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PROJECT PLAN FOR

RSX-11M VERSION 3.2

Submitted By: Clark D'Elia, Project Leader/Supervisor

Approved By: Frank Hassett, Software Engineering Manager

                Bill Heffner, RT/C Group Manager

                Kurt Friedrich, Software Product Manager

                Brad Glass, Software Quality Manager

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1.0   EXECUTIVE SUMMARY

1.1   Project Abstract

RSX-11M Version 3.2 is an updated release of the disk-based RSX-11M operating system. The main purpose of the project is to provide, in a timely manner, increased device support to extend our realtime product offering, to continue support for the low-end RSX-11M user, and to provide easier SYSGEN, auto patch kits and other ease-of-use features.

The development of RSX-11M V3.2 will have a schedule which is approximately 14 months from start to finish. This update to RSX-11M V3.1 will be developed to support new devices and to live up to our maintenance plan committment to ship updates at approximately one year intervals. It will contain fixes to all known bugs and will ship in April 1979.

1.2   Summary of Goals

The goal of RSX-11M V3.2 is to provide quality software with ease of use and support features and new device support for the small to middle-sized PDP-11 system.

1.3   Summary of Costs and Work Plan

See Business Plan and System Plan.

1.4   Summary of schedule and Milestones

The development of RSX-11M V3.2 will be done in stages. The completion of each stage will be marked by the combination of all new software into a Base level upon which the next stage of development will be done. Base levels will be spaced at approximately 2-3 month intervals.

The suggested schedule for RSX-11M V3.2 is for first customer shipments to begin April, 1979. In this time frame the following is scheduled:

Base level 23   30-Jun-78

Base level 24   15-Sep-78

Base level 25   15-Nov-78

Field test   01-Dec-78

Bare level 26   15-Feb-79

Submission to SDC   08-Mar-79

First Customer Shipments   19-Apr-79

In addition, RSX-11M V3.1 Auto-Patch kits will be submitted to the SDC
in the following months (quarterly starting with Q4 FY78):

May-78

Aug-78

Nov-78

Feb-79

2.0 DESCRIPTION OF PRODUCT

2.1 Problem Statement

The main purposes of RSX-11M V3.2 is to provide the following:

1. Bug fixes and ease of use enhancements

2. New device support

3. SCS-11 operating system kernel

Fixing of all known bugs and the distribution of auto-patch kits
should maintain customer confidence and enhance the viability of
update services. It should also help to create an even better
customer image as to the quality (and our dedication to that quality)
of the RSX-11M product.

Additional peripheral device support broadens the market in which
RSX-11M V3.2 can be sold and provides the capability to offer a larger
spectrum of competitive configurations.

The addition of new executive and MCR features stems from requests
made by the SCS-11 development group. RSX-11M V3.2 will be used as
the operating system kernel for that system.

2.2 Product Definition

2.2.1 New Features

Proposed enhancements are listed below. Note that items marked with an asterisk(*) are requested by the SCS-11 project. They will not be done if manpower is not provided by CSSG.

o Provide an optional (new RSX-11M PLUS) terminal driver to support the following features:

- limited type ahead
- full duplex operation
- VT100 support (ANSI escape sequences)
- DH11 DMA output exploitation
- fully buffered I/O internal to the driver

o Support of the following new devices will be added based upon hardware availability and completion of device drivers by the RT/C I/O Subsystems Group.

RX02 - .5 MB diskette
RX03 - 1 MB diskette
TS04 - 45 ips tape drive
TU77 - TU45 replacement (requires no software
       modifications)
RP07 - 300MB fixed media disk
TU78 - 125 ips (6250 bpi) tape system
RL02 - 10 MB disk
TU58 - .25 MB block-structured cartridge tape

o Provide a new high-speed backup/restore utility with the following goals:

- total volume or incremental operations
- back up an RP07 to TU78 in approximately 30 minutes
- replacement of DSC for middle- to large-sized systems

o Add new Executive features as follows:

- *Exit-with-status
- *Subset of the RSX-11M+ parent-offspring executive
  directives
- Task STOP-bit synchronization directives
- Support for the PDP-11/23 and 11/44 processors
- Add support for 2/4 file windows
- Clean-up of QIO processing to ease integration
  of user written ACPs.

