DIBOL-83
Compatibility Guide

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Operating System and Version:
CTS-300 V8.0
RSTS/E DIBOL V5.0
VAX/VMS DIBOL V2.0
Professional Tool Kit DIBOL V1.5

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INTRODUCTION

DIBOL is implemented on the major DIGITAL operating systems. This has brought about some minor differences in how DIBOL statements function on those systems. To develop transportable DIBOL applications, you must know what those differences are.

This manual explains how all the DIBOL statements and Universal External Subroutines behave on each system and how files may be transferred between different systems.

This manual should be used with the *DIBOL Language Reference Manual* and the appropriate DIBOL system user's guides for the systems which you are using.

The information in this manual applies to current and subsequent versions of DIBOL-83 beginning with the following implementations:

- CTS-300 V8.0
- RSTS/E DIBOL V5.0
- VAX/VMS DIBOL V2.0
- Professional Tool Kit DIBOL V1.5

NOTE

When RSTS/E appears by inself it refers to RSTS/E RMS and RSTS/E DMS.

CHAPTER 1
COMPILER DIRECTIVES

This chapter points out the specific ways in which DIBOL compiler options differ between systems.

DIRECTIVE	OPERATING SYSTEM	CHARACTERISTICS
.IFDEF-.ENDC		Same as DIBOL Language Reference Manual
.IFNDEF-.ENDF		Same as DIBOL Language Reference Manual
.INCLUDE	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	Source file libraries and the VAX Common Data Dictionary can be accessed if the program is compiled using the NOSTANDARD qualifier.
.LIST		Same as DIBOL Language Reference Manual
.NOLIST		Same as DIBOL Language Reference Manual
.PAGE		Same as DIBOL Language Reference Manual
.TITLE		Same as DIBOL Language Reference Manual

CHAPTER 2
LANGUAGE ELEMENTS

This chapter points out the specific ways in which DIBOL language elements differ between systems. All elements are included whether or not there are differences on the various systems.

ELEMENT	OPERATING SYSTEM	CHARACTERISTICS
Character Set	CTS-300 RSTS/E VMS	Same as DIBOL Language Reference Manual
	Professional	The Professional uses the DEC Multinational Character Set.
Statement Line Syntax		Same as DIBOL Language Reference Manual
Statement Labels	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	Statement labels can be up to 30 characters long. This extension is available only if the program is compiled using the NOSTANDARD qualifier.
Array Subscripting		Same as DIBOL Language Reference Manual
Literals		Same as DIBOL Language Reference Manual
Substrings		Same as DIBOL Language Reference Manual
Decimal Expressions		Same as DIBOL Language Reference Manual

CHAPTER 3
DATA DIVISION STATEMENTS

This chapter points out the specific ways in which DIBOL data division statements differ between systems. All statements are included whether or not there are differences on the various systems.

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
RECORD	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	The following options are available with programs which are compiled using the NOSTANDARD qualifier: • A named RECORD area can contain up to 65,535 characters. • A RECORD name can contain up to 30 characters.
COMMON	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	The following options are available with programs which are compiled using the NOSTANDARD qualifier: • A named COMMON area can contain up to 65,535 characters. • A COMMON area name can contain up to 30 characters.
Field Definitions	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	The following options are available with programs which are compiled using the NOSTANDARD qualifier: • Alpha fields can contain up to 65,535 characters. • A field name can contain up to 30 characters.

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
Array Definitions	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	The following options are available with programs which are compiled using the NOSTANDARD qualifier: • Fields in alpha arrays can contain up to 65,535 characters. • Array names can contain up to 30 characters.
SUBROUTINE	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	The subroutine name can be up to 30 characters long. This extension is available only if the program is compiled using the NOSTANDARD qualifier.

CHAPTER 4
PROCEDURE DIVISION STATEMENTS

This chapter points out the specific ways in which DIBOL procedure division statements differ between systems. All statements are included whether or not there are differences on the various systems.

