PDP–11 FORTRAN–77 Installation Guide

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This manual describes the installation and verification procedures for FORTRAN–77 Version 5.4.

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Operating System and Version:	RSX–11M Version 4.4 or higher RSX–11M–PLUS Version 4.2 or higher Micro/RSX Version 4.2 or higher RSTS/E Version 9.6 or higher VAX–11 RSX Version 2.4 or higher with VMS Version 5.0 or higher
Software Version:	FORTRAN–77 Version 5.4

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Preface

This manual describes the procedure for installing and verifying FORTRAN–77 on the following systems:

- RSX–11M and RSX–11M–PLUS
- Micro/RSX
- RSTS/E
- VAX–11 RSX

Intended Audience

This manual is intended for the system manager or the privileged user responsible for installing the FORTRAN–77 compiler.

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Chapter 1

Introduction to Installing FORTRAN–77

PDP–11 FORTRAN–77 Version 5.4 offers new features and enhancements to PDP–11 users of FORTRAN–77. Before you can use the new version, you must install it on your system. This chapter provides information you need to perform the installation.

On each of the supported operating systems, FORTRAN–77 is installed with an automatic installation procedure. The installation procedure prompts you for information that you must supply to complete the installation.

If your operating system is RSX–11M/M–PLUS, or RSTS/E, the installation procedure in your distribution kit is an automatic installation procedure that is new in FORTRAN–77 Version 5.4. The new procedure, called Auto-Install, functions as follows:

- Automatically checks the installation files for a new version of itself or an update. If Auto-Install finds a new version or update, it asks you if you want to install it. If you respond YES, Auto-Install displays the commands needed to perform the installation or update. If you respond NO, Auto-Install issues a warning that this could cause installations to fail and reprompts you to perform the installation or update.
- Combines the installation and update procedures for all products. Auto-Install checks the update area to ensure that updates for the version being installed are applied to the product's installation files prior to performing the installation.

  For RSX, the update procedures for FORTRAN–77 are in directory LB:[246,200].

  For RSTS/E, the update procedures for FORTRAN–77 are normally in a directory with the logical name PATCH$.

NOTE

On RSX and RSTS systems, if no update files are found in the update area, you will receive the following message:

```
WARNING -- Update file not found, kit files
not updated, procedure continuing
```

This message is normal; it does not indicate an error.

- Creates the following log files of the installation in the user's login directory:

  AUTOIN.LOG, which contains the main installation procedure's dialogue.

  F77F77.LOG, which contains the FORTRAN–77 portion of the dialogue.

- Creates temporary work areas on the user's device and deletes them before the installation completes. If any of these remain after an installation, you may delete them. The temporary work areas are created as follows:

  On RSX:

  Auto-Install sets your default device and directory to your login device and directory. It then creates the work area in directory [367,100] on your login device.

  On RSTS/E:

  Auto-Install creates a directory with logical name AUTWRK$, which is normally the directory [0,80] on the system device, as the Auto-Install work area.

- Creates temporary files in the user's login directory and deletes them before the installation completes. If any remain after an installation, you may delete them. The names of the temporary files are:

CUSTOM.DAT	INSTAL.TMP	F77F77.SAV
UPDATE.DAT	AUTUPD.DAT	F77F77.TMP
ISTAT.DAT	F77F77.CFG	

- Allows its own installation files to remain on the system after it is installed. RSX stores Auto-Install files in [367,367] on the system device; RSTS/E stores them in the logical name directory AUTOIN$ (normally [0,80]). These files are needed to reinstall FORTRAN–77 and other products and are usually not deleted. If the files have been deleted, you can reinstall Auto-Install from the distribution kit.

  On RSX, the names and functions of the installation files are:

AUTOIN.CMD	Controls installations
PRODIN.CMD	Installs individual layered products
CUSTOM.CMD	Controls customization processes
CUSTOM.TSK	Customizes the configuration data file
UPDATE.CMD	Controls the updating of the configuration data file
UPDATE.TSK	Updates the configuration data file
PRDTBL.DAT	Lists products Auto-Install may support
INSTAL.DAT	Lists products installed by Auto-Install
DEFUPD.TSK	Updates the status of the configuration data file

  On RSTS/E the names and functions of the installation files are:

AUTOIN.COM	Controls installations
PRODIN.COM	Installs individual layered products
CUSTOM.COM	Controls customization processes
CUSTOM.TSK	Customizes the configuration data file
UPDATE.COM	Controls the updating of the configuration data file
UPDATE.TSK	Updates the configuration data file
PRDTBL.DAT	Lists products Auto-Install may support
INSTAL.DAT	Lists products installed by Auto-Install
DEFUPD.TSK	Updates the status of the configuration data file

- Stores FORTRAN–77 installation data files on the system after it is installed. On RSX the directory is *dev:*[246,246], where *dev* is specified during customization; on RSTS/E, the directory is FRTRN7$. Do not delete these files. If they are deleted, subsequent installations will fail unless they are performed from the distribution kit.
- Handles error messages as follows:

  Ignores WARNING messages

  Aborts the installation of a product if FATAL messages are received during the installation of the product

Chapter 2

Installing FORTRAN–77 on RSX–11M and RSX–11M–PLUS Operating Systems

This chapter explains how to install FORTRAN–77 on the RSX–11M and RSX–11M–PLUS operating systems. Prior to installing this version of the FORTRAN–77 compiler, perform the following steps:

1. Read this chapter, which contains information necessary for installing the compiler.
2. Read the release notes, which describe new features and known problems for this version of FORTRAN–77. For information on how to access the release notes, see Section 2.5.
3. Ensure that the RSX operating system is installed and functioning properly.
4. Ensure that your system meets the minimum software and hardware requirements for FORTRAN–77. See the Software Product Description (SPD) in your kit for a list of the minimum software and hardware requirements.
5. Choose the optional attributes for your compiler. See Section 2.1.1 for information on optional compiler attributes.

A FORTRAN–77 installation requires between 15 and 30 minutes to complete, depending on whether or not you choose to include resident libraries in the compiler. It may require additional time if you choose to set your own compiler attributes rather than accepting the defaults.

2.1 Preparing to Install the FORTRAN–77 Compiler

Unless you choose the default installation, you must choose optional attributes for your FORTRAN–77 compiler. Among the attributes you must choose are the default attributes for your compiler, the default setting for compile-time switches, and the FORTRAN–77 Object Time System (OTS) libraries, if any, that you wish to install. The following sections discuss these options in detail.

2.1.1 Default Compiler Attributes

The configuration data file contains questions and answers that determine the default compiler attributes. You can accept these defaults or, if you choose to customize your compiler, you can change them by answering questions in the installation dialogue. The file is called F77F77.CFG and is stored in directory [246,246] on the device you specify in answer to the question in the installation dialogue: "Where do you want to store the installation files?"

Note that no question exists on floating-point hardware; if floating-point hardware is on the system, the compiler uses it automatically. If your system does not have the floating-point hardware, your compiler cannot perform floating-point constant folding at compile time.

2.1.2 Default Setting for Compile-Time Switches

As explained previously, the contents of the configuration data file, whether customized or not, determine the default attributes of the FORTRAN–77 compiler. These default attributes determine the default setting of the compile-time switches. Whatever default attributes you choose for your compiler, you can override them at compilation time by means of compile-time switches. Table 2–1 lists and describes the compile-time switches. The *FORTRAN–77 User Manual* contains detailed information on these switches and their DIGITAL Command Language (DCL) equivalents.

NOTE

When you change the default of an MCR compile-time switch during the installation, the equivalent DCL qualifier also changes.

Table 2–1: Compile-Time Switches

Switch	Description
/CK	Checks array references to ensure that they are within the array address boundaries specified.
/CO:n	Accepts at least *n* continuation lines. Value of *n* can be 0 to 111_8.
/DB	Provides symbol table information for use by the Symbolic Debugger.
/DE	Compiles lines with the letter *D* in column 1.
/DS	Uses I- and D-space active page registers.
/EX	Accepts source text up to column 132_{10} of an input record.
/I4	Allocates 2 words for the default length of integer and logical variables.
/LA	Causes current switch specifications to be retained for subsequent compilations.
/LI:n	Determines content of listings: source and map or source, map, and generated code.
/OP	Produces optimized code.
/RO	Specifies pure code and data sections as read-only to allow code sharing in multiuser tasks.
/SP	Automatically prints the listing file.
/ST:xxx	Flags extensions to ANSI standard in source code.
/TR:xxx	Controls the amount of extra code included in the compiled output for use by the Object Time System during error traceback.
/WF:n	Determines the number of temporary disk work files to be used during compilation.
/WR	Enables compiler warning diagnostics.

