Software Product Description

VAX-11 RSX, Version 2.5

Software for the PDP-11

SPD 26.73.08

VAX-11 RSX, Version 2.5 is a member of a family of operating system and other software products produced by Mentec Inc. for the PDP-11 family of computers. It is available from Mentec Inc. subject to a software license issued according to standard terms and conditions.

Description:

Overview

VAX-11 RSX is an emulator of the RSX Operating System family which executes on all VAX systems. VAX-11 RSX runs in compatibility mode on processors that support a PDP-11 instruction set subset in hardware or microcode, and also runs on processors without this support by providing its own software emulation of the same PDP-11 instruction set subset.

VAX-11 RSX provides special capabilities which enable PDP-11 users to develop programs for execution in the following environments:

- VMS compatibility mode (hardware-supported or software-emulated)
- RSX-11M-PLUS
- RSX-11M
- RSX-11S
- Micro/RSX

VAX-11 RSX also allows for the migration of many existing RSX applications to VMS.

Program Development Capabilities

The program development facilities provided by VAX-11 RSX consist of the following:

- PDP-11 Instruction Set Emulator (CEM$EMULATOR) which emulates the PDP-11 machine instruction set and allows RSX tasks to run on VAX processors that do not contain the compatibility mode hardware.
- MCR command line interpreter (CLI) which emulates the RSX MCR CLI so users may interact with a familiar user interface. MCR also provides access to many of the native VMS program development facilities.
- RSX Application Migration Executive (AME) which emulates the RSX Executive services.
- Indirect Command File Processor (ICM) which allows RSX indirect command files to be executed on VMS.
- DCL command back translator (BACKTRANS) which allows RSX utilities to be invoked through the use of the DCL command interface.
- A subset of the RSX program development utilities and libraries.
- A subset of the RMS-11, Version 2.0 program development utilities and libraries.
- The following RSX program development utilities are available to users of VAX-11 RSX:
- BRU - Backup and Restore Utility (ODS-1 only)
  Note: BRU can restore files to an ODS-2 volume. However, files on an ODS-2 volume cannot be read by BRU for backup or verify operations.
- CRF - Cross Reference Processor

- DMP - File Dump Utility
- EDI - Line Text Editor
- FLX - File Transfer Utility Program
- LBR - Librarian Utility Program
- MAC - PDP-11 MACRO-11 Assembler
- PAT - Object Module Patch Utility
- PIP - Peripheral Interchange Program
- SLP - Source Language Input Program
- TKB - Task Builder
- ZAP - Task/File Patch Program

The following RSX program development libraries and components are available to VAX-11 RSX users:

- FCSRES.STB - File Control Services symbol table
- FCSRES.EXE - File Control Services resident library
- ODT.OBJ - On-Line Debugging Tool object module
- QIOSYM.MSG - Standard RSX QIO error messages
- RSXMAC.SML - Standard RSX macros
- SYSLIB.OLB - System object library (without ANSI Magtape support)
- VMLIB.OLB - Virtual memory subroutine library

The following RMS-11 program development utilities are available to VAX-11 RSX users:

- BCK - File Backup Utility
- CNV - File Conversion Utility
- DEF - File Definition Utility
- DES - File Design Utility
- DSP - File Display Utility
- IFL - Index File Load Utility
- RST - File Restore Utility

The following RMS-11 program development libraries and components are available to VAX-11 RSX users:

- RMSRES.STB - RMS-11 symbol table
- RMSRES.EXE - RMS-11 memory-resident library
- RMSLIB.OLB - RMS-11 object library
- RMSMAC.MLB - RMS-11 macro library
- RMS11.ODL - Prototype disk-based overlay descriptor
- RMS11S.ODL - Minimum-size partial-function overlay descriptor
- RMS11X.ODL - Minimum-size full-function overlay descriptor
- RMS12S.ODL - Medium-size partial-function overlay descriptor
- RMS12X.ODL - Medium-size full-function overlay descriptor
- DAP11X.ODL - Full-function including remote support overlay descriptor
- RMSDES.IDX - Help file for the RMS DES utility

The following utilities for file transfer to and from RSX family systems and other VAX systems are available to VAX-11 RSX users:

- DTE - Data Terminal Emulator Utility
- MFT - File Transfer Utility

General Access

VAX-11 RSX users gain access to the system through the normal VMS LOGINOUT procedure. They may explicitly request MCR as their CLI, or they may have MCR as their default CLI by having it specified in the User Authorization File.

Alternatively, VAX-11 RSX users may use the DCL CLI. Under DCL, not all of the RSX and RMS program development utilities are directly available. Some of the utilities are available through DCL commands (e.g., LIBRARY/RSX-11), but for some other utilities, the user must explicitly request the utility to execute by typing either RUN SYS$SYSTEM:utilityname or MCR utility-name.