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
Value Assignment Statement		Same as DIBOL Language Reference Manual
ACCEPT	VMS Professional	Same as DIBOL Language Reference Manual
	CTS-300 RSTS/E DMS	Characters can be accepted from a file or terminal.
	RSTS/E RMS DMS	ACCEPT cannot be used with terminals opened in terminal block mode.
BEGIN-END		Same as DIBOL Language Reference Manual
CALL		Same as DIBOL Language Reference Manual
CLEAR		Same as DIBOL Language Reference Manual
CLOSE		Same as DIBOL Language Reference Manual
DELETE		Same as DIBOL Language Reference Manual
DETACH	CTS-300	Same as DIBOL Language Reference Manual
	RSTS/E	Detached programs cannot open a channel to a terminal. A user or program must be privileged to use DETACH.
	VMS Professional	DETACH is ignored.

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
DISPLAY	VMS RSTS/E RMS Professional CTS-300 RSTS/E DMS	Same as DIBOL Language Reference Manual Characters may be displayed to a terminal or a file opened in O mode.
DO-UNTIL		Same as DIBOL Language Reference Manual
FOR		Same as DIBOL Language Reference Manual
FORMS		Same as DIBOL Language Reference Manual
GOTO		Same as DIBOL Language Reference Manual
GOTO (computed)		Same as DIBOL Language Reference Manual
IF		Same as DIBOL Language Reference Manual
IF-THEN-ELSE		Same as DIBOL Language Reference Manual
INCR		Same as DIBOL Language Reference Manual
LOCASE		Same as DIBOL Language Reference Manual
LPQUE	CTS-300	LPNUM specifies the line printer number (1-4). The default printers are selected when the spooler is started. FORM displays the message LOAD XXXXXX IN LP at the terminal prior to printing the file.

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
LPQUE (Cont.)	RSTS/E	LPNUM line printer number is 0-7. The default is 0. FORM is not available.
	VMS	LPNUM specifies the printer queue number if it is decimal or the printer queue name if it is alpha. The default is SYS$PRINT. FORM specifies the number or name of the form which must be inserted into the printer before the file is printed. If FORM is not specified, FORM:0 is assumed. ALIGN places the file in the specified queue in a "HOLD" status so that the operator may take whatever action is necessary.
	Professional	Requests are not queued. LPQUE prints only if the printer is free; otherwise it generates an error.
OFFERROR		Same as DIBOL Language Reference Manual
ONERROR		Same as DIBOL Language Reference Manual
OPEN	CTS-300 RSTS/E DMS	The R submode and the RECSIZ qualifier are not required to create relative files. Files created using O mode can be used for sequential or relative access. R and RECSIZ can be used, however, if compatible syntax between DMS and RMS is desired; they will be ignored on DMS. ISAM files on RSTS/E DMS use a minimum of two channels even though only one is specified with the OPEN statement; one channel is used for the index file and one for a volume. Files having more than one volume, use an additional channel for each volume, i.e., a file with two volumes uses three channels. On RSTS/E if a file is opened in U mode, it cannot be opened in I mode on another channel or in I mode by another program. BKTSIZ is ignored.
	RSTS/E RMS Professional	BKTSIZ range is one through 15 blocks.

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
OPEN (Cont.)	RSTS/E	A program which uses an overlay structure implicitly uses one of the 15 available channels for reading in the overlays so only 14 channels remain available to the DIBOL programmer.
	VMS	BKTSIZ range is one through 32 blocks. The following options are available if you compile programs using the NOSTANDARD qualifier: • The number of channels available can be increased to 255. • Append mode (A) can be used to append to an existing sequential file or to a print file with the P submode (A:P). • Block submode (I:B,O:B,U:B) can be used to transfer blocks of data between the file and the program.
PROC-END	CTS-300 VMS Professional	Same as DIBOL Language Reference Manual
	RSTS/E	The buffer size should be large enough to include an entire record. For example, if a record spans two physical blocks, PROC should be specified with an argument of 2.
READ (Relative file)		Same as DIBOL Language Reference Manual
READ (Indexed file)		Same as DIBOL Language Reference Manual
READS	RSTS/E RMS VMS Professional	Same as DIBOL Language Reference Manual
	RSTS/E DMS CTS-300	READS cannot be used with files opened in U mode.

