Software Product Description

PRODUCT NAME: **VAX-11 RSX,** Version 2.1
RSX Operating Systems Emulator

DESCRIPTION

Overview

VAX-11 RSX is an emulator of the RSX operating system family which executes on all VAX/VMS systems, on MicroVAX II/MicroVMS systems, and on VAXstation II/ MicroVMS systems. It runs in compatibility mode on processors that support a PDP-11 instruction set subset in hardware or microcode and it also runs on certain processors WITHOUT this support by providing its own software emulation of the same PDP-11 instruction set subset. It provides special capabilities which enable PDP-11 users to develop programs for execution in any of the following environments:

- VAX/VMS compatibility mode (hardware-supported or software-emulated)
- MicroVAX II/MicroVMS compatibility mode (software-emulated)
- VAXstation II/MicroVMS compatibility mode (software-emulated)
- RSX-11M-PLUS
- RSX-11M
- RSX-11S
- Micro/RSX
- P/OS

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

Program Development Capabilities

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

- The PDP-11 Instruction Set Emulator (CEM$EMULATOR) which emulates the PDP-11 machine instruction set and allows RSX tasks to run on VAX, MicroVAX II, and VAXstation II processors that do not contain the compatibility mode hardware.

- The MCR command line interpreter (CLI) which emulates the RSX MCR CLI so that users may interact with a familiar user interface. MCR also provides access to many of the native VAX/VMS and MicroVMS program development facilities.

- The RSX Application Migration Executive (AME) which emulates the RSX Executive services.

- The Indirect Command File Processor (ICM) which allows RSX indirect command files to be executed on VAX/VMS and MicroVMS.

- The 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)
- CRF – Cross Reference Processor
- DMP – File Dump Utility
- DSC – Disk Save and Compress Utility Program (ODS-1 only)
- 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:

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- 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
- RSX-11MAC.SML – Standard RSX macros
- SYSLIB.OLB – System object library (non-ANSI version)
- 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 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/VMS and MicroVMS 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/RSX11), but for some other utilities, the user must explicitly request the utility to execute by typing either RUN SYS$SYSTEM:utility-name 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 VAX/VMS and MicroVMS 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, VAX/VMS and MicroVMS also provide 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.

VAX-11 RSX supports general access to magnetic tape volumes. In addition, tapes created on an RSX system by BRU, DSC, 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 VAX/VMS and MicroVMS Systems which are running VAX-11 RSX. Files of any type or size can be transferred via a serial line in either direction from one system to the other in this manner. The file transfer can be initiated from either system using the DTE utility available on that system. Note that file transfer cannot be initiated from systems running RSX-11M since DTE is not included as part of the RSX-11M system at this time (however, all other aspects of file transfer are supported with RSX-11M systems).

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 full access to DECnet.

COMPATIBILITY

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

- RSX-11M-PLUS, Version 3.0

* Micro/RSX, Version 3.0
* RSX-11M, Version 4.2
* RSX-11S, Version 4.2

Directive Compatibility

The following RSX executive directives are supported:

# ABRT$	DTRG$	IHAR$S	SFPA$
% ALTP$	ELAW$	MAP$	# SPND$S
# ALUN$	# ELGF$	# MRKT$	SPRA$
ASTX$S	ENAR$S	QIO$	# SPWN$
ATRG$	# ENCP$S	QIOW$	SRDA$
CLEF$	EXIF$	# RCST$	STLO$
CLOG$	EXIT$S	# RCVD$	STOP$S
CLON$	EXST$	# RCVX$	STSE$
# CMKT$	EXTK$	RDAF$	SVDB$
CRAW$	FEAT$	RDXF$	SVTK$
# CRGF$	GDIR$	RLOG$	TLOG$
CRRG$	# GLUN$	RLON$	TLON$
# CSRQ$	* GMCR$	# 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	I/D Space	Virt. Term.	PLAS	Other
GCCI$	MSDS$	CRVT$	CPCR$	CINT$
GCII$	MVTS$	ELVT$	RREF$	GSSW$
SCAA$	SCAL$S		RRST$	RDEF$
SCLI$			SREF$	RMAF$S
SNXC$			SRRA$	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 which 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, Version 3.0
* RSX-11M, Version 4.2
* RSX-11S, Version 4.2
* DECnet-11M-PLUS, Version 3.0
* DECnet-11M, Version 4.2
* DECnet-11S, Version 4.2

