

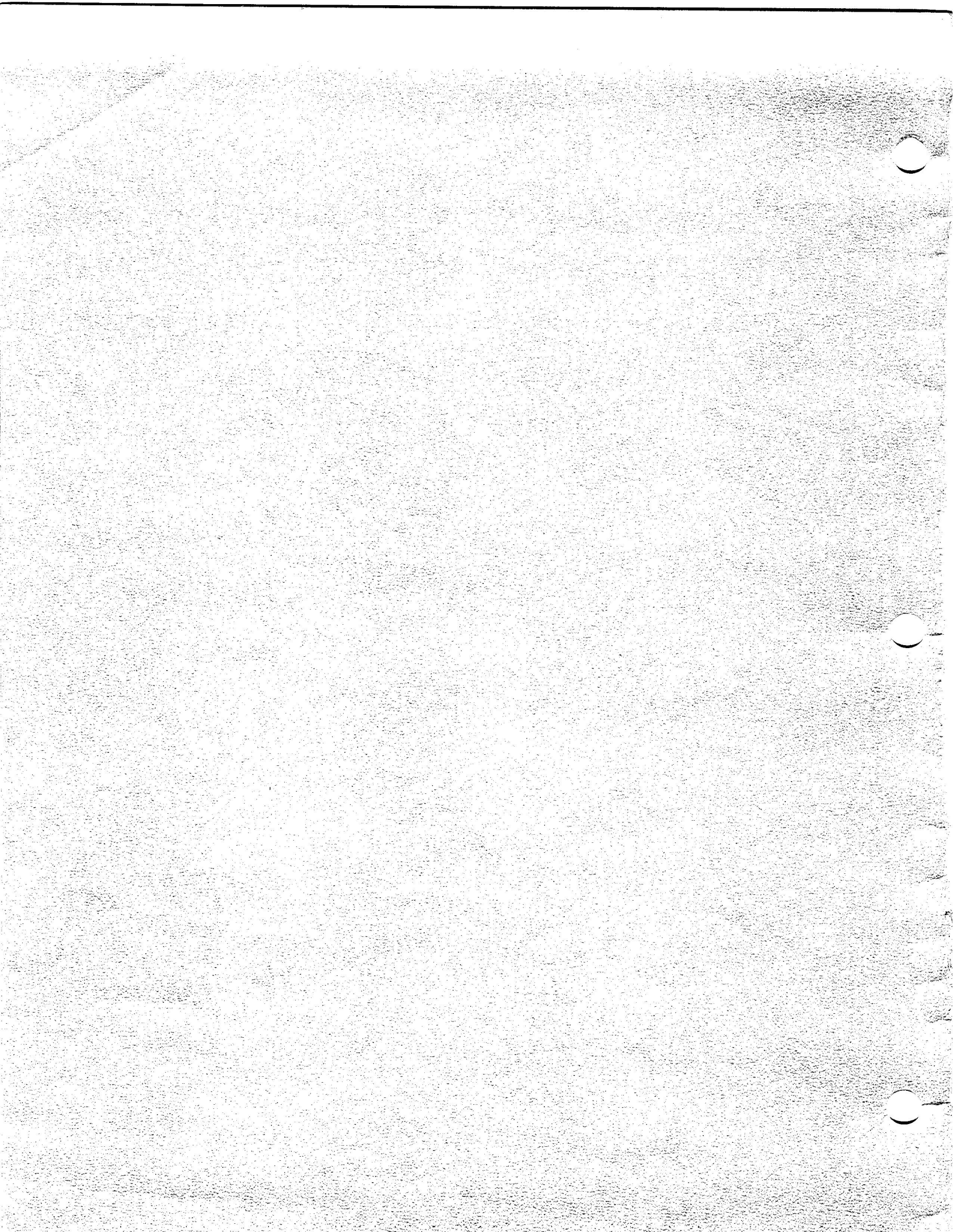
The Cache Buffer

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JANUARY 1985 ISSUE

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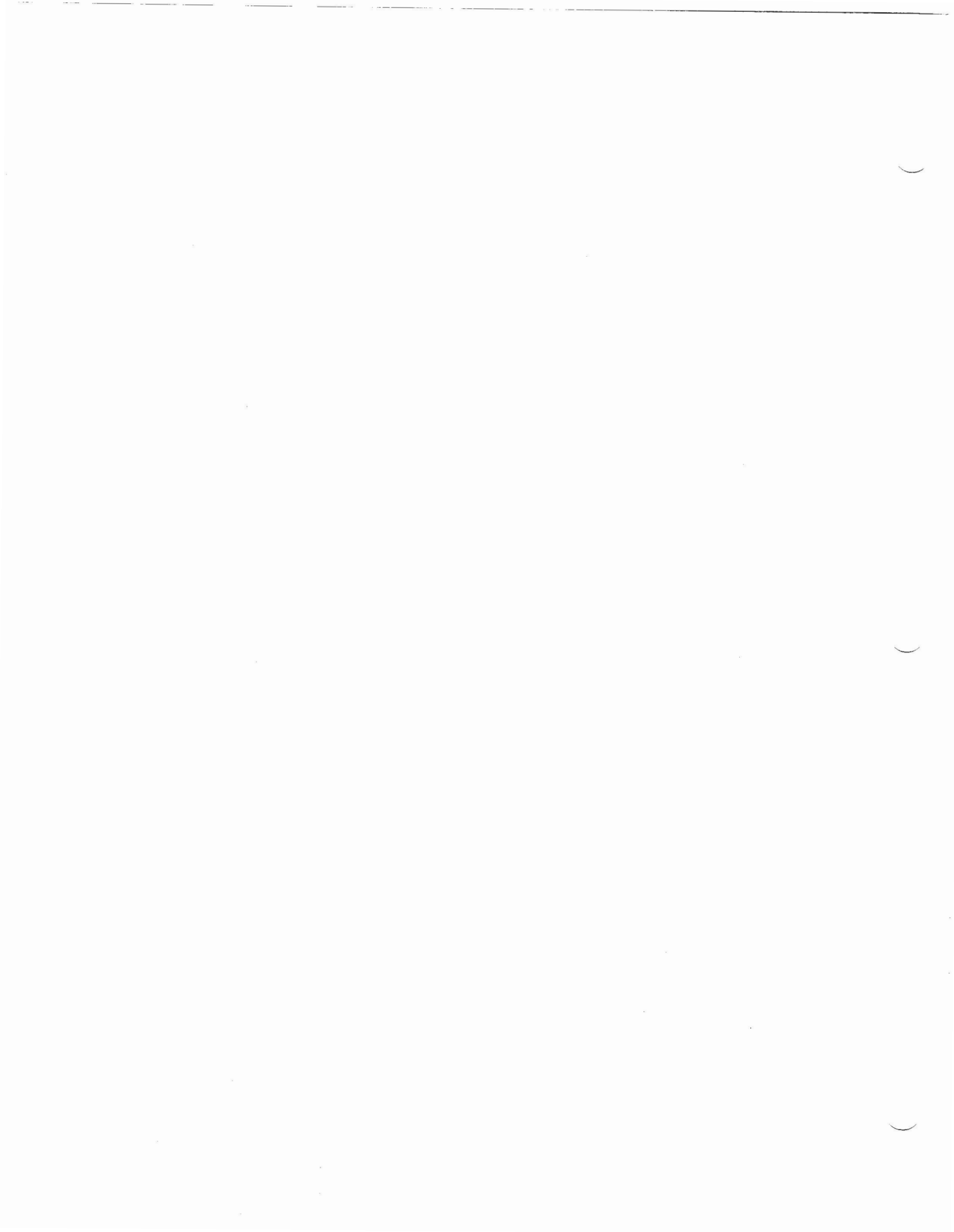




RSTS SPECIAL INTEREST GROUP
NEWSLETTER

IN THIS ISSUE

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FROM THE EDITOR

Well at long last, a RSTS newsletter has arrived!! Since you last received a copy of this fine publication, many things have changed. In Cincinatti at the Spring '84 symposia, I was asked to fill the RSTS/SIG newsletter editor post and I agreed.

Since that time, I have spent many hours trying to decide just what this new position was and what responsibilities it held. To my dismay, I learned that one of the reasons my predecessors deserted thier post was a lack of participation by the RSTS community. A newsletter by definition must contain some news, and since we have no regional reporters (not yet), I must rely on the community at large to submit news and other items of interest. So, as a result, I am now publicly begging for submissions and at the same time publicly apologizing for the lack of content in this first issue of mine.

Enough of the groveling. In this issue we do have a letter from our illustrious sysmposia scheduler describing the RSTS events taking place in Anaheim, some excerpts from the RSTS development team presentations in Cincinatti, and a couple of reprints in an area I would like to designate as the RSTS ANTIQUES column.

In the future, I would like to develop a couple of regular columns for the newsletter. One area I am definately going to include provided I have material to do so is the column I referred to as RSTS ANTIQUES. Many of you have these valuable antiques just laying around the office or computer room gathering dust. It could be an old BASIC SPD, some really obscure RSTS sales literature that some long forgotten salesman left you, or any other interesting or unique piece of junk that you care to submit. I will welcome (and most certainly use) any submission, so feel free.

Another idea presented to me at Cincinatti, was the concept of regional reporters. These reporters might be designated by local user groups or just be someone active in the RSTS community as a whole and be from a particular geographical region. Anyone wishing to volunteer (or volunteer someone) please send me your name, address, a daytime telephone number, and some backround information about yourself and I will try to contact you as soon as possible.

Well thats about it for this issue. Please submit all articles, antiques or other information to me at the address below. I will try to publish another newsletter as soon after the first of the year as possible. Thanks for you patience and I hope we can keep the ball rolling.