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
RECV		Same as DIBOL Language Reference Manual
RETURN		Same as DIBOL Language Reference Manual
SEND	RSTS/E VMS	Same as DIBOL Language Reference Manual
	CTS-300	A terminal number of -2 specifies that if the receiving program is not running it must be started (detached) in order to receive the message. A terminal number of -3 specifies that a new copy of the receiving program is to be started (detached) in order to receive the message.
	Professional	A terminal number of -2 or -3 specifies that if the receiving program is not running it must be started (detached) in order to receive the message. The receiving program must be referred to by its task name.
SLEEP	CTS-300 VMS Professional	Same as DIBOL Language Reference Manual
	RSTS/E	Entering a CTRL/C causes program execution to resume unless digit position eight is set with the FLAGS subroutine.
STOP	CTS-300 SUD RSTS/E VMS	Same as DIBOL Language Reference Manual
	CTS-300 XMTSD CTS-300 TSD	Programs cannot chain to an indirect command file.
	Professional	Programs cannot chain to an indirect command file. To chain to another program, you must use its task name.
STORE		Same as DIBOL Language Reference Manual
UNLOCK		Same as DIBOL Language Reference Manual
UPCASE		Same as DIBOL Language Reference Manual

STATEMENT	OPERATING SYSTEM	CHARACTERISTICS
USING		Same as DIBOL Language Reference Manual
WHILE		Same as DIBOL Language Reference Manual
WRITE (Relative file)		Same as DIBOL Language Reference Manual
WRITE (Indexed file)		Same as DIBOL Language Reference Manual
WRITES	RSTS/E RMS VMS Professional	Same as DIBOL Language Reference Manual
	CTS-300 RSTS/E DMS	WRITES is not permitted with files opened in U mode.
XCALL	CTS-300 RSTS/E Professional	Same as DIBOL Language Reference Manual
	VMS	The following options are available with programs which are compiled using the NOSTANDARD qualifier: • Decimal expressions can be used as subroutine arguments. • %VAL, %REF, %DESCR, and %XTRNL are provided to facilitate calling non-DIBOL routines. • The subroutine name can be up to 30 characters long.

CHAPTER 5
UNIVERSAL EXTERNAL SUBROUTINE LIBRARY

This chapter points out the specific ways in which DIBOL subroutines from the Universal External Subroutine Library differ between systems. All subroutines are included whether or not there are differences on the various systems.

SUBROUTINE	OPERATING SYSTEM	CHARACTERISTICS
ASCII		Same as DIBOL Language Reference Manual
DATE		Same as DIBOL Language Reference Manual
DECML		Same as DIBOL Language Reference Manual
DELET	VMS Professional RSTS/E	Same as DIBOL Language Reference Manual
	CTS-300	The channel number is required.
ERROR		Same as DIBOL Language Reference Manual
FATAL		Same as DIBOL Language Reference Manual
FLAGS	CTS-300	Same as DIBOL Language Reference Manual
	RSTS/E RMS Professional	When flag 6 is set it disables implicit carriage control.
	RSTS/E	FLAGS cannot be used with terminals opened in terminal block mode.
	VMS	Flag 6 is ignored.
		Flag 4 can be used to override the NOSCOPE terminal setting but cannot be used to override the SCOPE terminal setting.

SUBROUTINE	OPERATING SYSTEM	CHARACTERISTIC
INSTR		Same as DIBOL Language Reference Manual
JBNO		Same as DIBOL Language Reference Manual
MONEY		Same as DIBOL Language Reference Manual
PAK	RSTS/E RMS VMS Professional	Same as DIBOL Language Reference Manual
	CTS-300 RSTS/E DMS	Key fields in ISAM Files should not be packed. **NOTE** CTS-300 and RSTS/E DMS packed data format differs from that used by RSTS/E RMS, VMS, and the Professional.
RENAM	VMS Professional	Same as DIBOL Language Reference Manual
	RSTS/E	The new file and the old file must be in the same account and have the same protection code.
	CTS-300	The channel number is required.
RSTAT	CTS-300 RSTS/E DMS	For indexed files the terminator is the null character. For all other cases it may be ESC, LF, FF, or VT.
	RSTS/E	A terminal opened in terminal block mode is a special case. Check the RSTS/E DIBOL System User's Guide.
	VMS Professional RSTS/E RMS	For files, the terminator is the null character. For a terminal, the terminator may be ESC, LF, FF, or VT.