Note: 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

- VAX/VMS search lists consisting only of devices and rooted directories

- Installation onto 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 VAX/VMS and MicroVMS operating system environments. 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 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

P/OS support is limited to those P/OS directives which are identical to the RSX-11M-PLUS directives listed in the directive table above.

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.

MINIMUM HARDWARE REQUIRED

Any valid VAX, MicroVAX II*, or VAXstation II* system configuration with a minimum memory of 2M bytes. However, 4M bytes or more may be necessary to achieve satisfactory performance with some applications.

Note: An R80/RL02 configuration is required for VAX-11/730 systems.

* The performance of the software emulator on the MicroVAX II and VAXstation II is highly dependent on the type of applications 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.

Block Space Requirements (Block Cluster Size = 1):

Without the PDP-11 instruction set emulator:

Disk Space Required for Installation

6000 blocks (3,072K bytes)

Disk Space Required for Use (Permanent)

5800 blocks (2,970K bytes)

With the PDP-11 instruction set emulator:

Disk Space Required for Installation

9700 blocks (4,967K bytes)

Disk Space Required for Use (Permanent)

9600 blocks (4,916K bytes)

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.

GROWTH CONSIDERATIONS

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

VAXcluster Environment

This layered product is fully supported when installed on any valid and licensed VAXcluster configuration including those systems utilizing a common system disk. However, data sharing between nodes of a VAXcluster is not a feature of this layered product.

PREREQUISITE SOFTWARE

For VAX Systems:

VAX/VMS Operating System

For MicroVAX II Systems:

MicroVMS Operating System*

For VAXstation II Systems:

MicroVMS Operating System*

MicroVMS Workstation Software, Version 2.0

* The MicroVMS Base System and Common Utilities component are required in all cases. However, the following MicroVMS optional components may also be required depending on the application:

- Secure User Environment component – For /SP (spooling) with certain utilities

- System Programming component – To read/write RSX-compatible disks with the Files-11 ODS-1 ACP

Refer to the VAX/VMS and MicroVMS Optional Software Cross Reference Tables (SPD 25.99.xx and SPD 28.99.xx) for the required versions.

OPTIONAL SOFTWARE

The following optional software products require VAX-11 RSX as a prerequisite for being generated or run on VAX/VMS and MicroVMS systems. Not all of these products are supported on all VAX/VMS and MicroVMS system configurations. Consult the VAX/VMS and MicroVMS Optional Software Cross Reference Tables (SPD 25.99.xx and SPD 28.99.xx) or the individual products' SPDs for the required versions of the optional software. It is also advisable to consult the individual product's SPD to verify any additional requirements that may be applicable.

CORAL 66/VAX to RSX Cross Compiler

DECnet-11M (network generation only)

DECnet-11M-PLUS (network generation only)

DECnet-11S (network generation only)

FEPCM Software Tools Kit

FORTRAN IV/VAX to RSX

MicroPower/Pascal-VMS

PDP-11 DATATRIEVE/VAX

PDP-11 FORTRAN-77 DEBUG/VAX to RSX

PDP-11 FORTRAN-77/VAX to RSX

Professional Host Communications

Professional Host Tool Kit

Professional Host Tool Kit BASIC-PLUS-2

Professional Host Tool Kit COBOL-81

Professional Host Tool Kit DIBOL

Professional Host Tool Kit FORTRAN-77

Professional Host Tool Kit FORTRAN-77 DEBUG

Professional Host Tool Kit Pascal

Professional Real Time Interface Library

RSX-11M (system generation only)

RSX-11M-PLUS (system generation only)

RSX-11S (system generation only)

SHOP FLOOR GATEWAY

VAX BLISS-16 Implementation Language

VAX CORAL 66

VAX KCT32

VAX-11 RTEM

SOFTWARE WARRANTY

Warranty for this software product is provided by DIGITAL with the purchase of a license for the product as defined in the Software Warranty Addendum of this SPD.