Bill.

send submissions to:

W.H. Hobbs
Director of Operations and Services
Computerized Management Decisions, Inc.
6535 E. 82nd. St. Suite 102
Indianapolis, IN. 46250

PREVIEW OF THE FALL 1984 DECUS SYMPOSIUM

S.W.Pandorf, RSTS SIG Symposia Coordinator

I would like to take this opportunity to invite you to attend the Fall 1984 DECUS Symposium in Anaheim California, December 10-14 1984. The symposia is always an exciting, informative week, and Anaheim will be no exception. RSTS sessions will range from VERSION 9 UPDATE AND OVERVIEW to RSTS 'Magic'.

Of particular interest to the RSTS Community this time is the pre-symposium seminar, sponsored by the RSTS SIG, scheduled for Sunday December 9th.

This session will be chaired by Bruce Gaarder of Macalester College, a past RSTS SIG Chairman, and long time RSTS and layered product field test site. This tutorial is designed for those attendees who would like to have a step-up on the new release, and while it is not designed as a version 9 overview it will touch on many of the version 9 enhancements, and how the various field test sites worked with, and adjusted to, these new features.

The SIG is sponsoring this session after a long hiatus from pre-symposium seminars, we encourage you to register and attend.

Beginning Monday, December 10th, we have a very full week of RSTS sessions planned, and as is usual for the fall symposium there is a strong showing of both Digital and User sponsored sessions, the roadmap follows, but here are a few of the highlights:

Monday morning, roadmap, business meeting and ELECTIONS (finally, see associated articles this issue). RSTS futures, and the 'latest and greatest' on version 9 (Digital should be at the end (hopefully!) of the field test cycle, so the final makeup of the version 9 release should be almost 'cast-in-stone'). On Monday evening there are two

sessions of particular note, Mike Mayfield will be giving a session on advanced performance tuning techniques, and Mike and Steve Edwards will give the RSTS community its first 'Magic' session! This should be an exciting, and interesting, evening.

Tuesday has generally been left open for attendees to participate in some of the other layered product sessions, however, two sessions of note are the 'PDP-11 SORT/MERGE version 3', and 'Calling SORT/MERGE version 3.0' sessions.

Wednesday is again a full RSTS day, with today being the RSTS/OA day, tech tips, wish list, and a user paper on 'REMOTE SITE SUPPORT FOR RSTS SYSTEMS'.

Thursday starts with a session change, Digital due to other conflicts will not be able to give the talk on version 9 installation (however the material will be included in the overview session), so instead the SIG will sponsor a version 9 field test Question and Answer Session. If you have a question about version 9, ask it here. Other sessions throughout the day will center on specific aspects of the version 9 release. Of note on Thursday are two sessions, one the often requested, but never given (until now) session 'RS232 MAGIC - MODEMS and CABLES', and finally is the always well received session on 'CREATING A WELL STRUCTURED RSTS RDS1 DISK' by Wef Fleischman.

Friday is also a full RSTS day with sessions scheduled on 'RMS-11 TUNING', 'CACHING WELL', and others. Of note, since we do indeed have a Spring 1984 SIG tape, and plan to have a Fall 1984 SIG tape as well, there is a chance for you to find out, in advance, what's going to be on the Fall tape.

Once again, plan to attend, we'll look forward to seeing you in Anaheim.

SWPandorf Indianapolis, IN October 1984.

ROADMAP FOR ANAHEIM

This is the RSTS Roadmap for the Fall 1984 DECUS Symposium in Anaheim. It outlines all of the sessions (DIGITAL,USER,SIG) sponsored by the RSTS SIG. This document is intended to be a starting guide for the Fall symposium, it is not exhaustive, nor does it indicate any session changes or BOF (Birds-of-a-Feather) sessions that may be scheduled at the symposium.

SWPandorf Indianapolis October 1984.