SUBROUTINE	OPERATING SYSTEM	CHARACTERISTICS
RUNJB	CTS-300 RSTS/E VMS	Same as DIBOL Language Reference Manual
	Professional	A second argument of -2 specifies a back - ground task provided no other task by the same name is running. The filespec argument must be a task name.
SIZE		Same as DIBOL Language Reference Manual
TIME		Same as DIBOL Language Reference Manual
TNMBR		Same as DIBOL Language Reference Manual
TTSTS	CTS-300	The channel number is allowed but is ignored.
	RSTS/E Professional	The channel number is required.
	RSTS/E	TTSTS cannot be used with terminals opened in terminal block mode.
	VMS	DIBOL generates a Line Feed when a Carriage Return is entered. TTSTS can detect the Line Feed only if the channel number is supplied. TTSTS returns the number of characters pending. If the field is not large enough to hold the number, the largest number the field will hold is returned.
UNPAK		Same as DIBOL Language Reference Manual **NOTE** CTS-300 and RSTS/E DMS packed data format differs from that used by RSTS/E RMS, VMS, and the Professional.
VERSN		Same as DIBOL Language Reference Manual
WAIT	VMS	Same as DIBOL Language Reference Manual
	CTS-300 RSTS/E	Digit 3 means the same as digit 2.
	Professional	Not implemented

CHAPTER 6
FILE MIGRATION BETWEEN DIBOL SYSTEMS

This chapter explains the process necessary to move DIBOL source and data files from one system to another. There are two ways that you can transfer files: using DECnet and using a transfer medium.

6.1 TRANSFERRING FILES WITH DECnet

DECnet is a system network program which allows different DIGITAL computer systems to be joined together into a network of systems.

One of DECnet's capabilities is file transfer. If the systems between which you want to transfer files are linked with DECnet, then using DECnet is the recommended way to transfer files because it is a much simpler process than using media. Consult your system documentation for using DECnet.

If you are transferring DMS indexed files to an RMS system using DECnet, you must do the following:

- Convert the DMS indexed files to sequential format before transferring them. Consult section 6.3.2 for information.
- Transfer the files with DECnet.
- After they are transferred with DECnet you can convert them back to an RMS indexed format if you wish; consult section 6.3.5 for information.

If you are transferring RMS relative or indexed files to a DMS system you must do the following:

- Convert the files to a sequential format. Consult section 6.3.2 for information.
- Transfer the files with DECnet.
- Once files are transferred, no further processing is necessary for relative access files. Those files to be used for indexed access must be converted using the DMS utility, ISMUTL. Consult either the *CTS-300 System User's Guide* or the *RSTS/E DIBOL System User's Guide* for information on using ISMUTL.

6.2 TRANSFERRING FILES USING A TRANSFER MEDIUM

If DECnet is not available on your system, you must use a transfer medium. The term transfer medium is used in this chapter to refer to removable storage media such as disks, diskettes, or magtape.

This chapter recommends two methods. The preferred method uses disks or diskettes and is explained in section 6.3. If, however, you want to transfer files between systems using RMS, and both systems have a magtape drive, you may want to consider the method suggested in section 6.4.

This chapter is concerned with the transfer process only and refers to sources of specific information on the different system file transfer utilities or commands where that information is required.

The systems considered in this chapter are:

1. CTS-300 on the RT-11 operating system
2. RSTS/E
3. RSX-11M and RSX-11M-PLUS

NOTE

DIBOL is not implemented on these RSX systems, but they can serve as host systems to a Professional system which does implement DIBOL. The information in this manual applies to both RSX systems; therefore remaining references will be to RSX in general.

4. VAX/VMS
5. The Professional 300 Series

This chapter refers to commands and utilities which you will use as tools to transfer files. For information on those tools see the following documents:

- For RT-11 see the RT-11 System User's Guide
- For RSTS/E see the RSTS/E System User's Guide
- For RSX see the Utilities Manual
- For VMS see the VAX-11 Utilities Reference Manual
- For RMS on RSTS/E or RSX see the RMS User's Guide.
- For RMS on VMS see the VAX-11 Record Management Services Utilities Reference Manual
- For CTS-300 see the CTS-300 System User's Guide
- For DMS DIBOL on RSTS/E see the RSTS/E DIBOL System User's Guide

6.3 USING A DISK or DISKETTE as a TRANSFER MEDIUM

The method explained in this section is recommended, because it works on all systems implementing DIBOL. There are other methods and media which you can use, but the process is system or media dependent. After some experience with transferring files, you may find a more convenient way which works for your system.

