

THE MULTI-TASKER

Volume 16, Number 2

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The Newsletter of the RSX-11/IAS Special Interest Group

Contributions should be sent to: Editor, The Multi-Tasker, c/o DECUS, One Iron Way, MR2-3/E55, Marlboro, MA 01752

European members should send contributions to: Colin A. Mercer, Tennant Post, High Street, FAREHAM, PO16 7BQ, Hants, England

Members in Australia or New Zealand should send contributions to: Clive Edington, CSIRO, Computing Research 314 Albert St., East Melbourne, VIC 3002, Australia

Letters and articles for publication are requested from members of the SIG. They may include helpful hints, inquiries to other users, reports on SIG business, summaries of SPR's submitted to Digital or other information for the members of RSX-11/IAS SIG.

All contributions should be "camera-ready copy" e.g. sharp black type in a 160x240 mm area (8 1/2" x 11" paper with 1" margins) and should not include xerox copies. If you use RUNOFF to prepare your contribution the following parameters have been found to be satisfactory:

.PAPER SIZE 60,80 .LEFT MARGIN 8 .RIGHT MARGIN 72 .SPACING 1

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Special Section

RSX-11/IAS SIG 1982 Menu

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MULTI-TASKER FACES CRISES

If you read nothing else, please read this. The Multi-Tasker, like many other things, is effected by the current recession. We do not have enough money in the coming year to publish one issue a month!

One major part of the problem is our success. Over 12,000 people will receive this issue. If our mailing list can somehow be reduced, we can print more issues.

If the Multi-Tasker no longer applies to you or your site receives multiple copies that you can pass around, please think about dropping your subscription. Return the mailer sheet (back cover) to DECUS, checking the box to have your name removed from the Multi-Tasker. This will not effect any of your other SIG memberships.

1982 Menu Ballot Enclosed

The single most important activity the entire RSX-11/IAS SIG participates in is the Menu voting. A special section of this issue is the 1982 Menu items and ballot.

Please, in the next few days, take a few hours and meet with others at your site to fill out the ballot. And if there is any other site in your area that does not know about the Multi-Tasker, send a copy to them.

The voting format changes this year, so please read the instructions carefully. Remember, you can send in one ballot for each RSX-11M, RSX-11S, RSX-11M Plus, IAS, and RSX-11D system your site has. Experience shows that there are two systems for every Multi-Tasker. This issue is being mailed to over 12,000 people, so we should easily get back 24,000 ballots.

We need a huge response from all over the world. RSX and IAS are old, established products within Digital. All the glamour is in VAX/VMS and the new Professional. If we are to have any major effect, one thousand, two thousand, or even 5,000 menu responses will not make it. Your time spent filling out one ballot is multiplied by everyone else's so the RSX-11/IAS SIG speaks with a voice that cannot be ignored.

From the Editor

There is much to talk about with you in this issue. It should be evident from the bulk that you have several hours worth of reading ahead of you. The Multi-Tasker suffers from the happy problem of getting more submissions than it can normally use. In this issue, I have tried to cut into my in-basket and get into print as much material as possible.

The content runs the gamut from a new users experience with the queue manager to problem reports on RSX-11M V4.0 to detailed reports on what happened at the Atlanta symposium. The most important article is last - the RSX-11/IAS SIG 1982 Menu and Ballot.

Now to the bad news, at least from my point of view. This is not the original version of this column. At the Atlanta Symposium, I announced the August issue would be my last as Multi-Tasker Editor and that Robert Bismuth had accepted the job. Immediately, I started dreaming about my last column. Something short and simple, like "its been fun - goodbye world."

This is not to be. Since Atlanta, situations have changed for Robert and he no longer has the opportunity to take over the Multi-Tasker. So I must keep the job a little longer until someone else steps forward.

If you are even a teensie bit interested in the job, call me immediately.

More bad news. As mentioned on the front page, the Multi-Tasker has a budget problem. We have just started FY83 and the Multi-Tasker is budgetted for \$51.3K. This represents around 30% of the total budget for all 22 SIG newsletters, due to the fact we have the largest mailing list and historically publish an issue once a month.

But the money just does not go as far as it use to. The May/June 1982 issue cost \$7,300 to print, package, and mail. A little arithmetic shows that at this rate, we would use up the 1983 budget after seven issues. Making matters worse, SIG membership grows at the rate of 300 to 500 a month. At this time the bottom line is that the Multi-Tasker only has the funds to publish six issues in fiscal year 1983.

Plans are being made now for a mechanism to fully fund SIG newsletters in FY84. But for this year only, there might be several months when your issue does not arrive. At this moment, I plan to combine the September and October issue into one Anaheim pre-symposium issue. But please do not stop sending in submissions. If I get enough timely material, I will publish next month.

Ralph Stamerjohn
Multi-Tasker Editor
July 18, 1982

Phone: (314) 694-4252 (3-5 pm, CST)

Anaheim Pre-Symposium Seminars

Tom Viana
Training Working Group Chairman

The RSX-11/IAS SIG has scheduled four pre-symposium seminars for the day before the Fall 1982 DECUS Symposium at Disneyland in Anaheim (December 5, 1982). An excellent range of topics is being offered by some of the SIG's most knowledgeable and effective presenters.

Microprocessor Software Engineering
RSX-11M Crash Dump Analysis
Care and Feeding of the Files-11 Disk Structure
RSX-11M Systems Programming for Application Programmers

The first is a new offering which should offer very timely and valuable information. The CDA seminar, one of the first and best, is being offered again due to widespread interest expressed at Atlanta. The final two are repeats from Atlanta that have well developed formats, fine handouts, and are highly rated by attendees. Full descriptions of each seminar follow.

As can be inferred from the price, \$150 each, the SIG is not out to make money. These seminars are worth at least twice the price, as well as being convenient. Be sure to sign up early to reserve a place. The DECUS office may cancel a seminar if not enough people to cover expenses have registered by November 5th.

Registration material will be in the Anaheim Symposium registration packet. You can also obtain information by writing to:

DECUS, U.S. Chapter
Attn: Symposium
One Iron Way, MR2-3/E55
Marlboro, MA 01752

Microprocessor Software Engineering

You've chosen the latest, hottest microprocessor for your new system, and now you are faced with integrating it into a product and developing software for it. Trade-off decisions must be made and lived with. Which development systems are you going to use? Which language? Which operating system, if any at all? What software tools will you need?

The instructors bring to this seminar the distilled results of several years experience in designing and implementing products with microprocessor-based embedded intelligence for both commercial and industrial use.

The particular emphasis in this seminar will be on a host-target methodology for software development, using DEC machines and various cross-software packages to create a software development environment.

The instructors will discuss languages, operating systems, debugging tools and techniques, plus hardware considerations which affect software design.

Instructors: James A. McGlinchey, RA Enterprizes, P.O. Box 1595, North Wales, Pennsylvania, 19454.

Arthur P. Gaughan, RA Enterprizes, P.O. Box 1595, North Wales, Pennsylvania, 19454.

RSX-11M Crash Dump Analysis (CDA)

System availability and reliability are key concerns of any computer system, but especially for the types of applications which use RSX-11M. A system fails because a specific set of events occurred that the operating system and application were not prepared to handle. This seminar will cover how to pin-point the reasons for the failure so you can then prevent the problem in the future.

The main topics covered include how to prepare and manage RSX-11M system crashes and basic steps in crash analysis. Attendees will walk completely through a sample crash. More advance topics will deal with tools that go beyond CDA, tricks to isolate complex problems, and a discussion of the thought process behind being a "crash detective."

Each attendee will receive a workbook designed for taking notes. All important points will already be written down so you can concentrate on the speaker and not madly writing. The workbook also has extensive appendicies on RSX-11M system internals.

The last part of the day will be spent looking at crashes brought by seminar attendees. If you bring a crash, please bring a full crash dump listing (/ALL), a map of your RSX-11M executive, a listing of your RSXMC.MAC file, and any other relevant information (console log output, listings of user-written drivers, map of the current active task, etc.)

Prerequisites: Attendees should be familiar with Macro-11 and have one year experience with RSX-11M. It is assumed that attendees are familiar with the format of a RSX-11M crash dump listing. The seminar applies equally well to RSX-11M V3.2 and V4.0.

Instructors: Ralph W. Stamerjohn, Senior Systems Programming Specialist, Monsanto, 800 N. Lindbergh, St. Louis, Missouri, 63167.

Larry E. Estes, Senior Systems Programming Specialist
Monsanto, 800 N. Lindbergh, St. Louis, Missouri, 63167.

Ken L. Johnson, Programmer/Analyst II
Monsanto, 800 N. Lindbergh, St. Louis, Missouri, 63167.

Care and Feeding of the Files-11 Disk Structure

Have you ever had a "disk disaster?" Do you understand the Files-11 on-disk structure used by RSX? The Digital documentation regarding the organization of Files-11 disks is rather sketchy and is particularly confusing to newcomers to RSX. It is important that people responsible for RSX systems know how files are structured on their disks, what preventive maintenance may be done, and how to repair the damage done in a disk disaster. This seminar is directed to those people at all levels of RSX system experience who want to learn about the Files-11 on-disk structure and how to go about repairing corrupted disks. It will cover the following topics:

- o RSX-11M/M-Plus file I/O mechanism and flow
- o Details of the Files-11 on-disk structure
- o Dynamics of disk space and file management
- o Preventive maintenance of Files-11 volumes
- o Techniques for recovery from disk disasters

Instructors: Robert B. Denny, Creative System Design, Pasadena, California

Dr. L. Micheal Fraser, AFRI/Computer Science Department,
Bethesda, Maryland

RSX-11M System Programming for Application Programmers

This seminar presents an internal view of RSX-11M from an applications point of view. It should give Applications Programmers a better feel for the internal logic of RSX-11M and place them in a better position to use executive/file system features for their particular application. During the seminar, several examples will be studied to provide an indication of ways RSX-11M has been used or modified to meet the needs of an installation. A knowledge of Macro-11 would help the attendee, but is not essential. The following topics will be covered:

- o Executive concepts and control flow
- o Pool usage and abuse
- o Common scheduling/swapping problems
- o User written privileged tasks
- o Files-11 ACP QIO functions
- o Executive changes in RSX-11M V4.0
- o Examples and case studies

Instructors: Robert Bismuth, Redkite Software, St. Thomas, Swansea, Wales

Adrain Bottoms, Redkite Software, St. Thomas, Swansea, Wales

Speak Out

"Speak Out" is a monthly column for readers to express their opinions or to comment on a previous column. The articles published in this column are an individual's viewpoint and do not necessarily reflect the opinion of DECUS or the RSX/IAS SIG. Readers are welcome to submit articles on any subject concerning the RSX/IAS world. Send submissions to Multi-Tasker - Speak Out, c/o DECUS, One Iron Way, MR2-3/E55, Marlboro, MA 01752.

Digital's Maintenance of IAS BRU

From the Editor

The following is a reproduction of a letter to SPR administration which was also copied to the Multi-Tasker. It concerns an IAS user's experiences with BRU. The patches mentioned will not be published in the Multi-Tasker, due to length. However, any IAS user can obtain a copy by writing to the Multi-Tasker.

June 3, 1982
Frank R. Borger
Instrumentation Division Head
Department of Medical Physics
Michael Reese Medical Center
29th Street and Ellis Avenue
Chicago, IL 60616

Sheila Hatchell
Supervisor
SPR Administration
P. O. Box F
Maynard MA 01754

Dear MS Hatchell:

I am writing to you concerning the last SPR we submitted to your organization. The following occurred concerning said SPR

1. On April 13, 1982 I submitted SPR number 11-45678 which said in essence that BRU, (backup/restore utility) operating on our IAS version 3.1 system would experience non-repeatable and seemingly erroneous errors when trying to restore files from a tape.

2. During the week of May 10, 1982 I received Digital's response to my SPR. In essence the response said that they could not repeat my problem, and I should send in more information. Said response also conveyed (at least to me) the idea that as far as DEC knew, there were no problems with BRU under IAS version 3.1
3. On May 17, 1982 I returned from Spring 82 DECUS with a handout containing twelve (12) patches for BRU under IAS version 3.1. My feelings concerning the difference between said handout and the contents of your SPR response should not be printed here.

Although further study on our part has shown that the problems we are having with BRU are in due to a curious hardware malfunction on our tape drive, I would like your responses to the following questions.

1. Why are you waiting so long to implement these patches? (I can't believe that all TWELVE problems were found in a short space of time.)
2. If (as was mentioned in the handout,) the patches will be included in Autopatch tape C, how much longer would users who only have self-maintenance have to wait before said patches appear in the Software Dispatch?
3. Why, when I sent in an SPR concerning problems with BRU didn't your people at least try to see that I had all possible patches? I can see waiting to print some patches in the Software Dispatch, but if I have a definite problem with a product, I should at the very least be informed of any patches to said product up to the current date.
4. Perhaps my values are different from yours, but I consider problems with a program whose main purpose is to do backups (and hopefully restores) of ones programs and data to be rather crucial, and as such I would want to see any patches to the product in the Software Dispatch and/or autopatch tapes as soon as possible. Why then has it taken over a year for these patches to appear?

When handouts at a DECUS meeting are more up-to-date than the Software Dispatch, I find it very hard to justify the amount of money we are spending for this "service." (Maybe we should drop the Dispatch and use the money we save to send someone to every DECUS meeting.) What would have happened if we had opted for telephone support? Would we have been immediately informed of the existence of said patches, or would we just have received the same response our formal SPR received?

Awaiting your reply I remain,

Sincerely Yours,



Frank R. Borger

FRB/pdp

cc
The Multi-Tasker
The Devias Letter

DECUS, Digital, and Dollars

Ralph W. Stamerjohn
Multi-Tasker Editor

I learned much at Atlanta. But nothing more important than the fact that "Digital Equipment Corporation is in business to make a profit."

This is probably not a startling fact to most of you. My own employer, like many of yours, is also engaged in making money. But I learn slowly and it takes time for things to sink in.

This revelation changed the way I looked at many things. I, like most other members of the RSX-11/IAS SIG, have long lobbied for many changes in Digital's products and services. I have long dreamed of a symbolic debugger for Fortran. At each symposium, I cornered the RSX developers to put in a plug for my favorite new executive feature. Each year I dutifully fill out my menu ballot. I have offered my first-born son for a Software Maintenance Service that fixes my problems before I have them.

What is now clear is that unless Digital can be convinced there is money to be made, all the good thoughts, intentions, and siblings in the world are so much chaff in the wind.

And considering that Digital deals in billions of dollars, proving that they could make a \$100,000 return on investment by selling a Fortran debugger probably will not make it.

The RSX-11/IAS SIG is facing a image problem. The Digital products we work with - the PDP-11 or RSX-11M or IAS - have long lost their glamour. They are no longer the new kid on the block. Especially important, I believe that Digital does not see any large return on R&D and marketing dollars spent in this area.

If the SIG is to have any influence on what Digital does, it is critical that we speak in a way that Digital can interpret as dollars. We must use our strengths, especially the sheer numbers of us to make an impact. If we cannot, then why even bother.

For example, I have never attended a meeting of RSX people where someone did not complain about software maintenance. My first position in the SIG, back in 1977, was chairman of the SPR working group. My most recent attempt, the SPR Survey in the January 1982 issue, resulted in a total of 262 sites representing 704 systems reporting back (see results in next issue). This is not a very big stick to wave at a company that has probably sold over 100,000 PDP-11 processors.

In working on the survey results, it occurred to me that the entire exercise was doomed from the start. There was no way with the questionnaire I wrote to turn that data into something Digital could see as money. The two questions I should have asked were how many people planned to cancel their services and how much would people pay for more effective services.

The Menu is our next effort. I know the data we are collecting makes sense to Digital because we have worked with them on a format that prioritizes what things RSX/IAS users need. But even I would have a hard time getting excited over a survey that only had 310, 1304, and 863 responses, like the three previous Menu's did.

If the Menu is to have any meaning, we must overwhelm Digital with carefully considered voting. If we don't, I suggest that at future symposium we keep quiet about such things as debuggers and SPR's and start talking about how to deal with things as they are today. Because without each and everyone of us caring about the future, that is what we will have.

The 1982 Menu is more than sorting out what we want Digital to do. It will also measure whether it is time the RSX-11/IAS SIG should start considering the route of the PDP-15 and PDP-8.

From Five Years Ago

Gail Green
Multi-Tasker Historian

The August 1977 (Vol.8, No.2) issue of The Multi-Tasker contained a letter from Harvard Medical School which detailed their problems with V6.2 of RSX-11D. The problem list included: DSC won't operate on files created under V6B, TKB runs slower than TKB under 6B, and SYSGEN documentation is unclear about which libraries reside on which distribution disks.

A column called "Installations" was resumed in this issue. The featured installation for August was Bond's Wear, of Australia. Their hardware, software, applications, and future plans were briefly described. The primary uses of Bond's IAS system were production forecasting, planning, billing, and inventory control.

The wishlist put together at the IAS workshop at the Spring'77 Decus symposium was published. Topping the list were requests for improved backup facilities, improved accounting, and improved batch facilities.

Also resulting from the Spring Symposium was the creation of a working group on training. The group's purpose was to monitor training offered by Digital in order to effect improvements in course offerings and quality.

New Users

Wendy Cockerline
New Users Editor

This column is for the quiet majority of the RSX-11/IAS SIG - new users. We would like to answer your questions, print hints on using RSX, and publish your experiences. The best people to help new users are new users. Help clear up the confusion and send any comments, questions, or contributions to Multi-Tasker - New Users, c/o DECUS, One Iron Way, MR2-3/E55, Marlboro, MA 01752.

Getting Started with the Queue Manager

Bryant K. Moriarty

The Record
150 River Street
Hackensack, New Jersey

Why do I need a Queue Manager?, I can use the PIP function to spool my listings. You're right!, but can you stop a print job and back up a few pages if your printer jams. The Queue Manager also can have up to 15 processors, with the technique introduced by Frank Penner, your processor(s) can be identified by non-physical device names (psuedo names).

The July 1981 Multi-Tasker contains two good articles on the Queue Manager. The first titled Non-Physical Device Spooling by Frank Penner, gives you the technique in creating a queue for non existent devices. The second was the article titled Queue Manager and Despooler Overheads by Jim Kauffman, this contains the overheads of the material presented at Miami Symposium. I would recommend any new user reading both these articles.

Here are just a few of the problems I experience as a novice getting the Queue Manager going.

1.0 INSTALLING MULTIPLE PRINTERS/PROCESSORS

Each queue is associated with a physical device, usually a printer. What do you do when your setting the processors up for multiple printers? It was mentioned when installing the LPP task the default would be LPP0.

```
INS LPP/PRI=70.
```

By installing the LPP task again with a different name would produce another processor.

```
INS LPP/PRI=70./TASK=LPP1
```

The switch "/TASK=" gives you the ability to install task(s) with different names and overrides the "TASK=" option specified at task build.

Well now your all set, two print processors for both printers in your shop. You have by now started the Queue Manager an ready to print. Issue the command to print a file, it spools out on LP0: (YEA). Now, issue two print commands so that both printers will spool, they both spool out on LP0: (BOO). Why didn't the second listing spool on LP1, when LP0 was active printing the first job?

Lets look at the LPPBLD.CMD file an see what went wrong.

```
TK:[1,54]LPP/PR/MM/SL/CP/-FP,MP:[1,34]LPP/-SP=[1,24]LPPBLD/MP
;
; OPTIONS INPUT
;
STACK=50
UNITS=6
TASK=LPP0
PRI=70
PAR=GEN
ASG=CO:2
ASG=LP0:3          <<<=====|
GBLDEF=$CDDMG:0
.
.
.
```

You think it looks fine! Wrong! When you installed the second task you only changed the installed name, you didn't change the LUN assignments. Lun 3 is still assigned to LP0. What I tried was reassigning Lun 3 to be LP1: instead of LP0:, this works as long as in the startup command file you remember to do the reassignment.

Bug Fixes for Sample ACP

Ralph W. Stamerjohn

Monsanto
800 N. Lindbergh
St. Louis, Missouri

On the RSX Spring 1980 SIG Tape (Chicago), I submitted a manual on writing ACP's and template code for the various tasks needed. In the last couple of months, I have received separate letters from Bob Denny and Gabor Illes documenting some mistakes in the sample programs. If you use the template code, please fix the following errors:

1. The DISABL.MAC source code is missing an immediate mode (#) declaration on one of its instructions. This is on the instruction which marks the device for dismount. The current instruction sequence is:

```
;
; QUEUE PACKET TO ACP, SCHEDULE ACP, AND ACT LIKE WE ISSUED I/O
;
      BISB   US.MDM,U.STS(R5)      ;;MARK DEVICE FOR DISMOUNT
      INC    @U.VCB(R5)           ;;INCREMENT TRANSACTION COUNT
```

This should be changed to:

```
;
; QUEUE PACKET TO ACP, SCHEDULE ACP, AND ACT LIKE WE ISSUED I/O
;
      BISB   #US.MDM,U.STS(R5)     ;;MARK DEVICE FOR DISMOUNT
      INC    @U.VCB(R5)           ;;INCREMENT TRANSACTION COUNT
```

2. The null driver mishandles the transaction count when the executive is cleaning up windows for exiting or aborting tasks. Both the executive and the null driver are incrementing the transaction count for the IO.CLN function. The current code in NULDRV.MAC reads as follows:

```
;
; GET ACP TCB ADDRESS AND QUEUE PACKET TO IT.
;
DRVSND:INC    @U.VCB(R5)           ;INCREMENT TRANSACTION COUNT
          MOV   U.ACP(R5),R0       ;GET ACP TCB ADDRESS
          CALLR $EXRQP            ;QUEUE PACKET, SCHEDULE ACP, AND EXIT
```

This should be changed to:

```
;
; GET ACP TCB ADDRESS AND QUEUE PACKET TO IT.
;
      INC    @U.VCB(R5)           ;INCREMENT TRANSACTION COUNT
DRVSND:MOV   U.ACP(R5),R0       ;GET ACP TCB ADDRESS
          CALLR $EXRQP            ;QUEUE PACKET, SCHEDULE ACP, AND EXIT
```

3. The data structure for the null driver has the IO.CLN function has legal for the sample ACP. In fact, this function (7) is only issued by the executive and should not be marked legal in the DCB. Otherwise, any user program could issue the function. This fix is to change the legal function mask for bits 0-15 in the DCB (contained in NULDRV.MAC) from 000206 to 000006.
4. Gabor Illes points out that the function masks do not mark the IO.KIL function as legal, even though the manuals state this is required. I left off the function because it does not make sense for a null driver and would have been a no-op if present. Also, for mounted devices, the executive only calls the driver for an IO.KIL if UC.KIL (call driver always) is set.
5. Gabor also points out that, while ENABLE.MAC allows variable size VCB's to be allocated, the ACPMDM module in the ACP always returns a VCB of size OF V\$SIZE. The feature in ENABLE.MAC should probably be eliminated.
6. Bob Denny tried the software on an unmapped system and ran into one problem. The executive does not assemble the routine \$BLXIO for unmapped systems. His solution was to code a dummy version into NULACP.MAC. He also had some problems because the command files use the [1,x4] coding.

I have not brought up RSX-11M V4.0 yet, so do not know how it effects the example code or the material in the manual. I believe there should be only very minimal changes, if any, for most user-written ACP's.

Best of the SIG Tapes

Allan A. Watson

The Record
150 River Street
Hackensack, New Jersey

"Best of the SIG Tapes" session was held on May 13, 1982 at the Atlanta symposium. The session was chaired by Jim Neeland and Glenn Everhardt.

The session is an "open-mike" format. People from the audience come up and give short descriptions of any useful software they have found on the various SIG tapes.

I have tried as much as possible to list each entry referred to and the tape and UIC where the program may be found. It was not possible to record the name of each person who recommended the programs, but thanks to them all, as well as the creators of the programs, for sharing with all of us. Also, no guarantee is made that the notes below are correct.

- * INDEX of all SIG tapes through Fall, 1980, by Ralph Stamerjohn. TAPESB.MEM is abstracts of all submissions. RSXSIG.COM, RSXSIG.FIL, and RSXSIG.TYP are sorted directories of all files by UIC, filename, and type respectively. Invaluable tool in finding what you want. Found in [346,100] on Spring 1981 tape.

From the Editor

Work is proceeding on updating the submission through the latest tapes. When finished, it will be submitted to the DECUS library and this column will carry an announcement.

- * CCL (Console Command Language), latest release for RSX-11M V4.0. CCL allows user-defined commands controlled by a simple text file edit; useful as an alternate command line interpreter and catch-all task. The Spring 1982 tape has the complete KMSKIT for RSX-11M V4.0. KMSKIT is on many tapes, always in [344,*].
- * RUNOFF ([305,302] Fall 1981) a text-file formatter for documentation, letters. Baseline version by Bob Denny, who did the RUNOFF presentation at Fall 1981 DECUS (now available on videotape).
- * DOC ([340,020] Fall 1979), a template driven preprocessor for RUNOFF, generates standard letters, memos, etc. Comes with two templates for DECUS library submissions. Good indirect file facility.
- * SRD ([373,004] Spring 1981 and Fall 1981), the Sort Directory utility. One of the most useful of all SIG offerings. Updated version with updates merged from three different sources, incorporating different enhancements and fixing bugs. Also, fix to bug in which there was no sorting when using write-back with no list is on Fall 1981 tape. There are also many other versions on the tapes.
- * INDEX, a FORTRAN cross-referencer. Account and tape unknown.
- * Virtual disks allow treating a contiguous file as a mountable disk -- mods by Ken Cross to Ralph Stamerjohn original. Using on V4.0, needed about 1 1/2 hours to convert. On [313,20 to 23] Spring 1981 tape.
- * Network Submissions - [336,200] Spring 1981. Contains Network Virtual Disk, Network Mag Tape, Network Virtual Terminal, a submission by Digital DECnet Development Group. There is also electronic mail to and from VAX and RSX-11M systems.
- * LBL Software Tools - [307,030-033] Spring 1981 and Spring 1982. LBL Software Tools package by Joe Sventek, providing a UNIX-like environment and over seventy software utility programs (text manipulation, multi-column output, etc.). The latest version will be on the Atlanta Spring 1982 tape.
- * file. Same facility available on VAX-VMS for \$15,000. ADMIN -- creates an archive. DELTA -- inserts version of module into archive. GET -- gets version from archive.
- * VS Driver ([307,034] Spring 1981), a Variable Send/Receive Driver for RSX-11M (as on M+). Part of LBL tools package, provides Unix-like "pipe" mechanism on RSX-11M V3.2 and up.
- * LISTRS ([312,315] Spring 1982), a utility to list up to 18 columns.
- * UNDELETE ([307,020 and 22] Spring 1980 onward), utility to "undelete" accidentally deleted files. Part of disk disaster kit in [307,20] and [307,22]. These accounts also have other programs for disk disaster recovery.
- * DISASSEMBLERS to turn object code into MACRO-11, one is in Spring 1981 in [300,23], and a "more rugged" one in Spring 1981 in [373,23].
- * Fast tape copy programs, TPC and BIGTPC, used by SIG for doing tape copy. [300,2] on every tape, updated and improved each time. Handles tape no matter what format.
- * SORT file utility ([300,120] Spring 1981), handles items up to 9 lines long, sorts on keywords.
- * RESEQ ([330,11] Spring 1981), a FORTRAN utility to resequence source files.
- * RUNOFF ([360,235], Fall 1981) version enhanced to use Diablo printers, super- and sub-scripts.
- * DDT, Dynamic Debugging Tool, effective for Assembler programmers to learn MACRO-11. On Fall 1981 in [312,315]. Revised on Spring 1982 tape.
- * RMS tutorial on RMS internals and data structures, over 200 pages on Spring 1981 in [373,100].
- * CDA tutorial on crash dump analysis by Ralph Stamerjohn and Ken Johnson on Spring 1981 in [346,101].
- * RUNOFF including Table of Contents on Spring 1981 in [305,100].
- * Directive error message routines; a set of macros and a subroutine library that generate intelligent error messages for directives, QIO's, and FCS errors. Conditional, when code works, turn off. On Spring 1979 in [346,100].
- * GREP ([312,315] Fall 1980), program to scan text file(s) for a "regular expression pattern". Also many other versions.