RSTS Fall 1984 Symposium

Sessions by Day and Time

| Sessn | Title | Day | Time | Chair |
|-------|-------------------------------|-----|-------|----------------|
| RS001 | RSTS Opening Session | MON | 09:00 | SWPandorf |
| RS016 | RSTS/E Futures | MON | 10:30 | Scott Daily |
| RS017 | Future RSTS Hardware Support | MON | 11:30 | George Wyncott |
| | --- LUNCH --- | | | |
| RS020 | Overview of RSTS version 9 | MON | 13:30 | SWPandorf |
| RS035 | PDP-11 Hardware Planning | MON | 15:30 | Jeff Killeen |
| RS032 | RSTS Directory Structure | MON | 16:30 | Scott Daily |
| | --- DINNER --- | | | |
| RS022 | DCL Enhancements for V9 | MON | 19:00 | George Wyncott |
| RS014 | Advanced RSTS Tuning | MON | 20:00 | William Hobbs |
| RS012 | RSTS Magic: Advanced Tips | MON | 21:30 | SWPandorf |
| RS015 | Office Applic. for RSTS | WED | 09:00 | SWPandorf |
| RS010 | DECWORD/DP Enhancements | WED | 10:00 | SWPandorf |
| RS030 | DECNET V2.1 Overview | WED | 11:00 | SWPandorf |
| | --- LUNCH --- | | | |
| RS005 | Tech Tips I (SPR) | WED | 12:30 | Jeff Killeen |
| RS008 | RSTS Remote Site Support | WED | 14:00 | SWPandorf |
| RS019 | RSTS Layered Product Panel | WED | 15:00 | Phil Hunt |
| RS003 | RSTS MENU Session 1 | WED | 16:00 | John Doyle |
| RS033 | RSTS V9 Field Test Panel | THU | 09:00 | Jeff Killeen |
| RS006 | Tech Tips II (Bits and Bytes) | THU | 10:00 | Jeff Killeen |
| | --- LUNCH --- | | | |
| RS021 | Acct Mgmt on RSTS V9 | THU | 13:00 | William Hobbs |
| RS025 | VMS Style Login Restrict. | THU | 14:00 | SWPandorf |
| RS018 | Async. I/O under RSTS V9 | THU | 14:30 | Tim Gardner |
| RS023 | MICRO/RSTS V1.1 and beyond | THU | 15:30 | William Hobbs |
| RS036 | RS232 MAGIC - MODEMS/CABLES | THU | 16:30 | Jeff Killeen |
| RS034 | New Backup under RSTS V9 | THU | 17:30 | Tim Gardner |

--- DINNER ---

| | | | | |
|---------------|-----------------------------|-----|-------|--------------|
| RS009 | Disaster Recovery Planning | THU | 19:00 | Phil Hunt |
| RS031 | New Features and Directives | THU | 20:00 | Tim Gardner |
| RS011 | Well Structured RDS1 Disk | THU | 21:00 | Tim Gardner |
| | | | | |
| RS029 | RMS-11 Tuning | FRI | 09:00 | SWPandorf |
| RS002 | Fall '84 SIG Tape What's it | FRI | 10:00 | Phil Hunt |
| RS007 | Tech Tips III (Application) | FRI | 10:30 | Jeff Killeen |
| RS024 | Real Time App's under RSTS | FRI | 11:30 | Tim Gardner |
| --- LUNCH --- | | | | |
| RS026 | Caching Well on RSTS | FRI | 13:30 | Tim Gardner |
| RS027 | Backing up large files | FRI | 14:30 | Phil Hunt |
| RS004 | RSTS MENU Session 2 | FRI | 15:30 | John Doyle |

RSTS Fall 1984 Symposium

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| RS026 | Caching Well on RSTS | FRI | 13:30 | Tim Gardner |
| RS027 | Backing up large files | FRI | 14:30 | Phil Hunt |
| RS029 | RMS-11 Tuning | FRI | 09:00 | SWPandorf |
| RS030 | DECNET V2.1 Overview | WED | 11:00 | SWPandorf |
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| RS036 | RS232 MAGIC - MODEMS/CABLES | THU | 16:30 | Jeff Killeen |

All RSTS Sessions will be held in the Anaheim Convention Center Room 1.

The RSTS Suite (there will be no campground) will be in the Marriott Hotel (watch the boards for details).

There will be at least one live RSTS version 9 SYSGEN demo, watch the boards for date, time, and location.

DECUS is a participatory organization, that is, you the member/attendee are DECUS. Your participation is needed and desired. Digital sponsors many sessions during the week, but many more are user sponsored, and those users are YOU. There will be many chances throughout the symposium to contribute and participate. Take some time and consider participating at the next symposium. RSTS Steering committee members are easily identified by their badges, seek one of us out, and offer to participate.



1984 Spring
Cincinnati

DECUS

"RSTS/E: An Overview of Next Release"

RSTS Development Team

RSTS/E

June 4-8

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

RSTS/E V9.0 Overview
Backup/Restore Facility

- o Functional replacement for BACKUP.BAS - provides selective backup and restores with verification
- o Uses multi-volume container files - may be saved on standard RSTS format disks or ANSI labeled magnetic tapes.
- o VMS compatible - Provides RSTS <-> VMS file exchange using ANSI labeled magnetic tapes.
- o High reliability - container files include several different types of error correction codes.
- o High performance - uses many new RSTS V9.0 features to help optimize speed (Open next, Dynamic regions, Asynchronous I/O, etc.).
- o Disk optimization - provides several disk optimization functions on restore, including making executable files conditionally contiguous and pre-extending UFDs.
- o Supported in DCL - new BACKUP and RESTORE commands.
- o Supports streaming tape devices.
- o Logging - provides optional logfile for recording backups and/or restores.
- o Optional tape/disk initialization for multi-volume backup sets.
- o Optional account creation on restores with all account attributes restored.
- o Maintains all account/file attributes, including backup statistics.
- o Can be used to copy all accounts and/or data between unlike disks.
- o Does not provide disk-to-disk IMAGE copy (like SAVRES).
- o Only available on-line. No INIT.SYS (off-line) option.