o File System Improvements

- Use of 2/4 file windows

o   MCR improvements

    - Provide expanded HELP file
    - *A console device driver to control printing of
      console messages and logging of them to a console log
      file.
    - *A special INSTALL for semi-transparent multi-user
      task support
    - Generic device allocation
    - New commands (STOP, UNSTOP, SSM)
    - LOA/UNL improvements
    - Others TBS

o   SYSGEN improvements; improve human engineering by doing one
    or more of the following:

    - Provide system packages
    - Support for a standard FCSRES for system utilities
    - Provide a RSTS/TRAX-style program to dynamically
      detect online device configuration; or enhance the
      existing procedures performing the interactive
      portions of SYSGEN to use validation, auto-answer, and
      other techniques.

o   Repackage RSX-11S to allow for generation and host support on
    RSX-11M PLUS and IAS as well as RSX-11M V3.2.

o   Utility program enhancements

    FLX:

    - /-RW to inhibit magtape rewinding
    - 1600 BPI support
    - RX02/RX03, RK06/RK07, TU58, and RL01/RL02 support in
      RT-11 format. (Note that RT-11 automatic bad block
      replacement can not be supported.)

    SLP:

    - Checksum support
    - Support 132 byte input lines

    LBR:

    - *Provide support for a general library regardless of
      the contents of the modules (text, tasks, data, etc.)

    DMP:

    - /RW switch to allow user control of tape handling
    - An option to produce a detailed, labeled dump of
      Files-11 (ODS-1) file headers.

    BAD:

- Provide the ability to add bad block data manually to the last track without writing on the entire disk.

Volume Utilities:

- INI support for the RX02/03, RP07, and TU58
- MOU/DMO modifications to store volume labels for error logging, and allow multiple mounts

o Develop a new print spooler having the following capabilities:

- Support multiple line printers
- Store print queue on disk
- Allow user access to the print queue

o Error Logging

- Allow operator input to be stored in the error log
- Display the volume name on error reports (for mounted volumes)
- Support the RX02/03,TS04,TU77,TU78,TU58,RP07, and RL02

o Performance analysis -- this will be done by a joint effort between developers and Software Quality Engineers.

2.2.2 Additional Items If Funding and Man-power Are Available

o Multiple command line interpreter support

o Increase number of system global event flags (EFNs) using VAX/VMS implementation as a basis. (Note this must also be done in RSX-11M+ to be included in RSX-11M.)

o DCLS support as a SYSGEN option.

o KMC-11 Line Printer Controller driver

o LPA-11 support for 22-bit mode operation

o File System Improvements

- Mapping file windows in the ACP's address space, removing them from the executive pool.

- Create a 12K F11ACP to acquire additional address space for FCBs, windows, buffers, etc.

- FCS big buffering support.

2.2   Supplied Software - RSX-11M

The RSX-11M V3.2 System in addition to Executive Services, MCR Services, and I/O Drivers is supplied with the following software components:

1. A Files-11, ODS-I Compatible File System (F11ACP) in three packages of 2K, 2.5K, and 5K reflecting functionality, size, and speed options.

2. A subset MACRO-11 assembler (MAC-8K)

3. A full MACRO-11 assembler containing all features including floating point and Cross-Reference support (BIGMAC - 14K)

4. Task Builder with Global Cross Reference support (TKB) in three packages of 8K, 14K and 22K reflecting functionality, size, and speed options.

5. Interactive Editor (EDI)

6. Source Language Input Program (SLP)

7. Online Debugging Tool (ODT)

8. Executive Debugging Tool (XDT)

9. Post Mortem and Snap Shot Dump Program (PMD)

10. System Generation Procedures (Command files)

11. Bad Block Locator Program (BAD) capable of running both in on-line and standalone form.

12. Disk Structure Verification Program (VFY)

13. File Exchange Utility (FLX)

14. Peripheral Interchange Program (PIP)

15. Librarian Utility (LBR)

16. File Dump Utility (DMP)

17. Task Image Patch Utility (ZAP)

18. Test Routines/Sample Procedure

19. Disk Save and Compress Utility (DSC)

20. Cross Reference Program (CRF)

21. ANSI Magtape Support (MTAACP)

22. LOGIN/LOGOUT support (ACNT, HEL, BYE)

23. Multi-user support utilities (SHUTUP,BROAD)

24. Object Module Patch Program (PAT)

25. PRESRV - Volume Preservation Program - (for RK distribution only)

26. RMS-11 macro and subroutine libraries and utilities

27. File Compare Utility (CMP)

28. Line printer despooler (PRT) and optional enhanced spooler package

29. Indirect command file processor (...AT.)

30. Crash Dump Analyzer Program (CDA)

31. DEC standard editor (EDT)

32. New high-speed BACKUP/RESTORE Utility

2.3 Product Audience

RSX-11M V3.2 is targeted to the current users of RSX-11M (Realtime, process control and Communications/Networks) as well as sophisticated users who wish to operate a multi-user system for program development and running of applications.