Part of new LBL tools release is set of three programs for text control system, keep source code libraries with multiple generations in single

- * Test package for VT100 and VT52 terminals on Fall 1980 in [331,10].
- * TECO Version 36, the latest and greatest version of the super-editor and programming language. Spring 1980 in [342,2].
- * Floating point emulator for software requiring FPP hardware and users who don't have the hardware. By Glenn Everhardt. New version on Spring 1982 in [312,315]. Needs F4PEIS in your OTS. Likely to be be problem under RSX-11M+ V2.0 if task users external headers.
- * HELP files on many topics in Spring 1981 in [373,302].
- * RMDEMO including active tasks, task header info including open files, also DECNET. Like RMD for V4.0 except latter does not include DECnet. On Spring 1981 in [336,200].
- * DSRDMP ([373,317] Spring 1981) gives dump of what's in Pool (DSR). See also OPA (online pool analyzer).
- * TECO macro that runs screen as though it were using EDT V2. On Fall 1981 tape in [343,52].
- * SYSTAT, shows state of things in system on Spring 1980 in [337,60]. Anyone know whereabouts of author Mark Geggelman?
- * Program to read RT11 tapes on RSX on Spring 1981 in [343,23].
- * FFL ([312,315] Fall 1981) is fast FLX. Creates directories on the fly.
- * DSUTIL is a data set utility, interactive display on VT100 of any file or device, block-by-block, in octal word, octal byte, hexadecimal, ASCII, or EBCDIC. Also reads tapes, terminals, UFD's, etc. Forward and backward capability. New on Spring 1982, UIC unassigned.
- * GREP written in C, part of Bob Denny's C compiler kit. Handles string expressions better than version mentioned earlier. (New version of Conroy C compiler, binary only, on Spring 1982 tape; source will be given to DECUS library).
- * SPEED is CPU "speedometer" program, gives graphic representation of system idle time on Spring 1982.
- * SORT.COMD is a command file to build SORT-11 description files. On Spring 1982 tape.
- * PACMAN on Spring 1982 in [312,331]. Nuff said.
- * GONZO.FLM ([343,35] Fall 1981) type it out on VT100 for entertaining "film".
- * For DUNGEON addicts; when bat catches you and program seems in endless loop -- there IS a way out (find it if you can).

- * DAMMIT and COOKIE for outputting cute messages and wise sayings. Try installing both as ...CA. (catch-all). DAMMIT is on Fall 1979 in [300,203], COOKIE various places including C compiler kit and Spring 1982 and Fall 1980 in [307,22].
- * UNIXMTB ([70,7] Spring 1978) reads UNIX tapes. New one coming on Fall 1982 tape (if you can wait).
- * Program to read/write IBM floppy disks on Atlanta tape in [315,200].
- * DSCDIR ([332,100] Fall 1981 and Spring 1982) gives directory of DSC format tape, allows selective restore.
- * CWD ([307,20] Spring 1980) changes working directory. Set UIC with many added functions; doesn't change login directory, verifies existence of UFD, etc.
- * DVCDAT ([301,34] Fall 1980) gives formatted dump of device data structures.
- * SUPMAC ([321,3] Spring 1980) implements structured constructs in MACRO.
- * PUG ([370,20] Spring 1981) finds zero length files.
- * TAP ([373,1] Spring 1981) is formatless magtape reader.
- * GAB ([370,20] Spring 1981) hooks two terminals together and allows cross-talk.
- * OPA ([301,50] Spring 1981) is on-line pool analyzer. User has done RSX-11M+ version, will submit. Not sure if corrections have been done for RSX-11M V4.0.
- * DIARY ([307,20] Spring 1981) date and time stamps entries, sticks in DIARY.TXT file.
- * MAIL facility for RSX-11M. Two different versions in [344,*] (part of CCL submission) on various tapes and Fall 1980 tape in [307,22].
- * TYPE utility very useful; wildcard capability, CNTL/Z to abort. On Fall 1978 tape in [301,24] and Fall 1980 in [313,20] (Ken Cross version).
- * CCLDSP ([301,54] Spring 1980) reads CCL files, gives sorted display of available commands.
- * HELP patch to allow "HELP ?" to display all available topics in HELP.HLP. On [344,40] in Fall 1979 tape. Actually corrects HELLO.
- * FRAG ([321,3] Spring 1979) displays disk fragmentation. Also many other versions in other accounts.

- * TVG ([370,30] Fall 1980) is a complete viewgraphs package for Tectronix terminal.
- * FORTRAN interface to FCS for direct file I/O in [300,52] on Spring 1980.
- * SRDCMD ([330,4] Spring 1981) subtasks SRD, uses templates to generate command files.
- * MVI ([300,100] Spring 1982) shows who mounted a volume.
- * CVL ([344,40] Spring 1982 and others) is a system utility to change volume label. New mods, verifies label before taking action.
- * Virtual Disk package ([312,315] Spring 1982) on forthcoming tape works on RSX-11M+ V2.0, probably RSX-11M V4.0. Multi-device virtual disks, treating several small disks as one large one, or several contiguous files as a single disk.
- * MEMO.CMD ([370,41] Fall 1980) is command file to generate memos.
- * TCR ([375,2] Fall 1980) tells you characteristics of terminals.

Working Group News

Elizabeth Bailey
Working Group News Editor
(205) 386-2788

Two working groups have new chairman. The Virtual Disk working group is now chaired by:

Robert Hayes
P.O. Box X, Building 3500
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

The Process Control working group is now chaired by:

David Eisenhower
Colorado Interstate Gas
P.O. Box 1087
Colorado Springs, Colorado 80944

However, responses to the Process Control working group questionnaire, published in the last issue of the Multi-Tasker, can be sent directly to:

Nancy Pallett
G.M. Assembly Division
Process Control Systems
30009 Van Dyke
Warren, Michigan 48090

There is still plenty of time to send in this survey.

The Retired Versions of RSX working group is looking for help. Volunteers are needed to help sort out the 500 SPR's which this working group has recently acquired from the Multi-Tasker SPR Survey. Ideas are also needed as to what steps should be taken for supporting the old versions of RSX-11M.

Help Yourself

David DiGiacomo
Help Yourself Editor

"Help Yourself" is a place for you to get your tough questions answered. Each month, questions from readers will be published. If you have a question, send a letter to the Multi-Tasker - Help Yourself, c/o DECUS, One Iron Way, MR2-3/E55, Marlboro, MA 01752.

We would also like to publish the answers to questions. If you can help someone, contact the Multi-Tasker. Your answer will be sent directly to the person in need and published in the next edition.

This Month's Questions

Hanging Up Idle DZ11 Lines

Has anyone made modifications to the DZ11 terminal driver on an RSX-11M system such that it hangs up a modem after a predetermined length of idle time?

D.M. Jewell, P.O. Box 12194, Research Triangle Institute, Building 5, Research Triangle Park, North Carolina, 27709. Phone (919) 541-7266.

DECnet Macro Definitions

On the Miami 1981 SIG tape, there is a lot of utilities in [336,200] submitted by Digital Network Engineering. One is a modification of RMDEMO that displays the status of a DECnet Phase III network and is very interesting to us. This version uses macro definitions that are not in the DECnet libraries we have. We cannot find the following macros: NSPIN\$, RNBDP\$, ANBDP\$, LLWDF\$, PDVDF\$, NSDDB\$, CTRDF\$, and MBXDF\$. Anyone with knowledge of these macros, please contact me.

Alain Barthelemy, Institut Laue-Langevin, B.P. 156x, 38042 Grenoble-Cedex, France.

From the Editor

On my DECnet-11M V3.0 distribution kit, the macros named above are found in the file [130,10]NETLIB.MLB. This is the macro library used with assembling the DECnet sources. I have not put up Phase III yet or used the RMDEMO from the SIG tapes, so do not know if this is the final solution.

DECnet-11M Phase III and a DECSys-10

We have bought, from Digital, the licence of "DECnet-10 (QH-682, phase II) to connect a DECSys-10 with many PDP-11/24 RSX-11M V3.2, Decnet Phase III nodes. After many tries, it seems to us that this software cannot work. Noone in Digital France knows this product and can give any information. If anyone can help with this problem, please contact me.

Alain Barthelemy, Institut Laue-Langevin, B.P. 156x, 38042 Grenoble-Cedex, France.

From the Editor

I am acutely aware of Alain's problem, being a DECnet customer for six years that connects a DECSys-10 to RSX-11M nodes. We are also unable to convert to DECnet-11M Phase III, however, DECnet-11M Phase II (version V2.0) does work.

The problem basically comes from the fact that the DECnet-10 product is not a certified part of the DECnet community. It is implemented has a gateway in the DECSys-10 front-ends, converting the NSP protocol to the TOPS-10 internal ANF protocol. One advantage of this is, because ANF is a routing protocol, our Phase II network routes has long as the DECSys-10 is in the middle of our network.

It is my understanding that Digital is working on a Phase III implementation of DECnet-10 and that a modified gateway exists to support the DECSys-10 has a Phase II end node. We choose not to use the modified version because, by converting the DECSys-10 to an end node, we loss functionality - routing. Whoever the DECnet-10 product manager is in Marlboro should be able to help solve your problem.

Hints And Things

"Hints and Things" is a monthly potpourri of helpful tidbits and rumors. Readers are encouraged to submit items to this column. Any input about any way to make life easier on RSX/IAS is needed. Please beware that items in this column have not been checked for accuracy. Send any contributions to Multi-Tasker - Hints and Things, c/o DECUS, One Iron Way, MR2-3/E55, Marlboro, MA 01752.

Integer*4 and Fortran IV

Phil Rowland

Celanese Corporation
Charlotte, North Carolina

This article describes how to use integer values greater than 32767 from a Fortran IV program. The routines assume a floating point unit is available. In addition to its stated function of real to double integer conversion, the routine is an example of a Fortran function implemented in Macro-11 and a Macro-11 example of how to deal with the floating point unit. I4ARTH can be assembled and placed in FORLIB.OLB or SYSLIB.OLB for effortless task building.

```
.TITLE I4ARTH
.IDENT /000001/
;
; Fortran function routines to convert from REAL*4 to INTEGER*4 and back.
;
; This is for Fortran IV, which does not have I*4 math. Especially useful
; for calculating large (>32767) record numbers.
;
; Calling sequence:
;
; REAL*4 IVAL,RVAL,I4FIX,I4FLT
;
; Where: IVAL = I*4 storage
;        RVAL = R*4 storage
;        I4FIX = R*4 to I*4 conversion function
;        I4FLT = I*4 to R*4 conversion function
;
; Example:
;
; RVAL = I4FLT(IVAL)
;
;
; IVAL = I4FIX(RVAL)
;
;
; PW Rowland Celanese Corp. 24-Feb-82
; Version 1
```

```

;
; .PSECT I4ARTH
;
; F0 = %0
;
; I*4 to R*4, results in R0,R1
;

```

```

I4FLT:: ;Global reference label
TST (R5)+ ;Skip argument
STFPS -(SP) ;Save floating status
MOV (R5)+,R5 ;Get address of data
MOV (R5)+,-(SP) ;Put data on stack - backwards
MOV (R5)+,-(SP) ; ... second word
SETF ;Set floating unit to floating
SETL ;Set floating unit to long integer
LDCLF (SP)+,F0 ;Load and convert to floating
STF F0,-(SP) ;Store value on stack
MOV (SP)+,R0 ;Move value into R0 and
MOV (SP)+,R1 ; ... R1 in correct order
LDFPS (SP)+ ;Restore floating status
RETURN ;Return to caller

```

```

;
; R*4 to I*4, result in R0,R1
;

```

```

I4FIX:: ;Global reference label
TST (R5)+ ;Skip argument
STFPS -(SP) ;Save floating status
SETF ;Set floating unit to floating
SETL ;Set floating unit to long integer
LDF @ (R5),F0 ;Load floating value
STCFL F0,-(SP) ;Convert and store on the stack
MOV (SP)+,R1 ;Move value into R1 and
MOV (SP)+,R0 ; ... R0 in correct order
LDFPS (SP)+ ;Restore floating status
RETURN ;Return to caller

```

.END

From The Wizard's Book Of Magic

The Magic sessions at the symposium have become one of the most popular features of the RSX/IAS SIG. This column has the same purpose: to exchange and discuss ideas on non-standard RSX and IAS programming. Readers are encouraged to submit items to this column and are also warned that the material here have not been checked for accuracy. Also, implementation of any items from this column will be completely unsupported. The material here is potentially dangerous: incorrect usage could result in system crashes and other incorrect system operations. Send any submissions to Multi-Tasker - Magic, c/o DECUS, One Iron Way, MR2-3/E55, Marlboro, MA 10752.

Using V3.0 RMDEMO with RSX-11M V4.0

John Isakson

Zimpro, Inc.
Rothschild, Wisconsin

I have been using the old RMDEMO with RSX-11M since it was supplied with V3.0. However, it has crashed my version 4.0 system several times. After close investigation, I've found that the problem lies in the code that checks the event flag mask in the task header to see if the waitfor state is satisfied. It turns out that the event flag mask is not always in the task header. Sometimes it's in the TCB instead! You can tell by looking at SYSCM's second feature mask which has the bit F2.STP set if event flag masks and addresses are in the TCB's.

So, if you are using the old RMDEMO, look at the code where the name of the next runnable task is figured (a little bit above label EXEDN:). The code looks like this:

```

MOV T.PCB(R0),R4 ;GET TASK'S PCB ADDRESS
MOV P.HDR(R4),R4 ;GET TASK'S HEADER ADDRESS
BIT H.EFLM(R4),@H.EFLM+2(R4) ;IS THE WAITFOR
;SATISFIED?
BNE 80% ;IF NE, YES
60%: MOV T.ACTL(R0),R0 ;GET TCB ADDRESS OF
;NEXT TASK IN ATL

```

My solution is:

```

BIT #F2.STP,%FMASK+2 ;IS THE EVENT FLAG MASK
;IN THE HEADER?
BEQ 51% ;IF EQ, YES
BIT T.EFLM(R0),@T.EFLM+2(R0) ;IS THE WAITFOR
;SATISFIED?
BR 52% ;JOIN COMMON
51%: ;REF LABEL
MOV T.PCB(R0),R4 ;GET TASK'S PCB ADDRESS
MOV P.HDR(R4),R4 ;GET TASK'S HEADER ADDRESS
BIT H.EFLM(R4),@H.EFLM+2(R4) ;IS THE WAITFOR
;SATISFIED?
52%: BNE 80% ;IF NE, YES
60%: MOV T.ACTL(R0),R0 ;GET TCB ADDRESS OF
;NEXT TASK IN ATL

```

Software Performance Reports

This section contains SPR's submitted to the Multi-Tasker by users. SPR's should always be sent to DIGITAL. However, if you feel that a report should be published in the Multi-Tasker, you may send a duplicate copy to the editor at the addresses listed on the cover. Publication of an SPR in the Multi-Tasker does not imply endorsement by the SIG. Implementation of suggested fixes must be at the reader's own risk. The SPR's published in this column may be abstracts of the original submission and have not been checked for accuracy. Send submissions to Multi-Tasker - SPR, c/o DECUS, One Iron Way, MR2-3/E55, Marlboro, MA 01752.

More on BRU Sort Problem

More information has been received from Digital on the BRU sort problem reported in the last issue. In that article, Carl T. Mickelson reported an error in the quicksort algorithm that appeared to be the cause of BRU's internal stack overflows. While Digital agrees that Carl's analysis is correct, they think that fixing the bug may have a bad side effect. There is a small probability that BRU backups made with versions that have the bug may not be readable with a version of BRU that fixes the bug.

The problem is that the sorted order of the retrieval pointers is critical to the correct operation of BRU. When Digital initially designed BRU, high performance was a key goal. Analysis of previous backup programs showed that one major factor in performance for backups is disk access time. BRU attempts to minimize disk I/O by sorting its disk reads to be linear across the disk. The algorithm basically works as follows:

1. File headers are read by BRU and written to the tape. The retrieval pointers are accumulated in a large internal buffer.
2. The retrieval pointers are sorted, using the quicksort algorithm. The sorted results are then used to write file data blocks to tape. This means even if a file header is written first to a tape, its blocks may be written last depending on the result of the sort.
3. When a tape is restored to disk, the file headers are reread and the original retrieval pointers again accumulated in the internal buffer.
4. The retrieval pointers are sorted again using the same algorithm. Now BRU can restore the data blocks to the correct file.

From above, we can see that it is absolutely required that the results of the two sorts be the same. Digital believes that fixing the quicksort bug can give different sort results for certain undefined cases. This is also the reason for the warning in SPR 5.1.17.9 in the August 1980 dispatch.

Digital reports that they are working on a solution. What is unclear is what you should do in the mean time? At my site, we have decided to do nothing. If we encounter a stack overflow we will use DSC to reorder the disk and resave it. Once BRU makes the backup tapes, we know the bug did not result in an internal stack overflow so the results could be restored with the old version if necessary.

This is also the reason for the incompatibility between the BRU distributed with RSX-11M V3.2 and RSX-11M V4.0. Before doing a sort, BRU checked to see how many pointers were out of order and did not perform the sort if the number was less than the interbal value. This is set to 24(20.) in BRU V3.2. The solution in 5.1.17.9 was to bump this number high. Obviously at some value the sort would not take place and the bug not seen. In BRU V4.0, the constant has a value of 50(40.). This means that tapes saved by BRU V3.2 that had out-of-order retrieval pointers less than 50(40.) but more than 24(20.) could not be restored by BRU V4.0 because the results of the sort would be different. At DECUS, Digital distributed the following patch for BRU V4.0. The patch checks if the backup tape comes from V3.2 or V4.0 and uses the correct constant value. It occurs to me that this patch and Carl Mickelson's fix could be combined to implement a fix that uses the correct quicksort algorithm for new tapes and the old algorithm for V3.2 tapes.

```

        .TITLE LBNORD
;
; Modifications:
;
; 01.1P - patch to fix incompatibility problem between BRU versions
; 3.2/1.0 and 4.0/2.0
;
        .IDENT /1.01P/
        .PSECT
        .BLK.=
CNT=.BLK.+60
        .=.BLK.+46
        CALL PAT1
        .=.BLK.
        .PSECT $$PAT
$$PAT=.
PAT1:  MOV     NUMRP,R0
        BIT     #KY.T2D,$QUAL3      ;Check for restore
        BEQ     10$                  ;Not, exit
        BIT     #CF.NST1CF.SRT,$CFLAG ;Is it V4.0 tape
        BNE     10$                  ;Yes, exit
        MOV     OLDPAR,CNT           ;Fix number of "OUT OF ORDER" RP's
10$:   RETURN
        OLDPAR:::WORD 24              ;Magic number
        .END

```

If used, this patch should be applied to the V4.0 version of LBNORD. The original module checksum (LBNORD.OBJ;1) is 24261 and the patch module checksum (LBNORD.POB;1) is 24627. Also, if you have applied 5.1.17.9 to your V3.2 BRU, you should use whatever value in OLDPAR that you used for that version. One simple way to do this is to use a GBLPAT command when taskbuilding BRU:

```
GBLPAT=SCNDR:OLDPAR:nn
```

BRU Disk-to-Disk Restore Problem

The following information on BRU for RSX-11M V4.0 was handed out at DECUS by Digital. The following patch corrects the module BRURP for a problem concerned with the restore operation when the input disk is hardware bootable.

```
.TITLE BRURP
;
; Modifications:
;
; 101P - Fix hardware bootable disk problems
;
.IDENT /1.01P/
.PSECT

.BLK.=.
AD.boo == 20

.=.BLK.+104
CALL PAT1
NOP

.=.BLK.

.PSECT $$PAT
$$PAT=.

PAT1: BIT #AD.boo,$ADFLG ;Have we found system image yet?
      BNE 10$ ;Yes
      MOV $FILID,$SYFID ;Save its file ID
      BIS #AD.boo,$ADFLG ;Set flag indicating that

10$: RETURN

.END
```

The checksum for the original object module (BRURP.OBJ;1) is 73013. The checksum for the patch module (BRURP.POB;1) is 21716. Use the normal patching procedure for fixing this problem.

RX02 Loops If No Diskette

The following SPR on the RSX-11M V4.0 DYDRV (RX02) is from Mike Williamson of General Dynamics, Pomona, California.

When a read operation is performed on an RX02 drive that does not contain a diskette, the read does not time-out. Instead, the driver sends an "initialize" pulse to the controller every four seconds. The program that issues the read cannot be aborted; DY: cannot be unloaded; inserting a diskette into the drive has no effect. The only way to stop DYDRV from looping is to reboot the system.

Illegal Time Calculation

The following SPR on the RSX-11M V4.0 Executive (CVRTM) is from Dale DeMott of Caterpillar Tractor Company, Peoria, Illinois.

The executive module CVRTM does not correctly convert time intervals greater than 1092(10) minutes if EIS (M\$\$EIS) instructions are used. The following Fortran program will show the error:

```
DATA TEST/4RTEST/
CALL RUN (TEST,,1093,3)
END
```

We are using the following SLP patch to fix the problem.

```
CVRTM.MAC=CVRTM.MAC
-59,62
MOV #15.,R0 ;Multiply by 60 seconds/4
CALL $MUL ;Product cannot overflow 15 bits
MOV $TKPS,R0 ;Get ticks per second

.IF DF M$$EIS
ASH #2,R0 ;Multiply by 4

.IFF
ASL R0 ;Multiply by 4
ASL R0 ; ...

.ENDC
```

Cannot Allocate Terminals

The following SPR on the RSX-11M V4.0 ALLOCATE command is from Mike Williamson of General Dynamics, Pomona, California.

MCR will not allow a terminal (TT:) device to be allocated. This bug is caused by a typographical error in the source code ALLSUB.MAC, subroutine \$DVCHK. The second line after label 100\$ current reads:

```
BIT      U2.LOG,U.CW2(R1)      ; Is a user logged on it?
```

It should read:

```
BIT      #U2.LOG,U.CW2(R1)     ; Is a user logged on it?
```

TKB Cannot Link F4PRES to FCSRES

The following SPR on the RSX-11M V4.0 Task Builder (TKB M40.02) is from Tony Scandora of Science Applications, Oak Brook, Illinois.

The task builder shipped with RSX-11M V4.0 cannot build tasks that use a flat (non-PLAS) F4PRES at 140000 linked to a flat (non-PLAS) FCSRES at 160000. The global symbols in FCSRES are not made known to the task, even though F4PRES uses them. If the task does only Fortran I/O, no harm is done. But if the task calls a macro routine that directly calls any FCS routine, all of FCS gets loaded in the task, even though the task is linked to FCSRES.

The TKB for RSX-11M V3.2 did this correctly, but only showed FCSRES on the map. F4PRES's symbols were in the symbol table, but there was nothing in APR6 on the map. This version lists F4PRES's symbols correctly in the symbol table but incorrectly shows F4PRES at 160000.

Multi-Buffered FCS Mishandles Terminal EOF's

The following SPR on the RSX-11M V4.0 FCS .CLOSE routine is from Tony Scandora of Science Applications, Oak Brook, Illinois.

The multibuffered version of FCS .CLOSE routine returns an IE.EOF error when closing a terminal file that has just read a control-Z. The non-multibuffered version works successfully. The bug is fatal to Fortran programs. When closing a terminal file that has just received a control-Z (detected by the END= option on a READ statement), Fortran detects a close error and aborts the task.

A workaround for the problem is to patch Fortran's close routine to ignore IE.EOF errors when closing a terminal. The following is the patch code for Fortran-77 close module.

```
.TITLE $CLOSE
;
; Checksums (from V4.0's MAC assembler).
;
; CLOSE.OBJ      032201
; CLOSE.POB      026537
```

```
;
      .IDENT /PATX17/
      .PSECT $$OTSI,RO

$CLOSE:

. = $CLOSE+76
      CALL PATCH ;Replace the CALL .CLOSE

. = $CLOSE+130
PATCH: CALL .CLOSE ;Close the file
        BCC 10$ ; If OK, return
        BITB #FD.REC,F.RCTL(R0) ;Is it a terminal?
        BEQ 20$ ; Error if not
        CMP #IE.EOF&377,F.ERR(R0) ;Is error EOF?
        BNE 20$ ; Error if not
        MOV #IS.SUC,F.ERR(R0) ;Change error to success
        CLC ; and set success
10$: RETURN ;Return to caller

20$: SEC ;Error return
      RETURN ;Return to caller

.END
```

ICP .ENABLE DELETE Command Fails

The following SPR on the RSX-11M V4.0 Indirect MCR (ICP) is from Mike Williamson of General Dynamics, Pomona, California.

The .ENABLE DELETE command does not seem to work, that is the a file with the command in it is not deleted when it finishes processing.

Odd Terminal Buffer Size Cause PIP to Abort

The following SPR on the RSX-11M V4.0 PIP is from Mike Williamson of General Dynamics, Pomona, California.

If a terminal buffer size is set odd (SET /BUF=TI:81.) and multiple files are typed at the terminal (PIP TI:=FOO.1,FOO.2), PIP will abort after typing the first file.

MOU NT /FOREIGN Problems

The following SPR on the RSX-11M V4.0 MOU is from Gerard Newman of Unique Software Development, Knoxville, Tennessee.

There are two problems with the MOU /FOREIGN processing in MOUNT distributed with RSX-11M V4.0. First, when mounting a device as /FOREIGN, MOU will exit with an error stating it cannot activate the ACP. This is fixed by restoring the UCB address before checking to see if the device is already mounted.

```
MOUFOR.MAC;2/AU:72.=MOUFOR.MAC;1
\
-2,2
.IDENT /0112A/
-15
; 11-April-1982 G.K. Newman Fixed missing UCB bug in /FOREIGN
;
%
-322,322,/,;GKN001/
80$: MOV $DVUVB,R0 ;Restore UCB address first
BITB #US.MNT,U.STS(R0) ;Did someone beat us?
/
```

The second problem is that multiple mounts for /FOREIGN devices do not work. Fix the problem by reversing the sense of a branch instruction to be consistent with the returns from \$TSKRT.

```
MOUSUB.MAC;2/AU:72.=MOUSUB.MAC;1
\
-2,2
.IDENT /0207A/
-15
; 11-April-1982 G.K. Newman Fixed bug in already active ACP
;
%
-526,526,/,;GKN002/
BEQ 40$ ;If EQ already active or being fixed
/
```

Typo Error For DJ-11's in Full-Duplex Terminal Driver

The following SPR on the RSX-11M V4.0 TTDRV full-duplex driver comes from Joan Goodman of G.D. Searle. Chicago, Illinois.

The module TTDAT.MAC for the full-duplex terminal driver in RSX-11M V4.0 does not define the label for the DJ-11 data bases as global. The label DJUCB: should be changed to DJUCB::.

F77 Mishandles IOR Function Mixing I2 and I4

The following SPR on the Fortran-77 compiler is from Kenneth Radford of Synergistics Technology, Cupertino, California.

Incorrect code is generated for the following test Fortran routine.

```
SUBROUTINE TEST (INUM,NPTS,IFLG,DATA)
INTEGER IBUF(2048)
DO 100 J = INUM,NPTS
IDATA = DATA
IF (IFLG.EQ.2) IDATA = IOR(IDATA,"100000)
IBUF(J) = IDATA
100 CONTINUE
RETURN
END
```

If IFLG is not set to 2, IBUF results in all zeros. The problem can be seen in the generated code by looking at the inner three instructions of the DO-LOOP.

```
000042      MOV      #-4,$SEQC          ; 0004
000050      LDF      @10(R5),F0
000054      STCFI   F0,R0
000056      CMP      @6(R5),#2
000064      BNE     L$FANH
000066      MOV     R0,IDATA
000072      SXT     R1
000074      BIS     #100000,R0
000100      MOV     R0,IDATA
000104 L$FANH:
000104      MOV     IDATA,R0          ; 0006
000110      MOV     #-6,$SEQC
000116      MOV     R4,R1
000120      ASL     R1
000122      MOV     R0,IBUF-2(R1)
```

As you can see, if the CMP at 56 branches to L\$FANH, IDATA is never set with R0. The problem appears to be caused because of Fortran-77's interpretation of the "100000 constant. As documented, octal constants are always considered to be positive and any value larger than "77777 is interpreted as a INTEGER*4 value. The correct code is generated by defining ISGN has a INGEGER*2 parameter equal to "100000. Note, that if ISGN is defined as INTEGER*4, the error still occurs.

```
SUBROUTINE TEST (INUM,NPTS,IFLG,DATA)
INTEGER IBUF(2048)
INTEGER*4 ISGN
PARAMETER (ISGN = "100000)
DO 100 J = INUM,NPTS
IDATA = DATA
IF (IFLG.EQ.2) IDATA = IOR(IDATA,ISGN)
IBUF(J) = IDATA
100 CONTINUE
```

RETURN
END

Running Same Task Twice Crashes Non-Multiuser System

The following SPR on the RSX-11M V4.0 MCR (MCROV) is from Tony Gandy of Systeme Corporation, Orlando, Florida. He also includes the patch he received from Digital.