The general process is as follows:

- Prepare a transfer medium in RT-11 format
- Prepare the files for transfer
- Transfer the files onto the transfer medium
- Transfer the files onto the destination system
- Convert to the proper file format

6.3.1 Preparing a Transfer Medium in RT-11 Format

This method requires a transfer medium in RT-11 format. All DIBOL systems either read RT-11 format directly or have file transfer utilities which support RT-11 format.

Figure 6-1 illustrates the relationship between the systems:

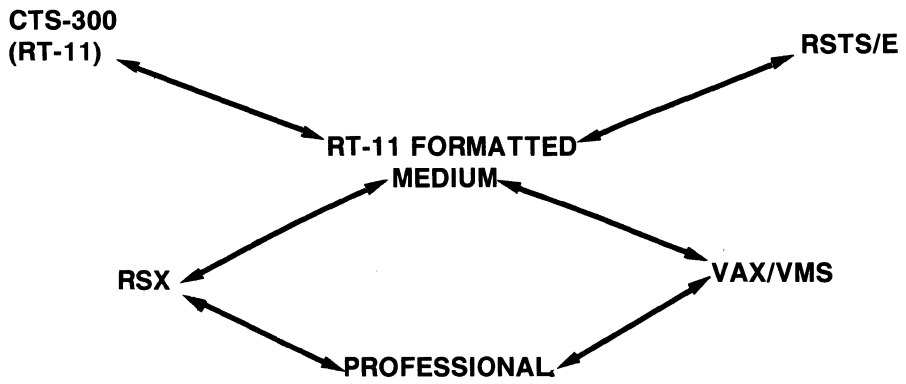

Figure 6-1

If you use a new transfer medium, it must be initialized and put into RT-11 format. To prepare a transfer medium in RT-11 format you must use one of the following tools:

- On RT-11 use the INITIALIZE command
- On RSTS/E use the FIT utility
- On RSX use the FLX utility
- On VMS use the FLX utility

If you already have a transfer medium in RT-11 format, it does not have to be initialized; it can be used as it is.

6.3.2 Preparing Files for Transfer

RT-11 supports only a sequential file format, so all files which are transferred onto an RT-11 formatted medium must be in a sequential format.

6.3.2.1 Files Not Requiring Preparation for Transfer — Files in sequential format do not require any preparation. Each of the following cases are files already in sequential format:

- On RT-11 and RSTS/E DMS, sequential and relative files (these files have the same structure but are accessed differently)
- On RMS systems, sequentially formatted files
- DIBOL source code files

If your files are already in sequential format, proceed to section 6.3.3.

6.3.2.2 Files Requiring Preparation for Transfer — Files not in sequential format must be converted to sequential format before being transferred. Each of the following cases are files not in sequential format which must be converted:

- DMS ISAM files on CTS-300 and RSTS/E

  To convert these files to sequential format, write a DIBOL program which opens a new sequential file for output, reads records from the ISAM file, and writes them into the new sequential file.

- RMS relative and indexed files on RSTS/E or RSX

  To convert either of these file types to sequential format use the following procedure:

  1. Use the RMS Convert utility (CNV) to write the contents of the non-sequential file into a new sequential file.

     With this utility the file being converted will be the input file and CNV will create a new sequential file using the name you specify for output and containing the records from the relative or indexed input file.

2. The sequential file is ready for transfer.

- RMS relative and indexed Files on VMS

  To convert either of these file types to sequential format use the following procedure:

  1. Use the VMS EDIT utility with the /FDL qualifier to create an FDL file to describe the characteristics of a sequential file that you will create in step 2.

     You may need to consult the *VAX-11 Record Management Services Utilities Reference Manual* concerning the File Definition Language to see how to define a sequential file.

  2. Use the VMS CONVERT utility with the /FDL qualifier to write the contents of the non-sequential file into a new sequential file that you described in the EDIT/FDL session in step 1.