2.4 Comparison With The Competition

Competitive data is available from Product Management.

2.5 Product Evaluation Strategy

See Section 11 (the QA Plan) that is provided by Software Quality Management.

1. RP07 system device

   24K memory

   and

   RH11/RH70 controller and one RP07 drive

   and

   TM11 controller and one TE/TU10 drive or,

   RH/TM02/03 controller and one TE/TU16 or TU45 or TU77 drive, or

   RH/TM78 controller and one TU78 drive or,

   TS11 controller and one TS04 drive.

2. RL02 system device

   24K of memory

   RL11 controller and two RL02 drives.

   For magtape distribution, the following is required:

   RL11 controller and one RL02 drive

   and

   TM11 controller and one TE/TU10 drive or,

   RH/TM02/03 controller and one TE/TU16 or TU45 or TU77 drive or,

   RH/TM78 controller and one TU78 drive or,

   TS11 controller and one TS04 drive.

3.4.2 Supported Hardware Options

RSX-11M V3.2 will provide support for the processor options, real time clocks, and peripheral devices currently listed in the V3.1 SPD. In addition, the following hardware options will also be supported.

RL11-RL02 Cartridge disk (Files-11 Structure - System Device)

RH11/RH70-RP07 Fixed Media Disk (Files-11 Structure - System Device)

RX211-RX02/RX03 Floppy Disk (Files-11 structure
    or RT11 format supported via FLX)

T(3 Tape Cartridge (Files-11 structure or RT11 format supported via FLX)

TS11 - TS04 Magtape (ANSI File Structured or DOS format Supported via FLX)

TM03-TU77 Magtape (ANSI File Structured or DOS format Supported via FLX)

TM78-TU78 Magtape (ANSI file structured or DOS Format Supported via FLX).

VT100 Alphanumeric Display Terminal

Note

DL11-E modem support for terminals will be available only with the optional new terminal driver.

3.5 Support Cost Goals

I(is our goal to reduce support costs below the levels for RSX-11M V3.1 (see section 7.0).

3.6 Reliability Goals

RSX-11M V3.2 will support error logging of device errors for all disks and tapes as well as logging of CPU parity errors on the PDP-11/44/60/70/74 processors. These features should improve the reliability of the total system by catching devices as they begin to fail; total system uptime should thus be increased. The software system goal is to be at least as reliable as previous versions of RSX-11M.

3.7 Trade off of Priorities

The key goal of RSX-11M V3.2 is to provide a reliable system update release in a timely manner. Key items in order of decreasing importance are the following:

Reliability of Software -- Released on schedule.

N(Device Support

SYSGEN and other ease-of-use enhancements

New high-speed disk backup/restore

New terminal driver

New print spooler

RSX-11S support for IAS

Time will be traded off for the inclusion of the above features, however the system will not be released until we are satisfied with its reliability.

4.0   RELATIONSHIP TO OTHER PRODUCTS

4.1   Relationship to Other System Projects

4.1.1   RSX-11M V3.2 with RSX-11M PLUS V1

RSX-11M PLUS was based on RSX-11M V3 but has undergone significant internal redesign and enhancement expecially to make the system more attractive in the high-availability and commercial environments.   It will be marketed for the very high-end PDP-11 systems. Therefore, RSX-11M remains the major multi-tasking, real time system for the corporation.

4.1.2   RSX-11M V3.2 with RSX-11D V6.2

A significant amount of functional overlap (about 80%) will exist between RSX-11M V3.2 and RSX-11D V6.2. RSX-11M requires significantly less memory (approximately one half) and, with the exception of the CD11 card reader, supports more peripheral devices.