VAX-11 RSX indirect command files may be executed from either MCR or DCL, but must contain only indirect directives and MCR commands.

On VMS, it is only possible to switch from one CLI to another by logging out of the current CLI and then logging in again using the new CLI, or by using the DCL or MCR SPAWN command. This differs from RSX-11M and RSX-11M-PLUS.

Operations With Disk and Tape Volumes

In addition to a native disk file structure (Files-11 Structure Level 2), VMS provides a disk file structure (called Files-11 Structure Level 1) that is compatible with RSX Systems. This provides for easy cross migration of code and data. Both file structures are available to programs running in either compatibility or native mode. However, not all features of Files-11 Structure Level 2 are available to programs running in compatibility mode.

Note: Files-11 Structure Level 1 (ODS-1) disks cannot be shared between nodes in a cluster.

VAX-11 RSX supports general access to magnetic tape volumes. In addition, tapes created on an RSX system by BRU, FLX, PIP, and RMS BCK can all be read on VAX-11 RSX by corresponding utilities. Similarly, it is possible to create tapes on VAX-11 RSX to be read on an RSX system.

Intersystem Facilities

VAX-11 RSX includes support for the RSX Data Terminal Emulator (DTE) and File Transfer (MFT) utilities. These utilities provide for two way file transfer to and from RSX family systems and other VMS Systems which are running VAX-11 RSX. In this manner, files of any type or size can be transferred by means of a serial line in either direction from one system to the other. The file transfer can be initiated from either system using the DTE utility available on that system.

DECnet is not available to RSX programs executing under VAX-11 RSX with one exception: applications written to use RMS-11, Version 2.0 will have access to DECnet.

Compatibility

VAX-11 RSX is an emulator of the RSX family of operating systems. Specifically, this product is designed to emulate:

- RSX-11M-PLUS
- Micro/RSX
- RSX-11M
- RSX-11S

Directive Compatibility

The following RSX executive directives are supported:

#	ABRT$						
	ACHN$		DTRG$		IHAR$S		SFPA$
%	ALTP$		ELAW$		MAP$	#	SPND$S
#	ALUN$	#	ELGF$	#	MRKT$		SPRA$
	ASTX$S		ENAR$S		QIO$	#	SPWN$
	ATRG$	#	ENCP$S		QIOW$		SRDA$
					PFCS$		

		PRMS$	
CLEF$	EXIF$ #	RCST$	STLO$
CLOG$	EXIT$S #	RCVD$	STOP$S
CLON$	EXST$ #	RCVX$	STSE$
# CMKT$	EXTK$	RDAF$	SVDB$
CRAW$	FEAT$	RDXF$	SVTK$
	FSS$		
# CRGF$	GDIR$	RLOG$	TLOG$
CRRG$ #	GLUN$	RLON$	TLON$
# CSRQ$ *	CMCR$ #	RQST$	UMAP$
% DECL$S	GMCX$ #	RSUM$	# USTP$
DLOG$ #	GPRT$ #	RUN$	% WSIG$S
DLON$	GREG$ #	SDAT$	WTLO$
DSAR$S #	GTIM$	SDIR$	WTSE$
# DSCP$S #	GTSK$	SETF$	

\# - Not entirely compatible with the same directive on RSX family systems

% - NO-OP

* - Compatible from the MCR CLI; not entirely compatible from the DCL CLI

The following RSX executive directives are NOT supported:

CLI	ID Space	Virt. Term.	PLAS	Other
GCCI$	MSDS$	CRVT$	CPCR$	CINT$
GCII$	MVTS$	ELVT$	RREF$	GIN$
SCAA$	SCAL$S		RRST$	GSSW$
SCLI$			SREF$	RDEF$
SNXC$			SRRA$	RMAF$S
				SMSG$
				SPEA$
				SREA$
				SREX$
				STAF$

STIM$

SWST$

TFEA$

ULGF$

Parent/Offspring	Variable_Send/Receive
CNCT$	VRCD$
EMST$	VRCS$
RPOI$	VRCX$
SDRC$	VSDA$
SDRP$	VSRC$

MCR Compatibility

The following RSX MCR commands are supported:

ALLOCATE	ASN	BYE	CANCEL
DEALLOCATE	DEBUG	DMOUNT	EDT
HELP	INIT	MOUNT	RESUME
RUN	TIME	UFD	

In addition, the following VMS DCL commands are available from the MCR CLI:

APPEND	ATTACH
CONTINUE	COPY
CREATE	CREATE/DIRECTORY
CREATE /NAME_TABLE	DEASSIGN
DEFINE	DELETE
DEPOSIT	DIFFERENCES
DIRECTORY	DUMP
EXAMINE	LOGOUT
MAIL	MERGE
PRINT	PURGE
RENAME	RUNOFF
SEARCH	SET

SHOW	SORT
SPAWN	STOP
SUBMIT	TYPE

The installation procedure provides the option to install an MCR help library which contains help text on both the RSX MCR and DCL commands that are part of the MCR CLI.