2.1.3 FORTRAN–77 Object Time System (OTS) Resident Libraries

Use of the FORTRAN–77 Object Time System (OTS) memory-resident libraries may reduce the size of users' tasks and may lower FORTRAN–77's requirements for system resources. During the installation dialogue, you are asked, "Build resident library?". If you answer YES, you will be asked two additional questions regarding which libraries you wish to build. Your choices are the three File Control Services (FCS) libraries, F7FRES, F7FCLS, and F7SRES, and the Record Management Services (RMS) library F7RCLS. You can build as many as two resident libraries: the RMS library plus one of FCS libraries. You can omit either or both if you prefer.

Your answer to the "File Services?" question determines the libraries that you can build. You are asked to build an FCS library if you replied FCS or BOTH; you are asked to build an RMS library if you replied RMS or BOTH

2.2 Mounting the Distribution Medium

To install FORTRAN–77, perform the following steps:

1. Log in to a privileged account. The installation procedure generates a log file, which will remain in your default login directory after you complete the installation. Therefore, it is not essential to use a hard-copy terminal to produce a record of your installation session. However, some informative operating system messages are omitted from the log file; if you need a detailed record of the installation, you may prefer to use a hard-copy terminal.
2. Verify that no one on your system is performing an installation using Auto-Install.
3. Verify that no one else on your system is using a previously installed version of FORTRAN–77.
4. If Auto-Install is not already installed on your system, verify that you have 800 free blocks of contiguous storage space available for Auto-Install on the system device (specified by *sysdev* in the installation procedure.)
5. Verify that you have 2270 free blocks of storage space available on the system device. Of this, you need 400 contiguous blocks for the FORTRAN–77 task and 150 contiguous blocks apiece for each OTS memory-resident library (as many as 700 contiguous blocks in all).
6. Place your distribution medium in the drive.

   If your distribution medium is a disk, insert the disk in the drive and set the switch to the RUN position. Make certain that the READY light is on.

   If your distribution medium is tape, load the tape according to the instructions for your drive. Set the ONLINE/OFFLINE indicator to ONLINE and make certain that the READY light is on.

   If your distribution medium is a TK50 tape cartridge, insert the tape into the drive according to the instructions for the drive, and close the cartridge-release button on the drive. Press the LOAD button and make certain the LOAD light is on.

7. Allocate and mount the device. Disks and tapes must be mounted foreign. For more information about allocating and mounting devices, see the *RSX–11M/M–PLUS Command Language Manual*.

2.3 Installing and Verifying the FORTRAN–77 Compiler

FORTRAN–77 is installed using the Auto-Install software. If Version 1.1 or a higher version of Auto-Install has not been installed on your system, you must install it before attempting to install FORTRAN–77.

2.3.1 Installing Auto-Install

To install Auto-Install, you must invoke the Backup and Restore Utility (BRU). If BRU is not installed on your system, install it with the following command:

```
> INS $BRU RET
```

If BRU is available, invoke it with one of the following commands, according to the type of distribution medium you have purchased:

For Disks:

```
> BRU/UFD/NOI/NEW/IMAGE:RESTORE/BAC:AUT101.A indev: sysdev: RET
```

For Tapes:

```
> BRU/DENS:dens/REW/UFD/NOI/NEW/BAC:AUT101.A indev: sysdev: RET
```

Replace *indev* with the name of the device on which you allocated and mounted your distribution medium. Replace *sysdev* with the name of your system device. Tape users replace *dens* with the bit density used on the kit tape. See the *RSX–11M/M–PLUS Utilities Manual* for more information on the Backup and Restore Utility.

2.3.2 Invoking Auto-Install

You can invoke Auto-Install with any one of the following commands:

1. @sysdev:[367,367]AUTOIN.CMD
2. @sysdev:[367,367]AUTOIN.CMD F77
3. @sysdev:[367,367]AUTOIN.CMD indev:F77

Replace *sysdev* with the name of your system device. Replace *indev* with the name of the device on which you allocated and mounted your distribution medium. Press RETURN to execute the command.

If you use command 1, the installation dialogue begins with step 1 in the following section.

If you use command 2, the installation dialogue begins with step 2.

If you use command 3, the installation dialogue begins with step 2 and skips to step 4.

2.3.3 Installation Dialogue

This section describes the installation dialogue that appears on your screen. The text that follows each question explains the answers to the question. These explanations do not appear in the actual installation dialogue.

The default answer appears at the end of each question, enclosed in angle brackets (< >). In some cases, the text of the question shows possible alternative answers in angle brackets, followed by the default in angle brackets. You can accept the default answer by simply pressing RETURN. If you enter an explicit answer, whether equivalent to the default or not, you must press RETURN to complete it. If you want to exit Auto-Install at any point (thus terminating the installation procedure), type CTRL/Z.

Depending on how you invoked Auto-Install, you will enter the dialogue at step 1 or step 2.

1. `Which product(s) do you want to install?`

   In response to this prompt, type F77, which is the product name for FORTRAN–77. Press CTRL/Z to exit from Auto-Install at this point.

2. `Where are the update files located <sysdev:>?`

   If the update files are located on the system device (the *sysdev* default refers to the boot device), press RETURN. If the update files are not located on the system device, enter the name of the device on which they are located, including the colon (:). To exit from Auto-Install at this point, press CTRL/Z.

3. `Which device are the distribution files for F77 (F77) located on (include colon)?`

   If you are installing FORTRAN–77 from a distribution kit, specify the drive on which you allocated and mounted the distribution disk or tape. If you are installing from an account on your system (for example, reinstalling an existing installation), specify the name of the device on

which the source files are located. To exit from Auto-Install at this point, press CTRL/Z.

If you are installing from the distribution kit or have answered YES to the "Allow future customization of this file?" question during a previous installation, Auto-Install will issue the following question:

4. `Do you want to customize F77 (F77) (Y/N) <N>?`

   Type Y to customize your FORTRAN–77 installation.

   Type N or press RETURN if you do not wish to customize FORTRAN–77.

   The default compiler may fulfill your system requirements. However, you may be able to improve compiler performance by customizing the compiler.

   If you have already customized your compiler during a previous installation, or if you want the default configuration, type N or press RETURN. The installation procedure will then skip all other questions pertaining to customization.

If you choose to customize, you will be asked further questions. Press RETURN to accept the default answer; press CTRL/Y to abort customization; press CTRL/Z to exit from customization but retain any changes made so far; or type a new value. If a question has multiple choices for the answer, the choices will be listed in angle brackets (< >).

NOTE

The default answers given in angle brackets (and the explanations of the defaults) apply if you have not changed the configuration data file to customize the compiler. The defaults may be different if you have already customized the configuration data file. The answers you provide in this file become the default answers in the installation procedure, overriding the defaults shown in the questions.

```
Target device <LB:>?
```

Specify the target device (that is, the device where the compiler will reside after the installation).

```
Task directory <[3,54]>?
```

Specify the UIC of the directory on the target device where the compiler will reside after the installation. The default is [3,54] on RSX–11M–PLUS, as shown; the default is [1,54] on RSX–11M.

```
Where do you want to store the installation files <SY0:>?
```

This is the device on which the distribution files will be stored when the installation is complete. Press RETURN if you want to store them on your default login device. Otherwise, enter the name of another device followed by a colon (:). The installation files will be stored in directory [246,246] or this device.

```
Allow future customization of this file <YES>?
```

Answer NO only if you want to disallow future customizing of the compiler

```
Purge old versions of FORTRAN if installation is successful <YES>?
```

If you do not answer NO, previous versions of FORTRAN–77 will be purged. You may want to keep previous versions until you are satisfied that existing programs compile correctly on the new version.

```
Print release notes <NO>?
```

Answer YES if you want to print release notes on the system default printer during the installation.

```
Print log file <NO>?
```

Answer YES if you want to print the installation log on the system default printer during the installation.

```
Error message type <LONG, SHORT> <LONG>?
```

Your answer determines the form in which FORTRAN–77 error messages will be presented.

```
File services <FCS,RMS,BOTH> <BOTH>?
```

Specify FCS if you want FCS services but not RMS. Specify RMS if you want RMS services but not FCS. Default if you want both FCS and RMS services. Your response to this question determines which types of resident libraries you will be allowed to specify later in the installation dialogue.

```
Use alternate convert module <YES, NO> <NO>?
```

Answer YES if you want to include the alternate convert module. Note that the alternate convert module requires floating-point hardware on the system.

```
Build resident library <YES, NO> <NO>?
```

Answer YES if you intend to build at least one resident library. If you answer YES, you will see one or both of the following two questions (depending on how you answered the "File services" question).

```
FCS OTS resident library name <F7FRES,F7FCLS,F7SRES>
<F7FCLS>?
```

Choose one of the three FCS libraries, or allow the F7FCLS default.

```
Build RMS OTS resident library F7RCLS <YES,NO> <NO>?
```

Answer YES if you also want the RMS library, F7RCLS. Otherwise, the RMS library is omitted.