RSX-11M will compete best in situations where:

    1. The lowest price is important,

    2. A specific laboratory job is required

    3. Realtime response and/or network throughput is essential, or

    4. RMS facilities, BASIC+2, or COBOL V3 are required.

4.1.3 RSX-11M V3.2 with RT11-F/B

RT11-F/B is targeted toward single (one-at-a-time) task operation with parallel program development in the background. As such, an overlap with RSX-11M V3.2 exists, but this overlap is minimal and will allow our customers to make trade-offs (single user vs. multi-programming, smaller executive size vs. RSX-11 compatibility, etc.) within a range of DEC products rather than buy from our competitors.

4.1.4 RSX-11M V3.2 with IAS

As compared with RSX-11D V6.2 there will be a lesser amount of overlap in functionality between RSX-11M V3.2 and IAS. RSX-11M will require significantly less memory. However, IAS is targeted to the large multi-function open shop environment.

4.1.5 RSX-11M V3.2 with RSX-11S V2.2

RSX-11S V2.2 is a subset of RSX-11M V3.2 and will be directly generatable from the latter. In addition, RSX-11S V2.2 will be packaged such that RSX-11M PLUS, IAS and RSX-11D V6.2 may also serve as host systems.

4.2 RSX-11M V3.2 Dependence on Other Projects

RSX-11M V3.2 is dependent upon the RT/C I/O Subsystems Group for writing drivers for the TU58, TU78, RX02/RX03, RP07 and TS04 as well as for maintenance and enhancement of all disk and tape drivers.

Maintenance and enhancement of the file system software (F11ACP, MTAACP, MOU, DMO, UFD, INI, BAD, FCS, DSC, PRESRV, PIP, DMP and VFY) rests with the RSX Files Group.

Support of RMS-11 as well as the RMS utilities resides with the Commercial Software Systems Group. Because the basic RMS-11 software is bundled with RSX-11M, an up-to-date, releasable RMS-11 package should be available by the Field Test base level. (Current indications are that this should be RMS-11 V1.8.)

The Commercial Software Systems Group is responsible for providing an updated version of EDT, the DEC standard editor, for release with RSX-11M V3.2.

Support of user mode diagnostics will be done by Diagnostic Engineering. Additional diagnostics for new devices (RL02, RM03, TS04, RK07, etc.) will also be their responsibility.

We are heavily dependent on outside groups that provide layered products to run on our system (compilers, DECNET, etc.) to ensure that they operate properly and can be integrated into the system easily by our users. Because these products are so numerous, we expect our involvement to be limited mainly to technical consultation and production of base levels for testing.

See the RSX-11M V3.2 System Plan for a detailed list of dependencies.

4.3   Dependence Of Other Projects on This Project

SCS-11 (Small Commercial System) will be using RSX-11M V3.2 as the operating system kernel.

4.4   Relation to Applications Software

Applications software consisting of nonprivileged tasks which were developed for RSX-11M V3.1 will continue to operate under RSX-11M V3.2. Privileged tasks which interface to system data structures will require little or no modifications.

5.0   APPLICABLE STANDARDS

5.1   Extant Standards

The following approved standards are supported:

    DEC 125 Cassette Format
    DEC 051 Coded Character Sets
    DEC 112 Data Format for Output
    DEC 109 Drive Selection
    DEC 110 Escape Sequences
    DEC 111 Terminal Synchronization

5.2   Pending Standards

If the new command language interface is to be implemented (see Section 2.2.2), the Digital Command Language specification as implemented on RSX-11M PLUS will be used.

5.3   Standards Needed or Suggested

A good Macro-11 Assembly Language Programming Standard should be available.

5.4   Compatibility

Compatibility with RSX-11M V3.1, RSX-11M PLUS V1 and the existing VAX-VMS AME will not be disturbed.

6.0   DEVELOPMENT REVIEW BOARD

The development review board will be responsible for reviewing all functional specifications relating to RSX-11M V3.2. It will be their responsibility to consider compatibility items and support of their products by RSX-11M V3.2.

Kurt Friedrich - Product Manager
Brad Glass - Software Quality Manager
Frank Hassett - Software Development Manager
Clark D'Elia - Software Development Supervisor
Ed Sapp - Operations Group Software Services
e Cutler - VAX-VMS Development
Ray Modeen - DECnet Project Leader
Howard Lev - Software Development Manager
Eric Polleck - Software Development Supervisor
Eric Baatz - Software Development Supervisor
Bill Munson - Software Development Manager
Charlie Santos - Software Quality Management
Bill Page - Software Development Supervisor
John Morgan - CSSG Development Manager
John Holz - IPG Software Application Manager

7.0   PLAN TO REDUCE SUPPORT COSTS

We are actively working with Software Quality Management, Software Services, and Educational Services to improve the system generation process. The goal of this effort will be easy RSX-11M installation. In addition, development personnel are committed to provide consultation and documentation review services to aid in the production of the RSX-11M Software Support Manual.