Indirect Command File Compatibility

All indirect command file directives and functions are supported to some extent except .FORM, .WAIT, and .XQT. Most RSX indirect command files can be executed successfully on VAX-11 RSX.

The following system generations and network generations are specifically supported:

- RSX-11M-PLUS 4.4
- RSX-11M 4.7
- RSX-11S 4.7
- DECnet-11M-PLUS 4.4
- DECnet-11M 4.7
- DECnet-11S 4.7

N ote: The MicroVAX II and VAXstation II are NOT recommended for RSX system generations or DECnet network generations due to the performance characteristics of the PDP-11 instruction set emulator on these processors.

Other Areas of Compatibility

VAX-11 RSX also supports the following features:

- Memory Resident Overlays
- Cluster Libraries
- FCSRES
- RMSRES
- VMS search lists consisting only of devices and rooted directories
- Installation on to and operation from a VAXcluster common system disk (SYSCOMMON)
- Virtual Sections
- FORTRAN-77 Virtual Arrays

General Areas of Incompatibility

Every effort has been made to make the functions this product supports as compatible as possible with the RSX environment given the constraints of the VMS Operating System environment. However, certain areas of incompatibility do exist in this product and may continue to exist in future versions. The few areas of incompatibility mentioned in the various sections of this Software Product Description (SPD) are not guaranteed to be all inclusive.

Other areas where incompatibilities exist include:

- No support for supervisor mode libraries
- No support for I-and-D space separation

Compatibility with Other Derivatives of RSX

No compatibility is expressed or otherwise implied with any other versions of the RSX family of operating systems or related operating systems, except where specifically noted.

Source License and Sources Listings Option

This option provides the user with listings of the source programs for this software product. It gives the user the right to use

the listings for any CPU at the facility/location specified in the agreement which has a Single-Use License for the object code.

HARDWARE REQUIREMENTS

Processors Supported by VAX-11 RSX:

VAX:	VAXft Model 110, VAXft Model 310, VAXft Model 410, VAXft Model 610, VAXft Model 612
	VAX 4000 Model 200, VAX 4000 Model 300, VAX 4000 Model 500, VAX 4000 Model 600,
	VAX 6000 Model 200 Series, VAX 6000 Model 300 Series, VAX 6000 Model 400 Series, VAX 6000 Model 500 Series, VAX 6000 Model 600 Series
	VAX 8200, VAX 8250, VAX 8300, VAX 8350, VAX 8500, VAX 8530, VAX 8550, VAX 8600, VAX 8650, VAX 8700, VAX 8800, VAX 8810, VAX 8820, VAX 8830, VAX 8840
	VAX 9000 Model 110, VAX 9000 Model 210, VAX 9000 Model 300 Series, VAX 9000 Model 400 Series
	VAX-11/730, VAX-11/750, VAX-11/780, VAX-11/785
MicroVAX:	MicroVAX II, MicroVAX 2000, MicroVAX 3100 Model 10/10E, MicroVAX 3100 Model 20/20E, MicroVAX 3100 Model 30, MicroVAX 3100 Model 40, MicroVAX 3100 Model 80, MicroVAX 3300, MicroVAX 3400, MicroVAX 3500, MicroVAX 3600, MicroVAX 3800, MicroVAX 3900
VAXstation:	VAXstation II, VAXstation 2000, VAXstation 3100 Model 30, VAXstation 3100 Model 38, VAXstation 3100 Model 40, VAXstation 3100 Model 48, VAXstation 3100 Model 76, VAXstation 3200, VAXstation 3500, VAXstation 3520, VAXstation 3540
	VAXstation 4000 Model 60, VAXstation 4000 VLC
VAXserver:	VAXserver 3100, VAXserver 3300, VAXserver 3400, VAXserver 3500, VAXserver 3600, VAXserver 3602, VAXserver 3800, VAXserver 3900
	VAXserver 4000 Model 200, VAXserver 4000 Model 300, VAXserver 4000 Model 500,
	VAXserver 6000 Model 210, VAXserver 6000 Model 220, VAXserver 6000 Model 310, VAXserver 6000 Model 320, VAXserver 6000 Model 410, VAXserver 6000 Model 420, VAXserver 6000 Model 510, VAXserver 6000 Model 520, VAXserver 6000 Model 610, VAXserver 6000 Model 620, VAXserver 6000 Model 630

Processors Not Supported:

MicroVAX I, VAXstation I, VAX-11/725, VAX-11/782, VAXstation 8000.