RSTS/E V9.0 Overview
Account Management

- o Replaces REACT, MONEY, and some commands in the UTILTY program.
- o Distinguishes between accounts and directories (directories have no password attribute).
- o Supports new multiple privileges and syntax rules for extended passwords.
- o "Templates" can define defaults for creating accounts or directories.
- o Fully supported in DCL - several new commands to create, modify and display accounts and directories:
 - CREATE/ACCOUNT - DELETE/ACCOUNT
 - CREATE/DIRECTORY DELETE/DIRECTORY

 - SET ACCOUNT - SHOW ACCOUNT
 - SET DIRECTORY SHOW DIRECTORY

 - SET PASSWORD - SET PASSWORD/SYSTEM
- o New account attributes:
 - "Captive" accounts (menu-driven accounts)
 - "Guest" accounts (no password prompting)
 - Spawn-only accounts (no logging in)
 - Expiration dates
 - Account names (1-13 characters)
 - Logged-in, logged-out disk quotas
- o SET PASSWORD command. Users must have SETPAS privilege to change their password.
- o System password (all, none, dial-ups, or network)
- o SET PASSWORD/SYSTEM command to change the system password or change its attributes.
- o ACCT.SYS file no longer used.
- o REACT's S[standard] option not supported.

RSTS/E V9.0 Overview
DCL Command File Processor

- o Based on VMS features
- o Fully supported in DCL and monitor,
no pseudo-keyboards or extra jobs
- o Nesting up to 12 levels
- o COM files are executable
- o Local and Global symbols
- o Command and symbol substitution
- o 32-bit integers, 255-character strings
- o DCL "functions"
- o Conditionals (IF ... THEN)
- o Branching (GOTO)
- o Error, CTRL/C trapping
- o Parameter passing
- o Prompting, selectable terminal I/O
- o Reading/writing DCL files
- o Terminal logging, with optional
time stamping
- o Same syntax for batch processing
- o Used for installation, system startup
- o System, group, user login command files

RSTS/E V9.0 Overview
DCL Enhancements

- o New commands for SORT/MERGE V3.0.
- o New commands to replace UTILTY commands.
- o New commands for account management.
- o New commands for V9.0 BACKUP facility.
- o New qualifiers for SET TERMINAL (eliminates need for TTYSET).
- o Enhancements to SHOW TERMINAL to display new terminal characteristics.
- o Extensive changes to support DCL command file processing.
- o User-defined command synonyms.
- o New relative date/time syntax.
- o SET and SHOW PRIVILEGE commands.
- o /NOERASE qualifier for INITIALIZE disks, to prevent erasing disk.
- o SHOW LOGICAL command to display user logicals.
- o SET and SHOW DEVICE commands to replace off-line (INIT.SYS) SET options.
- o SET and SHOW SYSTEM commands to replace most off-line (INIT.SYS) DEFAULT options.
- o Dispatches to programs using new \$-logical package locations.
- o On-line help for all DCL commands and qualifiers.
- o Conflicts in DCL command lines now resolved using "rightmost override" rule.
- o Does not support commands for using OPSER-based Print/Batch services (CCL's or QUE utility only).
- o DCL now required as the system default keyboard monitor.
- o DCL optionally can be defined as the primary run-time system.

RSTS/E V9.0 Overview Installation & Updates

- o Improved installation and update procedures. Uses DCL command files and BACKUP container files to install and update software.
- o Installation and update procedures simplified. Many manual steps now performed automatically. BUILD, CPATCH, etc. no longer required.
- o SGNANS included in SYSGEN. Allows creating new monitor based on configuration of existing one.
- o SYSGEN questions "sectioned." Allows accepting default responses to entire section without answering any questions.
- o No MAPs created during monitor builds. Reduces disk space and improves performance.
- o System-wide logical names now stored in XBUF. No limit on number of logicals defined. SYSGEN question eliminated.
- o Libraries and RSX emulation now standard in all monitors. RSX.RTS optional and only 1Kw.
- o Resident File Open/Close now standard.
- o Digital-reserved directories. Software organized into "packages" and maintained in directories referenced by reserved logical names.
- o Package locations can be changed as desired. All system references to packages are by logical name.
- o Nine-character system-wide logical names. Allows embedded \$ characters, used for Digital-reserved logical names.
- o Update kits include monitor replacement modules. No patching. SYSGEN required at each update.

RSTS/E V9.0 Overview
Security Enhancements

- o Multiple privileges. Based on VMS model.
- o Optional system password. Enforced in the monitor. DCL command to change it.
- o Password enhancements:
 - longer passwords
 - extended character set
 - enforced minimum length
 - hashed passwords
- o DECnet password checks in monitor

RSTS/E V9.0 Overview
Monitor Enhancements

- o Terminal Autobaud (on DZ, DH, VH lines).
- o Terminal type identifier.
- o Permanent terminal characteristics.
- o On-line 'SET' functions.
- o Many feature patches replaced with DCL commands (e.g., cache age).
- o Logged-in disk quotas.
- o Improved logged-out quotas.
- o Detached job quotas
- o Auto clustersize.
- o Add Library with no address.
- o Dynamic memory regions.
- o Improved multi-volume ANSI tape support.