As part of this development project, machine readable auto-patch kits for RSX-11M V3.1 will be produced on a quarterly basis starting with · 1978.

8.0   COMPONENT PLANS

Being a mature product, RSX-11M work will be mostly involved in modifying the existing software.

9.0 DEVELOPMENT STAFFING AND WORK PLAN

9.1 Staffing Plan

Modifications to the Executive, MCR, file system and the Utilities will be performed by members of the RSX Development Group. Modifications to the device drivers will be provided by the RT/C I/O Subsystems Group. In addition, one programmer from the SCS-11 group will be located in Tewksbury to contribute to the RSX-11M development effort while at the same time gain extensive system exposure.

9.1.1 Programmers/Designers

Name	Principal Function
Clark D'Elia	Management and Design
Jim Matthews	Programming and Design
Bernie Alimonti	Programming and Design
Charles Spitz	Programming and Design
Paul Kobar	Programming and Design
Mike Harvey	Programming and Design (LPA11-K)
Debbie Girdler	Programming and Design (Fast Backup)
Dale Donchin	Programming and Design (Fast Backup)
Walter Dunaj	Performance Evaluation (SQM)
Mike Harrison	System packages and SYSGEN ease-of-use (SQM)
On Loan	Programming and Design (from SCS-11)

9.1.2 Project Leader

Clark D'Elia

9.1.3 Staffing By Quarter

See System Plan.

9.1.4 Funding By Quarter

See System Plan.

9.2 Software Development Strategy

A base level development cycle will be employed periodically merging new functionality into the previous base level. Each Base level will be designed so that critical Software components are available at the proper time for work to procede on the new features.

9.2.1 Mandatory Tasks

- Provide maintenance to existing system code

- Produce quarterly auto patch kits for RSX-11M V3.1

- Provide SYSGEN ease-of-use improvements

- Provide new mass storage device support

- Provide RSX-11S support for IAS

- Write a high-speed disk backup/restore utility

- Provide new terminal drivers for optional use

- Provide enhanced print spooler functionality

9.2.2 Optional Additional Tasks

See section 2.2.2.

9.3 Code Reviews

9.3.1 Code Review Plan

Spot checks on the quality will be made by Clark D'Elia, Eric Baatz and Eric Pollack to ensure that a high quality level is upheld. Newer

members of the group will be subject to more intensive supervision and
code reviews.

9.3.2 Code Reviews

Code will be reviewed by the senior members of the development team.
These reviews will be entirely internal to the RSX-11M group and will
be conducted on an as needed basis.

9.4 Hardware Requirements

This development schedule is dependent upon the availability of
adequate hardware resources. Insufficient resources at suitable ECO
level will adversely affect the schedule and cause a slippage.

Starting in Nov-78, we must have access to prototypes for the 11/23
and 11/44 processors. The engineering configurations must be usable
to an operating system developer in that they include at least 32K of
memory initially and that they have a minimum of two RL01 (or RK05)
disk drives or one disk drive and a magnetic tape unit (800 bpi,
9-track).   (Note that systems configured with only floppy disks as a
system device are unacceptable.) To test fully the extended addressing
of the 11/44, that processor must have a minimum of 128K of memory by
1-Jan-79. We will require up to 10 hours a week access starting
1-Dec-78.

9.4.1 Development Configurations

As much development as possible will be done on SYSTEM #10350, which
contains all the master source disks and will run the most recent base
level of RSX-11M. This machine will be used for editing source
modules, assembling and linking and testing of all nonprivileged
tasks. It will also be used for building base levels of the software.

System #10350 will be transferred to another cost center in September
1978; system #10625 will become its replacement.

In addition, it is recognized that a standalone configuration must be
available for at least 4 hours a day. This should be system #372.

9.4.2 Debugging Configurations

Various other configurations available in the Tewksbury computer room
will be required averaging a total of 2 hrs per day until SDC
submission. This time requirement will usually occur in bursts of
longer time requirements but should average 2 hrs per day.

9.4.3 Where located

All machines must be located in the Software Development facility in Tewksbury.

9.4.4 Machine Time Needs During Each Phase

System #10350 (or replacement) must be available 24 hours per day during the entire development cycle.