NOTE

On RSX–11M systems, if you receive an error indicating that Auto-Install was unable to install the libraries, check to see that a library partition was created at system generation. If no library partition exists, you must create one before retrying the installation.

```
Stack size (must never be less than 512 words) <1024>?
```

Defines the size of the SP stack.

```
Compiler's dynamic storage <3840>?
```

Defines the amount of resident memory used by the work file on a virtual memory system. If your operating system supports dynamic memory allocation, the size of the compiler's dynamic storage is determined by assigning your response to the EXTTSK Task Builder option. If dynamic memory allocation is not supported, the compiler will use all of the memory available on the partition.

```
Control section STACK1 (expression analyzer/common block definitions)
<1160>?
```

Defines the size of the control section STACK1. FORTRAN–77 uses STACK1 as the expression analyzer stack in pass 1 and for named common block definitions in later passes.

```
DO stack (nested DO/IF statements) <240>?
```

Defines the size of the control section DOSTK1, which FORTRAN–77 uses for nesting DO and IF statements.

```
Lines per page (plus 3 lines of heading) <octal value>
<67>?
```

Specifies the number of lines allowed on a page of the default printer. Note that you must express this as an octal value.

```
Printer line width <octal value> <204>?
```

Specifies the number of character positions across the width of a line on the default printer. Note that you must express this as an octal value.

```
Supersede output files <0=NO, 1=YES> <0>?
```

A value of 0 indicates the compiler should not supersede output listing and object files. A value of 1 allows superseding.

```
I- and D-Space support <0=NO, 1=YES> <1>?
```

A value of 1 indicates the compiler will generate object files that can be use to build I-space and D-space tasks. A value of 0 disallows this.

```
Octal/decimal Version numbers <0=Octal, 1=Decimal> <0>?
```

Specifies whether to maintain version numbers of FORTRAN-generated file in octal values or decimal values.

```
Reinitialize switches <0=NO, 1=YES> <0>?
```

Defines the default setting for the /LA switch.

```
Array subscript bounds checking <0=NO, 1=YES> <0>?
```

Defines the default setting for the /CK switch.

```
Number of continuation lines <octal value> <23>?
```

Defines the default setting for the CO:n switch.

```
Include debug lines <0=NO, 1=YES> <0>?
```

Defines the default setting for the /DE switch.

```
Default to INTEGER*4 values <0=NO, 1=YES> <0>?
```

Defines the default setting for the /I4 switch.

```
Listing <1=Source, 2=(Source,Map) 3=(Source,Map,Generated code)> <2>?
```

Defines the default setting for the /LI switch.

```
Read Only code sections <0=NO, 1=YES> <0>?
```

Defines the default setting for the /RO switch.

```
Spool listing <0=NO, 1=YES> <0>?
```

Defines the default setting for the /SP switch.

```
Trace <0=NONE, 1=NAMES, 3=BLOCKS 7=ALL> <3>?
```

Defines the default setting for the /TR:xxx switch.

```
Number of temporary files <Range 1-3> <2>?
```

Defines the default setting for the /WF:n switch.

```
Enable optional warnings <0=NO, 1=YES> <1>?
```

Defines the default setting for the /WR switch.

```
FORTRAN ANSI interpretation <0=FORTRAN-66, 1=FORTRAN-77> <1>?
```

Defines the default setting for the /F77 switch.

```
Standards checking <0=NONE, 1=SOURCE, 2=SYNTAX, 3=ALL> <0>?
```

Defines the default setting for the /ST:xxx switch.

```
Produce symbolic debugger information <0=NO, 1=YES> <0>?
```

Defines the default setting for the /DB switch.

```
Extend source line <0=NO (72 cols), 1=YES (132 cols)> <0>?
```

Defines the default setting for the /EX switch.

```
Code optimization <0=NO, 3=YES> <3>?
```

Defines the default setting for the /OP switch.

```
Do you want to customize F77 again <Y/N><NO>?
```

Type Y if you want to change any of your answers to the customization questions. If not, press RETURN or type N.

Once the contents of the configuration data file are complete, Auto-Install installs FORTRAN–77. Throughout the installation process, Auto-Install displays several informational messages. Following the installation, Auto-Install runs the Installation Verification Procedure (IVP) for FORTRAN–77.

2.3.4 Installation Verification Procedure

The Installation Verification Procedure (IVP) consists of two tests: one checks the compiler's ability to detect a compile-time error and another checks the ability of the Object Time System (OTS) to detect a run-time error. Both tests require floating point hardware. If the first test is successful, the following message is displayed on your terminal:

```
F77 -- ERROR 28-E Overflow while converting constant or constant expression
                  [I = 71347] in module F77TST at line 6

F77 -- 1 Error F77TST.FTN;1
```

If the second test is successful, the following message is displayed on your terminal:

```
NNNNNN  --  ERROR 73
  Floating zero divide
  at PC = xxxxxx
    in   "F77TST" at or after 6

 Where NNNNNN is the task name and xxxxxx is the actual program location
```

If these messages are not displayed on your terminal, an error has occurred in your installation.

On a machine without floating point hardware, the IVP issues different messages. You can check the installation by attempting to compile and run a user program.

When the IVP is complete and the installation is successful, the following message is displayed on your terminal:

```
Installation of F77 (F77) successful.
```

2.3.5 After the Installation

After the installation, it is useful to place certain commands in your system start-up command file, STARTUP.CMD, to ensure that certain functions performed during the installation are automatically performed again whenever the system is rebooted. These commands include the reinstallation of FORTRAN–77 and the resident libraries and the removal of any existing libraries of the same name as those being installed. The commands are as follows:

RSX–11M–PLUS:

```
INSTALL LB:[3,54]F77.TSK
REMOVE libraryname/REG
INSTALL LB:[1,1]libraryname/RON=yes
```

RSX–11M:

```
INSTALL LB:[1,54]F77.TSK
REMOVE libraryname
INSTALL LB:[1,1]libraryname
```

Replace *libraryname* with the names of the FCS and RMS resident librarie you wish to install. The FCS libraries are F7FRES, F7FCLS, and F7SRES The RMS library is F7RCLS.

For further information on these commands, see the *RSX–11M/M–PLUS MCR Operations Manual* or the *RSX–11M/M–PLUS Command Language Manual*.

2.4 Installation Files

Table 2–2 lists and describes the files left in the system directories as a result of the installation.

NOTE

FORTRAN–77 searches specific directories for the files it needs. If you move these files to a different location, be sure to restore the original directory configuration before installing an update. The installation procedure deletes intermediary files, so that the files remaining in [246,246] when the installation procedure is complete are those you will need for reinstalling FORTRAN–77.

Table 2–2 lists the files remaining on your target disk after installation. Do not delete any of these files; the compiler needs them to function properly. Do not modify files related to the resident libraries; the compiler requires the current versions.

Table 2–2: RSX–11M/M–PLUS FORTRAN–77 Files

Compiler Building Files		
File Name	**Location**	**File Purpose**
F7711M.ODL	[1,2]	Compiler overlay descriptor file
F77TKB.CMD	[1,2]	Compiler Task Builder (TKB) command file

Compiler-related Files		
File Name	**Location**	**File Purpose**
F77.TSK	[3,54][1]	Task image
F77COM.MSG	[1,2]	Compiler error-message file
F77REL.DOC	[1,2]	Release notes

[1]On RSX–11M operating systems this directory is [1,54].