If the same installed task (...PIP) is run from two terminals in a RSX-11M V4.0 non-multiuser protection system, the system crashes. The Digital response reports that the MCR routine erroneously creates the second TCB in the single user module MCROV. The following correction file was given:

```
MCROV.MAC;2/AU:72./-BF=[12,10]MCROV.MAC;1/CS:135005
\
-2,2
  .IDENT /4.19/
-23,23
-90
;      JG0013 -- Prevent system crash when invoking same task
;      from different terminals.
;
$
-796,800,;/; JG0013/
220$: BIT   #F2.AHR,$FMASK+2 ; Check for alternate header support
/
```

TF.XCC and IQ.X Value Conflict

The following SPR on the RSX-11M V4.0 executive (DRQIO) is from John Isakson of Zimpro, Rothschild, Wisconsin

The TF.XCC and IQ.X subfunction code have the same binary value (1). DRQIO clears this bit in the routine FCXTR, which has the undesirable effect of clearing the TC.XCC bit for the IO.ATA function. The offending instruction should be removed.

Not Enough Space on RK05 Kits

The following SPR on the RSX-11M V4.0 SYSGEN is from Robert Hassinger of Liberty Mutual, Hopkinton, Massachusetts

The RSX-11M V4.0 SYSGEN fails due to insufficient file space. There are no provisions for dealing with the problem, making a successful system generation impossible.

Our system is being done on-line under RSX-11M V3.2 from an RK05 kit. During SYSGEN2, an error message is printed and SYSGEN aborts. The cause appears to be that there is insufficient space on the disk for the task build files that are created (incidentally, this is difficult to determine from the information displayed). The problem seems to be due to the specific details of our system.

Since our distribution kit is RK05, we are using small disks with limited space. The configuration we are generating includes both the LPA-11K and the LPS-11. Apparently, the insertion of the LPS and LPA modules in the system library causes the use of extra disk space, leaving insufficient space for all the task build files that are created.

Ideally, SYSGEN would be designed to work in cases like this, handling the disk space as required or at least checking available space and giving and opportunity to stop and correct problems at suitable places. Lacking this, the SYSGEN process should at least include documentation on how to deal with the problem so a successful SYSGEN can be done. As it is now, one must have information above and beyond what is provided by DEC to successfully generate a system such as ours.

Not Enough Space in SYSLIB.OLB

The following SPR on the RSX-11M V4.0 SYSGEN is from Robert Hassinger of Liberty Mutual, Hopkinton, Massachusetts

FORTRAN IV version 2.5 will not install per the instructions provided due to SYSGEN not providing sufficient capacity in SYSLIB when the system is generated. Apparently, the installation procedure for Fortran IV is predicated on SYSGEN creating SYSLIB with sufficient space to accommodate the Fortran OTS. Our SYSGEN failed to do this. The reason seems to be that certain modules (LPS, LPA, and others) are added to SYSLIB without SYSGEN making provisions to expand the library to the size required to accommodate Fortran.

Conversion from RSX-11M to VAX/VMS

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I work for a small R&D company. We acquired a VAX 11/750 back around Christmas. I have decided to respond to the Multi-Tasker's request for a diary documenting RSX to VMS conversion. I'll attempt to cover the first few months of our experience with this installment.

VERAC provides managerial and technical consulting. We use our Digital computer for scientific and simulation programming. The San Diego Office was born about three years ago and we acquired a PDP-11/34A with RSX-11M. At the end of last year, it was supporting about 8 programmers with the following configuration:

- * PDP-11/34A, FPP, 256 Kb memory, cache
- * 2 RL01's
- * CDC 9766 (configured as an RP06) with EMULEX controller
- * Cipher 900X magtape with W.P. controller
- * DeAnza ID2000 Image Processing Subsystem
- * Houston Instruments Model 8220 line printer
- * Various plotting terminals and CRT's
- * RSX-11M, Fortran-4-Plus

(As an aside, I would like recommend to everyone the Houston Instruments electrostatic printer. It is fast (1000 LPM), reliable, quiet, and inexpensive. Also, it prints on paper that can go in a three ring binder.)

It took a year for us to decide on getting a VAX. The introduction of the 750 clinched it for us; it was a much better "fit" for our environment than the 780. Also, a branch office which opened in Albuquerque was converting the 11/34. Delivery of the VAX was rapid after the order go-ahead. The system configuration was the minimum we could get away with:

- * VAX 11/750, 512 Kb memory
- * 2 RK07's
- * VMS, Fortran

We planned to strip the 11/34 of its peripherals and send the remainder off to Albuquerque. We would put the disk and tape subsystems on the Unibus and live with the resulting performance degradation. The hope was that the system would perform from a user's viewpoint at least as well as the 11/34. The advantages of having the VAX would be the virtual memory (no more overlaying) and the symbolic debugger.

Some research indicated that the Emulex disk controller for the PDP-11/34 would not work on the VAX Unibus. Also, the W.P. magtape controller, though good, was old and took four slots. We decided to buy new Emulex Unibus controllers for both and leave the old controllers on the PDP-11/34. We also hoped that by doing this, the transition would be eased since we could plug the devices into controllers on one machine or another.

The transition process was made interesting due to two problems. One was that we used BRU extensively on the 11/34. To this day, I have not been able to read BRU tapes on our VAX, though I have been told it may be possible. The other problem was that the CDC disk was configured as an RP06 on the 11/34, but would be an RM05 on the VAX. Of course, having to switch the disk between machines did not make the coming transition easier. A plan was formulated, which will be described later.

The machine arrived 18 December 1981 at 1500, right in the middle of the office Christmas party. The next month was very frustrating. It took much longer to install the system than I felt was reasonable, even considering the holiday season. Installation of the basic system was finally finished 12 January 1982. What a pleasure VMS generation is compared to RSX-11M.

At this point, both the PDP and VAX systems were running side-by-side. I initiated transition of two users who would most benefit from the virtual address space. Also, I made a point of preparing a benchmark Fortran program to gauge the performance of the machines. This program was a Kalman Filter for undersea tracking and is typical of the type of programs run at VERAC. There are two versions, one with extensive disk I/O and the other with almost none. At this stage, the benchmark timings were as follows:

	11/34 -----	11/750 -----
"base"	57 sec	51 sec
"no I/O"	25 sec	15 sec

The new VAX users were very happy with the system. Digital training helped; we sent a fellow to the "VAX Concepts" course in Los Angeles and he gave a short presentation to the rest of us about what he learned. We also got the SPI (Self Paced Instruction) course for "VAX Utilities and Commands." I am very happy with these training materials.

I was also very impressed with Digital's hot-line service, which we had for the VAX during the software warranty period. Answers to questions phoned in were prompt and helpful. I wish that the service was not as expensive as it is or that some flexible alternative to its use could be provided for small outfits.

The first step in upgrading the VAX was to purchase more memory. Half a megabyte does not really support VMS well. We knew that denser chips would be available someday, but we decided to go ahead and maximize memory out to the previous 2 Mb limit. For our purposes, more memory that this will not be really useful for quite a while. We used INTEL boards which were very reasonable and have worked well. I ran the benchmark again and found that run time for the "base" case dropped to 30 seconds. The "no I/O" case was about the same.

The next step was to transfer the CDC disk and the magtape. Essentially, this meant transferring the remaining users also. The process used was as follows:

1. DSC was used to back up the CDC disk on the 11/34. Seven tapes at 1600 BPI were needed.
2. The disk and tape drive units were plugged into the VAX.
3. DSC1 was used to restore all files onto the CDC disk, structure level 1.
4. BACKUP was used to backup the CDC disk on the VAX.
5. A new disk was initialized on the CDC drive as an RM05, structure level 2.
6. BACKUP was used to restore the files to the CDC disk.

Some difficulties were encountered in the above process due to bugs residing somewhere in VMS, BACKUP, or the EMULEX device controllers that lead to tape run-on and other problems. But all files were transferred OK.

I ran the benchmark at a couple of different points during the above transfer process. When the CDC disk was Structure Level 1, I ran it in compatibility mode and in native mode. I also ran it again on the CDC disk in Structure Level 2 in native mode. The results are below:

	COM - SL1	NAT - SL1	NAT - SL2
"base"	201 sec	29 sec	29 sec
"no I/O"	145 sec	15 sec	15 sec

The new file directory structure, though neat, has taken some getting use to. Initially, all files transferred on the CDC disk were still in the old [group,member] directories. When a user needed to use files from an old UIC, I would create a named directory for his project, copy all files from the old UIC to the new named directory, and then delete the old copies. In this way we have been gradually transforming our disk structure. We have been making heavy use of the sub-directory capability and find it to be extremely useful.

System tuning efforts have yielded no discernable improvement in performance, judging from benchmark runs and general use. I have modified parameters to reflect the large amount of memory and the small amount of disk space available for system files like PAGEFILE, SWAPFILE, and DUMPFIL. I need to do more work in this area.

Other activity in the last couple of months: we shipped the 11/34 off to Albuquerque (goodbye old friend), installed a network link called CHAOS-NET to a LISP-based single user computer, and set up TTY links to out WANG word processors and some IBM PC's our accountants use. Finally, we have been working on bringing up the various utilities, simulations, and other programs that previously ran on the 11/34.

All in all, we have so far been extremely pleased with the VAX. A lot of work is yet to be done -- I may provide another installment someday.

OMSI Pascal-1 Cluster Library

John Isakson

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If you have tried to link the OMSI Pascal-1 resident library, PASRES, with an FCSRES under RSX-11M V3.2, you have probably found out that it cannot be done! It seems that the boys in Oregon thought it wise to redefine the FCS routines \$RQCB and \$RLCB so that OPEN and CLOSE routines will use the Pascal heap allocation routines rather than FCS's. This makes it impossible to link to FCSRES. Now, with V4.0's new clustering capabilities, you can do it, and save about 2K words of FCS code in PASRES, while still using FCSRES with your other tasks.

Now, to do this, the first thing I had to do was re-build FCSRES (I'm using the PLAS flavor) to include those entry points so inconveniently commented out by SYSGEN, namely: .PRSDI, .ALUN, .FINI, and anything else used by OPEN (Pascal uses .OPFNB). These entry points are used in the OPEN FCS routine which still must be included in the Pascal Cluster Library, PASCLS.

The strategy now, is to create a revectoring routine in PASCLS for the FCS routines, build PASCLS, and provide a Jump table in PASLIB to reside in the root of any Pascal task. The revectoring mechanism used here is the same as documented in Figure 5-13 of the taskbuilder manual. Note that the SYSLIB code in module FCSVEC is not adequate for PASCLS because we still need code for OPEN and CLOSE to reside in the PASCLS and resolve these routines global references over in FCSRES. So, we'll write our own revectoring routine, PASVEC. Instead of using PSECT \$\$FSR3 like DEC's FCSJMP, I used the vector extension area \$\$VEX1. See Figure B-1 in the taskbuilder manual for a picture of \$\$VEX1. After looking at a sample Pascal taskbuild map, I found that the Pascal runtime system already uses some of \$\$VEX1, so I put my jump table right after that area. So here's what PASVEC looks like:

```

        .TITLE PASVEC
        .IDENT /01/
        .NLIST BEX.TOC
        .PSECT

;
; VERSION 01
;
; JOHN ISAKSON 22-APR-82
;
; MODIFIED BY:
;
; This module is intended to be a replacement for FCSVEC
; in SYSLIB for revectoring FCS calls into the task image.
; It will eventually become part of the PASCLS cluster
; library.
;
; EQUATED SYMBOLS
;
        .ASECT
;
; Define offsets into the Impure vector area
;
        .=60. ; MAKE ROOM FOR PASCAL
CSI1: .BLKW 1
CSI2: .BLKW 1
DLFNB: .BLKW 1
GETSQ:
GET: .BLKW 1
GTDID: .BLKW 1

```

```

MRKDL: .BLKW 1
PARSE: .BLKW 1
POINT: .BLKW 1
POSRC: .BLKW 1
PRINT: .BLKW 1
PRSDI: .BLKW 1
PRSDV: .BLKW 1
PRSFN: .BLKW 1
PUTSQ:
PUT: .BLKW 1
READ: .BLKW 1
WAIT: .BLKW 1
      = 0
      PSECT

.CSI1::
MOV     CSI1,-(SP)      ;GET OFFSET INTO VECTOR AREA
BR      COMMON

.CSI2::
MOV     CSI2,-(SP)
BR      COMMON

.DLFNB::
MOV     DLFNB,-(SP)
BR      COMMON

;
; THIS CODE IS REPEATED FOR EACH OF THE
; ENTRY POINTS LISTED ABOVE IN THE .ASECT
;
;
;
;
.WAIT::
MOV     WAIT,-(SP)
BR      COMMON

COMMON:
MOV     RO,-(SP)        ;SAVE RO
MOV     @ $VEXT,RO      ;GET ADDRESS OF VECTOR AREA
ADD     RO,2(SP)        ;ADD TO OFFSET
MOV     @2(SP),2(SP)    ;PICK UP THE ADDRESS OF ROUTINE
MOV     (SP)+,RO        ;RESTORE REGISTER
RETURN  ;CALL THE ROUTINE
.END

```

Once the revectoring routine is assembled, the PASCLS cluster library may be built. This is no big deal. I took the "normal" PASRES taskbuild command file and threw in three SYSLIB routines: OPFNB, CLOSE, and RSTFDB. These are the only routines to use the (re-defined) \$RLCB and \$RQCB routines. I also included the PASVEC routine above, and added a GBLINC for a routine called .PASJT. This is a handy way to force a module to be taken out of the library without an explicit reference in each Pascal taskbuild. Finally, add a GBLXCL for EVERY FCS module referenced in PASLIB. The command file follows:

```

; P A S C L S . C M D
;
; Task Builder command file for creating a shared cluster
; library from the modules in the Pascal support library.
;
;
PASCLS/-HD,PASCLS/MA/CR/-SP,PASCLS=
LB:[1,1]PASLIB/LB:$IO:$INPUT:$OUTPUT:$DYNMM
LB:[1,1]PASLIB/LB:$ERROR:$WRINT:$ARITH
LB:[1,1]PASLIB/LB:$OPEN:$CLOSE:$GETF:$PUTF:$SEEK:$READI
LB:[1,1]PASLIB/LB:$FPSIM:$FCMP:$CNVRT
LB:[1,1]PASLIB/LB:$FLTID:$WRITR:$READR
;
; With My PASVEC routine
PASVEC
;
; SYSLIB routines we need for clustering
;
LB:[1,1]SYSLIB/LB:OPFNB
LB:[1,1]SYSLIB/LB:CLOSE
LB:[1,1]SYSLIB/LB:RSTFDB
/
STACK=0
PAR=PASCLS:140000:40000
;
; We need a jump table to be loaded from PASLIB
;
GBLINC=.PASJT
;
; Prevent definitions for FCS entry points
; from appearing in .STB file
;
GBLXCL=$RLCB
GBLXCL=$RQCB
GBLXCL=.ASLUN
GBLXCL=.ALUN
GBLXCL=.CLOSE
GBLXCL=.CSI1
GBLXCL=.CSI2
GBLXCL=.DLFNB
GBLXCL=.FINIT
GBLXCL=.FINI
GBLXCL=.GET
GBLXCL=.GETSQ
GBLXCL=.GTDID
GBLXCL=.MRKDL
GBLXCL=.OPFNB
GBLXCL=.PARSE
GBLXCL=.POINT
GBLXCL=.POSRC
GBLXCL=.PRINT
GBLXCL=.PRSDI
GBLXCL=.PRSDV
GBLXCL=.PRSFN
GBLXCL=.PUT

```

```

GBLXCL= PUTSQ
GBLXCL= SAVR1
GBLXCL= READ
GBLXCL= WAIT
//

```

Now the onlyest thing to do is provide the jump table in \$\$VEX1 referenced by PASVEC. This is relatively trivial, as follows:

```

. TITLE PASJMP
. IDENT /01/
. NLIST BEX, TOC
. PSECT

;
; VERSION 01
;
; JOHN ISAKSON 22-APR-82
;
; MODIFIED BY:
; Redefinition of DEC's FCSJMP routine.
;
; This file will somehow have to wind up in PASLIB to be pulled
; into the task image by a GBLINC in the Pascal Cluster Library.
;
; LOCAL DATA
;
. GLOBL $VEXTA ;Get Vector area linked in
. PSECT $$VEX1, D, GBL, REL, DVR
. BLKW 30. ;Get Past Pascal Usage of VEX1

.PASJT:
. WORD .CSI1
. WORD .CSI2
. WORD .DLFNB
. WORD .GET
. WORD .GTDID
. WORD .MRKDL
. WORD .PARSE
. WORD .POINT
. WORD .POSRC
. WORD .PRINT
. WORD .PRSDI
. WORD .PRSDV
. WORD .PRSFN
. WORD .PUT
. WORD .READ
. WORD .WAIT

. PSECT

. END

```

Now, install PASCLS, insert PASJMP into PASLIB, and start re-building your Pascal tasks. A typical taskbuild command file would look like:

```

TASK/CP=TASK, LB:[1,1]PASLIB/LB
/
CLSTR=PASCLS, FCSRES:RO
//

```

Shortcutting SYSGEN Phase 2 and 3

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At the Atlanta DECUS meeting, some interest was expressed in customizing SYSGEN to support multiple systems being generated to different UIC's. Since the SYSGEN for V4.0 now supports such features, I thought it would be useful to document how to use them.

SYSGEN will allow the user considerable latitude in customizing the UFD's and disks upon which sources exist and the UFD's and disks 00 upon which tasks and maps are output. We normally build non privileged tasks to TK:[1,53] and privileged tasks to TK:[1,54]. SYSGEN, however, allows even greater flexibility. It will allow one to maintain a variety of customized privileged sources on [n,24] and build systems to [n,54].

The ability to do this is extremely useful if you are supporting a variety of systems on a single large disk system, and some of the systems are mapped, some unmapped, some use DCL and the queue manager, some don't, some use the Full duplex driver, and some don't. In such a situation, SYSGEN now has the hooks for greatly simplifying your work.

This document sole purpose is to document some of the internal SYSGEN symbols which I have come across. Their definition and use is as of BL30-BL31, but I don't think they have changed. I have used these features with success in the PRE2, and PRE3 files.

In operation, I type @PRE2 or @PRE3 to create the taskbuild command files I will use later on. PRE2 allows me to create taskbuild files for a privileged task, and PRE3 is used to create taskbuild files for utilities. This totally bypasses most of SYSGEN. To create you own prefix file, it is necessary to define certain global symbols rather than let SYSGEN create them as it goes along. The meaning of the symbols that are needed for such customizing is.

Symbol	If True
\$11M	RSX11M system, false otherwise
\$11MPL	RSX11M-Plus system, false otherwise
\$IAS	IAS system, false otherwise
\$MAP	Mapped system (always true for M-PLUS)
\$MAPM	Mapped system (true for mapped 11M, false for unmapped M, true for any M-plus, false for IAS)
\$FRLTK	FCSRES or SYSRES exists (M and IAS respectively)
FSLTK	FCSFSL exists (M=Plus)
\$FCSTK	FCS modules included in task image (no FCSRES)
\$EXRTK	Extended routines in task image - FCSRES and FCSFSL contain all of FCS plus \$EDTMSG and CSI\$ while SYSRES (IAS) contains only a subset of FCS. The additional routines in FCSRES and FCSFSL not found in SYSRES are called extended routines. False for 11M FCSRES and M-Plus FCSFSL True for IAS
\$ANFCS	FCS is ANSI
\$UTYP1	Set by XXXBLD.BLD file to tell SYSGEN3 whether the \$TYP1 string was used. \$TYP1 is used if FCSRES, FCSFSL, or ANSI versions of a task exist. If no FCSRES a TKB build command file might get created as FOOBLD.CMD. However, the FCSRES version might be FOORESBLD.CMD and \$UTYP1 would get set to tell SYSGEN3 that the \$TYP1 string (RES) had gotten used.
\$RSLIB	Resident library name (FCSRES for M, but can be selected. See CUSTOMIZE.CMD).
\$TYP1	Identifier in the middle of the command and ODL file names indicating the flavor of the task they will produce (RES, FSL, ANS).
\$TYP2	Command line suffix for some task and map names. Not to my knowlege used by M, but can be set so SYSGEN3 will produce tasks such as PIPRES.TSK, etc so one can distinguish between tasks built with FCSRES, FCSPLS, of ANSILB and those built with SYSLIB.
\$LIBOP	The TKB resident library option command line.
\$MUSW	"/MU" for multi-user M-Plus task.
\$MMSW	"/MM" for mapped 11M/M+. "/-MM" for unmapped 11M, null for IAS
\$DFLIB	Default system library for cmd and ODL files. Normally SYSLIB or ANSLIB.
\$TK	device and UFD for .TSK and .STB files
\$CL	device and UFD where .CMD and .ODL files are created.
\$OD	Device and UFD which the TKB command line uses for specifying the location of the ODL files.
\$MP	The device and UFD for the .MAP files
\$LI	device and UFD for the .OLB's other than [1,1]SYSLIB of LB:[1,1]ANSLIB

\$DBF	Delete taskbuild command and ODL files after taskbuilding.
\$BLD	Build the task.
\$EDF	Pause to edit task build command file
\$ANSLB	all tasks can use ANSLIB
\$ANSBB	Only task needing big buffering can link to ANSLIB
.;	
.;	PRE2.CMD
.;	This command file is presented for informational purposes only
.;	It is used at KMS for bypassing part of SYSGEN so that one can
.;	immediately proceed to the stage of creating the taskbuild command
.;	files. Enough symbols were defined so that the procedure would work
.;	for us. This does not mean that it will work for anyone else.
.;	To start up SYSGEN2 so we can create taskbuild command files (for
.;	customization, and testing) we type @PRE2.
.;	
	.ENABLE GLOBAL
	.SETN \$GRP 4 ! ie [1,24]
	.SETS \$MPD "SY:"
	.SETS \$EXC "SY:"
	.SETT \$UWD ! User written drivers
	.SETT \$ANM
	.SETT \$DYN
	.SETS \$SPL "/SP"
	.SETS \$FCP "LARGE"
	.SETF \$BYPAS
	.SETT \$MCR ! USING MCR NOT DCL
	.SETF \$DCL ! NOT USING DCL
	.SETT \$ANSLB ! Flavor of syslib and how .BLD files use
	.SETT \$ANSBB !
	.SETF \$EDF ! Do not pause to edit
	.SETS \$FCP "MULTIHEADER" !
	.SETS \$SYUIC "[1,54]" ! Fool into putting files on [1,24]
	.SETT \$11M ! An 11M system
	.SETF \$FRL ! These two options determine the flavor
	.SETT \$FRLTK ! of task built, we build with FCSRES
.;	Note that if you correctly define a bunch of global symbols such as
.;	\$BL\$, \$CL\$, \$MP\$, \$OD\$, \$LI\$, and \$TK\$, \$OBJDV, \$MAPDV, etc. it is
.;	possible (and rather easy) to support multiple systems on different
.;	UICs. Our systems build to [n,54] with all objects on [1,24] but
.;	other configurations can place privileged objects on [n,24].
.;	
	.SETS \$BL\$ "SY:[1,20]" !
	.SETS \$OBJDV "SY"
	.SETS \$CL\$ "SY:[1,24]"
	.SETS \$MP\$ "MP:[1,34]"
	.SETS \$MAPDV "MP"
	.SETS \$OD\$ "SY:[1,24]"
	.SETS \$LI\$ "SY:[1,24]"
	.SETS \$TK\$ "TK:[1,54]" ! We taskbuild to a logical device TK:
	.SETF \$BLD ! DON'T BUILD TASK AUTOMATICALLY
	.SETT \$SGN2 ! This is for sysgen 2
	.SETT \$MAP ! Want maps

```

.SETT $FUD           ! Full duplex terminal driver
.SETT $MUP           ! Multi-user protection
.SETN $GPB 0
.SETT $BGDSK        ! We have an RK07
.SETF $MLH          ! Not a prepger
@SYSGEN3           ! Create the taskbuild files

.;
.;
.; This command file is presented for informational purposes only
.; It is used at KMS for bypassing part of SYSGEN so that one can
.; immediately proceed to the stage of creating the taskbuild command
.; files. Enough symbols were defined so that the procedure would work
.; for us. This does not mean that it will work for anyone else.
.; To start up SYSGEN2 so we can create taskbuild command files (for
.; customization, and testing) we type @PRE3.

.PRE3.CMD

.ENABLE GLOBAL
.SETN $GRP 4         ! Files on [1,24]
.SETS $MPD "SY:"     ! Where to look for mapped obj
.SETS $EXC "SY:"     ! and executive sources
.SETT $UWD           ! User written drivers
.SETT $ANM           !
.SETT $MUP           ! Multi user protection
.SETT $DYN           !
.SETS $SPL "/SP"    !
.SETS $FCP "LARGE"  !
.SETF $BYPAS        !
.SETT $MCR           ! Using MCR not DCL
.SETT $DCL           ! Want DCL
.SETT $ANSLB        ! Flavor of FCS for creating
.SETT $ANSBB        ! the build files
.SETF $EDF          ! Do not pause to edit
.SETS $FCP "MULTIHEADER"
.SETS $SYUIC "[1,54]" ! Fool into putting files on [1,24]
.SETT $11M          !
.SETF $FRL          ! These three symbols determine the
.SETT $FRLTK        ! flavor of the TKB files (fcsres, nofcsre
.SETF $FCSTK        !
.SETS $BL$ "SY:[1,20]" !
.SETS $OBJDV "SY"   !
.SETS $CL$ "SY:[1,24]" !
.SETS $MP$ "MP:[1,34]" !
.SETS $MAPDV "MP"   !
.SETS $OD$ "SY:[1,24]" !
.SETS $LI$ "SY:[1,20]" !
.SETS $TK$ "TK:[1,53]" ! I build non-priv tasks to TK:[1,53]
.SETF $BLD          ! DON'T BUILD TASK AUTOMATICALLY
.SETT $BGDSK        ! I have an RK07
.SETT $SGN2         ! Pretend continuation from SYSGEN2
.SETT $MAP          ! Want maps (write to MP:)
.SETT $FUD          ! Full Duplex Terminal driver
.SETN $GPB 0
.SETF $MLH          ! Not a prepger
.SETF $SELECT       !
@SYSGEN3           ! Create the taskbuild command files

```

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Building Loadable Drivers with Loadable Databases

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From The Editor

This is a last minute submission that I felt was so important that I did not wait for Dave to write an article around his command files. In short, the following command files allow you to generate RSX-11M device drivers with loadable databases!

The following files allow you to query the standard SGNPER.CMD command file to generate a loadable driver data base for any RSX-11M V4.0 device driver but the terminal driver.

Dave reports that he generates his basic system with only the terminal driver and then uses the command files to generate all the remaining drivers. The only other special step he must take is to define at least one disk driver in his RSXMC.MAC file. This is because certain code in the executive is conditional on disk definitions. Simple add a symbol, like R\$LL1 to RSXMC.MAC.