Other machine utilization will average approximately 2 hours a day of prime time. For the two weeks preceding field test and submission to SDC (during the checkout of the packaging) we will require up to 12 hours a day of prime time on various configurations.

9.4.5 Special Hardware Required and Dates

Special hardware requirements exist only with respect to new device support. Concerned hardware engineering groups should consult with the supervisor of the RT/C I/O Subsystems Group for coordination. In general, fully operational prototype hardware must be available at least 1 month prior to the Base Level listed in section 10.2 below for inclusion of the device driver into that Base level.

To ensure proper integration and support for the new processors (11/23 and 11/44), we should have access to the prototype hardware no later than 1-Dec-78.

10.0 IMPLEMENTATION PLAN

10.1 Major Activities and Gating Factors

Successful project completion depends upon meeting machine configuration/time requirements set forth and timely delivery of related software components. In addition, the timely fulfillment of programming staff is viewed as a major dependency.

10.2 Major Milestones

The major milestones for RSX-11M V3.2 will be the completion of the base levels on time. The major content of each Base level is as follows:

Base Level 23   30-Jun-78

Preparation of functional specifications complete
Staffing complete
New Terminal driver running

Base Level 24   15-Sep-78

Device drivers available for RL02,RP07,TS04,TU77, and RX02/03
STOP-BIT directives

Base Level 25   15-Nov-78

Device driver available for TU58
New Print Spooler
New Backup/Restore Utility
Sysgen Improvements

Field Test   01-Dec-78

Base Level 26   15-Feb-79

Device driver available for TU78
Support for 11/23 and 11/44 processors
Sysgen Improvements

Submission to SDC 08-Mar-79

First Customer Shipments 19-Apr-79

10.3   Risks and Contingency Plans

Fulfillment of staffing in a timely manner is viewed as a major risk.
Failure to obtain critical team members by June, 1978, will cause the
delay of the product or the dropping of portions thereof. In
particular, the following potential impact is foreseen:

   - Failure to obtain SCS-11 programmer will result in the
     elimination of new executive features and new MCR features as
     indicated in section 2.2.1.

Slippage of hardware engineering projects has placed in jeopardy total
support/integration into the system for the following devices:
RP07,TS04,TU78. Our development efforts for these devices must be
accomplished totally using prototype hardware. Announcement of
official device support for these (and all other new hardware) will
not be made by the product manager until the software is successfully
tested on production hardware.

Prototypes for the new processors (11/23 and 11/44) should be
available for testing software by 1-Dec-78. Failure to gain adequate
access to the hardware will result in limited or no support for the
new processors in RSX-11M V3.2.

10.4 PERT and Milestone Techniques

PERT will not be used. Detailed monthly reports will be prepared
listing milestones met and missed, work in progress, work completed,
and work planned for succeeding month.

11.0 DOCUMENTATION STAFFING AND WORK PLAN

11.1 Writers

The RSX-11M group and the Technical Writing Group (headed by Don Van
Volkenburg) will be responsible for all RSX-11M V3.2 documentation.

11.2 Documentation Strategy

See Documentation Plan.

11.3 Documents

See Documentation Plan.

11.4 Documentation Reviews

Manual review is a serious undertaking. We will provide two weeks for
review and construe lack of written comment as agreement that the
quality of the manual is, from the reviewer's point of view, up to
DEC's high standards.

Two reviews will be conducted with the first considered the most
critical. This review will occur at the completion of the initial
draft and has a wider distribution. The second review has limited
distribution and incorporates reviewer comments and will be the
signoff copy.

Initial reviews will be conducted by:

    1. RSX-11M/M-PLUS Team members

2. A Software Support representative

3. A Training representative

4. A Software Writing representative

5. A Software Quality Engineering representative

6. A Marketing representative

7. A Product Management representative

8. A Software Development Management representative

9. An RSX-11D/IAS representative

10. A DECNET representative

11.5 Documentation Reviewers

All RSX-11M developers plus:

Ed Sapp	(Software Services)
Carl Rehbein	(Software Services)
Francios Nouvion	(Training)
Don Van Volkenburg	(Tech Writing)
Charlie Santos	(Software Quality Engineering)
Carl Ralston	(LDP Marketing)
Bernie LaCroute	(VAX Product Manager)
Pete Kilbourn	(OEM Marketing)
Rod Flakes	(IPG Technical Services)
Kurt Friedrich	(Software Product Management)
Frank Hassett	(Software Development Management)
Roger Allen	(IAS)

11.6 Machine Time

Machine time requirements for writers will be determined by the Documentation group and described in their detailed plans.

