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Software Product Description

DESCRIPTION:

RSX-11D is an event driven, disk based, multiprogramming, real-time operating system for PDP-11 with the memory management option. It uses memory management hardware to isolate all other areas of memory from a currently running program and to allow a program to be loaded anywhere in memory without modification. The system is process-structured and provides priority queued asynchronous I/O, a powerful file structure, flexibile scheduling, and 250 levels of software priority.

The system is designed for use in applications that require disk storage of programs and data, rapid loading of programs in response to interrupts, and/or convenient scheduling of operations.

The basic program unit executing under RSX-11D is the task, which consists of a program module or a set of program modules. Program modules are linked together and to the operating system by an overlay task builder and stored on disk in absolute image form. Task execution can be invoked by other tasks or by a terminal user. Tasks can be specified to: a) execute in an indicated memory partition, b) execute at a given priority, c) execute under an indicated User Identification Code, or d) execute only if memory is available. Tasks can be defined as checkpointable, which allows them to be swapped out of memory when space is required for execution of higher priority tasks. Optionally, they can be declared as multiuser. Multi-user tasks are shareable, allowing more than one user to have access to the reentrant part of the task in parallel by duplicating only the data dependent code in memory.

Multi-programming of tasks is provided in RSX-11D by assigning a software priority level (1-250) to each task. It allows interruption of a lower priority task when higher ones require the CPU resources. Event flags are provided to allow the individual task to control its execution and to allow communication with other tasks and the operating system.

Console operations for RSX-11D are supported by tasks called the Monitor Console Routines (MCR). A standard system contains routines for system service requests, utility functions, and the following operations:

- Log on and log off
- Enter and display current time and date
- Install or remove tasks
- Mount or dismount peripheral volumes
- Initialize peripheral volumes
- Run and schedule tasks
- Create directory on a volume
- Set system defaults
- List installed tasks
- List devices
- List memory partitions
- List common memory areas
- Assign a logical unit number (LUN) of an indicated task to an indicated physical device-unit
- List LUN assignments for an indicated task
- Save a system image (for next boot)
- Examine (and alter) memory locations

The RSX-11D File System provides support of files on disk volumes. Four levels of file protection (SYSTEM, OWNER, GROUP and WORLD) are supported via four levels of access (READ, WRITE, EXTEND and DELETE). Both sequential and random access are supported for block structured and fixed-length record files. Variable-length record files can only be processed sequentially. All types of files can be expanded dynamically.

Other functions supported by the system are:

- 11/70 Extended memory support to a system total of 1920K words
- 11/70 Cache parity checking and error logging support

- Time-scheduled partition option
- ANSI multi-volume magnetic tape support for fixed and variable length records
- I/O spooling to the disk for low speed peripherals (printer, terminal, and card reader) with associated queue entries and operator output control
- Job/task accounting of CPU usage, device accesses, and disk storage
- Error logging for system disks, including an error analysis task and error report generator
- Optional on-line diagnostic disk handler tasks
- RSX-11S system generation

The program development and utility functions provided by the standard RSX-11D system are as follows:

- Peripheral Interchange Program, PIP
- File Transfer Utility, FILEX
- Disk Save/Compress Utility, DSC
- File Compare Utility, CMP
- File Dump Utility, DMP
- File Verification Utility, VERIFY
- Source Language Program Editor, SLIPR
- Character Oriented Text Editor, EDIT
- Library Management Utility, LBR
- PDP-11 Macro Assembler, MACRO
- Task Builder Overlay Linker, TKB
- Single Stream Batch, BATCH
- On-line Volume Backup Utility, PRE
- System Generation Program, SGN1
- On-line Debugging Technique, ODT
- Task Image Patch Program, ZAP
- FORTRAN-IV IAS/RSX, FOR

Single-user System:

RSX-11D systems are distributed as bootable 48K word systems where memory is partitioned as follows:
EXEC - Resident Kernel Executive
SCOM - Tables, Lists, Code, and Nodes
MCR - Partition for MCR and some MCR functions
GEN - General-purpose partition for user tasks and libraries, e.g., SYSRES

This configuration is the minimum recommended for a single-stream command system. Non-batch program development is possible with this configuration, but it is not recommended because of limited symbol capabilities for the assembler or compilers running in this smaller environment.