The first file, SGNPER.COR, applies some simple corrections to SGNPER.CMD to allow it to be called without any terminal or psuedo devices defined.

```

;
; SGNPER.SLP
; Command file to patch "SGNPER.CMD" to allow
; driver data bases without TT: or psuedo devices.
;
SGNPER.CMD;2=SGNPER.CMD;1
\
-2908
.+++
.SETT GOTTT
.IF TEMPS EQ "" .SETF GOTTT
.+++
-2913
.+++
.IFF GOTTT .GOTO TT100
.+++
-3144

```

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```

.;;+
.IFDF $DEVBL .GOTO 99901
.;;-
/;;-

```

The next file, DEVBLD.CMD, is the master command file to generate any loadable data base you choose. It asks you the device name and number of controllers and then passes control to the modified SGNPER.CMD to actually generate the data bases. Two files result, xxTAB.MAC and xxPRE.MAC. The first is the database, including all the control labels needed for loadable drivers with loadable databases. The second is the prefix file defining the assembly parameters.

```

.;
.; DEVBLD.CMD
.; Command file to build databases for additional device drivers.
.;
.ENABLE SUBSTITUTION
.ENABLE GLOBAL
.DISABLE LOWERCASE
.; ASSEMBLY LIST DEVICE
.SETS $ALD "NL:"
.SETS $LST "NL:"
.SETF $RTE
.SETF $ACDFD
.SETT $DEVBL
.SETS $SGNUC "200,200"
.SETS $DFUIC "200,200"
@[ '$DFUIC' ]SGNPARM.CMD
.DISABLE LOWERCASE
.ASKS SAVEF SAVED ANSWER FILE NAME (D: '$SAO')
.IF SAVEF EQ "" .SETS SAVEF $SAO
.SETF $SGN2
.SETF $SAVED
.SETF $SGN1
.SETF $SAVE
.SETF $SGN3
.SETF $IAS
.SETS $SF1 ""
.SETS $SAO ""
.SETS $DIR "$DIR"
.SETS $DRV "$DRV"
.SETS $PREFX "$PREFX"
.SETF $XPRES
@'SAVEF'
.NEXT:
.ASKS DEVDNAM DEVICE NAME (IE: DK)
.IF <STRLEN> NE 2 .GOTO NEXT
.IF DEVDNAM NE "TT" .GOTO TT100
; NO TT DEVICE YET
.GOTO NEXT
.TT100:
.SETN DNUM 1.
.ASKN DNUM NUMBER OF CONTROLERS
.IF DNUM = 0 .GOTO NEXT
.SETS DEVDNUM "'DNUM'"

```

```

.IF DNUM LT 9. .SETS DEVDNUM "0"+DEVDNUM
;
; 'DEVNAM' 'DEVNUM'
;
.SETN $PNR 15.
.IF DEVDNAM NE "LP" .GOTO LP100
.ASKN [0:255.:30.] $PNR SECONDS BETWEEN PRINTER NOT READY MESSAGES
.LP100:
.SETN $CRR 15.
.IF DEVDNAM NE "CR" .GOTO CRR100
.ASKN [0:255.:30.] $CRR SECONDS BETWEEN CARD READER NOT READY MESSAGES
.CRR100:
.SETS $DEV "AD00AF00AR00IC00IP00IS00LA00LS00UD00XB00XL00XM00XP00XQ00XU00XW00"
.SETS $DEV $DEV+"CR00GR00LP00PR00"
.SETS $DV2 "PP00DB00DD00DF00DK00DL00DM00DP00DR00DR00DS00DT00DU00DX00DY00EM00"
.SETS $DV2 $DV2+"DT00CT00MF00MM00"
.SETS $DV3 "MS00MT00CO00YL00YH00YZ00YJ00NL00"
.SETS $DV3 $DV3+DEVDNAM+DEVDNUM
.OPEN #2 'DEVNAM'TAB.MAC
.ENABLE DATA #2
.TITLE 'DEVNAM'TAB
.ENABLE AMA
.MCALL HWDDF$, SCBDF$, UCBD$, CLKDF$
HWDDF$
SCBDF$ ,,SYSDEF
UCBD$ ,,TTDEF
CLKDF$
UMD=0
.IIF DF D$$IAG,UMD=400
ERL=0
.IIF DF E$$DVC,ERL=4
;
; DEVICE TABLE
;
$'DEVNAM'DAT:
.DCI = 0
.DISABLE DATA #2
.OPEN #1 'DEVNAM'PRE.MAC
.IF DEVDNAM EQ "AD" .DATA #1 A$$D01='DNUM'. ;AD01 A/D CONVERTERS
.IF DEVDNAM EQ "AF" .DATA #1 A$$F11='DNUM'. ;AF01 A/D CONVERTERS
.IF DEVDNAM EQ "AR" .DATA #1 A$$R11='DNUM'. ;AR11 LAB PERIPHERAL SYSTEMS
.IF DEVDNAM EQ "LA" .DATA #1 L$$A11='DNUM'. ;LA11 LAB PERIPH. ACCELERATORS
.IF DEVDNAM EQ "LS" .DATA #1 L$$S11='DNUM'. ;LS11 LAB PERIPHERAL SYSTEM
.IF DEVDNAM EQ "UD" .DATA #1 U$$D11='DNUM'. ;UD11 UNIVERSAL DIGITAL CONTROLLER
.IF DEVDNAM EQ "IC" .DATA #1 I$$C11='DNUM'. ;IC11/ICR-11 INDUS CONTROL SUBSYSTEM
.IF DEVDNAM EQ "IP" .DATA #1 I$$P11='DNUM'. ;IP11/IP300 PROCESS SUBSYSTEMS
.IF DEVDNAM EQ "CR" .DATA #1 C$$R11='DNUM'. ;CR11 CARD READERS
.IF DEVDNAM EQ "CT" .DATA #1 T$$A11='DNUM'. ;TA11 DUAL CASSETTES
.IF DEVDNAM EQ "DB" .DATA #1 R$$J11='DNUM'. ;RJ/RWP04\05\06 PACK CONTROLLERS
.IF DEVDNAM EQ "DD" .DATA #1 T$$U58='DNUM'. ;TU58 <NEW> DECTAPE CONTROLLERS
.IF DEVDNAM EQ "DF" .DATA #1 R$$F11='DNUM'. ;RF11 FIXED HEAD DISK CONTROLLERS
.IF DEVDNAM EQ "DK" .DATA #1 R$$K11='DNUM'. ;RK11 RK05 DISK CONTROLLERS
.IF DEVDNAM EQ "DL" .DATA #1 R$$L11='DNUM'. ;RL11 DISK CARTRIDGE CONTROLLERS
.IF DEVDNAM EQ "DM" .DATA #1 R$$M11='DNUM'. ;RM11 DISK CART CONTROLLERS
.IF DEVDNAM EQ "DP" .DATA #1 R$$P11='DNUM'. ;RP11-C\E DISK PACK CONTROLLERS

```

```

;RWM03 DISK PACK CONTROLLERS
;RJ/RWS03\04 DISK CONTROLLERS
;TC11 DECTAPE CONTROLLERS
;UDA DISK CONTROLLER
;RX11 DISK CONTROLLERS
;RX211 DISK CONTROLLERS
;ML11 MEMORY DISK CONTROLLERS
;LP/LS/LV11/LA180 LINE PRINTERS
;TU78 MAGTAPE CONTROLLERS
;TM02/03 MAGTAPE CONTROLLERS
;TM/TMA/TMB11 MAGTAPE CONTROLLERS
;TS04/TS11 MAGTAPE SYSTEMS
;PC11 PAPER TAPE PUNCH
;PR11 PAPER TAPE READER
;DALL-B PAR. LINE IINTERFACES
;DLL1-E LINE INTERFACE
;DMC11 LINE INTERFACES
;DP11 LINE INTERFACES
;DQ11 SYNC. LINE INTERFACES
;DUL1 LINE INTERFACES
;DUP11 LINE INTERFACES
;CONSOLE DRIVER
;NULL DEVICE
;CR: NOT READY MSG INTERVAL
;LP: NOT READY MSG INTERVAL
;RWM03 DISK PACK CONTROLLERS
;RJ/RWS03\04 DISK CONTROLLERS
;TC11 DECTAPE CONTROLLERS
;UDA DISK CONTROLLER
;RX11 DISK CONTROLLERS
;RX211 DISK CONTROLLERS
;ML11 MEMORY DISK CONTROLLERS
;LP/LS/LV11/LA180 LINE PRINTERS
;TU78 MAGTAPE CONTROLLERS
;TM02/03 MAGTAPE CONTROLLERS
;TM/TMA/TMB11 MAGTAPE CONTROLLERS
;TS04/TS11 MAGTAPE SYSTEMS
;PC11 PAPER TAPE PUNCH
;PR11 PAPER TAPE READER
;DALL-B PAR. LINE IINTERFACES
;DLL1-E LINE INTERFACE
;DMC11 LINE INTERFACES
;DP11 LINE INTERFACES
;DQ11 SYNC. LINE INTERFACES
;DUL1 LINE INTERFACES
;DUP11 LINE INTERFACES
;CONSOLE DRIVER
;NULL DEVICE
;CR: NOT READY MSG INTERVAL
;LP: NOT READY MSG INTERVAL
.OPEN #3 ['$DFUIC']SGNPARM.CMD;2000
.DATA #3 DUMMY FILE
.CLOSE #3
.OPEN #3 NL:
.SETT $SGN1
;IF P1 EQ "" @$EXC['$SGNUC']SGNPER.CMD
PIP ['$DFUIC']SGNPARM.CMD;2000/DEL
.CLOSE #1
.ENABLE DATA #2
$'DEVNAM'END::
.END
.DISABLE DATA #2
.CLOSE #2
.CLOSE #3
.GOTO NEXT

```

Once the database is generated, the following command file can be used to link the device driver with the loadable data base.

```

.ENABLE SUBSTITUTION
.A:
;IF P1 NE "" .GOTO B
.ASKS P1 DEVICE NAME
.GOTO A
.B:
MAC 'P1'DRV=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,[200,200]'P1'PRE,DL1:[11,10]'P1'DRV
MAC 'P1'TAB=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,[200,200]'P1'PRE,'P1'TAB
;
;BUILD DRIVER BUILD FILE

```

```

;
.OPEN 'P1'DRV.TKB
.ENABLE DATA
'P1'DRV/-MM/-HD/-FP,'P1'DRV/-SP/-WI,'P1'DRV=
'P1'DRV,'P1'TAB
LB:[1,54]RSX11M.STB/SS
LB:[1,1]EXELIB/LB
LB:[1,1]SYSLIB/DL
/
STACK=0
PAR=DRVPAR:120000:20000
/
.DISABLE DATA
.CLOSE
TKB @'P1'DRV.TKB
PIP 'P1'DRV.*,'P1'DKB;*/DE

```

RSX-11M V4.0 Release Notes (continued)

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From the Editor

The following letter is another user's experiences with RSX-11M V4.0. If anyone else can document their success/problems with the new release, it will help us all.

In response to your request for feedback on those persons who have found problems on V4.0 of RSX-11M, here are the problems we have found so far.

V4.0 can be genned on-line from a 3.2 system IF the patches to DSC contained in the software dispatch or the 4.0 release notes are applied, AND the patch to BIGIND is also applied, instructions for the latter being in the 4.0 release notes only.

We have the big disk (RP04/5/6) distribution kit on 800 BPI magnetic 9 track tape. I found errors in two ".BLD" files in [1,20]. These files generate the task build command and ODL files for system tasks. The contain several lines of the form ".DATA" to insert blank lines in the resulting ODL files: Indirect expects to see at least one character or blank space after the ".DATA", but these files apparently contain truncated lines, and IND terminated abruptly on RMDBLD.BLD during privileged task build, and CFLBLD.BLD during non-privileged task build. As this may be peculiar to this distribution kit only, I would suggest you try SYSGEN as delivered. If during SYSGEN3 INDirect dies with an illegal command ".DATA", the faults can be corrected with the editor: in

CFLEBLD.BLD the faulty line is just after the line beginning

.DATA LIB: .FCTR 'SLI'NEISLB/LB- . . .

In RMSBLD.BLD, there are two bad data lines after the symbol "SSMAPS": I found the best way to find them was to use EDT in change mode and move the cursor down the right hand edge of the data to find those .DATA lines which do not have at least one trailing space.

The most interesting problem I have had was when INITIALIZE didn't work, and the reason was that we have Fortran-77 on our system. One of the Fortran OTS modules is named \$INDEX (I believe that Fortran-4-Plus also uses a module of this name), and there is an entry point in INI module ININDX with the same name, and the task builder picks up the wrong module if the OTS modules are in SYSLIB. My solution was to edit the ODL file: the second line reference to "SYSLIB/LB" should be changed to "SYSLIB/DL". I am also including a copy of the response I just received to my SPR on this with DEC's solution to the problem.

The RMS utility CNV will not work. I have been told by TSC that this is a "known" problem and that the patch published in the March 1982 software dispatch 10.7.7.1M, "Spaces not legal in CNV command line" will correct this problem. I get checksum errors when I try to do this, so I am running the CNV task image from my 3.2 system, which still works.

ANSI mag tapes will not work on MT: (TU10) devices. TSC told me this is a "known" problem and have promised to send a patch. You can initialize, mount, and write to the tape, but the data is incorrect. Fortunately, FLX is not affected.

User mode diagnostics from V3.2 will still work on V4.0 (if you specified on-line formatting or diagnostic QIO during sysgen), so save your [200,200]BLDUMD.COM and [1,20]UMD.OLB files: they find problems IOX will not find, especially if the hardware problem is preventing you from mounting the disk.

We are using the ANSI version of FCSRES, and used SYSGEN part 3 to build all possible utilities linked to FCSRES. I have not seen any problems because of this.

I have some information not directly linked to V4.0 I would like to share. First, on formatting disks with FMT: after SPRING several problems with BAD not finding bad blocks on a disk, I received from DEC the correct procedure for formatting and locating bad blocks on a disk. Basically, FMT will find blocks with bad headers, but not with bad data; BAD will find block with bad data but not bad headers. The suggested procedure, which I have tried and found acceptable, is:

1. Mount the disk, spin it up, and allow temperature to stabilize (DEC recommends 10 minutes).
2. Use FMT with the /VE switch, so you will get a listing of all bad headers. Use a hard copy device, or write down all block numbers. DEC recommends doing this several times in succession, but I have found so far that once is enough.
3. Use BAD with the /LI switch, again to get a listing of all bad blocks. (Again, DEC recommends several times in succession).

4. Compare the two lists. If there are any block numbers reported by FMT which are not on the BAD list, run BAD with the /UPD switch to enter these blocks with bad headers into the bad block descriptor file.
5. Initialize the disk: it may be wise to explicitly state BAD=[AUTO] to insure that the bad blocks are avoided.

I have found this procedure works well.

I also have a minor problem with EDT v2.0 which DEC says they cannot duplicate, and I would like to know if anyone else has seen this: when using keypad (change) mode on a DEC VT132, the screen is sometimes set to a lower brightness, especially if the help key is pressed, and the cursor keys repeat very slowly (about 2 times per second), but all other keys repeat normally. We do not have any problems with VT52's or VT100's with advanced video, nor do we have any problems with any DEC software which sends cursor controls for VT100's (such as RMDemo and DATATRIEVE) on the VT132's which are supposed to use the same commands as VT100's. I would be interested in hearing from anyone with VT132's who is having similar problems. Incidentally, EDT in video mode will reset the internal characteristics of your VT100 series terminals (such things as internal wrap-around), and will not restore the terminals to their original status upon exit. TSC says this is a "known" problem.

RSX-11M V4.0 Machine Readable Manuals

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I wholeheartedly agree with Ralph StamerJohn when he says that the help files in [1,2]HELP.ULB are incredible. My initial efforts toward obtaining a 'nice' hard copy of the files were centered around the command file published by Ralph in the May/June 1982 issue of THE MULTI-TASKER. In order to avoid, as much as possible, any editing efforts, I made some modifications to his command file. I save this up because understandably the indirect command processor is terribly slow due to the fact that it is an interpreter.

Thinking that I am super fast at writing quick and dirty programs, I started on the enclosed program. The initial listing was a page and a half long and took an hour to write and debug. Two days later I had the final 'quick and dirty' program done.

As the enclosed sample shows, my program produces an RNO file which will show the commands preceded by an asterisk and of course an index of all of the commands. For the synonyms, e.g., #WO, the program substitutes the phrase SEE SECTION WO for this example. If the help file refers to another help file via the @ character, the RNO file will contain ***** REFER TO followed by the help file name.

I have not read through all of the results paper, however, I think that I have covered every sin in converting the files. For sure, the EDTHLP file needs editing because it has CRT control characters which mess of the printed document. By the way, the version of RNO that supports the .LITERAL and .END LITERAL commands must be used.

I obtained my hard copy by using the librarian to give me an alphabetized list of the members. For some reason, the librarian will not produce a file which can be edited then read by the indirect command processor. It only took me a few minutes to produce a command file called HELP.CMD in which each line is the name of a help file to be produced in RNO form.

I then used the following command file to produce the RNO files.

```
.ENABLE SUBSTITUTION
.START:
.OPENR #0 HELP.CMD
.LOOP:
.READ #0 HLPF
.IFF <EOF> .GOTO PROC
/
.PROC:
.SETS MBR HLPF
.LBR 'MBR'.HLP=HELP.ULB/EX:'MBR'
.V4D 'HLPF'
.PIP 'HLPF'.HLP;*/DE
.PIP 'HLPF'.RNO/PU
.GOTO LOOP
```

The program is installed with a task name of ...V4D. It takes about 30 minutes for the entire set of RNO files to be produced. I have a feeling that the indirect command file approach would take two or three hours on an idle machine I happened to be using. Plan on plenty of disk space because the HELP.ULB file is 2245 blocks and the results RNO files require 2640 blocks.

Having produced the RNO files, I listed them on an LA120. That process took about two hours resulting in about 6 inches of paper. The effort is well worth it. My manuals have not arrived yet and if I can bull my way through a system, I will be on the air quickly. I definitely do not plan to order more than one set of manuals because the RNO documentation supports most of the people I work with.

```
.TITLE V4.0 HELP LIST
.ENABLE AMA
.MCALL FCSMC$,EXIT$,QIOW$,GMCR$,DIR$,GET$,S
.MCALL OPEN$,PUT$,CLOSE$,CSI$,CSI#1,CSI#2
FCSMC$
FRRSZ$ 2
CSI$
.NLIST BEX
V4OHL: DIR$ #GMCR ;GET COMMAND LINE
BCC GGMCR ;IF NO PROBLEM
STUPID: QIOW$S #IO.WVB,#5,#1,,,<#MCR,#NCRL>
EXIT$S ;RAP USER ON KNUCKLES
NONE: QIOW$S #IO.WVB,#5,#1,,,<#NOFIL,#NOFILL>
EXIT$S
SPACE: QIOW$S #IO.WVB,#5,#1,,,<#SPAC,#SPACL>
CLOSE$ #INFIL
EXIT$S
GGMCR: MOV #8,R0 ;BLANK OUT FILE NAME
MOV #FILNAM,R1
10$: MOVB #' ,(R1)+
SOB R0,10$
MOV #DSW,R1 ;R1 = LENGTH OF COMMAND LINE
CMP #5,R1 ;LENGTH OK?
BGT STUPID ;IF NOT
SUB #4,R1 ;SUBTRACT OUT MCR COMMAND
MOV R1,IOSB+2 ;SAVE LENGTH
MOV #GMCR+2,R2
ADD #4,R2 ;R2=>FILE NAME IN MCR LINE
MOV #INBUFF,R3 ;R3=>INPUT BUFFER
MOV #FILNAM,R4 ;R4=>SAVE AREA FOR FILE NAME
1$: MOVB (R2),(R3)+
MOVB (R2)+,(R4)+
SOB R1,1$ ;IF MOVE NOT DONE
MOV #INBUFF,R0
ADD IOSB+2,R0 ;R0=>EXTENSION POSITION
MOVB #' ,(R0)+ ;CREATE '.HLP' EXTENSION
MOVB #'H,(R0)+
MOVB #'L,(R0)+
MOVB #'P,(R0)
ADD #4,IOSB+2 ;ADJUST FILE NAME LENGTH
CSI#1 #CSIBLK,#INBUFF,IOSB+2 ;CHECK OUT FILE NAME
BCS STUPID ;IF BAD, RAP USER, QUIT
CSI#2 #CSIBLK,OUTPUT ;RUN THE SECOND CHECK
BCC 3$ ;IF GOOD
JMP STUPID ;IF BAD, RAP USER, EXIT
3$: OPEN$R #INFIL,,,,,NONE ;OPEN INPUT,
MOV #INBUFF,R0 ;FORM OUTPUT NAME
ADD IOSB+2,R0 ;WITH '.RNO' EXTENSION
MOVB #'O,-(R0)
MOVB #'N,-(R0)
MOVB #'R,-(R0)
CSI#1 #SIBLK,#INBUFF,IOSB+2 ;IT SHOULD NOT BE BAD
BCC 2$
JMP STUPID ;COULD HAVE CODING ERROR
```

```

2$:   CSI#2   #SIBLK,OUTPUT
      BCS    2$           ;IF BAD, HAVE CODING ERROR
      OPEN$W #OUTFIL,,,,,SPACE ;OPEN OUTPUT.
      PUT$S  #OUTFIL,#LEFT,#LEFTL ;,LEFT MARGIN 1
      BCC    MORE        ;IF NO PROBLEM
FATAL: QIOW$S #ID,WVB,#5,#1,,, <#FAILM,#FAIL> ;OUTPUT FAILED
CLOSER: CLOSE# #INFIL      ;CLOSE INPUT FILE
      CLOSE# #OUTFIL      ;CLOSE OUTPUT FILE
      EXIT$S           ;EXIT
MORE:  PUT$S  #OUTFIL,#RIGHT,#RIGHL ;,RIGHT MARGIN 79
      BCS    FATAL      ;IF FATAL
      PUT$S  #OUTFIL,#TITLE,#TITL ;,TITLE
      BCS    FATAL      ;IF FATAL
      PUT$S  #OUTFIL,#LITER,#LITERL ;,LITERAL
      BCS    FATAL      ;IF FATAL
NXTLN: GET$S  #INFIL      ;READ A SOURCE LINE
      BCC    DISPT      ;IF NO PROBLEM
      CMPB  #IE.EOF,F.ERR(R0) ;EOF?
      BEQ   FINISH     ;IF YES
OUTF:  QIOW$S #ID,WVB,#5,#1,,, <#GETM,#GETML>
      JMP   CLOSER     ;AND EXIT
FINISH: PUT$S  #OUTFIL,#ENDL,#ENDLL ;,END LITERAL
      BCS    FATAL      ;IF FATAL
      PUT$S  #OUTFIL,#COL80,#COL80L ;,RIGHT MARGIN 79
      BCS    FATAL      ;IF FATAL
      PUT$S  #OUTFIL,#PAGE,#PAGEL ;,PAGE
      BCS    FATAL      ;IF FATAL
      PUT$S  #OUTFIL,#PINDX,#PINDXL ;,PRINT INDEX
      BCC    1$        ;IF NOT FATAL
      JMP   FATAL      ;IF FATAL
1$:   JMP   CLOSER     ;ALL WENT WELL, EXIT SMILING

DISPT: MOV   F.NRBD(R0),LENGTH ;GET RECORD LENGTH
      BNE   MDISPT     ;IF NOT EMPTY
BLANK: PUT$S  #OUTFIL,#ENDL+4,#1 ;PUT BLANK LINE IN RNO FILE
      BCC   OK1        ;IF OK
FAT1:  JMP   FATAL     ;FATAL, ABORT
OK1:   JMP   NXTLN    ;GO PROCESS NEXT LINE
MDISPT: MOV  #INBUFF,R1 ;R1 => SOURCE LINE
      CMPB #11,(R1) ;TAB?
      BNE  NTAB      ;IF NOT
NORML: PUT$S  #OUTFIL,#INBUFF,LENGTH ;OUTPUT TO RNO FILE
      BCS  FAT1      ;IF FATAL
      JMP  NXTLN    ;ELSE, PROCESS NEXT LINE
SPACEF: MOV  LENGTH,R0 ;R0 = LENGTH OF INPUT LINE
      MOV  #INBUFF+1,R1 ;R1 => SOURCE LINE
1$:   DEC  R0        ;DECREMENT LENGTH
      BEQ  BLANK     ;IF BLANK LINE
      CMPB #'',(R1)+ ;ANOTHER BLANK?
      BEQ  1$        ;IF YES, KEEP LOOKING
      DEC  R1        ;R1 => NON BLANK
      CMPB #'',(R1) ;SYNONYM?
      BEQ  SYNONM    ;IF YES
      JMP  NORML     ;ELSE, NORMAL
NTAB:  CMPB #'@(,R1) ;INDIRECT?
      BEQ  INDIR     ;IF YES

```

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```

      CMPB #'',(R1) ;SYNONYM?
      BEQ  SYNONM    ;IF YES
      CMPB #'1,(R1) ;HEADER LEVEL?
      BNE  1$        ;IF NOT
      JMP  HEADL1    ;LEVEL 1
1$:   CMPB #'2,(R1) ;HEADER LEVEL?
      BNE  2$        ;IF NOT
      JMP  HEADL2    ;LEVEL 2
2$:   CMPB #'3,(R1) ;HEADER LEVEL?
      BNE  3$        ;IF NOT
      JMP  HEADL3    ;LEVEL 3
3$:   CMPB #'4,(R1) ;HEADER LEVEL?
      BNE  4$        ;IF NOT
      JMP  HEADL4    ;LEVEL 4
4$:   CMPB #'5,(R1) ;HEADER LEVEL?
      BNE  5$        ;IF NO
      JMP  HEADL5    ;LEVEL 5
5$:   CMPB #'6,(R1) ;HEADER LEVEL?
      BNE  6$        ;IF NOT
      JMP  HEADL6    ;LEVEL 6
6$:   CMPB #'7,(R1) ;HEADER LEVEL?
      BNE  7$        ;IF NOT
      JMP  HEADL7    ;LEVEL 7
7$:   CMPB #'8,(R1) ;HEADER LEVEL?
      BNE  8$        ;IF NO
      JMP  HEADL8    ;LEVEL 8
8$:   CMPB #'9,(R1) ;HEADER LEVEL?
      BNE  9$        ;IF NOT
      JMP  HEADL9    ;LEVEL 9
9$:   CMPB #'',(R1) ;LEADING SPACE
      BEQ  SPACEF    ;IF YES MAY BE SPACE THEN *

      JMP  NORML     ;PIP HAS A COUPLE
      CALL SUPR      ;SUPPRESS LEADING BLANKS
INDIR: PUT$S  #OUTFIL,#ENDL+4,#1 ;PRODUCE BLANK LINE
      BCC  OK2        ;IF NO PROBLEM
FAT2:  JMP  FATAL     ;FATAL, ABORT
OK2:   MOV  #INDIN,R0 ;SET UP LINE TO SHOW REFERENCE
      ;TO ANOTHER FILE
      INC  R1        ;
      MOV  LENGTH,R2 ;
1$:   MOVB (R1)+,(R0)+ ;
      SOB  R2,1$     ;
      ADD  #INDIL,LENGTH ;
      DEC  LENGTH    ;ADJUST LENGTH
      PUT$S #OUTFIL,#INDI,LENGTH ;****SEE...
      BCS  FAT2      ;IF FATAL
      PUT$S #OUTFIL,#ENDL+4,#1 ;BLANK LINE TO RNO FILE
      BCS  FAT2      ;IF FATAL
      JMP  NXTLN    ;GO PROCESS NEXT LINE
SYNONM: CALL SUPR    ;SUPPRESS LEADING BLANKS
      MOV  #SYNN,R0 ;SYNONYM, PRODUCE RNO LINE
      INC  R1        ;
      DEC  LENGTH    ;ADJUST LENGTH
      MOV  LENGTH,R2 ;