12.0   QUALITY ASSURANCE PLAN

12.1   QA Strategy

The purpose of this section is to describe the plans for assuring the
quality of RSX-11M V3.2 before its release to SDC. A significant part
of quality assurance is the test process itself, the stages of and
plans for which are described below.

However, this test process is made much simpler, and the resultant
quality of the product higher, if the entire design and development
process is geared toward planning for testing and "building quality
in" rather than "adding it on" or waiting until the end of the
development cycle to see if it's there. To that end, it is incumbent
on every developer and documenter to plan for quality in terms of both
design and development. Individual work plans should reflect this, as
the system must be successfully subjected to the testing described in
the following sections before development is considered complete.

12.2   Unit and System Testing

Unit and System Testing are the responsibility of the development
group.   Each RSX-11M programmer and documenter is responsible for the
quality of his work, both in terms of its design integrity and as
ultimately perceivable by the user when it becomes part of the total
system. Exhaustive unit testing of the programmer's own design must
be completed for each component before it can be integrated with the
system (which in this case is RSX-11M V3.2).

Integration testing will be conducted using the traditional "building
block" approach.   As individual components successfully complete the
unit test phase described above, they will be integrated with the
existing base system to form a new base level. Base level contents
and dates are described elsewhere in this document. The criteria for
satisfying the requirements of each base level are defined in the
RSX-11M V3.2 System Plan, and will be used by SQM to monitor and
measure development progress.   The System Plan also defines
responsibilities of other groups that must be synchronized with
efforts described in this plan in order to produce a complete system.

System testing will be that test phase conducted on the last
"development" base level; that is, all coding, unit testing and
integration testing is done (the complete system exists). Again, see
the System Plan for specification of System Test entry criteria.
System Testing will be conducted by the development group on the
development machine, by all users of that machine, by Software
Services and by Manufacturing as described below.   Specific tests
developed by SQM and the developers must be run to address system
functionality, response, performance and documentation.

Special emphasis will be placed on new functionality, but from the prospective of how it relates to the operation of the total system. Successful completion of System Test as defined in the System Plan is a necessary condition for progression to the Field Test Phase described below.

12.3 User Environment Testing

As each defined base level becomes available, it will be subject to heavy use in the Manufacturing sites via exercise of the RSX-11M User Environment Test Package (UETP) developed by SQM. UETP development plans will be constructed to allow this to be possible. SQM and Engineering will also use this package to address system functionality for each base level. This test is incremental to other tests described herein. As such it is a necessary, but not a sufficient base level requirement. SQM will assess system "goodness" based on UETP execution results at all locations. Manufacturing is expected to continue heavy use of the field test base level and the UETP in parallel with the Field Test Phase described below.

12.4 Field Testing

The purpose of Field Test is to help establish the level of confidence that we have in a system before it is released to customers on an unlimited basis. This is possible because the system is exercised in customer environments chosen because of their ability to address system functionality in ways that we cannot duplicate or do not have adequate resources to make it feasible.

Field Test is incremental to system test. It is not a substitute for it, and as such must be defined as a distinct part of the development process. It is further constrained by the fact that it is a serial effort. Field Test cannot begin until design, code, unit test, integration test and system test are all complete as defined in the system plan. We should send a system to the field test with the idea that a problem is an exception rather than a rule. The planned Field Test period for RSX-11M V3.2 is two and one half months long. A detailed Field Test Plan will be a part of the RSX-11M V3.2 System Plan, and will be authored by SQM in conjunction with Product and Development Management and Software Services.

12.5 Demonstration Tests

None Planned.

12.6   Documentation Assurance

One of the primary ways that the quality of the system is measured by the user is via the documentation. A new user needs it to start his work; an experienced user needs it in order to take advantages of new features and to understand changes to the systems. Documentation should undergo all the phases of test that the software undergoes. The responsibility for conducting these tests is a joint effort among documentation development and SQM groups. The documentation must be field tested along with the software. It must therefore be complete at the start of Field Test (See the System Plan).

12.7   Human Factors Evaluation

Human engineering concerns relating to the use of the system software, the user documentation, and the system generation process will be addressed by SQM in their testing efforts. Additionally, one of the elements of feedback from customers during field test will include an implicit evaluation of human factors considerations for both software and documentation.