(continued on next page)

Table 2–2 (Cont.): RSX–11M/M–PLUS FORTRAN–77 Files

Installation Verification Procedure Files		
File Name	**Location**	**File Purpose**

Installation Verification Procedure Files		
File Name	**Location**	**File Purpose**
F77IVP.CMD	[246,246]	IVP command file
F77TST.FTN	[246,246]	IVP test program

Object Time System (OTS) Files		
File Name	**Location**	**File Purpose**
F77FCS.OLB	[1,1]	FCS version of the OTS
F77RMS.OLB	[1,1]	RMS version of the OTS
F7711S.OBS	[1,1]	RSX–11S OTS

Optional Object Time System (OTS) Files		
File Name	**Location**	**File Purpose**
F77CVF.OBJ	[1,1]	Alternate OTS module for floating point
F77EIS.OBS	[1,1]	Alternate OTS modules for Extended Instruction Set (EIS) floating-point functions
F77NER.OBS	[1,1]	Alternate OTS modules for error reporting
F77NIO.OBS	[1,1]	Alternate OTS modules for I/O support
F77RAN.OBS	[1,1]	Alternate OTS modules for random numbers
FCS11M.ODL	[1,1]	Module to build an overlaid FCS OTS
PDFMAP.OBS	[1,1]	Module to map intrinsic functions
RMS11M.ODL	[1,1]	Module to build an overlaid RMS OTS

(continued on next page

Table 2–2 (Cont.): RSX–11M/M–PLUS FORTRAN–77 Files

Files for Building Resident Libraries		
File Name	**Location**	**File Purpose**
F7FCLS.BLD	[1,1]	Command file for clustered FCS OTS
F7FCLS.CMD	[1,1]	TKB command file for clustered FCS OTS
F7FCLS.MAC	[1,1]	File to tailor clustered FCS OTS
F7FRES.BLD	[1,1]	Command file for nonclustered FCS OTS
F7FRES.CMD	[1,1]	TKB command file for nonclustered FCS OTS
F7FRES.MAC	[1,1]	File to tailor nonclustered FCS OTS
F7SRES.BLD	[1,1]	Command file for FCS OTS linked with FCSFSL
F7SRES.CMD	[1,1]	TKB command file for FCS OTS linked with FCSFSL
F7SRES.MAC	[1,1]	File to tailor FCS OTS linked with FCSFSL
F7RCLS.BLD	[1,1]	Command file for clustered RMS OTS
F7RCLS.CMD	[1,1]	TKB command file for clustered RMS OTS
F7RCLS.MAC	[1,1]	File to tailor clustered RMS OTS

Resident Library Files		
File Name	**Location**	**File Purpose**
F77EP.MAC	[1,1]	File to build OTS resident libraries and vector
F77GBL.XCL	[1,1]	File to exclude FORTRAN OTS entry points
F77VEC.MAC	[1,1]	File helps build OTS resident library vector

(continued on next page)

Table 2–2 (Cont.): RSX–11M/M–PLUS FORTRAN–77 Files

Resident Library Files		
File Name	**Location**	**File Purpose**
F7RCLS.TSK	[1,1]	Task image for clustered RMS library
F7RCLS.STB	[1,1]	Symbol table definition file for clustered RMS library
F7FRES.TSK	[1,1]	Task image for nonclustered FCS library
F7FRES.STB	[1,1]	Symbol table definition file for nonclustered FCS file
F7FCLS.TSK	[1,1]	Task image for clustered FCS library
F7FCLS.STB	[1,1]	Symbol table definition file for clustered FCS library
F7SRES.TSK	[1,1]	Task image for FCS library linked with FCSFSL
F7SRES.STB	[1,1]	Symbol table definition file for FCS library linked with FCSFSL
FCS.MAC	[1,1]	File helps build FCS OTS resident library

See Chapter 1 for a list of Auto-Install files.

2.5 Accessing the Release Notes

The FORTRAN–77 release notes describe new features and known problems for this version of FORTRAN–77. To copy the release notes file from the distribution medium prior to installing FORTRAN–77, be sure that the Backup/Restore Utility (BRU) is installed and enter one of the following commands according to the distribution medium you have purchased:

For Disks:

```
> BRU/NOI/UFD/NEW/IMAGE:RESTORE/BAC:F77REL.BCK indev: outdev: RET
```

For Tapes:

```
> BRU/DENS:dens/BAC:F77REL.BCK/REW/NOI/UFD/NEW indev: outdev: RET
```

If necessary, you can install BRU with the following command:

```
>INS $BRU RET
```

Replace *indev* with the device on which your distribution medium is allocated and mounted. Replace *outdev* with the destination device. See the *RSX-11M/M-PLUS Utilities Manual* for more information on BRU. After you issue this command, you can use the PRINT command to print the release notes, which will be located in directory [367,100].

During the installation, Auto-Install automatically copies the release notes file from the distribution medium to directory [1,2] on your system disk and names it F77REL.DOC. If you accept the default installation or answer YES to the question during the installation dialogue "Print release notes?" Auto-Install prints the file for you.

2.6 Reinstalling FORTRAN–77 from an Existing Installation

Auto-Install allows you to reinstall FORTRAN–77 Version 5.4 from an existing installation. The reinstallation procedure differs according to the decisions you made during the previous installation. This section explains the differences.

When you reinstall the product, the installation procedure asks the question, "Which device are the distribution files for F77 (F77) located on (include colon)?" Your response should be the name of the device you specified during your previous installation in answer to the question, "Where do you want to store the installation files?" The installation dialogue then proceeds as it did during the previous installation.

If you have manually deleted installation files, you must use the distribution kit to reinstall the product. If you have deleted the configuration data file, F77F77.CFG, you must do a complete installation from the distribution kit.

If you have not deleted the configuration data file, you may use the current file by copying it to your login directory. Copy it from directory [246,246] on the device you named when answering the question, "Where do you want to store the installation files?" during your previous installation. This forces Auto-Install to overlook the configuration data file contained on the kit and to use your customized one. From this point, the installation proceeds with the customization and installation dialogue as it did previously.

Chapter 3

Installing on a MICRO/RSX System

To install FORTRAN–77 on a Micro/RSX system, use the Micro/RSX automatic installation procedure, OPTION.CMD. As this procedure executes, it displays prompts to which you must respond to install FORTRAN–77. This section explains how to use the OPTION installation procedure.

Before you invoke the installation procedure, complete the following steps:

1. Log in to a privileged account.
2. Verify that you have sufficient disk space to install FORTRAN–77. Your system requires 1760 blocks for installation.[1]
3. Verify that, within these 1760 blocks, you have 400 free blocks of contiguous storage for the FORTRAN–77 task and 150 free blocks of contiguous storage for each OTS library.
4. Note that installation should take approximately 5 to 15 minutes, depending on your system environment, your configuration, and the software options you select during installation.
5. Insert the F77 Version 5.4 RX50 diskette or TK50 tape into the drive. If you insert the F77 tape, you also need to press the LOAD button. (The LOAD button will blink slowly for about 15 seconds. Wait until the button stops blinking.)

Release notes are copied automatically as part of the installation procedure. You can read them online or print them after you complete installation. They reside in directory [1,2] and are called F77REL.DOC.

[1] This block-count specification refers to the disk space required on your system disk. The sizes are approximations; actual sizes may vary depending on your system environment, your configuration, and the software options you select during installation.

To invoke the installation procedure, you type a command. If you are an inexperienced FORTRAN–77 user, type the following standard command:

```
$ @OPTION RET
```

If you are an experienced FORTRAN–77 user, you may wish to modify the standard command in one of the following ways:

```
$ @OPTION /FULL RET
$ @OPTION /DISK RET
```

The /FULL switch allows diskette and tape users to conditionalize FORTRAN–77 during installation. You can specify a particular record access method rather than accepting the default that supplies both.

If you use the /FULL switch, you will be asked whether you want to install FORTRAN–77 to use File Control Services (FCS), Record Management Services (RMS), or both. See your Micro/RSX operating system documentation for more information on FCS and RMS record access methods.

The /DISK switch allows tape users to install FORTRAN–77 on a disk other than the system disk (LB:). For example, you can use an optional fixed disk, if you have one.

If you use the /DISK switch, the output disk you want to use must be spinning and mounted as a public device. You must also include two lines in the file LB:[1,2]STARTUP.CMD to ensure that this disk is mounted as a public device each time the system is started up. Insert the following lines immediately before the label .APP1:

```
.IF $$CLI EQ "MCR" MOU device:/SYS
.IF $$CLI EQ "DCL" MOUNT device:/SYSTEM
```

After you type the standard or a modified @OPTION command, OPTION displays its main menu.

If FORTRAN–77 is already installed on your system, you must type R to indicate that you want to remove the old version of FORTRAN–77. The installation command procedure displays the information you need to perform this operation. After the task has been removed, reinvoke OPTION.CMD by typing the standard or a modified @OPTION command.

When you are ready to install FORTRAN–77, type I to indicate that you want to install software. Then, follow the instructions displayed on your terminal.

OPTION.CMD installs FORTRAN–77 and runs the Installation Verification Procedure (IVP). The IVP is a program that tests features of FORTRAN–77 and ensures that it is working properly. If the IVP completes successfully, the following message displays:

```
FORTRAN--77 installation verification successful.
```

If the installation procedure completes successfully, the following message displays:

```
Procedure successfully completed.
```

When you see this message, FORTRAN–77 is ready for use. Be sure to remove your diskette or tape from the drive.

If the installation procedure fails, your system issues an error message that identifies the reason for failure. For explanations of error messages issued by the installation procedure and suggestions for possible user actions to fix problems, consult the appropriate operating system manual.

Table 3–1 lists the files you should see on your fixed disk after installation. Do not delete any of these files; the compiler needs them to function properly.