Multi-user System:

A 56K-word memory configuration with at least two million words of disk storage is recommended for concurrent program development and application execution. This provides adequate space for FORTRAN IV libraries, a background compilation of large FORTRAN programs, and residency of several handler tasks.

The distributed RSX-11D system requires an RK05J cartridge. Thus, more than one RK05 drive may be necessary to meet the disk storage requirements for an application. RSX-11D provides facilities for multi-user program development, but it is not a general time-sharing system.

MINIMUM HARDWARE REQUIRED:

One of the following Processor systems with bootstrap, KW11 clock, console terminal and at least 48K words of memory:

- PDP-11/34
- PDP-11/35, 11/40 with Extended Instruction Set and Memory Management Unit
- PDP-11/45, 11/55 with Memory Management Unit
- PDP-11/60 (in 11/40 mode)
- PDP-11/70
- One of the following disk systems: *Note: If RSX-11S systems are to be generated, at least 14 Megabytes must be available on a single disk drive.*
  1. RK11 Disk Cartridge Controller (includes one RK05J disk drive)
  2. RK611 Disk Pack Controller (includes one RK06 disk drive)
  3. RPR11 Disk Pack Controller (includes one RPR02 disk drive)
  4. RP11 Disk Pack Controller (includes one RP03 disk drive)
  5. RJP04/05/06 (or RWP04/05/06 for 11/70) Disk Pack Controller (includes RP04/05/06 drive)
- One of the following:
  1. An additional RK05J or RK05F
  2. An additional RK06 disk drive (for RK611 system only)
  3. TMA11 Magnetic Tape Controller (includes one TE10 or TS03 magnetic tape transport)
  4. TJE16/TWE16 Magnetic Tape Controller (includes one TE16 magnetic tape transport)

OPTIONAL HARDWARE:
Additional memory to a system total of 124K words, 1920K words on PDP-11/70 systems.

Processor Options:
PDP-11/34 Extended Arithmetic Element
PDP-11/40 Floating Point Instruction Set
Floating Point Processor

Clocks:
KW11-L Line Frequency Clock
KW11-P Programmable Clock
DL11-W Line Frequency Clock with Serial Line

Terminals:
LA30, LA36, LT33, LT35
VT05, VT50, VT52, VT55 (no MCR support is provided for escape sequences)

I/O Peripherals:
PR11 paper tape reader or PC11 Paper Tape reader/punch
CR11, CM11 or CD11 Card Reader
CTS11 Card reader/punch (available from Computer Special Systems)
LA35, LS11, LV11 (no software support provided for plotter)
LP11 line printer
LA180
XY11 Calcomp 563, 565 plotter (available from Computer Special Systems)
XY311 Calcomp 936 color plotter (available from Computer Special Systems)

Magnetic Tape Devices:
TA11 Dual drive cassette system
TC11 Dual DECtape system and dual transport
TMB11 Magnetic Tape System
TJU45, TJW45, TU45 Magnetic Tape System
TJE16 Magnetic Tape System

Disk Drives:
RX11 Floppy Disk System
RK11 Disk Cartridge System with RK05J or RK05F drives
RK611 Disk Pack Controller with RK06 disk drives
RPR11 Disk Pack System
RP11 Disk Pack System
RJP04/05/06 Disk Pack System
RF11 Fixed-head Disk System
RJS03 Fixed-head Disk System
RJS04 Fixed-head Disk System

Communications:
DC11 Single-line asynchronous serial line
DL11 Single-line interface
DJ11 Serial line multiplexor
DH11 Serial line multiplexor
DM11-BB Modem control for DH11
DZ11 Serial line multiplexor

Laboratory/Industrial Control:
AD01-D A/D converter
AFC11 A/D converter
UDC11 Universal Digital Controller
IDA11-AA Contact sense module
IDA11-AB Contact sense module
IDA11-BA Contact interrupt module
IDA11-BB Contact interrupt module
IDA11-CA I/O converter
IDA11-DA Solid state AC/DC driver
IDA11-EA Flip-flop DC driver
IDA11-FA Single shot driver
IDA11-GA Latching output relay
IDA11-HA Flip-flop output relay
IDA11-JA Single shot output relay
IAA11-AA Multi-range A/D converter
IAA11-BA D/A converter
IAA11-BB D/A converter
IAA11-BC D/A converter
IAA11-BD D/A converter