RSTS/E V9.0 Overview
INIT.SYS Enhancements

Easier system startup

- o "Start Timesharing <Yes>?"
- o Automatically INSTALS SIL
- o Selects first time monitor defaults
- o Creates minimum SWAP.SYS and CRASH.SYS files
- o Starts Timesharing
- o Not necessary to INSTAL SILs before starting
(Option: "START RSTS2")
- o DEFAULT calculates XBUF default on new SILs
(10% - 15% user memory)
- o DEFAULT allows XBUF placement above 512Kw
- o Some DEFAULT parameters removed.
(Installation name, Cache Cluster Size,
Magtape Label, Date/Time Format and Power
Fail delay can be modified on-line).
- o SET Option removed.
(all SET parameters can be modified on-line).

RSTS/E V9.0 Overview
Virtual Disk Driver (DV0:)

- o Allows the use of host memory as a disk device (Temporary storage of data requiring fast access).
- o Contains the same structures as any other physical disk (SATT.SYS, BADB.SYS, etc.).
- o Memory allocated through the DEFAULT option of INIT.SYS (Memory Table sub-option; same as XBUF).
- o Need at need at least 4Kw for file-structured use (1Kw = 4 blocks).
- o Must be initialized (DSKINT) after each system start-up (data is lost when system is shut down).

RSTS/E V9.0 Overview
Suggestions for Virtual Disk Usage

- o Small Memory Systems:
 - 1Kw to 2Kw can be used in non-file-structured mode as a system-common read/write area.

- o Large Memory Systems:
 - Temporary work files for SORT/MERGE utilities
 - OVR.SYS or ERR.SYS placement.

- o Major advantage over data caching during writes.

- o Default = "/NOCACHE" when logically mounted.

RSTS/E V9.0 Overview
Streaming Tapes

- o Streaming tapes:
 - TU80: Unibus, 1600 bpi, 25 or 100 ips
 - TSV05: Qbus, 1600 bpi, 25 or 100 ips
 - TK25: Qbus, 8K bits per inch, 55ips only
- o RSTS V8.0-7 cannot issue I/O requests fast enough to stream the TU80 and TSV05 at 100 inches/second.
- o RSTS V8.0-7 will stream TK25 at 55 inches/second on writes but cause excessive repositioning during reads (effective throughput is 1/2 to 1 Mb per minute).
- o RSTS V9.0 will provide high-speed streaming support for the TSV05 and TU80, and reduced repositioning on the TK25.
- o Streaming speeds will be achievable in RSTS V9.0 using:
 - Asynchronous Disk and Tape I/O directives
 - Overlapped I/O between disk and tape
 - Multiple outstanding I/O requests
 - Dynamic regions used for I/O buffers
 - Monitor level ANSI End-Of-Volume Support

RSTS/E V9.0 Overview
User Mode I and D Space

- o Supported by RSX task builder (RSTS native-mode).
- o Non-overlaid tasks only (for V9.0).
- o Allows a maximum of 64K user space.

RSTS/E V9.0 Overview
Hardware Support

New Hardware Supported in RSTS V8.0-7 Update Kit "E":

o Processors: "High performance Micro/PDP-11"

- J11 based Micro/PDP-11
- PDP-11/70, PDP-11/44 compatible memory management
- Floating point instruction set

o Disks:

- RD52 (31Mb Fixed media)
- RC25/RCF25 (26Mb Removable/26Mb Fixed)

o Tapes:

- TK25 (45Mb cartridge tape)

RSTS/E V9.0 Overview
Hardware De-Support

o Hardware not supported after Jan 1, 1984:

- TU58 (DECTAPE II)

o Driver code removed in RSTS V9.0:

- RF11 (Fixed head disk)

- RS03/04 (Fixed head disk)

- TU58 (DECTAPE II)

(Code will be made available to Software Services).

RSTS/E V9.0 Overview
Print/Batch Services (PBS)

- o Major enhancements since V8.0.
- o Supports multiple BATCH servers.
- o Processes DCL command files under BATCH.
- o Multiple print/batch queues. User-specified default queues.
- o Saved context across restarts. No need to redefine queues, servers at startup.
- o Multiple jobs. Creates jobs as needed. Removes idle jobs after defined time.
- o Allows any set of queues to be assigned to any set of servers.
- o SET commands to modify queues, servers, or entries.
- o SHOW commands to display queues, servers, or entries.
- o Forms alignment. Enhanced to print line numbers and column markers.
- o User-defined default form names per queue.
- o User defined page limits for print jobs.
- o User-defined CPU and time limits for batch jobs.
- o Supports escape sequences in print jobs.
- o Supports parameter passing to batch jobs.
- o No RJ2780 support.
- o No operator logging (OPSER).
- o No operator request processing (\$MOUNT).

RSTS/E V9.0 Overview Documentation

Overview

- o Extensive changes to describe the new features in version 9.
- o New manual provided for writing DCL and batch command files.
- o No master index available at release (sorry). Investigating possibility of providing one after V9.0.