```

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```

SOB      R1,1$          ;IF CLEAR NOT DONE
MOV      #HEAD4,R0     ;R0 => STORAGE FOR THIS KEY
TSTB    HEAD3          ;CHECK FOR FIRST KEY
JMP      HEADLM        ;FINISH UP
HEADL5:  MOV      #HEAD5,R0 ;R0 => START OF CLEAR
1$:      MOV      #HEAD5C,R1 ;R1 = LENGTH OF CLEAR
        CLR      (R0)+    ;CLEAR A BYTE
        SOB      R1,1$    ;IF CLEAR NOT DONE
        MOV      #HEAD5,R0 ;R0 => STORAGE FOR THIS KEY
        TSTB    HEAD4          ;CHECK FOR FIRST KEY
        JMP      HEADLM        ;FINISH UP
HEADL6:  MOV      #HEAD6,R0 ;R0 => START OF CLEAR
1$:      MOV      #HEAD6C,R1 ;R1 = LENGTH OF CLEAR
        CLR      (R0)+    ;CLEAR A BYTE
        SOB      R1,1$    ;IF CLEAR NOT DONE
        MOV      #HEAD6,R0 ;R0 => STORAGE FOR THIS KEY
        TSTB    HEAD5          ;CHECK FOR FIRST KEY
        JMP      HEADLM        ;FINISH UP
HEADL7:  MOV      #HEAD7,R0 ;R0 => START OF CLEAR
1$:      MOV      #HEAD7C,R1 ;R1 = LENGTH OF CLEAR
        CLR      (R0)+    ;CLEAR A BYTE
        SOB      R1,1$    ;IF CLEAR NOT DONE
        MOV      #HEAD7,R0 ;R0 => STORAGE FOR THIS KEY
        TSTB    HEAD6          ;CHECK FOR FIRST KEY
        JMP      HEADLM        ;FINISH UP
HEADL8:  MOV      #HEAD8,R0 ;R0 => START OF CLEAR
1$:      MOV      #HEAD8C,R1 ;R1 = LENGTH OF CLEAR
        CLR      (R0)+    ;CLEAR A BYTE
        SOB      R1,1$    ;IF CLEAR NOT DONE
        MOV      #HEAD8,R0 ;R0 => STORAGE FOR THIS KEY
        TSTB    HEAD7          ;CHECK FOR FIRST KEY
        JMP      HEADLM        ;FINISH UP

HEADL9:  MOV      #HEAD9,R0 ;R0 => START OF CLEAR
1$:      MOV      #HEAD9C,R1 ;R1 = LENGTH OF CLEAR
        CLR      (R0)+    ;CLEAR A BYTE
        SOB      R1,1$    ;IF CLEAR NOT DONE
        MOV      #HEAD9,R0 ;R0 => STORAGE FOR THIS KEY
        TSTB    HEAD9          ;CHECK FOR FIRST KEY
        JMP      HEADLM        ;FINISH UP

HEAD1:   .BLKB  80.
HEAD2:   .BLKB  80.
HEAD3:   .BLKB  80.
HEAD4:   .BLKB  80.
HEAD5:   .BLKB  80.
HEAD6:   .BLKB  80.
HEAD7:   .BLKB  80.
HEAD8:   .BLKB  80.
HEAD9:   .BLKB  80.
HEAD1C=.-HEAD1
HEAD2C=.-HEAD2
HEAD3C=.-HEAD3
HEAD4C=.-HEAD4
HEAD5C=.-HEAD5
HEAD6C=.-HEAD6
HEAD7C=.-HEAD7

```

```

HEAD8C=.-HEAD8
HEAD9C=.-HEAD9
NULL:    .ASCII  /.BLANK/
NULLL=-.NULL
MCR:     .ASCII  <12>/ILLEGAL COMMAND LINE/<15>
MCR1=.-MCR
CSIBLK:  .BLKB  C.SIZE
        .EVEN
GMCR:    GMCR$
        .EVEN
IOSB:    .BLKW  2
INBUFF:  .BLKB  160.
SIBLK:   .BLKB  C.SIZE
        .EVEN
NOFIL:   .ASCII  <12>/INPUT FILE DOES NOT EXIST/<15>
NOFILL=-.NOFIL
        .EVEN
SPAC:    .ASCII  <12>/COULD NOT CREATE OUTPUT FILE/<15>
SPACL=-.SPAC
INFIL:   FDBDF$
        FDRCA$  ,INBUFF,160.
        FDOP$A  1,CSIBLK+C.DSDS
        .EVEN
OUTFIL:  FDBDF$
        FDATA$  R,VAR,FD,CR,160,,-5
        FDRCA$  ,OUTBUF,160.
        FDOP$A  2,SIBLK+C.DSDS
        .EVEN
FAILM:   .ASCII  <12>/WRITE TO OUTPUT FAILED/<15>
FAILL=-.FAILM
LEFT:    .ASCII  /.LEFT MARGIN 1/
LEFTL=-.LEFT

COL80:   .ASCII  /.RIGHT MARGIN 79/
COL80L=-.COL80
RIGHT:   .ASCII  /.RIGHT MARGIN 80/
RIGHL=-.RIGHT
TITLE:   .ASCII  /.TITLE HELP FILE FOR /
FILNAM:  .BLKB  8.
TITL=-.TITLE
LITER:   .ASCII  /.LITERAL/
LITERL=-.LITER
GETM:    .ASCII  <12>/GET FROM INPUT FAILED/<15>
GETML=-.GETM
        .EVEN
ENDL:    .ASCII  /.END LITERAL/
ENDLL=-.ENDL
PAGE:    .ASCII  /.PAGE/
PAGEL=-.PAGE
        .EVEN
PINDX:   .ASCII  /.PRINT INDEX/
PINDXL=-.PINDX
LENGTH:  .WORD  0
INDI:    .ASCII  / ***** REFER TO /
INDIL=-.INDI
INDIN:   .BLKB  160.

```

```

SYNM: .ASCII / SEE SECTION /
SYNML=-SYNM
SYNN: .BLKB 160.
INDX: .ASCII /.INDEX /
INDXL=-INDX
OUTRUF: .BLKW 160.
ENDI: .ASCII /.END LITERAL/
ENDIL=-ENDI
      .END      V40HL

```

To produce the program for the command file given above, enter

```

>MAC V40HL=V40HL
>TKB V40HL=V40HL
>INS V40HL/TASK=...V4D

```

Recovering Corrupted ANSI Magtapes

Chris Doran

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Continuing the series of media recovery programs, I offer the attached program to retrieve files from a corrupted ANSI mastape. It was written after our TS03 started erasing the front two feet of the first tape loaded after switch on, due to a broken reset line on a bus cable. It can also be used when a tape has been INI'd by mistake, or to read ANSI tapes on a system without ANSI support.

The user should be familiar with the ANSI tape structure described in Appendix G of the "I/O Operations Manual". Each file is bracketed by 80-byte header and trailer blocks containing the file name and other information. The program expects the normal sequence of blocks, and copies files (selectively) so long as it finds them. Whenever it meets something unexpected, instead of giving up like MOUNT and MTAACP, it displays the block on the terminal and asks what it should be. It will handle both 'D' and 'F' formats, as given in the HDR2 record, or specified by the user if that is missing or invalid.

Answers to most questions are single characters:-

```

Y = Yes           N = No
Q = Quit program (close current file and exit)
S = copy file Slowly, displaying and querying each block
F = copy rest of file Fast (cancels 'S' mode)
I = Ignore rest of current file (used in slow mode)

```

'Slow' mode is useful for finding the start of real data on a highly corrupted tape. When a file block is found without a header to give it a name, the user is asked for one. If an EOF block containing the name appears subsequently, it can be renamed.

RT-11 ANSI tapes have 512-byte headers, no HDR2 and EOF2 blocks, and all files are in 'F' format. Answering 'Y' to the "Written by RT-11?" question accommodates for these differences at the expense of some intelligence. The program does not undo RT-11's embedded carriage-control.

The program was written in FORTRAN-77 as an exercise, but an F4P version is available from the author. The typed files can be checked using SLP as follows:

```

>SLP
SLP>=NL:/CS:cccccc
@ffffff.FTN
/

```

where files "ffffff" and checksums "cccccc" are:

```

ANSICOM 147204 ANSI 76352 UCASE 107347 MTRIO 46064
OPNFIL 23332 CLSREN 37475 TYPBLK 156113 GETCHR 36355

```

C Common areas and parameters for ANSI tape recovery program.
 C File: ANSICOM.FTN

```

C
PARAMETER (ISSUC=1, IEEOF='366'0, IEBBE='310'0,
*         IEEOV='366'0, IEVER='374'0, IEEDT='302'0,
*         IEDNR='375'0, IEDAO='363'0,
*         IDRLB='1000'0, IORWD='2400'0, IOSPB='2420'0,
*         VOL1=1, HDR1=2, HDR2=3, MARK=4, FILE=5, EOF1=6,
*         EOF2=7, NEWF=8, EOVI=9, EOVI2=10, UNKNWN=11)
CHARACTER MODE,FNAME*36
LOGICAL*1 COPY,FILOPN,SLOWLY,COPYAL,DISPLD,RT11,B
INTEGER*4 NBLOCK,NREC
COMMON//NBLOCK,NREC,LNAME,ISB(2),IPR(6),B(512),COPY,FILOPN,
*        SLOWLY,COPYAL,DISPLD,RT11
COMMON/CHRCOM/FNAME,MODE

```

PROGRAM ANSI ! MAGTAPE RECOVERY

```

C
C C J Doran, Sira Institute Ltd., South Hill, Chislehurst,
C Kent, BR7 5EH, England.
C
C This program will read an unmounted ANSI mastape block by block,
C allowing user intervention if the block read was not what it expected.
C
C Version: V1.01 Date: 27-Apr-82
C
C Task-build as:
C
C >TKB
C TKB>ANSI,ANSI/-SP=ANSI,GETCHR,MTQIO,TYPBLK,OPNFIL,CLSREN,UCASE
C TKB>RENAME,LB:[1,1JF77OTS/LB
C TKB>/
C ENTER OPTIONS:
C TKB>MAXBUF=512
C TKB>//
C
C See "Multi-tasker" Vol 10, No 4, pp87-88 for RENAME.
C
CHARACTER*4 HDRTYP,BLKTYP(11),ANS*1,ILLBYT*27,TYPES*40
INTEGER*4 A(128)
INCLUDE 'ANSICOM.FTN'
EQUIVALENCE (A,B),(BLKTYP,TYPES)
C Normal sequence of block types (repeats at HDR1):
DATA BLKTYP/'VOL1','HDR1','HDR2','MARK','FILE','EOF1',
* 'EOF2','MARK','EOV1','EOV2','????'/
* IEXPCT,IPR(1),MODE,LNAME,COPY,COPYAL,FILOPN,SLOWLY,ILLBYT/
* UNKNWN,1,'?',0,4*.FALSE.,' -- invalid byte count'/
C
C Suppress count conversion error message in DECODE:
CALL ERRSET(64,,TRUE,,FALSE,,TRUE,,FALSE.)
1 TYPE 1000
1000 FORMAT('Mastape device [ddu]: ')
ACCEPT 1010,L,I
1010 FORMAT(A2,I)
CALL ASNLUN(1,L.AND,'57537'0,I,IDS) ! 57537 sets upper case
IF(IDS.NE.ISSUC) GOTO 1
CALL GETCHR('Written by RT-11',16,ANS,'YN',2,I)
RT11=I.EQ.1
TYPE 1030
1030 FORMAT('Start at block (<=0 for current) = ')
ACCEPT *,NBLOCK
IF(NBLOCK.LT.0) NBLOCK=0
IF(NBLOCK.NE.0) THEN
CALL MTQIO(IORWD) ! Rewind tape
NBLOCK=NBLOCK-1 ! Blocks to space out
IF(NBLOCK.EQ.0) THEN
IEXPCT=VOL1 ! Block 1 should be VOL1
ELSE ! others can be anything (default)
C Space to first block required. Have to do one block at a time because
C a multiple space block instruction fails on tape marks.

```

```

DO 4 NREC=1,NBLOCK
3 CALL MTQIO(IOSPB) ! (IPR(1) initialised to 1)
IF(ISB(1).EQ.IEEOF) GOTO 3 ! Don't count tape marks
IF(ISB(1).EQ.IEEOV) THEN
CALL GETCHR('Read past E-0-V mark',28,ANS,'YN',2,I)
IF(I.EQ.2) GOTO 9999
END IF ! end of volume mark
4 CONTINUE
END IF
END IF ! tape positionings required
IF(RT11) MODE='F' ! all RT-11 files are ANSI F
CALL GETADR(IPR,A) ! Set up buffer pointer
C
C Come here for a new tape block.
10 NBLOCK=NBLOCK+1
DO 20 I=1,128
20 A(I)=0
IPR(2)=512
CALL MTQIO(IORLB) ! Read tape block
DISPLD=.FALSE. ! Not displayed yet
C Check for and handle read errors.
IF(ISB(1).EQ.IEEOF) GOTO 200 ! Tape mark
IF(ISB(1).NE.ISSUC) THEN
IF(ISB(1).EQ.IEBBE) THEN
CALL TYPBLK(' is bad',7)
ELSE IF(ISB(1).EQ.IEDAO) THEN
CALL TYPBLK(' -- data overrun',16)
ELSE IF(ISB(1).EQ.IEVER) THEN
CALL TYPBLK(' -- unrecoverable error',24)
ELSE
TYPE 1060,ISB(1),NBLOCK
1060 FORMAT(' Error ',03,' on block ',I6,'.')
GOTO 9997 ! Continue?
END IF
END IF ! errors
C
C Block read. If RSX, should be 80 or 512 bytes. 80-byte blocks are file
C headers etc, 512 byte blocks are data. All RT-11 blocks are 512 bytes,
C so check everything.
IF(ISB(2).EQ.0) GOTO 10 ! Ignore empty block
IF(.NOT. RT11) THEN
IF(ISB(2).GT.80) GOTO 500 ! Not 80, try file data
IF(ISB(2).NE.80) CALL TYPBLK(' is short header block',22)
END IF ! RT11
C Find header type. Ask on TI: if unknown.
DECODE(4,1090,B) HDRTYP ! Copy B(1:4) into HDRTYP
110 I=INDEX(TYPES,HDRTYP)
ITYPE=(I+3)/4
IF(MOD(I,4).NE.1) THEN
IF(RT11) THEN
IF(IEXPCT.EQ.FILE) GOTO 500
TYPE 1100,NBLOCK,BLKTYP(IEXPCT),BLKTYP(FILE)
END IF ! RT11
CALL TYPBLK(' is invalid header block',26)
TYPE 1080
1080 FORMAT('Enter type [VOL1/HDR1-2/FILE/EOF1-2/EOV1-2/QUIT/cr
* to ignore]: ')

```

```

ACCEPT 1090,HDR1YP
1090  FORMAT(A)
      IF(HDR1YP.EQ,' ') GOTO 10 ! <cr> = ignore totally
      CALL UCASE(HDR1YP,4) ! Change to UC for compares
      IF(HDR1YP.EQ,'QUIT') GOTO 9998 ! Close file and exit
      IEXPCT=UNKNWN
      GOTO 110
      END IF ! invalid header block type
C Valid header block, see if we expected it (if anything in particular).
  IF(ITYPE.NE.IEXPCT .AND. IEXPCT.NE.UNKNWN .AND.
    * .NOT.(ITYPE.EQ.EOV1 .AND. IEXPCT.EQ.EOF1))
    * TYPE 1100,NBLOCK,BLK1YP(IEXPCT),BLK1YP(ITYPE)
1100  FORMAT(' Block',I12,'. Expecting ',A,' read ',A,'.')
C Process according to what we got anyway.
  GOTO (140,150,170,200,500,180,190,200,300,310),ITYPE
C VOL1 header, just print name of tape.
140  TYPE 1110,NBLOCK,(B(I),I=5,10)
1110  FORMAT(' Block',I12,'. Volume label: ',6A1)
      IEXPCT=HDR1 ! Next should be file header
      GOTO 10
C HDR1 defines filename. See if it's wanted, unless copy all flags set.
150  IEXPCT=HDR2
      IF(FILOPN) THEN
        CALL CLSFIL
        TYPE *,'No EOF block, file closed anyway.'
      END IF ! file already open
      FNAME=' '
      DECODE(17,1090,B(5)) FNAME(1:17) ! Save filename string
      LNAME=INDEX(FNAME,'')+1 ! and its length noting possible
      LNAME=LNAME+INDEX(FNAME(LNAME:18),' ')-2 ! embedded spaces
      DECODE(6,1130,B(36),ERR=160) I,L ! Get version no components
1130  FORMAT(I4,I2)
160  TYPE 1135,NBLOCK,FNAME(1:LNAME),(I-1)*100+L+1
1135  FORMAT(' Block',I12,'. Start of file ',A,';',06.6)
      COPY=.TRUE.
      IF(.NOT.RT11) GOTO 10 ! RT-11 doesn't write HDR2's
C HDR2, Open file if required, in appropriate mode (D or F).
170  IEXPCT=MARK
      IF(.NOT.COPY) GOTO 10
      IF(.NOT.RT11) DECODE(1,1090,B(5)) MODE
      CALL OPNFIL ! Open file
      GOTO 10
C EOF1. Close file if open.
180  IEXPCT=EOF2
      TYPE 1140,NBLOCK,(B(I),I=55,60),(B(I),I=5,21)
1140  FORMAT(' Block',I12,'. End of ',6A1,'-block file: ',17A1)
      IF(.NOT.RT11) GOTO 195 ! No EOF2's in RT11, expect NEWF
C EOF2. Close file again, in case EOF1 missed.
190  IEXPCT=NEWF ! Expect mark & new file
195  CALL CLSREN ! Close, possibly renamins
      GOTO 10
C
C Tape mark found. End-of-volume if we had one last time too.
200  NBLOCK=NBLOCK-1 ! Don't count it as a block
      IF(SLOWLY) TYPE *,'Tape mark after block',NBLOCK,'

```

```

IF(ITYPE.EQ.MARK) THEN
  TYPE *,'End of volume mark.'
  GOTO 9997 ! Continue?
END IF ! End of volume
ITYPE=MARK ! Remember in case a second
GOTO (240,240,209,210,230,240,219,220,240,240,240),IEXPCT
209  TYPE 1100,NBLOCK,BLK1YP(HDR1),BLK1YP(MARK) ! { HDR2 -> }
210  IEXPCT=FILE ! mark -> file
      GOTO 10
219  TYPE 1100,NBLOCK,BLK1YP(EOF1),BLK1YP(MARK) ! { EOF2 -> }
220  IEXPCT=HDR1 ! mark -> HDR1
      GOTO 10
230  IEXPCT=EOF1 ! file -> mark -> EOF1
      GOTO 10
240  TYPE 1100,NBLOCK,BLK1YP(IEXPCT),BLK1YP(MARK)
      IEXPCT=UNKNWN
      GOTO 10
C
C EOVI. End of file and volume in a multi-volume set.
300  IEXPCT=EOV2
302  CALL CLSREN ! Close file, with possible rename
      TYPE *,'End of volume block.'
      GOTO 9997 ! Continue?
C
C EOVI. Second end-of-volume block. If expected, user is reading past it.
310  IF(IEXPCT.NE.EOV2) GOTO 302
      IEXPCT=UNKNWN ! Anything could follow
      GOTO 10
C
C Process file record if copying. Note file may not yet be open.
500  IF(IEXPCT.NE.FILE .AND. IEXPCT.NE.UNKNWN)
    * TYPE 1100,NBLOCK,BLK1YP(IEXPCT),BLK1YP(FILE)
      ITYPE=FILE
      IF(IEXPCT.EQ.FILE .AND. (.NOT.COPY)) GOTO 10
      IF(IEXPCT.NE.FILE .AND. .NOT.FILOPN) CALL TYPBLK(' ',1)
      IEXPCT=FILE
      CALL OPNFIL ! Open file if not done already
      IF(.NOT.(FILOPN.AND.COPY)) GOTO 10
      IF(ISB(2).NE.512) TYPE *,ISB(2),' byte file block!'
      IF(SLOWLY) THEN
        CALL TYPBLK(' ',1)
        CALL GETCHR('Copy block',10,ANS,'YNQFI',5,I)
        GOTO (509,10,9998,508,506),I
506  COPY=.FALSE. ! Ignore rest of this file
        GOTO 10
508  SLOWLY=.FALSE. ! continue copying, Fast
      END IF ! slow copy
509  IF(MODE.EQ.'F') THEN
        WRITE(2'NREC) B
        GOTO 10
      ELSE
C Decompose D type block into records. Format is 4 bytes of ASCII byte
C count, followed by the ASCII bytes themselves. ' ' as the first byte
C of the count means end of block.
        L=0

```

```

520     L=L+1
        IF(L.GE.512 .OR. B(L).EQ.'') GOTO 10 ! All done
        DECODE(4,1170,B(L);ERR=525) M
1170    FORMAT(I4)
        M=L+M-1
        IF(M.GT.512) THEN
C Illegal byte count. Report and write out rest of record as is.
525     DECODE(4,1090,B(L)) ILLBYT(24;27) ! Complete message
        CALL TYPBLK(ILLBYT,27)
        M=512
        L=L-4 ! Write illegal count too
        END IF ! illegal record length
530     WRITE(2,1180) (B(I),I=L+4,M)
1180    FORMAT(4(64A1))
        END IF ! D/F format
        NREC=NREC+1
        L=M
        GOTO 520

C
C End of Program (?).
9997   CALL GETCHR('Continue',8,ANS,'YN',2,I) ! Continue?
        IF(I.EQ.1) GOTO 10 ! Yes, read next block
9998   CALL CLSFIL ! No, close file
9999   END ! and return to MCR

SUBROUTINE UCASE(S,L)
C Convert lower-case characters in S to upper.
BYTE S(1)
DO 10 I=1,L
    IF(S(I).GE.'a' .AND. S(I).LE.'z') S(I)=S(I).AND,'137
10    CONTINUE
RETURN
END

SUBROUTINE MTQIO(IFUNC)
C Issue mastape function QIO.
INCLUDE 'ANSICOM.FTN'
CALL WTQIO(IFUNC,1,6,ISB,IPR,IDS)
IF(IDS.NE.ISSUC) TYPE 4050,IDS
4050   FORMAT(' WTQIO rejected, $DSW = ',03)
IF(ISB(1).EQ.IEEOT) STOP 'Physical end of tape'
IF(ISB(1).EQ.IEDNR) STOP 'Device not ready'
RETURN
END

SUBROUTINE OPNFIL
C Open file, if not open already. Ask for name and mode unless known.
CHARACTER*1 ANS
INCLUDE 'ANSICOM.FTN'
IF(.NOT.FILOPN) THEN
    IF(COPYAL) GOTO 730
    COPY=.FALSE.
    SLOWLY=.FALSE.

```

```

        CALL GETCHR('Copy file',9,ANS,'YNGQS',5,I)
        GOTO (730,740,720,700,710),I
700    CALL EXIT ! Quit
710    SLOWLY=.TRUE. ! copy slowly -- block by block
        GOTO 730
720    COPYAL=.TRUE. ! Go -- copy all
730    COPY=.TRUE. ! Yes, copy
        IF(LNAME.EQ.0) THEN
            TYPE 3000
            FORMAT('$File name: ')
            ACCEPT 3010,FNAME
3000   FORMAT(A)
3010   FNAME(LEN(FNAME);LEN(FNAME))=' '
            LNAME=INDEX(FNAME,'')+1
            LNAME=LNAME+INDEX(FNAME(LNAME:18),' ')-2
        END IF
        CALL TSTCHR('Record format',13,MODE,'DF',2,I)
        CALL ASNLUN(2,'SY',0) ! Reset default O/P device
        IF(I.EQ.2) THEN
C Open fixed length records file (task etc.), 128*4=512 bytes.
            OPEN(UNIT=2,FILE=FNAME,FORM='UNFORMATTED',STATUS='NEW',
                * RECL=128,ACCESS='DIRECT',ASSOCIATEVARIABLE=NREC,ERR=740)
            ELSE
C Open variable length records file (ASCII or binary).
            OPEN(UNIT=2,FILE=FNAME,FORM='FORMATTED',STATUS='NEW',
                * CARRIAGECONTROL='LIST',RECL=512,ERR=740)
            END IF
            FILOPN=.TRUE.
            NREC=1
740    END IF
RETURN
END

SUBROUTINE CLSREN
C Close file. Allow user to rename it if the name in the EOF block
C is different to that with which it was opened.
CHARACTER*18 REALNM
INCLUDE 'ANSICOM.FTN'
IF(.NOT.FILOPN) GOTO 780
IF(NREC.NE.1) THEN
    DECODE(17,3020,B(5)) REALNM
    FORMAT(A)
3020   IF(FNAME(1:17).NE.REALNM(1:17)) THEN
        REALNM(LEN(REALNM);LEN(REALNM))=' '
        TYPE *,'File ',REALNM(1;INDEX(REALNM,' ')),
            * 'was opened as: ',FNAME(1:LNAME)
        CALL GETCHR('Rename',6,ANS,'YN',2,I)
        IF(I.EQ.1) THEN
            CALL ASSIGN(3,REALNM,17)
            IDS=1
            CALL RENAME(2,3,IDS)
            IF(IDS.LT.0) TYPE 3030,IDS
3030   FORMAT(' Rename failed ',03)

```

```

        END IF
        END IF
        END IF
C
C Enter here to close without rename option.
ENTRY CLSFIL
IF(FILOPN) THEN
    IF(NREC.EQ.1) THEN
        TYPE *, '!! Deleting empty file: ', FNAME
        CLOSE(UNIT=2, DISPOSE='DELETE')
    ELSE
        CLOSE(UNIT=2)
    END IF
END IF
780 LNAME=0
    IF(.NOT.RT11) MODE='?'
    FILOPN=.FALSE.
    COPY=.FALSE.
    RETURN
END

SUBROUTINE TYPRK(TITLE,LT)
C Type
out current block.
INCLUDE 'ANSICOM.FTN'
CHARACTER*80 TITLE
DATA MASK/'177/'
TYPE *, 'Block', NBLOCK, TITLE(1:LT), ', ', ISB(2), ' bytes.'
IF(.NOT.DISPLD .AND. ISB(2).NE.0) THEN
    IWIDTH=80
    IF(ISB(2).NE.80) IWIDTH=64
C MAX0 call replaces control chars by spaces.
    TYPE 4010, (MAX0(MASK.AND.B(I),*40), I=1, ISB(2))
4010  FORMAT(' Contents: ', /, 8(X, <IWIDTH>A1, /, ;))
        DISPLD=.TRUE.          ! Don't display again
    END IF
    RETURN
END