Table 3–1: Micro/RSX FORTRAN–77 Files

Compiler Files		
Name	**Location**	**Purpose**
F77.INS	[1,2]	Installation command file
F77.TSK	[3,54]	Task image
F77COM.MSG	[1,2]	Compiler error-message file
F77REL.DOC	[1,2]	Release notes
FORTRAN.HLP	[1,2]	Help file

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Table 3–1 (Cont.): Micro/RSX FORTRAN–77 Files

Installation Verification Procedure (IVP)Files		
Name	**Location**	**Purpose**
F77IVP.CMD	[246,246]	IVP command file
F77IVP.FTN	[246,246]	IVP test program
F77IVP.MST	[246,246]	IVP master file

Object Time System (OTS) Files		
File Name	**Location**	**File Purpose**
F77FCS.OLB	[1,1]	FCS version of the OTS
F77RMS.OLB	[1,1]	RMS version of the OTS
F7711S.OBS	[1,1]	RSX–11S OTS

Optional Object Time System Files		
Name	**Location**	**Purpose**
F77EIS.OBS	[1,1]	Alternate OTS modules for EIS functions
F77NER.OBS	[1,1]	Alternate OTS modules for error reporting
F77NIO.OBS	[1,1]	Alternate OTS modules for I/O support
F77RAN.OBS	[1,1]	Alternate OTS modules for random numbers
FCS11M.ODL	[1,1]	Module to build an overlaid FCS OTS
PDFMAP.OBS	[1,1]	Module to map intrinsic functions
RMS11M.ODL	[1,1]	Module to build an overlaid RMS OTS

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Table 3–1 (Cont.): Micro/RSX FORTRAN–77 Files

Resident Library Files		
Name	**Location**	**Purpose**
F7FCLS.STB	[1,1]	Symbol table for clustered FCS OTS
F7FCLS.TSK	[1,1]	Task file for clustered FCS OTS
F7RCLS.STB	[1,1]	Symbol table for clustered RMS OTS
F7RCLS.TSK	[1,1]	Task file for clustered RMS OTS

Chapter 4

Installing FORTRAN–77 on a RSTS/E Operating System

This chapter explains how to install FORTRAN–77 on the RSTS/E operating system. Prior to installing this version of the FORTRAN–77 compiler, perform the following steps:

1. Read this chapter, which contains information necessary for installing the compiler.
2. Read the release notes, which describe new features and known problems for this version of FORTRAN–77. For information on how to access the release notes, see Section 4.5 in this chapter.
3. Ensure that the RSTS/E operating system is installed and working properly.
4. Ensure that your system meets the minimum software and hardware requirements for FORTRAN–77. See the Software Product Description (SPD) for a list of the minimum software and hardware requirements.
5. Choose the optional attributes for your compiler. For information on optional compiler attributes, see Section 4.1.1 in this chapter.

A FORTRAN–77 installation requires between 15 and 30 minutes to complete, depending on whether or not you choose to include resident libraries in the compiler. It may require additional time if you choose to set your own compiler attributes rather than accepting the defaults.

4.1 Preparing to Install the FORTRAN–77 Compiler

Unless you accept the default installation, you must choose optional attributes for your FORTRAN–77 compiler. Among the attributes you must choose are the default compiler attributes, the default setting for compile-time switches, and the FORTRAN–77 Object Time System (OTS) resident libraries, if any, that you wish to install. The following sections discuss these options in detail.

4.1.1 Default Compiler Attributes

The configuration data file contains parameters and values that determine the default compiler attributes. You can accept these defaults or change them by answering the questions you will be asked in the installation dialogue if you choose to customize your compiler. The configuration data file is called F77F77.CFG. It is stored in the logical name FRTRN7$ location (FRTRN7$ specifies device and directory).

Note that no question exists on floating-point hardware; if floating-point hardware is on the system, the compiler uses it automatically. If your system does not have the floating-point hardware, your compiler cannot perform floating-point constant folding at compile time.

Section 4.3.3 shows the dialogue for customizing the configuration data file.

4.1.2 Default Setting for Compile-Time Switches

As explained previously, the contents of the configuration data file, whether customized or not, determine the default attributes of the FORTRAN–77 compiler. These default attributes determine the default settings of the compile-time switches. Whatever default attributes you choose for your compiler, you can override them at compilation time by means of the compile-time switches.

Table 4–1 lists and describes the compile-time switches. The *PDP–11 FORTRAN–77 User's Guide* contains detailed information on these switches and their DIGITAL Command Language (DCL) equivalents.

NOTE

When you change a CCL compile-time switch during the installation, the equivalent DCL qualifier also changes.

Table 4–1: Compile-Time Switches

Switch	Description
/CK	Checks array references to ensure that they are within the array address boundaries specified.
/CO:n	Accepts at least *n* continuation lines. Value of *n* can be 0 to 111_8.
/DB	Provides symbol table information for use by the Symbolic Debugger.
/DE	Compiles lines with the letter *D* in column 1.
/DS	Uses I- and D-space active page registers.
/EX	Accepts source text up to column 132_{10} of an input record.
/I4	Allocates 2 words for the default length of integer and logical variables.
/LA	Causes current switch specifications to be retained for subsequent compilations.
/LI:n	Determines content of listings: source and map or source, map, and generated code.
/OP	Produces optimized code.
/RO	Specifies pure code and data sections as read-only to allow code sharing in multiuser tasks.
/SP	Automatically prints the listing file.
/ST:xxx	Flags extensions to ANSI standard in source code.
/TR:xxx	Controls the amount of extra code included in the compiled output for use by the Object Time System during error traceback.
/WF:n	Determines the number of temporary disk work files to be used during compilation.
/WR	Enables compiler warning diagnostics.

4.1.3 FORTRAN–77 Object Time System (OTS) Resident Libraries

Use of the FORTRAN–77 Object Time System (OTS) memory-resident libraries may reduce the size of users' tasks and may lower FORTRAN–77's requirements for system resources. During the installation dialogue, you are asked, "File services?" You reply either RMS, FCS, or BOTH to that question. Your reply determines your options when you are later asked, "Build resident library?"

On RSTS/E, there are two resident libraries you can build: the RMS clustered resident library (F7RCLS) and the FCS resident library (F7FRES). You can build the RMS library if you responded either RMS or BOTH to the "File services?" question. Similarly, you can build the FCS library if you responded either FCS or BOTH.

4.2 Mounting the Distribution Medium

To prepare for the installation of FORTRAN–77, perform the following steps:

1. Log in to a privileged account. The installation procedure generates a log file, which will remain in your default login area after you complete the installation. Therefore, it is no longer essential to use a hard-copy terminal to produce a record of your installation session.
2. Verify that no one else on your system is performing an installation using Auto-Install.
3. Verify that no one on your system is using a previously installed version of FORTRAN–77.
4. If Auto-Install is not already installed on your system, verify that you have 750 free blocks of contiguous storage space available for Auto-Install.
5. Verify that you have 2270 free blocks of storage space available on the system device. Of this, you need 400 contiguous blocks for the FORTRAN–77 task and 160 contiguous blocks apiece for each OTS memory-resident library (as many as 720 contiguous blocks in all).
6. Place your distribution medium in the drive.

   If your distribution medium is a disk, insert the disk in the drive and set the switch to the RUN position. Ensure that the READY light is on.

   If your distribution medium is tape, load the tape according to the instructions for the drive. Set the ONLINE/OFFLINE indicator to ONLINE and ensure that the READY light is on.

   If your distribution medium is a TK50 tape cartridge, insert the tape into the drive according to the instructions for the drive, and push down the cartridge-release handle on the drive. Press the LOAD button and ensure that the LOAD light is on.

4.3 Installing and Verifying the FORTRAN–77 Compiler

FORTRAN–77 is installed using the Auto-Install software. If Auto-Install (Version 1.1 or higher) has not been installed on your system, you must install it before installing FORTRAN–77.

4.3.1 Installing Auto-Install

To install Auto-Install, type the following command:

```
$ RESTORE/REPLACE/ACCOUNT/END=NODISMOUNT indev:[1,2]AUT101.A
AUTOIN$:*.* RET
```

Replace *indev* with the name of the device (diskette or tape) on which you physically mounted your distribution medium.

4.3.2 Invoking Auto-Install

You can invoke Auto-Install with any one of the following commands:

1. @AUTOIN$:AUTOIN.COM
2. @AUTOIN$:AUTOIN.COM F77
3. @AUTOIN$:AUTOIN.COM indev:F77

Replace *indev* with the name of the device on which you physically mounted your distribution medium. Press RETURN to execute the command.

If you use command 1, the installation dialogue begins with step 1 in the following section.

If you use command 2, the installation dialogue begins with step 2.

If you use command 3, the installation dialogue begins with step 2 and skips to step 4.

4.3.3 Installation Dialogue

This section describes the installation dialogue that appears on your screen. The text that follows each question explains the answers to the question. These explanations do not appear in the actual installation dialogue.