     For example, if you created the file SEQUEN.FDL in step 1 to describe the sequential file for transfer and you were converting an indexed file named CUSDAT.IDX, your command to the convert utility might be as follows:

     CONVERT/FDLSEQUEN.FDL CUSDAT.IDX CUSDAT.SEQ

     This command would create a new sequential file CUSDAT.SEQ according to the specifications in SEQUEN.FDL and would write the records from CUSDAT.IDX into CUSDAT.SEQ.

  3. The sequential file is ready for transfer.

6.3.3 Transferring the Files onto the Transfer Medium

Once files are in sequential format they can be transferred. You must mount the transfer medium on your system and transfer the files onto it. Use one of the following procedures:

NOTE

On VMS and RSX-11M PLUS you must use the /FOREIGN qualifier when you mount the RT-11 formatted medium.

- On RT-11, transfer the files onto the transfer medium with the RT-11 COPY command.
- On RSTS/E, transfer the files onto the transfer medium with the FIT file transfer utility.
- On RSX and VMS, transfer the files onto the transfer medium with the FLX file transfer utility.

When this procedure is complete you can move the transfer medium to the destination system.

6.3.4 Transferring the Files onto the Destination System

On the destination system mount the transfer medium and transfer the files onto that system.

- On RT-11, transfer the files from the transfer medium onto the RT-11 system with the RT-11 COPY command.
- On RSTS/E, transfer the files from the transfer medium onto the RSTS/E system with the FIT file transfer utility.
- On RSX and VMS, transfer the files from the transfer medium onto the RSX or VMS system with the FLX file transfer utility.

6.3.5 Converting to Proper File Format

If the files are to remain in sequential format, the transfer process is complete. If the files were originally in relative or indexed format they can be converted back to that format with one of the following procedures:

- On CTS-300 and RSTS/E-DMS, files to be accessed relatively don't require further processing.

  On either of these systems, you can convert files that were originally in indexed format back to indexed format using the utility ISMUTL.

- On RSTS/E RMS, RSX, or VMS you can convert files back to their original format by using the RMS, DEF and CNV utilities.

  On RSTS/E RMS and RSX, use the RMS Define utility (DEF) to create a file in the format that you want and then use the RMS Convert Utility (CNV) to write the records from the transferred file into the new file in the proper format. You may need to use the TR and PD switches with the DEF utility.

  On VMS, use the EDIT/FDL utility to create the file describing the file format that you want and then use the CONVERT utility to convert the transferred file into the new file in the proper format.

6.3.6 Transferring Files to and from a Professional System

Because the Professional must be connected to either a VAX/VMS or RSX host system, a Professional system is a special case. DIBOL file transfers to a Professional system must first go to the host system.

For file transfers involving a Professional system use the following procedure:

- Determine which type of host system is involved.
- Transfer the files to the host system.
- When the files are on the host system, transfer them to the Professional itself.

For example, assume that you want to transfer DIBOL files from a RSTS/E system to a Professional system linked to a VAX/VMS host. First treat the procedure as a transfer from RSTS/E to VAX/VMS. When the transfer to VAX/VMS is complete, transfer the files from the VAX/VMS system to the Professional.

To transfer files from the Professional to another system, reverse the procedure. Transfer the files from the Professional to the host system and then follow the file transfer procedure for transferring files between the host system and whatever system is to receive the files.

For information on transferring files between the Professional and its host system, consult your Professional system documentation.

6.4 FILE TRANSFERS BETWEEN RMS SYSTEMS

If you are transferring between systems which both have RMS and each system has a magtape drive you can make a direct transfer between those systems without needing to convert RMS relative or indexed files to sequential format.

You can do this type of transfer with the following procedure:

- Prepare the magtape to receive the files.
- Run the RMS Backup utility to transfer the files from the original system onto the tape.
- Move the magtape to the destination system and transfer the files from the magtape onto the destination system using the RMS Restore utility.

READER'S COMMENTS

NOTE: This form is for document comments only. DIGITAL will use comments submitted on this form at the company's discretion. Problems with software should be reported on a Software Performance Report (SPR) form. If you require a written reply and are eligible to receive one under SPR service, submit your comments on an SPR form.

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