Data Acquisition:
One or more of the following subsystems:
● LPS11 Laboratory Peripheral Systems. Requires: LP11-S, LPSAD-12, LPSKW and LPSDR-A. Options:
  1. BA408/LPSAM-SG switch gain or LPSAM/LPSAM-E multiplexor
  2. LPSVC 12-bit D/A converter
  3. LPSDA D/A expander

PREREQUISITE SOFTWARE:
None

OPTIONAL SOFTWARE:
DECNET-11D
PDP-11 COBOL
FORTRAN IV-PLUS
RSX-11D/2780 Emulator Package
BASIC-11/IAS-RSX
CORAL-66, CORAL-66 FPP
ICS/ICR Handler

TRAINING CREDITS:

Four (4) – Consult the latest Education Services Catalog for available courses.

SUPPORT CATEGORY:

A – Software Support will be provided as listed in the Software Support Categories Addendum to this SPD

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer without additional charge. After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

ORDERING INFORMATION:

This software is furnished under a license for use on a single CPU and can be copied and modified (with inclusion of DIGITAL's copyright notice) only for use on such CPU, except as may otherwise be provided in writing by DIGITAL.

Standard options with no support services are only available after the purchase of one supported license. When a software license is ordered without support services, the category of support applicable to such software is Category C.

Source and/or listing options are only available after the purchase of at least one supported license and after a source license agreement is in effect.

The following key (D, E, F, R, T, Z) represents the distribution media for the product and must be specified at the end of the "Q" number, i.e., QJ580-AD = binaries on 9-track magnetic tape.

D = 9-track Magnetic Tape
E = RK05 Disk
F = 7-track Magnetic Tape
R = Microfiche
T = RK06 Disk
Z = No hardware dependency

Standard Options

QJ580   -A— Single-use license, binaries, selected source modules, documentation, support services (media: D, E, F, T)

QJ580   -C— Single-use license, binaries, selected source modules, documentation, no support services (media: D, E, F, T)

Source/Listing Options

QJ583   -E— Utility Program Sources (media: D, E, F, T)

QJ583   -F— Utility Listings (media: R)

QJ587   -E— Executive, Drivers, File System Utility, FORTRAN OTS sources (media: D, E, F, T)

QJ587   -F— Executive, Drivers, File System Utility, FORTRAN OTS sources (media: R)

QJ588   -E— Executive, Drivers, File System, FORTRAN OTS sources (media: D, E, F, T)

QJ588   -F— Executive, Drivers, File System, FORTRAN OTS program listings (media: R)

Upgrade Options

The following option is available as an upgrade kit from RSX-11M to RSX-11D for use on the same single CPU on which RSX-11M to RSX-11D is licensed. The license previously granted for RSX-11M shall be extended to cover this upgrade to RSX-11D.

QP580   -A— Single-use license, binaries, key source modules, documentation, support services (media: D, E, F, T)

QP580   -C— Single-use license, binaries, key source modules, documentation, no support services (media: D, E, F, T)

Update Options

Users of RSX-11D whose specified Support Category warranty has expired, or whose Standard Program Update Service has expired, may order under license the following software update at the then current charge for such update. The update is distributed in source or binary form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QJ580   -H— Update of binaries, key source modules, documentation, no support services (media: D, E, F)

QJ580   -N— Update of all Program Sources (media: D, E, F, R)

QJ583   -N— Utility Program Sources Update (media: D, E, F, R)

QJ584   -N— FORTRAN IV Compiler Sources Update (media: D, E, F, R)

QJ585   -N— Executive, Drivers, File System, FORTRAN OTS Sources Update (media: D, E, F, R)

Users of RSX-11D whose specified Support Category warranty has not expired may order under license the following software update for the then current media charge. The update is distributed in source or binary form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QJ580 -W— Update of binaries, key source modules, documentation, no support services (media: D, E, F)

Miscellaneous Options

QJ580 -G— Pre-delivery documentation kit (media: Z)

ADDITIONAL SERVICES:

QJ580 -3— Standard Binary Program Update Service (media: D, E, F)

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