The default answer appears at the end of each question, enclosed in angle brackets (< >). In some cases the text of the question shows valid answers in angle brackets, followed by the default in angle brackets. You can accept the default answer by by simply pressing RETURN. If you enter an explicit answer, whether equivalent to the default or not, you must press RETURN to complete it. If you want to exit Auto-Install at any point (thus terminating the installation procedure), type CTRL/Z.

Depending on how you invoked Auto-Install, you will enter the dialogue at step 1 or step 2.

1. `Which product(s) do you want to install?`

   In response to this prompt, type F77, which is the product name for FORTRAN–77. Press CTRL/Z to exit from Auto-Install at this point.

2. `Where are the update files located <PATCH$:>?`

   If the name of the patch account is PATCH$, press RETURN. If the patch account is not named PATCH$, enter the correct name, including the colon (:). To exit from Auto-Install at this point, press CTRL/Z.

3. `Which device are the distribution files for F77 (F77) located on (include colon)?`

   If you are installing FORTRAN–77 from a distribution kit, specify the drive on which you allocated and mounted the distribution disk or tape. If you are installing from an account on your system (for example, reinstalling an existing installation), specify FRTRN7$:. To exit from Auto-Install at this point, press CTRL/Z.

   If you are installing from the distribution kit or have answered YES to the "Allow future customization of this file?" question during a previous installation, Auto-Install will issue the following question:

4. `Do you want to customize F77 (F77) (Y/N) <N>?`

   Type Y to customize your FORTRAN–77 installation.

   Type N or press RETURN if you do not wish to customize FORTRAN–77.

   The default compiler may fulfill your system requirements. However, you may be able to improve compiler performance by customizing the compiler.

   If you have already customized your compiler during a previous installation, or if you want the default configuration, type N or press RETURN. The installation procedure will then skip all other questions pertaining to customization.

If you choose to customize, you will be asked further questions. Press RETURN to accept the default answer; press CTRL/Y to abort customization; press CTRL/Z to exit from customization but retain any changes made so far; or type a new value. If a question has multiple choices for the answer, the choices will be listed in angle brackets (< >).

NOTE

The default answers given in angle brackets (and the explanations of the defaults) apply if you have not changed the configuration data file to customize the compiler. The defaults may be different if you have already customized the configuration data file. The answers you provide in this file become the default answers in the installation procedure, overriding the defaults shown in the questions.

```
Target device <SY:>?
```

Specify the target device, (that is, the device where the compiler will reside after the installation).

```
Task directory <[1,2]>?
```

Specify the directory in which you want the compiler tasks to reside after the installation.

```
Allow future customization of this file <YES>?
```

Answer NO only if you want to disallow future customizing of the compiler.

```
Print release notes <NO>?
```

Answer YES if you want to print release notes on the system default printer during the installation.

```
Print log file <NO>?
```

Answer YES if you want to print the installation log on the system default printer during the installation.

```
Error message type <LONG, SHORT> <LONG>?
```

Your answer determines the form in which FORTRAN–77 error messages will be presented.

```
File services <FCS,RMS,BOTH> <BOTH>?
```

Specify FCS if you want FCS services but not RMS. Specify RMS if you want RMS services but not FCS. Default if you want both FCS and RMS services. Your response to this question determines which types of resident libraries you will be allowed to specify later in the installation dialogue.

```
Use alternate convert module <YES, NO> <NO>?
```

Answer YES if you want to include the alternate convert module. Note that the alternate convert module requires floating-point hardware on the system.

```
Build resident library <YES, NO> <NO>?
```

Answer YES if you intend to build at least one resident library. If you reply YES to this question, you will see either or both of the following two questions, depending on how you replied to the previous "File services?" question.

```
Build RMS clustered resident library <YES,NO> <NO>?

Build FCS resident library <YES,NO> <NO>?
```

Answer YES to each question if you want to include the indicated library in the compiler.

```
Stack size (must never be less than 512 words) <1024>?
```

Defines the size of the SP stack.

```
Compiler's dynamic storage <3840>?
```

Defines the amount of resident memory used by the work file on a virtual memory system. If your operating system supports dynamic memory allocation, the size of the compiler's dynamic storage is determined by assigning your response to the EXTTSK Task Builder option. If dynamic memory allocation is not supported, the compiler will use all of the memory available on the partition.

```
Control section STACK1 (expression analyzer/common block definitions)
<1160>?
```

Defines the size of the control section STACK1. FORTRAN–77 uses STACK1 as the the expression analyzer stack in pass 1 and for named common block definitions in later passes.

```
DO stack (nested DO/IF statements) <240>?
```

Defines the size of the control section DOSTK1, which FORTRAN–77 uses for nesting DO and IF statements.

```
Lines per page (plus 3 lines of heading) <octal value>
<67>?
```

Specifies the number of lines allowed on a page of the default printer. Note that you must express this as an octal value.

```
Printer line width <octal value> <204>?
```

Specifies the number of character positions across the width of a line on the default printer. Note that you must express this as an octal value.

```
Supersede output files <0=NO, 1=YES> <0>?
```

A value of 0 indicates the compiler should not supersede output listing and object files. A value of 1 allows superseding.

```
I- and D-Space support <0=NO, 1=YES> <1>?
```

A value of 1 indicates the compiler will generate object files that can be used to build I-space and D-space tasks. A value of 0 disallows this.

```
Reinitialize switches <0=NO, 1=YES> <0>?
```

Defines the default setting for the /LA switch.

```
Array subscript bounds checking <0=NO, 1=YES> <0>?
```

Defines the default setting for the /CK switch.

```
Number of continuation lines <octal value> <23>?
```

Defines the default setting for the CO:x switch.

```
Include debug lines <0=NO, 1=YES> <0>?
```

Defines the default setting for the /DE switch.

```
Default to INTEGER*4 values <0=NO, 1=YES> <0>?
```

Defines the default setting for the /I4 switch.

```
Listing <1=Source, 2=(Source,Map) 3=(Source,Map,Generated code)> <2>?
```

Defines the default setting for the /LI switch.

```
Read Only code sections <0=NO, 1=YES> <0>?
```

Defines the default setting for the /RO switch.

```
Spool listing <0=NO, 1=YES> <0>?
```

Defines the default setting for the /SP switch.

```
Trace <0=NONE, 1=NAMES, 3=BLOCKS 7=ALL> <3>?
```

Defines the default setting for the /TR:xxx switch.

```
Number of temporary files <Range 1-3> <2>?
```

Defines the default setting for the /WF:n switch.

```
Enable optional warnings <0=NO, 1=YES> <1>?
```

Defines the default setting for the /WR switch.

```
FORTRAN ANSI interpretation <0=FORTRAN-66, 1=FORTRAN-77> <1>?
```

Defines the default setting for the /F77 switch.

```
Standards checking <0=NONE, 1=SOURCE, 2=SYNTAX, 3=ALL> <0>?
```

Defines the default setting for the /ST:xxx switch.

```
Produce symbolic debugger information <0=NO, 1=YES> <0>?
```

Defines the default setting for the /DB switch.

```
Extend source line <0=NO (72 cols), 1=YES (132 cols)> <0>?
```

Defines the default setting for the /EX switch.

```
Code optimization <0=NO, 3=YES> <3>?
```

Defines the default setting for the /OP switch.

```
Do you want to customize F77 again <Y/N><NO>?
```

Type Y if you want to change any of your answers to the customization questions. If not, press RETURN or type N.

Once the contents of the configuration data file are complete, Auto-Install installs FORTRAN–77. Throughout the installation process, Auto-Install displays several informational messages. Following the installation, Auto-Install runs the Installation Verification Procedure (IVP) for FORTRAN–77.

4.3.4 Installation Verification Procedure

The Installation Verification Procedure (IVP) consists of two tests: one checks the compiler's ability to detect a compile-time error and another checks the ability of the Object Time System (OTS) to detect a run-time error. Both tests require floating point hardware. If the first test is successful, the following message is displayed on your terminal:

```
F77 -- ERROR 28-E Overflow while converting constant or constant expression
                  [I = 71347] in module F77TST at line 6

F77 -- 1 Error F77TST.FTN;1
```

If the second test is successful, the following message is displayed on your terminal:

```
NNNNNN  --  ERROR 73
  Floating zero divide
  at PC = xxxxxx
    in   "F77TST" at or after 6

 Where NNNNNN is the task name and xxxxxx is the actual program location
```

If these messages are not displayed on your terminal, an error has occurred in your installation.

On a machine without floating point hardware, the IVP issues different messages. You can check the installation by attempting to compile and run a user program.