System Generation Manual

- o Reorganized to document the improved installation and update process.
- o Simplified where possible to reduce the amount of technical information presented during installation.
- o Describes changes to INIT.SYS options.
- o Describes the new Virtual Disk option.
- o No longer describes INIT.SYS options that are available through on-line commands.

System Manager's Guide

- o Reorganized. Includes new information on:
 - Multiple Privileges
 - Print/Batch Services
 - Account Management
 - New DCL "manager" commands

RSTS/E V9.0 Overview
Documentation

System User's Guide

- o Formerly the DCL User's Guide
- o Provides system information for the general user.
- o Documents "general use" DCL commands.
- o Provides an overview of the new DCL command file processor.
- o Provides basic information on the use of multiple privileges.
- o Documents DCL user commands for Print/Batch Services.
- o Describes the new BACKUP utility and the DCL commands to use it.
- o Describes the new SORT/MERGE utility (V3.0) and the DCL commands to use it.

RSTS/E Guide to Writing DCL and BATCH Command Files

- o New manual for V9.0.
- o A "how to" manual that includes both reference material and explanations on writing command procedures.
- o Documents DCL commands that are used in command procedures (GOTO, IF, etc.).
- o Documents the DCL functions (F\$xxxxx).
- o Describes the use of symbols, expressions, error handling and other useful programming material.
- o Includes annotated examples of command procedures.

Utilites Reference Manual

- o Formerly the System User's Guide.
 - o Converted to a "reference" format.
 - o Describes utilities for general system use, in alphabetical order.
 - o Documents privileges required by each utility.
 - o Includes "declining" utilities.
-

Task Builder Reference Manual

- o Includes new appendix for User I & D space.
-

System Directives Manual

- o Updated for technical accuracy.
 - o Describes all new V9.0 directives.
 - o "Privileged" and "Non-privileged" headings replaced with names of privilege required.
-

Programming Manual

- o Updated for technical accuracy.
- o Describes all new SYS calls.
- o "Privileged" and "Non-privileged" headings replaced with names of privilege required.
- o Describes new modes and write modifiers for various devices.

RSTS/E V9.0 Overview
Documentation

RSTS/E Quick Reference Guide

- o Provides general system information.
- o Lists all DCL commands and qualifiers,
in alphabetical order.
- o Describes system and RMS utility programs
(PIP, RMSIFL, etc.).
- o Includes new information on BASIC-PLUS and
system programming.

RSTS Antiques

PRODUCT NAME: RSTS/E, Version 6A, Resource Sharing Timesharing System/Extended

SPD 13.1.4

DESCRIPTION:

RSTS/E is a total processing system which allows multiple users to interactively process large amounts of data easily and efficiently. RSTS/E supports up to 63 simultaneous users processing data using BASIC-PLUS or using the optionally available COBOL or FORTRAN IV language facilities. BASIC-PLUS jobs can range from small desk calculator jobs to large 32K byte programs and can use chaining and interjob communication features to execute even larger programs. COBOL programs have a maximum size of 56K bytes.

The data file system of RSTS/E provides a wide range of on-line processing capabilities. Files can be random or sequential, numeric or alphanumeric. Files can be created, updated, extended, sorted and deleted interactively from the user's terminal or under program control. Files can be protected from access on an individual, group, or universal basis. Files can be accessed by many terminal users simultaneously and updated on-line. Data can be stored on removable disk cartridges, disk packs, or magnetic tape. Industry-compatible magnetic tape files prepared on another computer can be read on RSTS/E, and tape files generated on RSTS/E are readable by other computer equipment.

As noted, users interact with RSTS/E using the BASIC-PLUS, FORTRAN or COBOL languages. BASIC-PLUS is similar to, but more powerful than Dartmouth BASIC. The language is easy to learn and use. It simplifies debugging since programs can be interrupted at any point, checked, corrected, and operation resumed. Its immediate mode of operation enables the terminal to be used as a desk calculator. COBOL is the standard language for business data processing applications. FORTRAN IV is a well-known language for scientific problem solving.

Since RSTS/E is a resource sharing system, every terminal user has access to all the system peripherals and resources. Line printers, card reader, disks, tapes -- all are available to any terminal user on-line. Enhancing the use of these resources is RSTS/E's ability to provide output in the most meaningful format for the recipient. One system resource -- the terminals, can also be accessed by a user program for input and output. A single program can control any number of terminals up to a total of 63.

RSTS/E installations can expect efficient operation because the operating system continuously and dynamically allocates processor time, memory space, file space, and peripherals on a best-fit/best-throughput basis. Efficiency results, too, from the system manager and privileged users having on-line access in BASIC-PLUS to system management commands and operations, many of which are normally done manually. Additional system commands and library programs are also available to all users.

The ability for total or selective backup of programs and files is provided in RSTS/E. Backup can be done on-line without disrupting system users, or it can be done off-line. In the event of a system crash, power brown-out or other malfunction, the basic system will automatically recover while programs and data files are maintained intact and can generally be easily restarted from the point of failure.