Processor Restrictions

The PDP-11 compatibility mode instruction subset is emulated in software on all processors except the following which provide compatibility mode in hardware:

VAX-11/730, VAX-11/750, VAX-11/780,VAX-11/785, VAX 8600, and VAX 8650.

The performance of the software emulator is highly dependent on the type of application being run and the amount of memory available. In general, however, applications will take significantly longer to execute under the software emulator as compared to their execution in hardware compatibility mode on the VAX-11/780.

Other Hardware Required

A minimum memory of 2 Mbytes is required. However, 4 Mbytes or more may be necessary to achieve satisfactory performance with some applications.

Disk Space Requirements (Block Cluster Size = 1:)

Without the PDP-11 Instruction Set Emulator:

Disk space required for installation:	8500 blocks (4,352 Kbytes)
Disk space required for user (permanent):	7000 blocks (3,584 Kbytes)

With PDP-11 Instruction Set Emulator:

Disk Space required for installation:	12,200 blocks: (6,246 Kbytes)
Disk Space required for use (permanent):	10,700 blocks (5,478 Kbytes)

These counts refer to the disk space required on the system disk. The sizes are approximate; actual sizes may vary depending on the user's system environment, configuration, and software options.

CLUSTER ENVIRONMENT

This layered product is fully supported when installed on any valid and licensed VAXcluster* configuration without restrictions. The HARDWARE REQUIREMENTS sections of this product's Software Product Description detail any special hardware required by this product.

VAX 5.x VAXcluster configurations are fully described in the VAXcluster Software Product Description (SPD 29.78.xx) and include CI, Ethernet, and Mixed Interconnect configurations.

Note: Files-11 structure Level 1 (ODS-1) disks cannot be shared between nodes in a cluster.

SOFTWARE REQUIREMENTS

OpenVMS Operating System V5.5-V6.1

Note: VAX-11 RSX, prior to Version 2.4, is not supported on OpenVMS V5.0

Restriction

Use of the MCR SET/UIC=[g,m]command requires a OpenVMS V5.4 or later system. System and network generation of RSX-11M, RSX-11S, and RSX-11M-PLUS also require OpenVMS V5.4 or later, because they use the SET/UIC=[g,m] command.

VMS *Tailoring*

VAX-11 RSX does not require any of the tailorable OpenVMS classes in order to run compatibility mode tasks. However, certain features of VAX-11 RSX and certain MCR commands do require the tailorable OpenVMS classes described below:

For OpenVMS V5.x systems, the following OpenVMS classes required for full functionality of this layered product:

- System Programming Support Required in order to access RSX-compatible disks (Files-11 On-Disk Structure Level1)
- Secure User's Environment Required in order to spool listing files from the VAX-11 RSX utilities (by using the /SP switch)

For more information on OpenVMS classes and tailoring, refer to the OpenVMS Operating System Software Product Description (SPD 25.01.xx)

OPTIONAL SOFTWARE

The following optional software products require VAX-11 RSX as a prerequisite for being generated or run on VAX systems. Not all of these products are supported on all VAX system configurations. Consult the individual product's

Software Product Description (SPD) for the supported system configurations and the required versions of the optional software. Not all products are supported for generation or execution on VAX-11 RSX. Consult the individual product's SPD to verify any additional requirements or restrictions that may be applicable.

- DECnet-11M, V4.7 (network generation only)
- DECnet-11M-PLUS, V4.4 (network generation only)
- DECnet-11S, V4.7 (network generation only)
- RSX-11M, V4.7 (system generation only)
- RSX-11S, V4.7 (system generation only)
- RSX-11M-PLUS, V4.4 (system generation only

GROWTH CONSIDERATIONS

The minimum hardware/software requirements for any future version of this product may be different from the requirements for the current version.

MEDIA DISTRIBUTION

9-track 1600 BPI Magtape, TK50 Streaming Tape

This product is also available as part of the OpenVMS Consolidated Software Distribution on CDROM.

ORDERING INFORMATION

Software Licenses: QL-382A*-** Software Media/Documentation: QA-382A*-** Software Documentation: QA-382A*-GZ Software Product Services: QT-382A*-**

* Denotes variant fields. For additional information on available li censes, services and media, refer to the appropriate price book.

LICENSE MANAGEMENT FACILITY SUPPORT

This layered product supports the OpenVMS License Management Facility.

License units for this product are allocated on an Unlimited System use basis.

For more information on the License Management Facility, refer to the OpenVMS Operating System Software Product Description (SPD 25.01.xx) or the License Management Facility manual of the OpenVMS Operating System documentation set.

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Since the Base Kit is prerequisite software for the Advanced Programmer's Kit, it must have the equivalent level Software Product Service.

SOFTWARE WARRANTY

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