SUBROUTINE GETCHR(PROMPT,LP,ANS,REPLY,LR,INDX)
C Print PROMPT at II:, and set a single-character reply to ANS (UC only).
C Look up CHAR in string REPLY, containing valid answers, and return
C index number in INDX if found. If not, repeat prompt until ANS is valid.
CHARACTER ANS, PROMPT*80, REPLY*10
900  TYPE 5000, PROMPT(1:LP), (REPLY(I:1), I=1, LR)
5000  FORMAT('#', A, ' [', <LR-1>(A1, /), A1, ' ]? ')
        ACCEPT 5010, ANS
5010  FORMAT(A)
C Enter here if character is already in ANS.
ENTRY TSTCHR(PROMPT,LP,ANS,REPLY,LR,INDX)
CALL UCASE(ANS,1)
INDX=INDEX(REPLY(1:LR),ANS)
IF(INDX.EQ.0) GOTO 900
RETURN
END

```

Power Failure Restart

Matt Tomlinson

Digital Equipment Corporation
Dallas, Texas

Power failure restart is the ability of a system to smooth out intermittent, short-term power fluctuations with no apparent loss of service and data, all the while maintaining logical consistency within the operating system and application tasks. Power failure affects absolute response time and peak load capacity because it applies to the aggregate system performance rather than to increasing performance when the system is actually in operation. A system is not performing when it is shut down, and if the executive can reduce down periods with a power failure restart, aggregate performance is increased.

The powerfail sequence of an RSX-11 operating system, if powerfail recovery is elected as a SYSGEN option and the PDP-11 hardware is configured appropriately, is implemented in three routines in the module POWER:

1. PDOWN - powerfail interrupt down

When power begins to fail, the processor traps to the executive through vector 24(8). In RSX-11, vector 24(8) is mapped to the routine PDOWN, which takes the following actions.

- All volatile machine registers (general registers, floating registers, memory management, Unibus mapping) are saved on an internal stack.
- The powerfail vector (24) is switched to the power up routine, PUP.
- The processor is halted to await the power up interrupt.

2. PUP - powerfail interrupt up

When power is restored, the executive again receives control by the same trap mechanism as above. Beginning at location 23 is the new PC (24) and PSW (26) of the powerfail interrupt up routine. This routine, PUP, does the following:

- All volatile machine registers are restored from the internal stack.
- The powerfail indicator, \$PWRF, is incremented.
- A schedule request is forced for the null task.

- d. The powerfail vector is switched to the power down routine, PDOWN.
- e. The system clock is turned back on.
- f. An RTI instruction is executed to pop the preserved PC and PSW from the kernal stack.

3. \$POWER - powerfail recovery

Before the executive does a context switch, it checks the powerfail indicator, \$PWRFL, to see if powerfail recovery should be done. The previous routine, PUP, forces a context switch to make sure this happens before returning to any user program. After returning from PUP, the executive finishes any processing it was performing and then dispatches to \$POWER. This routine takes the following actions:

- a. Clears the powerfail indicator, \$PWRFL.
- b. Declare a significant event by calling \$DRDSE.
- c. Clear the clock error flags and energize output relay of the KW11-Y if watchdog timer (K\$SW11) support is included.
- d. Clear memory parity CSR's if memory parity support (P\$SRTY) is included.
- e. Preserve force miss bits in Cache Control Register if cache is defined.
- f. Clear the memory error register.
- g. Queue an Error Message Block (EMB) for error logging if this option (E\$SLOG) is included in the system.
- h. Effect powerfail AST's for tasks that are active and in core.
- i. Do powerfail recovery for all active devices by calling powerfail entry point (xxPWF) of the driver and unconditionally call powerfail entry point of any device that has UC.PWF set in U.CTL of its UCB.

As mentioned previously, the entire power failure/restart mechanism is initially triggered by a processor trap. Whenever AC power drops below 90-95 volts for 120V power (value depends on PDP-11 processor type) or outside a limit of 47 to 63 HZ (as measured by DC power), the powerfail sequence is initiated. The CPU automatically traps to location 24 and the powerfail code has between 2 and 5 milliseconds (again dependent on processor type and RC characteristic voltage retention of the processor circuitry) to save all volatile information and condition peripherals for power failure.

For most PDP-11 systems, if battery backup is present and the battery charge is not depleted when power recovery is restored, the processor traps to location 24 and executes the power-up routine to restore the machine to its state prior to the power failure. If batteries are not present (needed for MOS memory), a boot to the system bootstrap ROM default device is executed. Most PDP-11 (or LSI-11) processors and bootstrap modules have mode selection options for action to take upon power-up. A very good example of the options available for the LSI-11 is published in the 1979-80 Digital "Microcomputer Processor Handbook." Additional mode option information can be found by referring to the Reference Guide or Option Description for the bootstrap module on your system. What is most important to realize is that the hardware and how it is configured play a very important role in the powerfail mechanism. If the bootstrap module is strapped to boot the system upon any trap through location 24, it is obvious that the powerfail restart mechanism will not function correctly. Conversely, if the hardware is configured properly but powerfail recovery is not selected as a SYSGEN option, the mechanism will not function.

Atlanta Symposium Wrapup

Ralph W. Stamerjohn
Multi-Tasker Editor

DECUS Symposium are always exciting, but Atlanta was something special. It is hard to capture on paper the enthusiasm and intensity that people generated. Some of the moments I remember include:

Tim Grey, before telling a BRU war story at the Magic Session, asked "How many people here have used BRU?" After everyone showed their hand, a voice floated up from the back, "How many have used it twice!"

Robert Bismuth, at his Weird Things to Do With RSX-11M session, pointing out how convenient it was to use tasks for other things than running code: like using them as large I/O buffers for other tasks.

A roomfull of people showing up on Wednesday night, the only free time of the symposium, to talk about "Is There Life After RSX?" We concluded the patient had only left puberty and had its best years ahead of it.

Meeting Max Woodbury, a Software Specialist in Digital's Laboratory Systems Support Group in Atlanta. Max took vacation to come the symposium and helped the RSX SIG any number of times answer both technical questions and where was a good place to eat. Digital is very lucky to have someone like Max, who will give up his free time to help and listen to users.

Most of the technical details from the symposium are either in the handouts (six SIG's had handouts for sale) or the Symposium Proceedings. You can probably get a copy of the first from someone in your LUG. The proceedings can be ordered from DECUS.

Two interactive sessions are covered elsewhere in this issue: The Best of the SIG Tapes and IAS Question and Answer Session. The RSX-11M/M Plus Question and Answer Session will be in the next issue. Also, the RSX SYSGEN and VAX Conversion panels were taped live at the symposium and should be available in the future for showing at LUG meetings.

The rest of this report comes from various sources. To start with, Allen Watson and Bryant Moriarty from The Record, New Jersey's Largest Newspaper submitted the following trip reports. First is Allen Watson's:

The following is a brief summary of some of the valuable insights, facts, and rumors learned in Atlanta during my six-day stay. This was my third successive symposium, and from my experience, they become more valuable every time I go, because I have a firmer foundation to build on.

1. Presymposium seminar on RSX Internals by Bruce McCulley, DEC, was a condensed version of 3-day internals seminar given by DEC Education Services. Bravura performance by McCulley. Brought all the pieces together for me. Worth the trip by itself. A \$600 value for \$150. Topics covered: overview of RSX Exec, use of Memory Management by Exec, APR's, Directive Common in V4.0, priveleged tasks mapping to Exec, Pool management, Pool Monitor Task, Clock Processing, scheduler, swapper and shuffler, system synchronization (interrupts, system service routines, user tasks), \$STKDP, the Fork routine, traps and interrupts, processing of SST's, information on debugging crashes, directive processing, Task Control Blocks and Task Headers, the Partition Wait Queue, Life cycle of a task, memory allocation, checkpointing, the I/O database, data structures (DCB, UCB, SCB, I/O packets), I/O processing, specifics on V4.0, CLI support and new directives, cluster libraries. Wow!
2. Learned that although V4.0 (and M Plus V2.0) DCL is modifiable, it must be reassembled and built for each modification. Decided to continue to use CCL as primary Command line Interpreter for now. New version of CCL available for this purpose.
3. RMD in new versions has super features that give specific task information.
4. Disk seek optimization in new versions offers potential 30% improvement in response. RMD gives feedback on disk performance, aiding in tuning.
5. As COBOL-11 user, disturbed to find that there will be no support for COBOL programs to use separate I and D space, nor for Cluster Libraries. In fact, the current release of COBOL-11 will be the last! (From COBOL developer). DEC intends to replace it with COBOL-81, which is currently a subset of COBOL-11. Many of the missing features will be added back, but probably not all.

Current release of COBOL-81 comes with a clusterable library. Compile time and execution time purported to be considerably faster than COBOL-11. Support for separation of I and D space, if it comes at all, will be one to two years off.

Rumor of a "virtual COBOL" available from independent supplier; am checking this out and will try to remember to report. No further details.

6. RMS library (V1.8) is NOT clusterable. DEC has completed V2.0 of RMS, which is clusterable, but this will not be shipped for six to twelve months; distribution problems arising from bundling RMS with the operating systems.
7. To date, only certain that FORTRAN, COBOL-81, and FCS libraries can be clustered. Heard conflicting reports about the FMS library. So cluster library support will, initially, benefit only users of FORTRAN or COBOL-81 and FCS, and do nothing for the rest of us.
8. In some situations, V4.0 BRU can't read a V3.2 BRU tape. Inclusion of certain commands in SYSGEN command files causes a 4.0 SYSGEN done on 3.2 to fail. Workaround sheet distributed in RSX campground. Also, in ATTACH directive, new IQ.X subfunction should be ignored until next release; it don't work. DSC on 3.2 cannot read 4.0 tape either.
9. Everyone, even non-VAX users, excited about DEC's introduction of VAX-11 C. The C manual sold out in the bookstore by Tuesday. VAX-11 C supports RMS. DEC has no current plans to implement on PDP-11's; some questioned that they would try to compete with DECUS C compiler. Most code written in DECUS C should be easily portable to VAX-11 C.
10. TECO sub-SIG still alive and well as part of DMS SIG (TECO users should subscribe to DMS newsletter). There is a TECO macro librarian, John Runyon, Box J, Navesink, NJ 07752. Rumors of a TECO V38 seen on the VAX.
11. Interesting session on Tape Library management using Datatrieve. Lots of good ideas.
12. Session on RSX SYSGEN procedures, general principles to follow and gotchas to watch for, was outstanding. Good tutorial on use of SLP by Joe Sventek. On using CMP to generate SLP correction files, if you get message "Too many changes", remove CMP and re-install with larger "/INC=.." parm. Excellent talk on whys and hows of Autopatching, and how to protect yourself from it. "How to make SYSGEN decisions" was a five-minute goldmine. Cleaning up after a SYSGEN also highly useful. Question on "When should I apply Autopatch, when not?" led to quote of the week from Ralph Stamerjohn: "If it don't stink, don't stir it."
13. There is no "/NOMCR" switch on VAX IND (for those like me considering migration).
14. Ralph Stamerjohn's talk on "The Mathematics of RSX-11M (or The Gospel According to Ralph)" gave me a clearer understanding of what a real-time system is, why it is that way, and what to do with it. Funny, folksy, and incredibly practical. Sample: "Any programmer can crash a system. If up-time is important to you, don't allow development on the system."

15. RSX C-users workshop -- a new release of DECUS C supporting floating point, hooray! Requires FP hardware, but don't despair; you can use Glenn Everhardt's FP emulator. Many new user supplied libraries of C functions, such as "flexible string handling". C tasks don't have to be installed to use ARGC and ARGV. Source available through DECUS library in about 90 days (August).
16. PDP-11 futures include 11/70 capability at very low price, but using Unibus, and NOT Massbus. So, new peripherals should be Unibus type.
17. Fall 83 DECUS will be in Las Vegas. SIG anniversary party that week; plan on black tie.

Next is Bryant Moriarity's report

The following is a short summary of my six-days in Atlanta. I use the words "short summary" because, to explain all the information that an individual(s) obtains is to much to describe. This was my third symposium, and the motivation one comes back with is fantastic. Since coming back, I've been able to use some techniques that were presented and can't wait to use more. If there was only more time! Most important, this symposium has shown me that I too can make a contribution. Being able to tell of a problem or helping with a problem I might have experienced. Personally, I find the symposium's help to enrich ones professional growth. Below is a brief description of some of the things I found valuable to me.

1. Presymposium seminar titled "CARE and FEEDING OF FILES 11 DISK VOLUMES" by R.B. DENNY and L.M. FRASER, to sum this seminar up in one word "FANTASTIC". I recommend anyone who wants to get a better understanding of file structures, and what to do in the event of file corruption to attend this seminar. This seminar was well worth it, I walked out with a better knowledge of FCS, FILES-11 ACP and the internal structures than any book could try to describe. As a matter of fact I could not wait to go home and try out some of the techniques covered.
2. Found the RSX-11 product panel enlightening, being a RSX-11M user going to M+ to take advantage of separate I & D space. Found MACRO-11 the only supported software at this time. Bad news for COBOL-11 users, rumor has it, we might not see it. Also the cluster libraries feature, allowing libraries to share APR's. Anyone's guess when FMS will support clustered libraries. RMS-11 V2.0 will support clustered libraries when released.
3. The enhanced Tape Handling to be able to generate IBM formatted tapes could be useful. Does anyone know if this feature would also be able to convert IBM formatted tapes to ASCII.
4. The seminar on SHUFFLER/SWAPPING/SCHEDULAR by Jane Lawyer to be very good, recommend this to any new user. Jane covered the functional details giving me a better understanding of the these executive functionals.

5. Learned the benefit of External Headers in M+ V2.0, the biggest factor Pool savings, Preserves Low-Core Contexts and enhanced checkpointing. Also I found out what the external header was, and how they work.
6. The seminar on SYSGEN procedures was most valuable, preparing to go to M+, getting ideas on what problems one can run into gave me the foresight, Prepare!. Joe Sventek, gave a good presentation on PATCH and SLP. The user who applies a PATCH and finds out the checksum is wrong (we all had those) should have picked-up on that /CS switch. Believe me, it comes in handy.
7. The datatrive seminar titled "RECORD DEFINITION WORKSHOP" by Gary Saxter gave us the answer to HOW DO I MODIFY A LIST?. When I got back, I used your technique and it works fine. Thank You, Gary Saxter.
8. Also learned, if your going to use the datatrive DECLARE clause, be sure to FINISH. Unless, you don't value POOL.
9. Heard a rumor that COBOL-11 V4.4 will be the last release, an will be superseded by COBOL-81 which is now supported under M/M+. Is this true?
10. I was impressed by the TELECONFERENCE session, that DEC would hold out the announcement of their personal computers for DECUS. THANKS!

The following are notes on various sessions. The vast majority of this material comes from Greg Merrell, a Senior Software Specialist in the Digital Cleveland office. Greg sent over 100 blocks of files from the notes he took at the symposium, covering a wide range of topics. The notes on the RSX Product Panel, RSX Technical Session, and Personal Computer are combined with material from Doug Ahlemeyer of University Computing Company.

RSX/IAS Product Panel (Mon 11:15)

There is now a 16-bit program office to coordinate all 16-bit activities, including: hardware, software, engineering, disk systems, support, product line interaction.

All of the following apply to both RSX-11M V4.0 and RSX-11M/PLUS V2.0 unless otherwise indicated:

- * Delivery of RSX-11M V4.0 should be nearly over, all sites that should automatically get a kit should have it by now.
- * RSX-11M Plus V2.0 is in the SDC; starts shipping in approx 1 month.
- * DCL is a distinct subset of VMS DCL. It has embedded help facilities. It can be modified by the user.
- * CLI's are nonprivileged due to new directive support.

- * RSX-11M Plus sysgen supports loadable or resident databases.
- * New hardware includes RM05/80 on 11/70's; LPA-11K support now on both M and M+.
- * TTDRV has new hangup I/O function; autobaud from 110 to 9600; up to 256 terminals on M+.
- * Cluster Libraries will work today on F77, FMS, but not RMS V1.8; Will work on RMS V2.0 (which is due sometime in the fall of this year). No supported clustering build files distributed at this time. Parameters cannot be passed on the stack when clustering libraries (which is what RMS V1.8 does now).
- * MTAACP is full ANSI level 1,2,3 except for user labels. Does include EBCDIC translation as well as provision for up to three more tables.
- * ERRLOG reports were designed by field service so that they can more easily read them.
- * Programs can call directly the help facility.
- * Macro-11 is faster now.
- * FTB can reference shared regions.
- * User I/D Space(M+ only) can be used by F77 V4.0. Under M+ V2.0 cannot use overlays with I/D space support for a task.
- * Interrupt dispatching can go right to FORK level if is a disk interrupt without going to the driver.
- * M+ SYSGENS require a Massbus disk, an RK07, or an RA80.
- * M+ 11/23,24 Systems may have up to 64 TT's. No supervisor mode libraries. No User Mode I/D space. Otherwise, the same as other M+ systems.
- * M+ RL02 distribution kit has all drivers are loadable. System disk includes autopatch for layered products. As patched systems come out, they will be a new system disk distribution similar to the original.
- * RSX-11S new features include system controlled partitions. Full memory management support (PLAS).

RSX-11M (as opposed to 11M+) is getting 'Mellow'. See note from Steve Paavola in last month's Multi-Tasker. RSX-11M is not being retired at this time, and there will be at least a two year warning before it is. (DEC statement.)

The cost to upgrade from RSX-11M to RSX-11M+ will decrease over time, but the timetable for that is unclear at this time.

When RSX-11M V4.1 comes out, it will require a system with memory management and at least 64KW to do any type of sysgen (mapped or unmapped).

In the future, RSX-11M support for the following devices cannot be guaranteed: RF11 disk, TAl1/TU60 DECCassette, TC11/TU56 DECTape, TM11 for TS03/TU10 magtape, PC11 papertape, DJ11, VT11 graphics terminal, AD0x A-D interfaces, AFC11/UDC11 laboratory interfaces, DP11.

RSX-11M V4.0 Technical Presentation (Mon 16:00)

- * SYSGEN enhancements--saved answers:
 - o Saved answers for Phase II is now supported, except for the ICS/ICR, DSS/DRS and IP questions.
 - o Named input and output saved answer files for both Phase I and Phase II.
 - o Answers for both Phase I and Phase II may be combined into a single saved answer file.
 - o SYSGEN can "chain" directly from Phase I into Phase II, if desired.
- * Autoconfigure feature in SYSGEN. This new feature is in the form of a privileged task which is used to determine the host system's hardware configuration. This feature replaces all the question and answer session hassles in phase i. Auto-configure supports all the new packaged systems (11/23+ and 11/24), along with all the devices that are available through SYSGEN, except for communications devices, laboratory devices, industrial control devices, and KMC-11 micros. This feature will also compute the floating CSR addresses for each of these devices, provided that they adhere to the standard I/O page configuration rules, along with computing the appropriate vector addresses for all identified supported devices. Finally, the autoconfigure task will provide all of this information in a form that is suitable to be used by sysgen, so that fewer questions are required to be asked.
- * Other SYSGEN related improvements:
 - o Fewer, less confusing set of FCP options.
 - o Full support of the memory resident FCS library.
 - o STARTUP.COMD, that is provided with the distribution kits, will contain commands to initialize the Queue Manager, DCL, and the Error Logger.
 - o Phase III has been completely rewritten. You need only to specify tasks that are to be built, instead of answering Y or N for each one.
 - o Baseline systems will be automatically identified when booted.
- * Terminal driver enhancements:
 - o Answer speeds for remote lines may be set on an individual line basis.

- o Individual remote lines may be set for autobaud detection.
 - o Hang up modem function available. The driver will log off the user if he is still logged on. This feature only applies to FDX terminals.
 - o Logging off a remote line will automatically hang up the line. This can be inhibited with the "BYE/HOLD" command. This feature only applies to FDX terminals.
- * The new Error Logger has been totally rewritten in V4.0. There are four separate tasks that now make up the Error Logger.
 - * The Task Builder has position independent shared region support (/LI shared libraries and /CO shared common), enhanced program section ordering control (/SG segregate program sections and /SQ sequential program sections), and cluster library support.
 - * Pool space improvements:
 - o Better use of existing pool resources: VMR'S allocation algorithm and the task loader checkpoint mechanism.
 - o Pool resources increased: consolidated crash and powerfail stacks, loadable IP-11 driver, and executive commons.
 - o Pool monitoring has the executive continuously monitors free pool size. A new pool monitoring task (PMT) that continually monitors pool fragmentation, notifies users of imminent pool depletion, establishes necessary pool usage controls, reduces pool fragmentation by checkpointing, and allows system recovery in the event of total pool depletion.
 - * Executive enhancements:
 - o Asynchronous buffered I/O
 - o Extended stop-bit synchronization
 - o Floating point transportability
 - o 22-bit transportability
 - o Enhanced group global event flag support with full interlock protection
 - o XON/XOFF support for fast console terminal support
 - o Set System Time directive
 - o Extended parent/offspring functionality: emit status, send ,request and pass offspring information, extended exit status block so you now have the capability saving the TKTN abort code when a task aborts.

BRU Users Report (Thu 10:15)

A number of problems with BRU (Backup and Restore Utility) under RSX-11M V3.2 were discussed. A list of the latest patch level for each of the BRU modules was provided in the campground.

Other problems noted by the presenter include:

- * When restoring a disk with /VER/DISP, the count of files restored listed at the end of the operation is twice the number of files restored.
- * When doing multiple backups under BRU, the first will work fine, while the second will always fail. BRU must be exited with a CTRL-Z and restarted. (At this point, a comment was made by the RSX-11M development team that no DEC utilities are guaranteed to be serially reusable. This raised a number of grumbles from the crowd.)
- * If a large contiguous file is being restored, it is possible that it will be restored on top of a bad block. This has been fixed in V4.0 BRU.
- * If the creation date of a file is zero at the time of backup, e.g. an open file, The restored file will have a bogus creation date/time field.
- * Under multi-user IAS, password information is lost when BRUing a disk. The multi-user form of IAS stores the password information in an unused word of the file header for the directory. BRU recreates file directories on restore, and therefore won't have the password information available to it.

External Headers in RSX-11M+ (Tue 1:15)

With standard headers the header is copied from the front of the task address space into pool (DSR). This costs approximately 62 words if there are no resident libraries used by the task.

With external headers in M+, the header is copied to memory just in front of the task, but not within the task's logical address space. On a checkpoint write operation, the header is NOT copied back into the normal task address space, but is copied along with the task to disk as an appendage. The Directive Status Word (DSW) is still copied into the real task address space as always. The savings are twofold:

1. Checkpoints are faster as no copy of the header from memory to memory is needed before or after the disk write.
2. Low core (pool) is saved.

When a task takes advantage of the external header feature, the task header can no longer be guaranteed to be mapped by the exec at all times. The exec uses APR6 to map over the header when needed, and remaps it when needed for another function. For example: if UC.Q is set in a user-written driver, the current header gets unmapped.

Changes have been made in the TCB and PCB to support this capability. \$HEADR may no longer point to the header, but references to it as @\$HEADR will still get the saved SP. ACP writers and P.HDR users in /PR tasks should be especially aware.

External headers may be selected or inhibited on a per task basis. The task builder supports two new switches: /XH and /-XH. Note that they are not complements of each other, but two distinct switches. /XH (which is the default) permits the use of INS /XHD=YES, but does not force an external header by itself. /-XH prohibits the use of /XHD=YES on install.

RSX-11M allows a similar but different feature called "Alternate Headers". Alternate headers only provide a different location than the low end of the task address space for the saved task header during checkpointing. Pool is still used for the real header during task execution. This is only there to support the RT11 emulator which needs the low end of the 32K address space for proper operation.

Note that the RSX-11M group is not supporting alternate headers for user use; the RT-11 group will support the RTEM, and will in turn be provided support by the RSX group for alternate headers. External headers under RSX-11M+ V2.0 are supported, however.

RSX to VMS/AME Conversion Issues (Wed 16:00, 16:30, 17:00, 17:30)

A total of four sessions were held concerning the issues of converting an RSX-11M/11M+ application to run under VAX/VMS. Some were chaired by users, others were presentations of DEC developers. As they are all related, they are documented together here.

The following Indirect MCR issues were brought up:

- * CTRL-Z as an answer is returned as 'FALSE' rather than exit.
- * The /NOMCR switch is not available for testing command files.
- * Under MCR, there is no 'DCL command' function.

The following steps have been found to work well in order to do an RSX V3.2 SYSGEN under VMS. Note that RSX-11S SYSGEN's are supported, while RSX-11M GEN's are not. Steve Paavola (RSX-11M Product Manager) stated that even though it is not guaranteed to work, they can think of no major hurdles to doing a V4.0 11M SYSGEN under VMS.

```
Username: name/CLI=MCR          ! AME indirect only works this way
> CRE/DIR/OWN=[100,1] [x,x]     ! Create the appropriate directories
                                ! with you owning them
> RUN SYS$SYSTEM:RST           ! Restore the rsx sysgen files to them
> RUN SYS$SYSTEM:SYSGEN       ! Up the symboltable size
SYSGEN> SET CLISYMTBL 35
SYSGEN> ^Z
> ASSIGN LB0: SY:              ! Sysgen uses both LB: and LB0:
```

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```
> SET /UIC=[200,200]
> @SYSGEN                      ! Now we start it up
```

Fortran-77 code is reasonably transportable to VMS with a few notable exceptions:

- * Error handling is different.
- * ERRST does not return the same results.
- * If CTRL-Z is entered as input, REWIND does NOT reset it as under 11M.
- * There is a difference on the /NOLIST switch.
- * Terminal records are terminated by <CR><LF>, not just <CR>

The RSX-11M development group now 'owns' the VMS AME. It is their intent to add all V3.2 directives where possible to the AME. The following features are not planned for implementation at this time: Virtual terminals, CLI directives, I/D space, CINT\$, DECnet access, shared libraries, and file sharing.

As stated above, RSX-11S V4.0 SYSGENS are supported and do work. RSX-11M V4.0 SYSGENS are not supported, but are believed to work. DECnet-11S/M V3.1 SYSGEN are known to not work due to use of RSX-11M V4.0 indirect command processor features.

It is also planned to try to split the indirect command processing code out of the AME so that it can be modified more easily to include new RSX features.

From Gregg Merrell

The VMS AME enhancements project is just getting started, so if you have any suggestions, please submit them. The SPR mechanism should be adequate.

Thursday Evening Sessions (Thu 20:00+)

There were three sessions which I attended on Thursday evening: Wierd Things to do with RSX, VMS Question and Answer Session, and RSX-11M Magic.

The two sessions on RSX were unusual, and I chose to sit and listen rather than take notes. I do have tapes of some of the Magic session, and some of the VMS Q & A as they were going on simultaneously.

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Unfortunately, I did not tape the wierd things to do with RSX which contained some very unorthodox techniques for dealing with RSX. A quick summary from my memory should suffice:

"My favorite programming tools for RSX are ODT and ZAP. I always link a copy of ODT to the executive and leave the task (ODT.TSK) sitting around for when I need to go in and modify the executive. ZAP is for fixing bugs in programs. Only when I have to will I go back and change the sources." That should give you a taste.

PDP-11 Hardware Futures (Fri 09:00)

Two different processor product families were discussed: a low cost PDP-11 family, and a single chip PDP-11. The low cost PDP-11 will have the following characteristics:

- * Q22 bus structure.
- * F11 (11/23+) chip set based (FPU, CIS options)
- * 5-1/2" winchester which looks like the one from the Professional.
- * 5-1/4" floppies which also look like those from the Professional.
- * The box will consist of cage, pwr supply, floppy, winchester, distribution panels.
- * It will occupy about half the space of an 11/23 system.
- * It can be rack, floor, or desk mounted.

Note that a prototype of this system was actually on site at the session. Also, that room was filled to overflowing and the questions went on well past the cutoff time of the session.

The new PDP-11 chip will be roughly the performance of the 11/70, and may have FPU and CIS as standard features.

DIGITAL'S Personal Computer Announcement

The RAINBOW 100 series has operating system of CP/M-86/80. This is a self-arbitrating 8/16 bit operating system which supports all CP/M applications.

The CPU consists of two microprocessors, so it can run 8 and 16 bit CP/M software designed to operate on either Z80- or 8088- based systems. The rainbow comes with a standard 64KB RAM memory that can be upgraded to a total of 256KB. It has space for dual 400KB floppy disk drives for a total of 800,000 bytes of on-line storage. The lineprinter is connected to the RAINBOW via a RS232 printer port. Plug-in options include: 64 and 192KB add-in memory boards, an asynchronous and synchronous communications board, and a video bit-map option that can handle color graphics. Other system options include: an external 5MB 5 1/4" Winchester technology drive, a second set of dual floppy disk drives, and VT100, VT125 emulation capability for time-sharing to larger DEC systems.

The operating system for the PROFESSIONAL 300 series is P/OS. This is based on DIGITAL'S RSX-11M operating system. P/OS is a multitasking operating system with a menu-oriented user interface. P/OS uses the same file structure as DIGITAL'S VAX-11 32-bit computers.

The CPU consists of the same 16-bit microcomputer chip as DIGITAL'S PDP 11/23 and PDP 11/24 minicomputers. An optional Floating Point Unit is also available. The PROFESSIONAL 350 systems unit comes with a standard 256KB of system memory, in addition to 32KB (optionally 96KB) of dedicated video memory, six option slots, space for dual 400KB floppy disk drives for a total of 800,000 bytes of data and space for a 5MB 5-1/4" Winchester fixed disk drive. The lineprinter is connected to the PROFESSIONAL via a RS232 serial printer port. An optional synchronous/asynchronous EIA communications port with modem control is also available. The smaller PROFESSIONAL 325 is a floppy-based system fully compatible with the PROFESSIONAL 350. It supports 800,000 bytes of on-line floppy storage. In addition to video and floppy control, one option board is supported. The extended bit-map board or another advanced option may be added. Both professional models provide bit-mapped video control, with its inherent capabilities for soft character sets, integral graphics, and flexible screen handling as a standard feature. The extended bit-map option board adds two additional display planes for monochromatic shading and for color.

Communications is a major strength of the PROFESSIONAL series. The initial communications provided allows the PROFESSIONAL be connected to any DIGITAL system as a VT100, VT52 or VT125 terminal emulator. In addition, the PROFESSIONAL computers can perform file transfer to or from any DIGITAL system running VAX/VMS, RSX-11M, or RSX-11M-PLUS; or another PROFESSIONAL computer.