When the IVP is complete and the installation is successful, the following message is displayed on your terminal:

```
Installation of F77 (F77) successful.
```

4.3.5 Installing Resident Libraries

If you plan to install a FORTRAN–77 resident library, you must first remove any old ones that may be installed. To do so, use the REMOVE command as follows:

```
$ REMOVE/LIBRARY name RET
```

To install the new resident libraries, use the INSTALL command as follows:

```
$ INSTALL/LIBRARY LB:name [/qualifier[,s]] RET
```

In these commands, replace *name* with the name of the FCS or RMS library (F7FRES for FCS, F7RCLS for RMS).

For further information on these commands, see the *RSTS/E System Manager's Guide*.

4.3.6 Start-Up Control File

After installing FORTRAN–77, use a text editor to modify the start-up control file (START.COM) in your operating system to include the following UTILITY command. This command will then be defined at the beginning of each time-sharing session:

```
DEFINE/COMMAND/SYSTEM F77 dev:[x,y]F77.TSK
```

where dev: is the value established by the "Target device?" question and [x,y] is the value established by "Task directory?" If you do not change the configuration data file defaults, the command is:

```
DEFINE/COMMAND/SYSTEM F77 SY:[1,2]F77.TSK
```

If you plan to use one of the FORTRAN–77 resident libraries, you can add the INSTALL commands for installing them to this file. These commands are described in the *RSTS/E System Manager's Guide*.

4.4 Installation Files

Table 4–2 lists and describes the files stored during installation. These files are necessary to the compiler. Deleting them will cause the compiler to malfunction. Do not modify the resident library-related files; the compiler requires the current versions.

NOTE

After installation, FORTRAN–77 causes specific directories to be searched for the files it needs. If you move these files to a different location, be sure to restore the original directory configuration before installing a subsequent update. The installation procedure deletes intermediary files, so that the files remaining in FRTRN7$ upon installation completion are those you will need for rebuilding FORTRAN–77.

Table 4–2: RSTS/E FORTRAN–77 Files

Compiler Building Files		
File Name	**Location**	**File Purpose**
F77RST.ODL	[1,2]	Compiler overlay descriptor file
F77RST.CMD	[1,2]	Compiler TKB command file

(continued on next page)

Table 4–2 (Cont.): RSTS/E FORTRAN–77 Files

Compiler Files		
Name	**Location**	**Purpose**
F77.TSK	[1,2]	Task image
F77COM.MSG	[1,2]	Compiler error-message file
F77REL.DOC	[1,2]	Release notes

Installation Verification Procedure Files (IVP)		
Name	**Location**	**Purpose**
F77IVP.COM	FRTRN7$:	IVP command file
F77TST.FTN	FRTRN7$:	IVP test program

Object Time System (OTS) Files		
Name	**Location**	**Purpose**
F77FCS.OLB	[1,1]	FCS version of the OTS
F77RMS.OLB	[1,1]	RMS version of the OTS
F7711S.OBS	[1,1]	RSX–11S OTS

Optional Object Time System (OTS) Files		
Name	**Location**	**Purpose**
F77CVF.OBJ	[1,1]	Alternate OTS module for floating point
F77EIS.OBS	[1,1]	Alternate OTS modules for EIS functions
F77NER.OBS	[1,1]	Alternate OTS modules for error reporting
F77NIO.OBS	[1,1]	Alternate OTS modules for I/O support

(continued on next page)

Table 4–2 (Cont.): RSTS/E FORTRAN–77 Files

Optional Object Time System (OTS) Files		
Name	**Location**	**Purpose**
F77RAN.OBS	[1,1]	Alternate OTS modules for random numbers
FCS11M.ODL	[1,1]	Module to build an overlaid FCS OTS
PDFMAP.OBS	[1,1]	Module to map intrinsic functions
RMS11M.ODL	[1,1]	Module to build an overlaid RMS OTS

Files for Building Resident Libraries		
Name	**Location**	**Purpose**
F7FRES.BLD	[1,1]	Command file for nonclustered FCS OTS
F7FRES.CMD	[1,1]	TKB command file for nonclustered FCS OTS
F7FRES.MAC	[1,1]	File to tailor nonclustered FCS OTS
F7RCLS.BLD	[1,1]	Command file for clustered RMS OTS
F7RCLS.CMD	[1,1]	TKB command file for clustered RMS OTS
F7RCLS.MAC	[1,1]	File to tailor clustered RMS OTS

Resident Library-Related Files		
Name	**Location**	**Purpose**
F7RCLS.LIB	[1,1]	Clustered RMS library
F7RCLS.TSK	[1,1]	Task image for clustered RMS library
F7RCLS.STB	[1,1]	Symbol table definition file for clustered RMS library
F7FRES.LIB	[1,1]	Nonclustered RMS library
F7FRES.TSK	[1,1]	Task image for nonclustered FCS library
F7FRES.STB	[1,1]	Symbol table definition file for nonclustered FCS file

(continued on next page)

Table 4–2 (Cont.): RSTS/E FORTRAN–77 Files

Resident Library-Related Files		
Name	**Location**	**Purpose**
F77EP.MAC	[1,1]	File to build OTS resident libraries and vector
F77GBL.XCL	[1,1]	File to exclude FORTRAN OTS entry points
F77VEC.MAC	[1,1]	File helps build OTS resident library vector
FCS.MAC	[1,1]	File helps build FCS OTS resident library

See Chapter 1 for a list and description of the Auto-Install files.

4.5 Accessing the Release Notes

The FORTRAN–77 release notes describe new features and known problems for this version of FORTRAN–77. To copy the release notes file from the distribution medium prior to installing FORTRAN–77, enter the following command:

```
$ RESTORE/REPLACE/END=NODISMOUNT indev:[1,2]F77REL.BCK
FRTRN7$:*.* RET
```

Replace *indev* with the device on which your distribution medium is allocated and mounted. Once you have copied the release notes file to your login directory, you can use the PRINT command to print it.

Auto-Install also automatically copies the release notes file from the distribution medium to directory [1,2] and names it F77REL.DOC.

If you accept the default installation or answer YES to the question in the customization portion of the installation dialogue,"Print the release notes automatically?" Auto-Install prints the release notes file.

4.6 Reinstalling FORTRAN–77 from an Existing Installation

Auto-Install allows you to reinstall FORTRAN–77 Version 5.4 from an existing installation. The reinstallation procedure differs according to the decision you made during the previous installation. This section explains the differences.

When you reinstall the product, the installation procedure asks the question "Which device are the distribution files for F77 (F77) located on (include colon)?" Your response should be FRTRN7$:. The installation dialogue then proceeds as it did during the previous installation.

If you have manually deleted installation files, you must use the distribution kit to reinstall the product.

If you have deleted the configuration data file, F77F77.CFG, you must do a complete installation from the distribution kit. If you have not deleted the configuration data file, you may use the current file by copying it to your login directory from FRTRN7$:. This forces Auto-Install to overlook the configuration data file contained on the kit and to use your customized one. From this point, the installation procedure proceeds as it did previously.

Chapter 5

Installation on VMS with VAX–11 RSX

This chapter describes how to install the PDP–11 FORTRAN–77 on VAX–11 RSX using VMSINSTAL.

VMSINSTAL is the command procedure that installs PDP–11 FORTRAN–77 on your VAX–11 RSX system. As the command procedure executes, it displays questions regarding installation options. This section explains these questions, their answers, and other steps you must take to install FORTRAN–77.

Default settings are provided for all the questions. If you want to accept a default, press RETURN. Otherwise, type your reply and press RETURN.

Before you invoke VMSINSTAL, do the following:

1. Log in to the system account.
2. Be sure the logical name SYS$DISK is assigned to the disk that contains the current version of VMS. This disk also contains the command procedure that initiates the new installation or update procedure. Note that SYS$DISK should not be SYS$SYSTEM.
3. Alter your system so that it is operating in standalone mode. This way, other user activity will not interfere with your installation.
4. Verify that you have sufficient disk space to install and use FORTRAN–77. Your system requires 2500 blocks for installation; it requires 1400 blocks for permanent use.[1]
5. Verify that, within these blocks, you have 400 free blocks of contiguous storage for the FORTRAN–77 task and 150 free blocks of contiguous storage for each OTS library.

[1] This block-count specification refers to the disk space required on your system disk. The sizes are approximations; actual sizes may vary depending on your system environment, your configuration, and the software options you select during installation.

6. Note that installation should take approximately 20–30 minutes, depending on your system environment, your configuration, and the software options you select during installation.
7. Issue the following command:

```
$ SET DEFAULT SYS$UPDATE RET
```

Release notes are copied automatically as part of the installation procedure. You can retrieve any release notes copied from the SYS$HELP directory. During the installation you will receive a prompt asking if you want to print the release notes and how many copies you want to print.

After you have completed these steps, you are ready to invoke the installation procedure. Type the following command:

```
$ @VMSINSTAL FOR77PDP054 dev: RET
```

Replace *dev* with the device in which you placed your distribution kit.