INSTALLATION

This software product can be installed by the customer using the step-by-step documentation available for this product. Optionally you can purchase DIGITAL Installation Services which provide for the installation of the software product by an experienced DIGITAL Software Specialist.

Courtesy Installation

This software product will be installed by DIGITAL at no additional charge if you purchase it concurrent with a Start-Up Service Package that includes Installation Service. Both the host operating system and this product must be installed concurrently.

ORDERING INFORMATION

Single-Use licensed software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of DIGITAL's copyright notice and any proprietary notices on the software) for use on that same CPU.

You will need a separate license for each CPU on which you will be using the software product (except as otherwise specified by DIGITAL). Then, Materials and Service Options are selected to utilize the product effectively. **THE LICENSE OPTIONS ARE DESCRIBED BELOW. IF YOU ARE NOT FAMILIAR WITH THE SERVICE OPTIONS, YOU MAY OBTAIN THE APPROPRIATE SOFTWARE PRODUCT SERVICE DESCRIPTION(S) FROM YOUR LOCAL DIGITAL OFFICE.** If you are already familiar with these options, you may obtain the ordering information directly from the Software Options Chart.

LICENSE OPTIONS

Single-Use License Option

The Single-Use License is your right to use the software product on a single CPU.

For your first installation of this software product you must purchase as a **minimum**:

* Single-Use License option, and

* Distribution and Documentation option

The license gives you the right to use the software on a single CPU and the Distribution and Documentation option provides the machine-readable software and related documentation.

To use this software product on additional CPUs, for each CPU you must purchase as a **minimum**:

* Single-Use License option

In addition to the right to use, the license gives you the one-time right to copy the software from your original CPU installation to the additional CPU. Therefore, the Distribution and Documentation option is not required, but optional.

VAXcluster License Option

You are eligible for a VAXcluster license option on your second or each subsequent CPU that is part of a VAXcluster system. This is a Single-Use License offered at a reduced price and provides all of the License rights described above. A standard, Single-Use license option (example: Qxxxx-UZ) is required with the first purchase of this software product and is also required for the first CPU of a VAXcluster system.

For software configuration purposes, A VAXcluster system is a set of VAX processors, each running the VMS operating system, where each VAX processor has a direct path to every other VAX processor via Computer Interconnect (CI) Bus.

Distribution and Documentation Option

The Distribution and Documentation option provides the machine-readable software and the basic documentation. You must have, or order, a Single-Use License to obtain this option. You will need this option to install the software for the first time. When revised versions of this software product become available, they may also be obtained by purchasing this option again.

Software Revision Right-To-Copy Option

The Right-To-Copy option allows a customer with multiple CPUs to copy a revised version of a software product from one CPU to another. Each CPU must be licensed for that product. You first install the revised software on one CPU; then you can make copies for additional CPUs by purchasing the Right-To-Copy option for each additional CPU.

Documentation-Only Option

The Documentation-Only option provides one copy of the basic documentation.

Software Product Services

A variety of service options are available. For more information on these or other services, please contact your local DIGITAL office.

SOURCE MATERIALS OPTIONS

You can obtain optional source materials for this software product by signing DIGITAL's Software Program Sources License Agreement and then purchasing the source option(s) you want. The agreement entitles you to use the source materials at one customer facility or location which is specified in the agreement.

Most users do not require source materials. They are used primarily to make modifications to the software product. Source kits provided by DIGITAL do not necessarily contain all source files used by DIGITAL to build binary kits.

Source License and Sources Listings Option

This option provides you with listings of the source programs for this software product. It gives you 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.