Application development for the PROFESSIONAL series is facilitated by the Tool Kit option. This option is a set of layered utilities and language compilers that run on RSX- or VAX/VMS-based systems and provide an environment for the PROFESSIONAL application development. The new release of FORTRAN-77 is one of the compilers that will be included in the Tool Kit option, but it will not be available until 1st quarter of 1983. An optional Telephone Management System is also available.

PDP-11 FORTRAN-77 V4.1

This release will be available in JUNE or JULY. Features of V4.1:

- * ANSI flagger - this is a facility that is embedded in the compiler, which allows user programs to be analyzed for extensions to the full ANSI X3.9-1978 FORTRAN standard. A compiler switch controls this flagging.
- * F77 V4.1 allows a character variable, character array element or a character substring to be used as the key specifier in an indexed read statement.
- * Clustered OTS library can now be built for F77. Only the FCS version of the F77 OTS can be built as a clustered library.

* FORTRAN-77 V4.1 can be run on the following new operating system releases: RSX-11M V4.0, RSX-11M-PLUS V2.0, RSTS V7.2, and IAS V3.1.

Advanced Programming Techniques with FMS (Thu 9:15)

There are a number of things to watch out for when using multiple simultaneous forms with FMS.

1. Line numbers - Be sure that the top, bottom and help forms do not overlap any lines. Any overlapped lines will be lost, and can only be restores by repainting the disturbed form. Upon entry of CTRL-W for repaint, the non-active form will be lost.
2. Left/right - The start and end lines of the form determine the lines to clear, therefore you will usually want to specify the starting and ending lines to both be line 23, and not use that line in your forms. Your left/right split forms will work fine even though the driver doesn't clear the entire screen before painting.
3. Impure areas - An impure area is required for each active form.
4. Subroutine order - The following is an example of the required forms driver subroutine calls necessary to permit two active forms:

```

Call FINIT(1)           ! Init impure area #1
Call FLCHAN(X)         ! Assign the channel for form #1
Call FLOPEN(LIB1)     ! Open the library for form #1
Call FINIT(2)         ! Init impure area #2
Call FLCHAN(X)         ! Same channel as first FLCHAN
Call FLOPEN(LIB1)     ! Same library as first FLOPEN
Call FCLRSB           ! Form #2

```

then

```

Call FINIT(1)           ! Get the first form active again
Call FLCHAN(X)         ! (Use this line only with RSX)
Call FSHOW             ! And put up form #1

```

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When editing large forms, sometimes FED will run out of internal work space. This can be corrected by installing FED with an /INC or by rebuilding with the EXTTSK increased from 4K to 8K. Notem this is not supported, and that if enhancements are made to the forms editor your expanded forms might not fit into the editor in the future!

The forms driver software looks for any escape sequence beginning with <ESC>O to indicate special terminators. When the keypad is put into alternate keypad mode, it returns sequences of this form. The driver, though, does not check to see if the third character is one of the standard ones from the keypad. If you were to enter for example, <ESC>OA, the forms driver would return to your program with a value of 65. as the terminator.

To make this special terminator function somewhat transparent to the user, you could program the terminal answerback string to be <ESC>O something such that when the user types CTRL-break, the special terminator is returned to the application program.

FMS Question and Answer Session (Thu 15:30)

Q: How can I put FMS routines in overlays?

A: Make sure FDVDAT and the HLL module are in the ROOT.

Q: What is new in FMS V2.0?

A: A number of new characteristics are in V2.0: names can be longer than 6 characters; FED is improved; more attributes, such as boxes, VT100 attributes (double, etc.); FGET can go to a general processing routine before returning; entry/exit help processing; multiple forms which repaint on CTRL-W; logical order of fields on form does not have to be physical order; timeout support on FGET's; read request write through; and redefine keypad, i.e. GOLD keypad.

Q: I have trouble moving VMS forms libraries to RSX.

A: Fixed in FMS/VAX V1.1.

Q: I can't put a '-' in a fixed decimal field.

A: Will look into it.

RT-11 Emulator under RSX-11M and VMS (Thu 12:45)

- * Supports both real devices and up to 8 units of a virtual device (VS0:-VS7:).
- * Clock functions through calls to RSX.
- * The emulator is an RT-11 V4.0 F/B system with multi-terminal support.
- * It supports spooling to the RSX LP: through the spooler system.
- * The following programmed requests behave differently:
 - o .CMKT- the remaining time will always be 0.
 - o .MTxx- only TT0: is supported.
 - o .SPFUN- only functions available from the RSX driver.
- * The following functions are not available at all:
 - o Formatting.
 - o Error logging.
 - o ODT (use VDT instead).
 - o Direct access to FILES-11 files.
 - o Access to the I/O page.
 - o Down line loading to other RT-11 systems.

- o PC-11, CR-11, VS-11, RF-11, PDT, TU60 devices.
- o DECnet, 2780/3780.
- o Time-share Dibol (SUD only).
- o Lab peripherals.
- o Any XM specific features.
- o Micro-power Pascal (It needs the XM monitor).
- o MU-Basic (?)

- * FIP (File Interchange Program) permits file copy access to FILES-11 files from within the emulator. FLX can be used from the RSX-11M side.
- * JOAT (Jack Of All Trades) is used to exit from the emulator and pass commands to MCR. CTRL-P also causes exit from RTEM.
- * Can do RT-11 sysgen and COPY/BOOT.
- * The emulator is PRI=50., nonpriv, and checkpointable if the system is genned with alternate (RSX-11M) or external (RSX-11M+) header support.
- * Both RSX-11M and RT-11 license are required to use.
- * First ship scheduled for Q1FY83 and will be RT-11 V4.0 based.
- * RTEM requires the full duplex terminal driver for RSX.

RT-11 Product Panel (Tue 11:15)

- * There are currently over 50,000 RT-11 licenses in the field.
- * The RT-11 Emulator under RSX-11M/M+ (which will be the responsibility of the RT-11 product group) is expected to begin shipping Q1 FY83.
- * RT-11 version 4.0 with Autopatch E is now considered the new master for patching purposes. (This was noted in the Dispatch.)
- * MRRT V1.1 FCS should be Q4 FY82 and will support 11/03,23 and DRV11-J.
- * DECnet V2.0 only supports one active link, i.e. RT cannot be a routing node, only an end node. The DMV11 has been tested, but only on the 11/23B.

RT-11 V5.0 will be a "stabilization" release. It was stated that RT-11 has achieved its full design capability, and there will be few major additions to it. Some of the potential additions at this time appear to be:

- * User defined commands (ala alterable DCL?)

- * Logical disks
- * Console logging

DECnet-11M V3.1 Internals (Thu 11:45)

Version 3.1 will not run on an unmapped RSX-11M/S system. The Communications Executive communicates between the processes (layers) of DECnet. Is table driven and acts as an extension to the executive. The table is CETAB.MAC.

A process is not a task, but an overlay mapped by the Communications Executive. Processes runs in kernel mode, not user mode. Various functions done by following processes.

- * AUX offloads DSR space. Performs various Communications Executive functions.
- * X.25/DDCMP is the datalink layer. Uses CCB, LDB. Under V3.1, CCB's are dynamically associated with LDB's. Under V3.0, the association was static.
- * Transport is three pieces - NSP, NETACP, EVP.
 - o NSP directs packets.
 - o NETACP handles transport initialization, i.e. buffer size, phase II vs. phase III.
 - o EVP does database update, i.e. ROL (Reachability/Output Line vector)
- * Network Services is in two places - NSP, NETACP.
 - o NSP is NS: for QIO interface. Handles SND, RCV requests.
 - o NETACP is ACP for NS:. Handles OPN, CLS, CON, DSC, ACC, REJ, GND, etc.
 - o Structures used include network mailbox, logical link table, I/O packets.
- * Session Services are spread over three pieces - NSP, NETACP, NVP.
 - o Handles access control.
 - o Translates node name into node number.
 - o Provides optional data for CON, REJ, ACC, etc calls.
 - o Structures used include remote name block, alias name block, object table, connect blocks.

DEC and Public Packet Networks (Mon 16:30)

Current DEC Public Packet products include:

- * RSX/PSI supports both independent and DECnet X.25 circuits.
- * RSX hardware is DPV, DUP, KMS on RSX-11M, RSX-11M+, but not RSX-11S.
- * VAX/PSI supports only independent X.25 circuits; Plans are in place to integrate X.25 with DECnet on VAX.
- * VAX hardware is DUP and possibly KMS.
- * Private X.25 nets do exist today, and are expected to grow.
- * KMS-11 supports up to 56KBPS and is available now.

In the future, X.25 links will be made through host system interfaces as today, and in addition, gateway boxes will provide access for non-supporting operating systems. (This might include RT-11 and RSTS/E as neither is planned for resident X.25 support at this time.)

DECnet Question and Answer Session (Tue 16:30)

- Q: When shutting down my network, it seems to hang on the DMC/DMR interfaces.
A: Check the over-the-top cables on the boards.
- Q: I would like to use my shared memory (MA780) as a DECnet device.
A: We will consider it.
- Q: The BDV is new for the 11/23B. Will the old DLV work on it too?
A: Yes.
- Q: Are there any plans to publish the documentation for RTPAD/REMACP ?
A: No.
- Q: The DECnet specs and some operating systems support the use of up to 39 characters for usernames and passwords, but not DECnet itself. How come?
A: That is an implementation restriction at this time; it will be fixed in the future.
- Q: What is the difference between the RVT on the DECUS tape and that on the DECnet kit?
A: They are the same(?). Under 11M V4.0, you need the RVT on the DECnet-11M V3.1 kit (which will be shipping in 2-3 months).
- Q: I sometimes get timeouts on links over two hops.
A: Increase the number of buffers on the intermediate node.
- Q: Where on the bus should I install DMx interfaces?
A: Up towards the CPU.
- Q: How can I share the readonly portions of NFARS routines?
A: Under PAL it works. Wait for RMS V2.0 for regular NFARS sharing.

- Q: When using remote terminal, and I type Y, I get returned to the local system.
A: Install RTPAD with LOG_IO priv per the installation guide.
- Q: Can VMS BACKUP be run through the network?
A: Yes.
- Q: What is the current maximum number of nodes allowed?
A: 255 nodes for Phase III, 1000 for Phase IV.
- Q: How can I tell which VMS jobs are network jobs?
A: Under V2.x \$SHOW SYS/NET. Under V3.0, jobs will be split into Batch, Interactive, and Network.

TOPS10 Communications Overview (Tue 12:45)

ANF10 provides support for terminals, remote terminals, complex topologies, and RJE. DECnet provides support for task-to-task communication, 10-to-10 communication, network file transfers, network remote terminals (NRT). ANF is hardcoded for specific hardware, therefore making it very difficult to add new device support. DECnet is layered, allowing easier implementation of new hardware, but at some premium in performance (in theory).

The remote terminal server function is embedded in the monitor, making it difficult to effect changes. This will be a factor when DECnet Phase IV comes out, as it will have a standard for remote terminal protocol.

ANF/IBM and ANF/DECnet each require an individual front end processor.

TOPS20 Communications Overview (Tue 10:00)

DECnet Phase III for the TOPS20 operating system was formally announced. First customer ship was expected to occur in Q3 FY83. Full functionality from TOPS20 to TOPS20 will be provided for:

- * NFT supports any file type.
- * SET HOST is a full remote command terminal.
- * MAIL provides remote mailboxes.

Functionality to non TOPS20 systems as follows:

- * NFT allows ASCII sequential and image files to/from VAX and PDP11's.
- * HOST can go to VAX (unsupported).
- * Task-to-Task has data format conversion routines for 36/32 bits for Fortran and Cobol.

- * Remote Files can be open, close, read, write for ASCII sequential only.
- * Download to DN200, RSX-11S.
- * No foreign mail at this time.

Other notes include:

- * Network verification is performed by running NIPGEN.
- * DMR-11 replaces the DN20(KMC/DUP), DN21(DMC-11), and DNSxx.
- * New comm devices will use Digital STD names, not DNxxx.

VAX/VMS V3.0 Update Session (Mon 10:15)

- * VAX History
 - o Version 1.0 released in 11/77.
 - o Version 2.0 released in 08/80.
 - o Version 3.0 to be released in 07/82 (at SDC now).
 - o There are now over 6,000 VAX CPU's in the field.
- * VAX/VMS V3.0 Product Goals
 - o Continued high quality
 - o Increased performance
 - o Additional CPU's supported
 - o Increased functionality
 - o Increased ease of use
 - o New communications support
 - o New layered products
- * VAX/VMS V3.0 Executive/Hardware Support Changes from V2.0
 - o In kernel executive there is improved AST handling; lower overhead TT driver; and miscellaneous improvements, e.g. Autobaud; Integral local node DECnet; Multi-CPU support for the 782.
 - o Lock Manager is a system service. Locks a named resource.
 - o SYSGEN can create an XUSER.PAR based on the hardware available automatically, is called AUTOGEN.PAR. Many new settable parameters.
 - o RMS has new support for stream files (needed for C language). Prolog 3 now available for keyed files only to compress key/data fields.
 - o RTL is higher performance and has additional language support. Changes to support the new system services \$MOUNT, \$DISMNT.
 - o Accounting file format has changed in V3.0 from V2.0, but backward translation utility is provided for accounting package use.

- o RL02-based systems available with a single RL02 system, only one of BASIC, FORTRAN or PASCAL is supported.
- o Only one 'A' license is needed across 730, 750, 780/782 CPU's. Individual distributions ('H' kits) may still be needed.
- o VAX-11/782 uses shared MA780 only for CPU-CPU interaction. Any MS780 present is only needed for diagnostic purposes.
- o VAX-11/750 new devices includes RL02 and RA80 disks.
- o DMF-32 line printer interface is not only DMA, it is also smart, i.e. it expands tabs to spaces on the fly, etc. The synchronous port can be a tributary for DECnet, but not a master.
- o DMP-11 is now supported for DECnet.
- o ANSI magtape Level 1,2,3 except for buffer offset and user labels. Now supports all wildcarding as disks do.

- * Layered Product/Utility enhancements
 - o Code Management System available for V3.0 as it was for V2.x.
 - o CDD now uses lock manager.
 - o New or original languages include COBOL, C, DIBOL, FORTRAN, ADE.
 - o Many utilities converted to native mode from compatibility mode, e.g. DIFF, DUMP, VERIFY.
 - o PHONE is upgrade for TALK.
 - o MONITOR is upgrade for DISPLAY; Can run online or write to snapshot archive files.
 - o Backup now runs stand-alone also.
 - o DCL command definition utility allows online modification of DCL translation/option tables. New lexical functions added.
 - o HELP now issues prompts for unspecified fields.
 - o MAIL now includes a search for keyword capability.
 - o RUNOFF now supported. DSR implementation that was on the V2.0 kits with bug fixes and improvements.
 - o SEARCH is similar to the TECO Search macro or the DECUS GREP utility.
 - o DEBUG has new support for PL/I, G/H floating; COBOL/FORTRAN/BLISS symbolic source debugging.

- * Documentation
 - o DECnet manuals now part of the kit.
 - o RMS Tuning Reference manual new.
 - o Other manuals include RUNOFF, 782 processor, Magtape.

* Terminal Performance Improvement

Changes to the terminal driver have resulted in the following performance changes:

CPU	Old limit (KBYTES/SEC)	New limit (KBYTES/SEC)
---	-----	-----
780 (DZ-11)	8	20
750 (DZ-11)	6	18
730 (DMF-32)		35

- * Installation of V3.0
 - o Installation can be done directly from the V3.0 distribution or as an upgrade from a running V2.5 system. (It must be 2.5, not 2.4 or earlier).
 - o Distributions all are in BACKUP format, not DSC. All distributions have a bootable BACKUP so no TU58 or RX01 load is needed.

VMS V3.0 Executive Enhancements (Wed 10:15)

Changes in VMS V3.0 include the following:

- * Page/Swap Files
 - o Page and swap files changed from V2.x
 - o Page file no longer function of WSMAX
 - o Swap file has variable sized slots
 - o There can be multiple page and swap files
 - o File size requirements are reduced
 - o Primary files can be non-contiguous
 - o Page file can be a Global Section
- * Lock Manager
 - o 6 modes from casual to firm!
 - o Lock request notify AST available
 - o Used by RMS, CDD, DBMS in V3.0
- * VAX-11/730 Changes
 - o Very few 730 specific were needed; about same as 750
 - o Drivers may port with no changes if they use exec subroutines
 - o Drivers require reassemble/relink at each new release
 - o UBA is different from 750 and 780
 - o The IDC is not on UBA, but looks sort of like it
- * Shared Images
 - o Relocation was moved to IMGACT from LINK
 - o .ADDR now results in PIC addresses
- * VAX-11/782 executive is same as others, but subroutines are changed.
- * New System Services
 - o GETSYI: get system information
 - o GETDVI: get device information
 - o ENQUE: add to a queue
 - o DEQUE: remove from a queue
 - o MOUNT: mount a device/comm channel

- o DISMOU: dismount a device/comm channel
- o 2 others which were described as relatively obscure
- * SYSGEN
 - o Now has help text
 - o Can SHOW /CONFIG and SHOW /UNIBUS
 - o Can configure vectors and CSR's via CONFIGURE
 - o Can show configuration on autoconfigure
 - o No more xxUSER.PAR files, AUTOGEN.PAR replaces
 - o AUTOGEN.PAR fits well for most hardware configs
 - o More than 200 parameters now available
 - o Lookaside lists now include IRPSIZE, LRPSIZE, and SRPSIZE(small)
 - o NPAGEDYN now independent of XRPSIZES and COUNTS
 - o Pool automatically expands itself on overflow (YAH!!!!)
 - o Automatic expansion of pool is not very fast
- * Logical Name Translation
 - o Now based on hashing table for faster access
 - o SHOW LOGICAL now allows % and * and is sorted
- * AST performance improved by assuming only one at a time
- * QIO Processing straightened code for xxxVBLK and xxxPBLK paths
- * Miscellaneous
 - o Up to 2047 channels instead of 127
 - o VMB and SYSBOOT are only files that must be contiguous
 - o User rundown available for user written system services
 - o Exception handling common to EXEC/RTL moved to EXEC
 - o NULL and SWAPPER processes cannot be deleted
- * ;System Dump Analyzer
 - o Invoked by ANALYZE /CRASH or /SYSTEM (running system)
 - o Now does symbolic disassembly
 - o Now has SHOW POOL /TYPE=... and /RANGE=...
- * Delta/Xdelta
 - o Now supports symbolic disassembly
 - o Now has 'O' which goes over CALL and JSB

VAX Languages Panel (Mon 12:45)

Fortran V3.0 has the following new features:

- * Namelist support for Namelist function; Often needed for IBM/CDC compatibility .
- * Cross Reference facility added.
- * DEBUG now includes support for doing source language debugging.
- * INCLUDE statements can now reference text libraries as well as individual files.
- * The compiler can now flag non FIPS-standard syntax.
- * MIL STD 1753 support of IMPLICIT NONE requires explicit declaration of all variables; Bit handling subroutine standards.
- * CDD support, DML interface supported.

For BLISS-32, DEBUG now supports source level debugging.

The next release of PASCAL will include changes to comply with the current standards being developed. Performance will be optimized. New extensions will be added to interface with the VMS environment.

Sharable libraries under VAX/VMS V3.0 do not need to be comprised solely of position independent code due to changes in the linker and image activator. For reference, the following do generate PIC modules: C, BASIC, BLISS, PASCAL. Note that FORTRAN currently does not.

VMS V3.0 Field Test Panel (Wed 14:15)

The field test panel consisted of six customers, one of whom was from Europe. They represented mixed configurations, uses, and user community sizes. There were four beta releases which they received: 1.0 - Oct81, 1.1 - Nov81, 2.0 - Feb82, 2.1 - Mar82. The general reaction was that the releases were extremely clean, and they foresee no reason why users shouldn't upgrade their systems relatively quickly. Comments included the following:

- * Be sure to read the installation guide and release notes more than once!
- * G/H floating on the 780: works well
- * INQUIRE statements in command procedures require quotes on lower case text and text with embedded blanks.
- * If an input file is opened on a magtape with TYPE='OLD' (Fortran) without the READONLY attribute, the tape is opened read/write and a write ring is needed.

- * System directories are not where they used to be. Logical directory names such as SYS\$SYSTEM should be used exclusively instead of [SYSEXE] type forms.
- * The VS11 driver moved with no problems.
- * The DEBUGger reads all linker generated files before prompting. For a 3600 block executable file, this takes about 2 minutes!
- * Save V2.x BLISS files such as .REQ, and .L32; they may be needed.
- * Terminal I/O on the 730 seemed slow.
- * Liked the BACKUP /DELETE switch which deletes files after backing them up.
- * There are many new management tools.
- * Logins can be controlled by time of day, and day.
- * New switch for terminals SET TTxx:/PERM/NOSETSPEED prevents users from resetting terminal speeds.
- * Autobaud works fine if <CR> is used.

Calling VMS DCL from a Program (Wed 13:45)

The technique presented was very straightforward. It consists of creating a mailbox (to pass a command line), calling LIB\$SPAWN (to startup the subprocess), writing to the mailbox (the actual command line), and hibernating while waiting for the LIB\$SPAWN to complete. Specific subroutines to implement this technique from higher level languages will be on the SIG tape produced at the symposium.

VMS Realtime Performance (Tue 9:15)

VAX/VMS realtime performance is as much of a design goal as features and ease-of-use. Much has been done to improve the realtime performance in V3.0 of VMS as compared to V2.x.

11/730 and 11/750 get to the first instruction of the interrupt service routine as they directly vector interrupts. An 11/780 must poll the UBA to determine the requesting vector, and therefore takes slightly longer.

Interrupt Priority Levels (IPL's) are hardware levels:

- * IPL's 20-23 are used for interrupt processing.
- * IPL's 8-11 are used for fork processing.

- * IPL 0 is used for normal processing.

Tests were run to compare 11/780 to 11/70 and 11/750 to 11/44. All tests were designed to measure the delay (latency) from the moment a KW11-P clock generated an interrupt request until the device register was read. This represents the type of situation facing a typical user, i.e. when my device says that it needs to be serviced, how long is it until I can actually get at the device registers and do something useful?

Graphs were presented which could not be copied in full, but are supposedly being published later. Pertinent points were noted and are listed below. The key points were defined as the peak of the curve (which in almost all cases represented >90% of the points), and the maximum time value (which indicates the maximum latency and maximum chance of losing data).

Load	11/780 V2	11/780 V3	11/70 11MV4	11/750 V3	11/44 11MV4
Idle (peak)	30	30	25	30	35
(max)	375	120	110	180	160
Heavy I/O (pk)		30	25	30	35
(max)		160	150	210	270

Note: All times are in microseconds.

Each of the systems collected 5 million data points to produce the graphs from which this data was taken. Note also that the maximum values typically represent only one data point from 5 million samples.

The VAX/VMS engineering group wrote the routines on the VAX, while the RSX engineering group wrote the routines for the 11/70 and 11/44 systems. It was not known by the presenter whether or not the driver on the 11M systems was loadable or resident, nor what the exact configuration of the PDP-11 systems was other than the presence of the KW11-P clock board. The clock was jumpered to interrupt at BR6/IPL22.

More information will be published in the future concerning realtime performance on the VAX under VMS.

VMS System Services (Fri 11:15)

This session dealt with the differences between certain system services as implemented under VMS V2.x and the new services under VMS V3.0. Note: the choice of zero time being 17-Nov-1858 is because that is the Smithsonian date. New and changed services include the following:

- * System service vectors are moved into P1 space, but are still in S0 space, too.
- * System services can be restricted on a per-process basis.

- * \$GETJPI can now also return quotas and statistics for resident/paging.
- * \$GETDVI replaces \$GETCHAN, and \$GETDEV. Arguments use the \$GETJPI (i.e. list) format.
- * \$GETSYI is new and returns system information.
- * \$SETSTK sets new size of innermode stack.
- * \$MOUNT/\$DISMNT take list format arguments like \$GETJPI. It is actually implemented as a privileged sharable image.

Potential programming problems with system services might be the following:

- * If inner and outer modes share use of an event flag for \$QIO processing, then the IOSB should be tested for a non-zero value to indicate I/O complete.
- * Conditions handlers can cause problems if a handler itself declares another handler. The details get very muddy.

File System changes in VMS V3.0 include:

- * Versions are now limited to 32K, not 62 or 63 as was the case on V2.x.
- * To get the 32K limit, you must SET /VERSION_LIMIT=32767 .
- * *;0 will now return multiple versions.
- * ;-n are now relative numbers.
- * ;-0 is now the oldest for F11ACP, but not RMS or BACKUP.
- * Directories cannot be accidentally deleted if they contain a file. If you really want to delete one, you must SET file/NODIRECTORY.
- * If you put execute protection on a directory, then you must specify the directory name explicitly, not by wildcard.
- * BACKUP needs read access to each directory, and also [0,0].
- * Access dates have been implemented. When a disk is mounted, a retention time can be specified. Files are updated when accessed and they fall outside the update window time. NOTE: you could lose some system files if they aren't referenced too frequently!

Symposium Notes

Finally, at the symposium I drafted all attendees as Multi-Tasker reports. Everyone was given a report form and asked to note any special impressions that had or anything special they learned. The following is taken from the 30 forms I got back. The notes are in no special order. As much as possible, I have used the attendees actual words, mostly so people who have never attended a symposium can get an idea of the vast amount of communication that takes place at a symposium.

- * Presented at the RMS-11 workshop was a procedure to estimate indexed file design (blocks allocated, bucket requirements, file size, etc.) that was much easier to understand than RMS documentation set. This was coupled with a brief talk on internal mechanics and structures. This session marked the first time I clearly understood, as a new RSX and RMS user, how to optimize a RMS file.
- * Digital announced a two year extension in support of IAS, from June 1983 to June 1985.
- * Saw first signs that RSX-11M may be taking the path of DOS, RSX-11D, and IAS.
- * There were some very good migration sessions on IAS to RSX-11M Plus and RSX-11M to VAX. Please continue these.
- * This is my first symposium. I am very pleased to see you enforcing the badge requirements and commercialism guidelines. I am impressed by the organization of the symposium and Digital's participation. The night sessions went on far too long. At the RSX-11M Q&A, the RSX team was far more patient than I would have been with all the barbs being thrown at them. Some people were unprofessional in their questioning on problems concerning non-DEC hardware.
- * I found the sessions on RSX to VAX conversion very good - no, make that outstanding. I'm currently making the transition and found the experiences of others quite valuable. With the introduction of the VAX 11/730, the integration of typical RSX applications on VAX systems will become more commonplace. There were lots and lots of other areas that were also very valuable. There might be a little more effort on applying RSX to specific application areas.
- * I attended the VMS real-time performance session. The things that were most interesting to me concerned the closeness in performance between the 11/70's (RSX) and 11/780's (VAX) and the 11/44's (RSX) and 11/730's (VAX). This is in the area of interrupt latency, the time from the processor receipt of an interrupt to the execution of the first useful instruction in the service routine. The presenter was from the VMS performance measuring group and said that the study results would be published and that the study was actually broader in scope than was discussed at this session. I think this type of information would be of great value to anyone considering a VAX upgrade.
- * This was my first symposium and I have learned that there is a tremendous wealth of knowledge and resources about DEC. However, I'm a new user of DEC, as is my company, and I would appreciate more seminars and/or Multi-Tasker articles like the session taught on RSX-11M Mathematics.
- * I learned about a rumor DEC is trying to phase out the RM02/03 and there are still no plans to support GIGI under RSX.