MINIMUM HARDWARE REQUIRED:

Although not necessarily a recommended configuration, the minimum hardware configuration on which a RSTS/E system can be generated and operated consists of one of each of the following:

- PDP-11/40 with KE11-E, or PDP-11/45, or PDP-11/70
- 32K words (BASIC-PLUS only) or 64K words (BASIC-PLUS and COBOL or FORTRAN) of parity memory with KT11 Memory Management
- KW11 Clock
- ROM Bootstrap for Disk/Tape
- Console terminal: LA30, LA36, VT05, VT50, LT33 or LT35
- One of the following disk systems:
 1. RK11 Disk cartridge controller (includes RK05 drive) with additional RK05 drive
 2. RJP04 (or RWP04 for 11/70 only) Disk pack controller (includes RP04 drive)
 3. RP11 Disk pack controller (includes RP03 drive)
 4. RPR11 Disk pack controller (includes RPR02 drive)
 5. RF11 Fixed-head disk controller (includes RS11 drive) with additional RS11 drive
 6. RK11 Disk cartridge controller (includes RK05 drive) and RF11 Fixed-head disk controller (includes RS11 drive)

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7. RK11 Disk cartridge controller (includes RK05 drive) and RJS03/RJS04 (or RWS03/RWS04 for 11/70) Fixed-head disk controller (includes RS03/RS04 drive)
- One of the following magnetic tape systems (not required for dual RK11 disk systems):
 1. TJU16 (or TWU16 for 11/70) Magnetic tape controller (includes TU16 transport)
 2. TM11/TMA11 Magnetic tape controller (includes 7- or 9-track TU10 transport or TS03 transport)
 3. TC11 DECTape controller (includes TU56 dual transport)

OPTIONAL HARDWARE SUPPORTED:

- Additional parity memory to a system total of 124K words (including up to 32K words of MOS memory on 11/45) or additional parity memory to a system total of 1024K words (11/70)
- FP11 Floating Point Processor or KE11-F Floating Instruction Set
- Up to 8 RP04, RP03, or RPR02 drives
- Up to 8 RK05 drives
- Up to 4 RS03/RS04 drives (for swapping only) or up to 8 RS11 drives
- RX11 Dual or Single Floppy Disk System
- Up to 8 TS03, TU10, or TU16 transports
- Up to 4 TU56 dual transports
- Up to 8 LP11, LS11, LV11 (in ASCII mode only), or LP05 line printers
- CM11, CR11 or CD11 Card reader
- PC11 Paper tape reader/punch or PR11 paper tape reader
- Up to 63 terminal line interfaces, of which up to 16 can be single-line (KL11, DL11, LC11, or DC11), and the remainder multiplexors (DH11-AA with DM11-BB, 20mA or EIA line adaptors)
- Up to 63 terminals: LA30, LA36, VT05, VT50, LT33, LT35, RT02, or IBM 2741-compatible terminals

PREREQUISITE SOFTWARE:

None

OPTIONAL SOFTWARE SUPPORTED:

SORT-11
 DMS-500
 RSTS-CTS/2780
 PDP-11 COBOL
 FORTRAN IV/RSTS-E

TRAINING CREDITS:

3. Consult the latest Educational 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:

During the first year, Update Policy shall be in accordance with the Software Support Categories Addendum to this SPD. After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

ORDERING INFORMATION:

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The following key (C, D, E, F, P, R, Z) represents the distribution media for the product and must be specified at the end of the "Q" number, i.e., QR430-AD = binaries on 9-track magnetic tape.

C = DECTape
 D = 9-track Magnetic Tape
 E = RK Disk (DECpack)
 F = 7-track Magnetic Tape
 P = 9-track Magnetic Tape (MASSBUS only)
 R = Microfiche
 Z = No hardware dependency

Standard Options

QR430 -A- Single-use license, binaries, documentation, support services (media: C, D, E, F, P)

QR430 -C- Single-use license, binaries, documentation, no support services (media: C, D, E, F, P)

QR430 -D- Single-use license only (media: Z)

Source/Listing Options

QR430 -F- Listings (media: R)

QR432 -F- Monitor and SYSGEN Listings
(media: R)

QR433 -F- BASIC-PLUS, all run-time systems
listings (media: R)

Upgrade Options

The following option is available as an upgrade kit from RSTS-11 and requires previous purchase of one license with support services.

QR400 -H- Single-use license, binaries,
documentation, support services
(media: C, D, E, F)

Update Options

Users of RSTS/E whose license does not include free updates under warranty, whose warranty has expired, or whose Standard Program Update Service has expired, may purchase the following. The update is distributed in source or binary form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QR430 -H- Binaries, documentation (media:
D, E, F, P)

Miscellaneous Options

QR430 -G- BASIC-PLUS and User's manuals
(media: Z)

ADDITIONAL SERVICES:

QR430 -3- Standard Binary Program Update
Service (media: C, D, E, F)

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