SOFTWARE OPTIONS CHARTS

The distribution Media Codes used in the Software Options Chart are described below. You specify the desired Media Code at the end of the Order Number, e.g., QC382-H4 = binaries on RC25 Disk Cartridge.

3 = RX50 Floppy Diskette
4 = RC25 Disk Cartridge
5 = TK50 Tape Cartridge
H = RL02 Disk Cartridge
J = RA60 Disk Cartridge

M = 9-track 1600 BPI Magtape (PE)
R = Microfiche
V = RK07 Disk Cartridge
Z = No hardware dependency

CHART I

NOTE: The availability of these software product options and services may vary by country. Customers should contact their local DIGITAL office for information on availability.

OPTIONS	ORDER NUMBER VAX-11/725 VAX-11/730	ORDER NUMBER VAX-11/750 VAX-11/782* VAX-11/785	ORDER NUMBER VAX-11/780	ORDER NUMBER VAX 8600 VAX 8650
LICENSE OPTIONS: A LICENSE IS REQUIRED FOR EACH CPU.				
Single-Use License	QC382-UZ	QD382-UZ	QE382-UZ	QK382-UZ
VAXcluster License		QD382-QZ	QE382-QZ	QK382-QZ
MATERIALS AND SERVICE OPTIONS:				
Distribution and Documentation Option	QC382-H4 QC382-HH QC382-HM	QD382-HH QD382-HJ QD382-HM QD382-HV	QE382-HJ QE382-HM QE382-HV	QK382-HM
Software Revision Right-To-Copy Option	QC382-HZ	QD382-HZ	QE382-HZ	QK382-HZ
Documentation Only Option	QL382-GZ	QL382-GZ	QL382-GZ	QL382-GZ
Installation Service Option	QC382-I4 QC382-IH QC382-IM	QD382-IH QD382-IJ QD382-IM QD382-IV	QE382-IJ QE382-IM QE382-IV	QK382-IM
DECsupport Service	QC382-94 QC382-9H QC382-9M	QD382-9H QD382-9J QD382-9M QD382-9V	QE382-9J QE382-9M QE382-9V	QK382-9M
Basic Service	QC382-84 QC382-8H QC382-8M	QD382-8H QD382-8J QD382-8M QD382-8V	QE382-8J QE382-8M QE382-8V	QK382-8M
Self-Maintenance Service	QC382-34 QC382-3H QC382-3M	QD382-3H QD382-3J QD382-3M QD382-3V	QE382-3J QE382-3M QE382-3V	QK382-3M
SOURCE MATERIALS OPTIONS:				
Source License and Sources Listings	QL382-FR	QL382-FR	QL382-FR	QL382-FR

* For software licensing purposes, a VAX-11/782 is a multiprocessor that is considered a single CPU.

CHART II

NOTE: **The availability of these software product options and services may vary by country. Customers should contact their local DIGITAL office for information on availability.**

OPTIONS	ORDER NUMBER MicroVAX II	ORDER NUMBER VAXstation II
LICENSE OPTIONS: A LICENSE IS REQUIRED FOR EACH CPU.		
Single-Use License	QZ382-UZ	Q4382-UZ
MATERIALS AND SERVICE OPTIONS:		
Distribution and Documentation Option	QZ382-H3 QZ382-H5	Q4382-H3 Q4382-H5
Software Revision Right-To-Copy Option	QZ382-HZ	Q4382-HZ
Documentation Only Option	QL382-GZ	QL382-GZ
Installation Service Option	QZ382-I3 QZ382-I5	Q4382-I3 Q4382-I5
DECsupport Service	QZ382-93 QZ382-95	Q4382-93 Q4382-95
Basic Service	QZ382-83 QZ382-85	Q4382-83 Q4382-85
Self-Maintenance Service	QZ382-33 QZ382-35	Q4382-33 Q4382-35
SOURCE MATERIALS OPTIONS:		
Source License and Sources Listings	QL382-FR	QL382-FR