12.8   Work Plan

Test Development will be conducted by development (unit, integration, system tests), SQM (UETP) and Software Services (miscellaneous).

Schedules and milestones for the QA process are included in the System Plan, as they relate to the entire system.

12.9   Release Criteria

The singlemost important criterion for the release of RSX-11M V3.2 is quality. At no time and for no reason will quality be compromised. The criterion of "quality" is implemented by way of specific criteria for each phase of testing described above. Again, these criteria, with a schedule for their completion are contained in the System Plan. SQM will be responsible for determining whether or not these criteria are met, and will provide information to the Product Manager, who has the ultimate release decision responsibility.

13.0 DISTRIBUTION PLAN

13.1 Release Packages

Each RSX-11M V3.2 distribution kit contains a bootstrappable system capable of running on the minimum configuration for which it is intended. All system components required to run and generate custom tailored RSX-11M V3.2 systems are also included in the kit.

The software kit provided with each RSX-11M V3.2 system contains both source and binary modules (source is provided to enable the requisite conditional assemblies which minimize the size of the executive). The software kit includes:

Source Modules

1. Executive (includes Executive Debugging Tool)

2. I/O Drivers

3. File system (F11ACP)

4. MCR routines (MCR)

Binary Modules

1. MACRO-11 Assembler (subset and full)

2. Task Builder (TKB)

3. Interactive Editor (EDI)

4. Source Language Input Program (SLP)

5. Peripheral Interchange Program (PIP)

6. File Exchange Utility (FLX)

7. Disk Structure Verification Program (VFY)

8. File Dump (DMP)

9. Online Debugging Technique (ODT)

10. Object Module Patch Program (PAT)

11. Librarian (LBR)

12. Test Routines/Sample Procedure

13. Post Mortem and Snap Shot Dump Program (PMD)

14. Bad Block Locator Program (BAD)

15. Task Image Patch Utility (ZAP)

16. Disk Save and Compress Utility (DSC)

17. Global Cross Reference Program (CRF)

18. ANSI magtape system (MTAACP)

19. Multi-user Protection Programs (ACNT, SHUTUP, BROAD)

20. Line printer despooler and optional enhanced spooler package

21. RMS-11 macro and subroutine libraries and utilities

22. File Compare Utility (CMP)

23. Crash Dump Analyzer Program (CDA)

24. DEC standard editor (EDT)

25. New high-speed BACKUP/RESTORE utility

The content of the documentation kit is specified in the Documentation
Pil .

13.2 Forecast Per Quarter by Type of Distribution Medium

See Business Plan.

13.3 Pre-Release Policy

Due to the availability of sites for field test, there will be no
pre-releases of this product. After RSX-11M V3.2 is submitted to the
SDC, software pre-releases may be made by the Product Lines or by
Software Services. All requests must be approved by the Product
Manager. Preparation of the distribution media, documentation
availability, and support become the sole responsibility of the
requesting party.

13.4   Subsequent Release And Policies

To be supplied as part of business plan.

13.5   Software Support Distribution Packages

Software support's automatic distribution system will be utilized in
distributing software kits to specialists.

14.0   TRAINING PLAN

14.0.1   Software Support Training

Minimal Software Support training should be required for RSX-11M V3.2
beyond that already provided for RSX-11M V3.1. A one or two day
seminar covering RSX-11M V3.2 enhancements and new facilities should
be sufficient.   Key development personnel will be available for
consultation and initial presentations.

14.0.2   Customer Training

The existing RSX-11M course will be adaptable to RSX-11M V3.2 with
minimum effort.

15.0   SOFTWARE SUPPORT PLAN

TBS.

16.0   MAINTENANCE PLAN

16.1   SPR Plan

SPRs for RSX-11M V3.1 will be supported for 6 months after the release
of V3.2 from the SDC. After that time, only V3.2 will be supported.
Furthermore, no intermediate base levels will be supported beyond the
generation of the next; therefore, it is a requirement that layered
software products be based on the final V3.2 released system.

16.2 Maintenance Release Plan

No specific maintenance release is scheduled. However, auto patch
kits will be created quarterly for RSX-11M V3.1.

17.0 POST RELEASE PLAN

17.1 Post Partum Review

Post Partum Review for this project will be held by the Software
Quality Manager.

[End of Project Plan]