The installation procedure first checks to ensure that you are running it in standalone mode. If you are not doing so, VMSINSTAL issues a warning message that identifies the active processes on your system. It also asks if you want to continue.

```
Do you want to continue anyway [NO]?
```

If you want to install FORTRAN–77 in standalone mode, press RETURN. The installation procedure stops, so you can reconfigure your system and reinvoke VMSINSTAL.

If you want to install FORTRAN–77 while processes are active on your system, type YES and press RETURN.

VMSINSTAL then asks you if you are satisfied with the backup of your system disk.

```
Are you satisfied with the backup of your system disk [YES]?
```

If you are not satisfied, type NO and press RETURN. VMSINSTAL will abort, and you can then backup your system disk. If you are satisfied, press RETURN.

After you have accepted the backup of your system disk, the following message displays:

```
Please mount the first volume of the set on dev:

Are you ready?
```

Place the first volume of your distribution kit in a free drive. Then, answer YES and press RETURN to proceed. If you answer NO, VMSINSTAL will abort.

VMSINSTAL confirms that the distribution volume has been mounted; then, the following messages appear:

```
The following products will be processed:

FOR77PDP V5.4

Beginning installation of FOR77PDP V5.4 at hh:mm

%VMSINSTAL-I_RESTORE, Restoring produce to saveset A...
```

For each additional volume of your distribution kit, the installation procedure displays the following message:

```
%BACKUP-I-READYREAD, mount volume n on dev: for reading
Enter "Yes" when ready:
```

Place each volume in a free drive. Type YES and press RETURN. VMSINSTAL recognizes when you have mounted the correct number of volumes for your system and moves to the next step in installation. If you do not mount the correct number, VMSINSTAL aborts.

VMSINSTAL next checks your version of VAX–11 RSX. Installation halts if your system runs a version that is too old. If VAX–11 RSX Version 2.4 or higher has been installed, VMSINSTAL displays the following message:

```
%ANALYZE-I-ERRORS, VMI$ROOT:[SYSEXE]RSX.EXE;11          0 errors
%FOR&&DPD-I-RSXINSTALLED, The version of VAX--11 RSX installed is
   VAXRSX V2.3
```

The next prompt displays five release notes options from which you can make a selection.

```
1.  Display release notes
2.  Print release notes
3.  Both 1 and 2
4.  Copy release notes to SYS$HELP
5.  Do not display, print, or copy release notes

Select option [2]: 2
```

The effects of these options are as follows:

1. Option 1 displays the release notes immediately on your screen. You can terminate the display of the release notes at any time by pressing CTRL/C. When you have finished, VMSINSTAL copies the release notes to SYS$HELP.

2. Option 2 prompts you for a queue name, as follows:

```
Queue name [SYS$PRINT]:
```

   You can either specify a queue name and press RETURN, or press RETURN to send the file to the default output print device. When printing has finished, VMSINSTAL copies the release notes to SYS$HELP.

3. Option 3 displays the release notes, prints them, and then copies then to SYS$HELP.
4. Option 4 copies the release notes to SYS$HELP, but does not print or display them.
5. Option 5 does not print, display, or copy the release notes in this step. However, the release notes will be copied to SYS$HELP later during tl installation procedure.

Next, VMSINSTAL displays the following prompt:

```
Do you want to continue the installation [NO]?: YES
```

If you want to continue the installation, type YES and press RETURN. If you type NO or press RETURN, VMSINSTAL discontinues the installatior

The next prompt asks you to enter information concerning product licensir

```
Product:          PDP11-FORTRAN77
Producer:         DEC
Version:          5.4
Release Date:     31-October-1990

Does this product have an authorization key registered and loaded?: Y
```

This prompt refers to the Product Authorization Key (PAK) that is provided in the PDP–11 FORTRAN–77 kit. You must verify that PDP–11 FORTRAN–77 has been registered correctly. If you have registered PDP–1 FORTRAN–77 using the PAK, type YES. If you have not, type NO or simp press RETURN. As a result, VMSINSTAL will discontinue the installation.

The next prompt you receive asks the following:

```
Do you want to purge files replaced by this installation [YES]?
```

If you do not want to save any of the files from the previous version of FORTRAN–77, press RETURN. The files will be deleted during the installation procedure. However, if you want to save any files from the previous version, type NO.

VMSINSTAL asks if you want to perform the Installation Verification Procedure (IVP).

```
Do you want to run the IVP after the installation [YES]?
```

The IVP is a program that tests features of the FORTRAN–77 compiler and its OTS to ensure that they are working properly. It should be run after each FORTRAN–77 installation.

If you accept the default, VMSINSTAL begins the IVP as soon as it completes installation. If you type NO, VMSINSTAL stops after installation.

When you answer the IVP prompt, VMSINSTAL completes installation. Informational messages appear on your screen as VMSINSTAL finishes each step.

If the IVP runs, output from it displays on your screen. When the IVP has completed successfully, VMSINSTAL displays a message informing you whether or not the installation was successful. After the IVP finishes running, you should terminate the installation procedure.

To terminate the installation procedure, enter EXIT in response to the following prompt:

```
Products:
```

If you are using the console device, VMSINSTAL displays the following message:

```
Please mount the console volume on dev:
Are you ready?
```

Mount the console volume in the console drive and type YES to continue. A message confirming the mounting of the console volume is displayed.

VMSINSTAL then signals termination with the following message:

```
VMSINSTAL procedure done at hh:mm
```

If this installation is successful, PDP–11 FORTRAN–77 is ready for your use when the installation procedure is complete.

If the installation is not successful, consult the *Guide to VAX/VMS Software Installation* for possible causes of the failure.

Table 5–1 lists the files you should see on your target disk after installation. Do not delete any of these files; the software needs them to function. Do not modify the resident library-related files; the software requires the current versions.

Table 5–1: VAX–11 Version 2.4 RSX FORTRAN–77 Software Components

Compiler-related Files		
File Name	**Location**	**File Purpose**
F77.EXE	[1,54]	Task image
F77COM.MSG	[1,2]	Compiler error-message file
F77REL.DOC	[SYSHLP]	Release notes

IVP-related Files		
File Name	**Location**	**File Purpose**
F77IVP.COM	[SYSHLP]	IVP command file
F77TST.FTN	[SYSHLP]	IVP test program

OTS-related Files		
File Name	**Location**	**File Purpose**
F77FCS.OLB	[1,1]	FCS version of the OTS
F77RMS.OLB	[1,1]	RMS version of the OTS
F7711S.OBS	[1,1]	RSX–11S OTS

Optional OTS-related Files		
File Name	**Location**	**File Purpose**
F77CVF.OBJ	[1,1]	Alternate OTS module for floating point
F77EIS.OBS	[1,1]	Alternate OTS modules for EIS functions
F77NER.OBS	[1,1]	Alternate OTS modules for error reporting
F77NIO.OBS	[1,1]	Alternate OTS modules for I/O support

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Table 5–1 (Cont.): VAX–11 Version 2.4 RSX FORTRAN–77 Software Components

Optional OTS-related Files		
File Name	**Location**	**File Purpose**
F77RAN.OBS	[1,1]	Alternate OTS modules for random numbers
FCS11M.ODL	[1,1]	Module to build an overlaid FCS OTS
PDFMAP.OBS	[1,1]	Module to map intrinsic functions
RMS11M.ODL	[1,1]	Module to build an overlaid RMS OTS

Files Building Resident Libraries		
File Name	**Location**	**File Purpose**
F7FCLS.BLD	[1,1]	Command file for clustered FCS OTS
F7FCLS.CMD	[1,1]	TKB command file for clustered FCS OTS
F7FCLS.MAC	[1,1]	File to tailor clustered FCS OTS
F7FRES.BLD	[1,1]	Command file for nonclustered FCS OTS
F7FRES.CMD	[1,1]	TKB command file for nonclustered FCS OTS
F7FRES.MAC	[1,1]	File to tailor nonclustered FCS OTS
F7RCLS.BLD	[1,1]	Command file for clustered RMS OTS
F7RCLS.CMD	[1,1]	TKB command file for clustered RMS OTS
F7RCLS.MAC	[1,1]	File to tailor clustered RMS OTS

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Table 5–1 (Cont.): VAX–11 Version 2.4 RSX FORTRAN–77 Software Components

Resident Library-Related Files		
File Name	**Location**	**File Purpose**
F77EP.MAC	[1,1]	File to build OTS resident libraries and vector
F77GBL.XCL	[1,1]	File to exclude F–77 OTS entry poi
F77VEC.MAC	[1,1]	File helps build OTS resident libra vector
FCS.MAC	[1,1]	File helps build FCS OTS resident library
F77RESLIB.COM	[SYSMGR]	File to install F–77 resident OTS libraries