- * DECUS is still the most useful week a person can spend on getting useful information.
- * Most DEC people were talking more freely than in the past. There were some, in the back of the room, who were rude at the Magic Session.
- * The availability of the DEC developers was astonishing at the software clinic and other times. I rarely saw fewer than 4 developers in the campground.
- * My goals for this symposium were first, to hear reports from those who have already gone to V4.0 and second, get a feel for the issues to be concerned with in migrating from RSX to VAX/VMS. Through the various sessions and panels, I was able to achieve both of these goals. In addition, the Digital people seemed unusually responsive to questions and complaints and tantalized us with the new product announcements and hints of new architectures to be pursued. Other sessions I found particularly interesting and informative were the new site planning, the EDT sessions, the discussions on improving programmer productivity, managing software development, the Best of the SIG Tapes, the user report on BRU, and of course, the Magic session.
- * How about a session/article on why AST's are so great. Teasers were given in several sessions.
- * Particularly enjoyed the Novice RSX Question and Answer Session. It was a lot less 'intimidating' atmosphere.
- * I learned that someone else was as intimidated by WIZARDS at his first symposium as I felt at this one, my first. I guess I really learned that there is a whole range of levels of interest and ability.
- * I found out that SLP for the new releases will not use and maintain record sequence numbers in the source file. This means that your SLP files will produce listings with line numbers corresponding to the original file - any new lines created by SLP show up with no line numbers. This sure makes the development of .COR files a lot easier. This option can be set in SLPBLD.COMD to be the default mode of SLP.

IAS Question and Answer Session

John Drummond

The following question and answers reflect the questioner's interpretation of the answer. Where appropriate the answer has been edited. Some questions are omitted because no answer was recorded.

- Ray French, Boeing Commercial Airplane Co.
 Q: We are running IAS V3.0 and are considering adding RM05's (there is no V3.0 handler for RM05's). Will the 3.1 RM05 handler work on 3.0?
 A: ERRLOG may not know what to do with an "RM05". There may also be a problem with INI.

Frank Borger, Michael Reese Medical Center
 Q: With the announced level of support to be done in the future, I do not believe DEC can support us well enough. Will DEC re-consider pricing on sources of IAS?
 A: Digital will get feelings back to DECUS.

Mike Lamatrice, Naval Sea Systems Command
 Q: Why doesn't COPY/BLOCK:n...work? There has been a patch for the density switch but not the block switch.
 A: Submit SPR

T. Mahaney, NAPC
 Q: When will BRU work correctly?
 A: It does many things well but too many very poorly. (ED: a booklet of patches for IAS BRU were available in the Campground at Spring 82 DECUS. They should be in AUTOPATCH "C").

Jim Kelsay, U.S. EPA
 Q: We wish to add RM80's to our system. Does anyone know if the code for the RM80's in the DR driver works?
 A: Yes, it does. (ED: Can anyone provide some first hand experience?)

John Guidi, The Jackson Laboratory
 Q: Are there any differences in the TCS (time sharing control services primitives) between IAS V3.0 and V3.1? If so, what?
 A: Only differences are in correction of known bugs.

Steve Lord, B. F. Goodrich
 Q: The line printer handler and terminal handler do not process the Fortran carriage control character '+' in the same manner. The terminal handler outputs the contents of the buffer and then a carriage return. The line printer handler outputs a carriage return first.
 A: Work on the SPR's should be in progress.

Allan L. Van Lehn, LLNL
 Q: How can we keep LP from timing out or give users spool control W/O SCL privilege?
 A: Rebuild a spool control task SPR7.. to have 24 hr timeout or use Fortran/Macro routine to give users spooler control.

John Guidi, The Jackson Laboratory
 Q: How are the CPU resources accounted for? Why is it that multiple runs of the same task accumulate different resource statistics?
 A: EM05 is where the accounting is done. Look at it. One of the reasons for the discrepancies is that ISR's are included in statistics, Also sampling of accounting is subject to the windows in which the accounting statistics are taken. Depending on the states of the entire system, different statistics will be taken for different snapshots.

George R. Wells, General Electric Co.
 Q: A system generated for PDP 11/44 will run on either PDP 11/45 or PDP11/70, but when booted on PDP 11/44, the TT... Handler aborts on first input. Are others having same problems?
 A: Work Around: restore "HNDLIB" to original distribution. SPR Patch to ..TKBK was off by two bytes. If PDP11/44 has a floating point processor, no

problem. Otherwise with no FP, TT Handler aborts.

Larry W. Ebinger, Sandia National Lab
 Q: What is the maintainer's policy on printing answered and unanswered SPR's?
 A: No Answer!! (ED: the policy within DECUS is that the publication of SPR answers is solely at Digital's discretion).

S. Strezleck, Nabisco Brands
 Q: Unsolicited input using IO.ATA. Can't make it work for a single character input without a carriage return but with a carriage return it works fine. Control C AST works fine. Can't I get true AST response with a single character, (no CR) and if so how?
 A: Unsolicited input AST is triggered by a termination character. (ED: it appears possible to patch the TTY handler to cause an AST on each character if an unsolicited AST has been requested. I'll publish a patch as soon as I can test it.)

Otto Titze, Kernphysik THD
 Q: If under PDX I enter TYPE UPF, it will not work. Error message is "PIP Failure."
 A: Use Convert. The format of the User Profile File has changed.

Otto Titze, Kernphysik THD
 Q: It is impossible to have two different IAS-systems saved with a swap file on the same disk. Gives a sequence number error.
 A: Delete swap file at shutdown and activate at startup.

Mike Lamatrice, Naval Sea Systems Command
 Q: The PDS command "QCPRS" does not work as documented. It identifies itself, then says "BYE." I can get it to work by putting all the dictionary information on the command line
 A: That is the way to do it.

Bruce Wright, Duke University Medical Center
 Q: Reads on disks for a non-intergral number of blocks which have correctable errors from the hardware (soft errors) are not corrected by the DB: driver.
 A: DEC is aware of the problem, this is also true of many other drivers on both IAS and RSX-11M. A fix is in progress.

Bill D'Camp, Logicon
 Q: I have a customer with IAS V3.0 on a 11/70 with a TEL6. At random intervals, he does a "LOA MM:" and then does a "INI MM:LABEL". The system does not respond and the tape drive does not initialize the tape. If you reboot the system, it works.
 A: Possible hardware or software bug or both.

W.T. Howatt, Atomic Energy of Canada
 Q: Can the patched version of BRU be incorporated as a standalone BRU?
 A: No. It may be distributed later.

Ken MacDonald, NOAA/CEAS
 Q: Is there a way to cause a task to be loaded into the highest available memory? This would be useful in avoiding the scatter loading of dynamically loaded handlers, the DECnet drivers, and other fixed tasks which fragment memory

A: Several suggestions made: manually load handler instead of putting in a startup file. Run a large task to take up core and force handlers to load high. DECnet has a patch to load its handlers high and the IAS support group may publish the method used.

Ken MacDonald, NOAA/CEAS

Q: Is a C Compiler available that works on IAS V3.1?

A: The DECUS C works on IAS. The full version is available from the DECUS library. A binary only kit will be on this SIG tape.

Ken Guralnik, E.G.&G.

Q: Why does the interrupt enable on the RP06 controller get cleared and stay that way when using two disk drives simultaneously (DSC DB1:=DB0:).

A: Bug in DB and DR handlers. Fix coming soon.

Larry Ebinger, Sandia National Lab

Q: In a multiuser system, if all T/S tasks are waiting for terminal input, they will be shuffled and/or checkpointed. Why?

A: Node pool shortage? Executive needs to check for AST. Pointers for that are in the task header.

Ken Guralnik, E.G.&G.

Q: I want to read and write to the same terminal from different tasks. I would like to eliminate the "CONTROL-R" output before the outputted text when a read is outstanding. How?

A: Will check and let you know. (ED: the "CONTROL-R" output can be removed by patching the TTY driver in module WRITE.MAC at label UPRSTR to output nulls instead of "up-arrow R").

John Seguin, PRC

Q: We built a V3.1 pack from distribution tapes, but the pack won't boot without floating point on the system. Is there a problem in general or is there something weird on our tapes?

A: TKBK patch from Autopatch B has an error which is corrected in Autopatch C.

John Seguin, PRC

Q: Is there anyway to shrink the executive for a 11/45? We run multiuser but not timesharing.

A: Don't use PLAS, remove some of the features of the terminal handling. Keep number of installs to minimum, omit parity handling, remove unused handlers like NL.

Hal Lynch, Utah State University

Q: Has the mount with DCF when using BRU been relaxed?

A: ZAP the task header privilege mask or use the INS/PRIV.

Allan Van Lehn, LLNL

Q: Why does BRU hang, on the last tape of a multi-volume tape backup between the write, rewind, and verify pass?

A: Autopatch C or DECUS handout should fix this problem.

Bill D'Camp, Logicon

Q: I run a 11/44 with RL02 system disk. At random intervals, we get a "load failure" message during the startup of the system. Once this has occurred, the task which had the load failure cannot be installed, even on subsequent

reboots and the only remedy is to run BAD on the disk. Curiously enough, BAD only works one time before it gets "bad block file overflow". This has happened on roughly eight different packs.

A: If a task header is corrupted, there is a load failure. Check with Field Service, this sounds like a hardware problem.

Fran Fallon, U.S. EPA

Q: We have a heavily overloaded 11/70 running IAS V3.0. We crash frequently for lack of nodes (probably due to heavy communications). In the crash dumps, the end of the node pool always has the same character string, which looks like the title from an old report. Does this indicate some nodes being permanently held out of use?

A: No answer. (ED: Digital is making some efforts to reduce the number of nodes required by DECnet).

Bill D'Camp, Logicon

Q: I recently had a disk disaster which caused several blocks in various locations on the disk to have parity errors. In one case there was a parity error in the second block of a five block directory file. When the user tried to access a file which was in the second block or later in the directory, the system crashed. In another case, a file header block had a parity error. When the header block with the parity error became the next available file header, no more files could be created.

A: If the directory file is deleted ([0,0]uic.DIR;1), then a VFY/LO will catalog all lost files into [1,3]. This could solve the first problem.

Mike Lamatrice, Naval Sea Systems Command

Q: How can I determine the size of tasks such as TKB?

A: Use MCR command SYS/TAS.

Mike Lamatrice, Naval Sea Systems Command

Q: Versatec printer/plotter built with DMA and UMR=4 causes system to nearly grind to a halt when it is used. It is not set spooled (that makes it hand on occasion) and a DEC line printer is also in the system

A: Put Versatec on end of Unibus.

Frank Borger, Micheal Reese

Q: Trying to redo SPR for V3.1. DEC manuals say CPU time is now in three different places (ATL, task header, ???). The algorithm for deciding where the information is does not work. We get wrong values. Only have problems with swapping and/or shuffling going on heavily.

A: No known problems, submit an SPR.

Bill D'Camp, Logicon

Q: If you print multiple copies of the same file to the line printer before the first copy has finished, printing all copies of the file are deleted.

A: Make a hard copy of the situation and submit an SPR.

S. Strelleck, Nabisco

Q: BRU on a multiuser system causes all my passwords to disappear.

A: The password is stored in the file header for the UFD file. BRU builds UFD without referencing the password information. The result is no passwords are passed. (ED: this may be fixed if IAS support lets the BRU maintainer know where the password is hidden).

Allan Van Lehn, LLNL

- Q: We need a way to control the batch log output. We tried the 'rename' suggestion from the Fall 1981 symposium. The file was moved to the directory and two trailer banners were printed on the line printer.
- A: Queue despooler is culprit. No known fix or work around.

W.T. Howatt, Atomic Energy of Canada

- Q: VFY/RC always echos a blocking factor of 2, regardless of the blocking factor typed into the command line.
- A: VFY taskbuild command file should be edited to increase one of two 'extend section' directives to TKB. Not sure which is correct one to modify.

Bill D'Camp, Logicon

- Q: Will device drivers or prototype drivers for new devices be provided before support is terminated in 1985?
- A: No new device support. (ED: However, RM80 support is in the DR driver and the TS11 handler is in the unsupported UIC).

Allan Van Lehn, LLNL

- Q: VFY/LI cannot be controlled with control-O. Why and how do we get it?
- A: This is feature of I/O between VFY and terminal handler. No workaround.

Steve Lord, B.F. Goodrich

- Q: When using EDT on versions of a file other than the most recent one, the changes are written back into the original version number.
- A: This is a feature. To get a new version number, you can specify the file name (without version numebr) upon exit.

James Niday, Lawrence Livermore Lab

- Q: COPY does not preserve dates when copying from a foreign device (RT11 floppy) even though /DATE:KEEP option is used.
- A: Copying is really done by FLX in this case. It does not recognize the option.

W.T. Howatt, Atomic Energy of Canada

- Q: Does anyone know how to restart a terminal line that has been turned off by a control-S?
- A: Internal DEC publication has the method. It will be published in the DEVIAS newsletter.

Hal Lynch, Utah State University

- Q: How do I increase the number of terminals on IAS beyond 32?
- A: Just follow the directions in the manual. IAS will support 64 terminals, no more than 32 on-line at once.

Hal Lynch, Utah State University

- Q: How do I generate an application system on a disk other than the system disk.
- A: RUN SYD to redirect SY: SYD is in the unsupported UIC.

Hal Lynch, Utah State University

- Q: Is there any plans to fix the online formatter for RP04's
- A: SPR the problem.

George Wells, General Electric

- Q: Can you clearly identify within Autopatch which ones are unpublished? I never run Autopatch automatically because I have already applied patches to twenty systems, also one or two Dispatches have been applied post-date to Autopatch.

A: No.

Otto Titze, Kernphysik THD

- Q: Loading tasks with several SGA's may cause system deadlocks. Loader does not load the whole task in one operation. Is there a solution.
- A: Submit an SPR.

RSX-11/IAS SIG 1982 Menu

Legare Coleman
RSX-11/IAS SIG Chairman

Louis Stoll
Menu Coordinator

The RSX-11/IAS Special Interest Group conducts a yearly balloting to determine the most important issues facing the users of Digital Equipment Corporation real-time computer systems. It is now time for the 1982 Menu voting. Enclosed is the list of menu items and the menu ballot to be returned.

This menu and ballot is one step in a continuing process. This is the Fourth Menu Ballot conducted by the RSX-11/IAS SIG. At the past DECUS symposium in Atlanta, the results of the previous menu were discussed and Digital responded to the top items. The complete menu results and the Digital response has been published in the Multi-Tasker.

Also at the Atlanta Symposium, the attendees input their suggestions for this menu. The items on this menu are taken from this input and all previous menu submissions that have not been committed to by Digital. The results of this voting will be announced at the Anaheim symposium and the next menu will begin.

The menu voting is open to all RSX/IAS sites. Each site is allowed to cast one ballot for each IAS, RSX-11D, RSX-11M, RSX-11M Plus, and RSX-11S operating system license it has purchased. This will typically mean one ballot for each RSX/IAS system. If a site is eligible to cast multiple ballots, please make a copy of the ballot and use one ballot for each system. If there are multiple users on a system, please meet together and return a consolidated ballot.

This menu ballot is different from past ballots. This ballot is an experiment in the continuing process of trying to improve the menu process and make it more effective. The first thing you will notice about this menu is that many more items are included than in the past. In the past, due to space and mailing restrictions, we were limited to 75 menu items. By including this ballot in the Multi-Tasker, this restriction was removed. This menu ballot includes all menu submissions that have been collected over the years that Digital has not responded to as available or announced. This will mean more work on your part to read and understand all of these items, but you will get to vote on all items, not just those that the menu committee felt were most important.

The second thing you will notice about this ballot is that the method of voting has been changed. The old method of voting was felt to be overly complicated and error prone. This was shown to be true by the high number of ballots which were received which were not completed correctly.

RSX/IAS Fall 1982 Menu

On this ballot there is a numbered line which corresponds to each menu item in the form:

nnn. -1 0 1 2 3

The nnn is the number which corresponds to the menu item number. All you need to do is circle the value following the menu item number which corresponds to your installations choice. The meaning of of each value is as follows:

- 1 **DON'T WANT.** If this menu item is implemented, it will have a detrimental effect on your installation.

- 0 **DON'T CARE.** If this menu item is implemented, it will have no effect on this installation. Also use if item does not apply to your site.

- 1 **NICE TO HAVE.** If this menu item is implemented, this installation would use the facility, but not having it is no great problem.

- 2 **VERY USEFUL.** If this menu item is implemented, this installation would make extensive use of this facility.

- 3 **MUST HAVE.** If this menu item is implemented, this installation would make extensive use of this facility. If this menu item is not implemented, this installation will implement the facility on its own, or purchase the facility from another vendor.

The menu ballot has had a very favorable impact on Digital in the past, and a large number of the items on past ballots have been implemented. In order for this process to be this effective in the future, we must continue to recieve the large number of responses that we have recieved in the past. We must also continue to take this process seriously. Please don't return menu ballots with all of the items having a 3 circled. This menu will be as effective as you make it.

Tabulating the menu is a large task for our volunteers, so please fill out the ballot very carefully. Please avoid some of the common mistakes made in the past:

- * Make sure you submit separate ballots for each system you have. In the past, we know many sites have submitted only one ballot when they have ten systems. For example, there have been many sites who have submitted only one ballot but indicate they use DECnet.

RSX/IAS Fall 1982 Menu

- * Please use a separate ballot for each system. The tabulating programs are not setup to handle a single ballot that represents more than one system.
- * Please fill in the memory size in words, not bytes. For example the maximum memory you could put on a 11/34 is 124 KW.
- * Make sure you fill in the profile information on the first page. While the results are considered as a whole, we use the profile information to generate specific reports on the needs of large systems versus small and real-time versus multi-function.

The product line information is especially critical. Product lines inside Digital are a major source of funding for software development. With the product line information, we can directly target results.

The completed ballots must be received by October 31, 1982. Any ballots not received by that time may not be included in the final tally. Please mail the menu ballot to:

RSX-11/IAS Menu
c/o DECUS, MR2-3/E55
One Iron Way
Marlboro, MA 01752

If the Menu is to have any effect on Digital, a substantial number of the RSX/IAS systems delivered must respond. The RSX/IAS Menu is the primary method for users to supply input to Digital on their needs for the future. Please take the time to vote now. If you have any comments on the menu items or menu process, please include them on a second sheet. Also send any suggestions for items to be on the next menu in 1983. A menu submission form was published in the May/June 1982 issue of the Multi-Tasker.

P.S. This menu is being mailed to all people receiving the Multitasker. If you know of other sites in your organization or area, please forward a copy of the menu and ballot to them. Your help in this will insure the menu reaches the majority of RSX/IAS sites in the world.

RSX/IAS Fall 1982 Menu

MENU ITEMS

1.0 BATCH

1. Provide an option for the user to direct batch log files to a file instead of a print queue.
2. Allow the system operator to control or override the device selected by the MOU command in batch jobs.

2.0 CONSOLE SERVICES

3. Provide an editor/compiler to make it easy to alter or extend DCL commands.
4. Enhance DCL to support indirect commands in the same fashion as VMS.
- 6 5. In order to prevent "streaming terminals" from depleting pool, limit the number of queued command lines from a single terminal to a reasonable number.
- 6 6. Provide a mechanism to limit the size of the console log file. For example: a circular file where the oldest entries would be overlaid by the newest entries.
- 2 7. Provide a single-line version of OPE so that OPE could be used in indirect command files.
8. Provide a switch on the SET command to allow a time-out value to be set by terminal. (ie. SET /TMO=dev:value)
- 1 9. Provide support to allow output from status commands to be directed to a device. This would allow the output from those commands to be directed to the printer.
- 1 10. Add a switch to the RUN/INS commands to automatically attach the TI: device when the task is activated. This would allow older programs which do not attach the terminal to benefit from the type-ahead buffering feature. It would also prevent the "loss" of characters by tasks which don't get the terminal attached before the first character is typed.
- 2 11. Add the ability to recall, edit, and re-enter the last command line entered from the terminal.

RSX/IAS Fall 1982 Menu

12. Provide a switch on DEV to list all users who currently have a device mounted.
13. Enhance DEV to operate on classes of devices. (ie. DEV DISK or DEV D*: would display all disk devices)
14. Allow the specification of a schedule time and/or reschedule time on indirect command file invocations. (ie. @filespec [dtime][/RSI=magu])
15. Provide a switch on ABO from privileged terminals to force the abort of the task regardless of its current state (outstanding I/O, checkpointed, marked for abort, etc.). The user would assume the responsibility that the ABO /I MEAN IT might translate into ABO /CRASH.
16. Provide switches to MOU (/RO /RW) which would cause MOU to verify the presence/absence of a write protect ring.
17. Provide a switch to DMO to list open files on the device and another to force a dismount even if files are open on the device.
18. Add functionality to INI to permit increasing the index file size without destructive initialization of the entire volume.
19. Allow the user to specify the location of BITMAP.SYS and INDEXF.SYS on the INI command line.
20. Add an option to INS which would prevent non-privileged users from running non-checkpointable tasks.
21. INS should echo the file name (and possibly the task name) in all error messages. This would greatly simplify problem resolution for failed INS commands in indirect command files run in quiet mode (STARTUP.CMD).
22. Add an option to INS which would force the task to run at the top of the partition. This would greatly reduce fragmentation which occurs when a non-checkpointable/non-shuffable region must be installed in a system partition.
23. Add a switch to LOA to allow a unique filespec of the file containing the driver.
24. Enhance IND to search a default device and UFD if the command does not specify a device and UFD, and the file is not found in the user's UFD.
25. Add support to the IND .TESTFILE command to return the file protection attributes relative to the current UIC.
26. Add support to the IND .TESTFILE command to perform wild card file operations.
27. Enhance IND to permit numeric variables to have negative values.

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- 0 28. Enhance IND to support double percision integer numeric variables.
- 1 29. Add commands (.SAVE .RESTORE) to IND to save and restore the current status of .ENABLE/.DISABLE options.
- 0 30. Enhance HELLO to prevent additional non-privileged users from logging onto a system if a predetermined maximum number of logged on users has been exceeded.

3.0 DEBUGGING TOOLS

- 2 31. Provide a symbolic debugging tool which could be used for all non-interpretive languages. The debugger interface should be fully documented so that all compiler/assembler vendors could produce products which are compatible with the debugger. In the ideal implementation, the debugger would operate outside of the target task's address space, and would not require modification of the target task's overlay structure. The absolute minimum functionallity would include breakpoints on symbolic statement labels, and display/modification of the contents of symbolic variable names. The display/modify functions should support data types such as binary integer, floating point, octal, decimal, hexadecimal, and packed decimal. Other functionality, such as watch points, display/modification of program code, trace facilities, and many others are highly desirable.
- 0 32. Enhance PMD to store a binary task image dump, and add an online analyzer for the binary image, and add a CDA type analyzer to produce a customizable (by switches) hard copy.

4.0 DOCUMENTATION

- 1 33. Provide an option for installation to purchase machine readable documentation kits. This would make it possible for the installation to provide online access to the entire documentation kit. No more hours spent playing "Who has my manual?".
- 2 34. Provide an option for installations to purchase documentation kits on micro fiche.
- 2 35. Provide system logic manuals for each release of all operating systems and continue to add topics to the manuals.
- 3 36. Provide a master reference manual for each operating system. The manual would contain a summary of all services provided by the system and a cross reference to the manual(s) which contain additional detail information.

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37. Provide an RSX-11M to M-PLUS Migration User Guide as part of the standard documentation set.
38. Provide a single document for real-time users, describing various ways to utilize system functionality and system parameters.
39. Publish data on effects of changing the system tuning parameters and data on areas of most significant system throughputs and performance bottlenecks.
40. Document the use of each file on the distribution kits, especially, under what circumstances they may be deleted.
41. Provide documentation and/or feature updates as direct page replacements marked by change bars.
42. Rewrite the RSX/IAS I/O operations manual with added emphasis on examples and tutorial information for the first-time user.
43. Document the PIPUTL routines in the system library manual.
44. Provide a programmer reference card for FORTRAN programmers.

5.0 EDITORS

45. All editors should copy the file protection mask of the input file to the output file.
46. Enhance EDT to get the terminal characteristics from the terminal driver, and initialize for that type of terminal.
47. Enhance EDT to include the LEARN and LOCAL modes as in KED.
48. Provide and document a method for the user to support non-DEC terminals on EDT.

6.0 EXECUTIVE SERVICES

49. Provide more system pool space for RSX/IAS operating systems.
50. Provide two system pool allocation routines, one for dynamic areas and a second for more static areas. The two areas should be allocated from opposite ends of pool to keep the dynamic and static areas together. Modify all system routines to call the proper routine.

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- 2 51. Provide a loadable crash dump routine. This would remove the crash routine from the exec and thereby increase available pool, and would allow different crash devices to be used for a single sysgen.
- 2 52. Provide a loadable XDT so that it can be loaded only when needed and would not impact pool.
- 1 53. Increase the number of levels of protection over and above privileged and non-privileged.
- 1 54. The executive should enforce \$SWSTK as the only way for privileged tasks to map over the executive.
- 2 55. Provide optional support for a software floating point emulator. This would allow the use of F77 on machines which do not have the FPP.
- 2 56. Provide support for virtual disks in all operating systems. This is one of the most popular features from the SIG tapes and should be supported as a feature.
- 1 57. Provide a documented method of implementing user written directives which does not require the modification of any executive code or tables.
58. Provide lock and unlock directives which would allow the user to serialize access to resources. The directives should allow the user to wait on the release of a locked resource, and ideally would prevent or detect and notify the caller of a deadlock situation.
- 1 59. Provide executive support to allow SST traps in one task to be processed by another task. This would allow debuggers and other such tasks to be external to their targets.
- 1 60. Map exit with status to exit, and stop to wait in systems which do not have support for these directives.
- 0 61. Provide COBOL callable routines for directive support similar to the routines provided for FORTRAN.
- 2 62. Provide a facility to chain two or more directives together for execution without involuntary context switches. This would allow programs which must synchronize activity to do so without creating windows. In addition, this would relieve DEC of the never ending task of providing new directives which combine two or more already existing directives (QIOW, RCST, RCVX, SDRC, VRCS, VRCX, etc., ect., etc.)
- 2 63. Provide a subfunction on IO.ATT and IO.ATA QIO functions which would return an error status if the terminal was already attached by another task. This would allow the task to take some intelligent action instead of the current "attach queued forever" implementation.

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64. Allow tasks using memory resident overlays to dynamically extend themselves.
65. Provide pipeline like support on all operating systems.
66. Provide support for overlapped seek and I/O optimization on all operating systems.
67. Provide for recovery from powerfail on all disk devices.

7.0 FILE BACKUP/RESTORE

68. Provide support for backup to a disk container file so that small disks could be backed up into files on larger disks.
69. Enhance BRU to allow output from the /DISPLAY switch to be directed to a device or file.
70. Modify BRU to require terminal input before continuing to the next tape in a multiple tape operation.
71. Provide a /BETWEEN switch to BRU to allow backup between certain times.
72. Add a switch to BRU which would allow additional backup sets to be added to a continuation tape.
73. Add an option to BRU to create UFD's on a FILES-11 volume being restored without using the initialize command.
74. BRU should verify the labels on all tapes (input and output).
75. BRU should keep a catalog of files in a backup set so that recovery of a file on the last reel does not require that the entire set be scanned.
76. Provide an option in BRU to allow the incremental backup of the latest version of each file only.

- 8.0 FILE SYSTEM

77. Provide support for disk quotas and disk usage monitoring. This method should allow a manager to specify a limit on the amount of disk space available to each user, and don't allow the user to exceed this limit.
78. Provide file disk data caching support.

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79. Provide system library routines that perform complete wild-card find operations.
80. Provide support of the ODS2 disk structure on RSX. The minimum required support would be a choice of ODS1 or ODS2 at sysgen. The best solution would be to support both ODS1 and ODS2 in the same system. This would allow copying of data from one structure to the other. The announcement of P/OS shows that the work to implement this feature has already been done. The extension of support will be a must in order to have compatible media between P/OS and RSX.
81. Document the FILES-11 block locking feature, and provide user interface routines.
82. Document the FILES-11 placement control, and provide user interface routines.
83. Provide a multi-buffering and large buffer version of FCS across all operating systems.
84. Provide a user interface to allow access to the file creation and access dates.
85. Make all FCS routines re-entrant so that PUT\$/GET\$/READ\$/WRITE\$/etc. can be called from AST routines.
86. Provide RMS as an ACP or some other technique which allows a single copy of the code, external to the user task, to provide record management services to all user tasks. The bucket and index buffers should also reside in a common buffer pool so that locking could be done on a record basis rather than a bucket basis. The common buffer pool should also reduce physical I/O when multiple tasks are accessing the same file.

9.0 HARDWARE

87. All terminal multiplexors (DH, DZ, etc.) should be modified to support the speed select line on the 212-A modem.
88. Provide a time of day clock which would make the time of day, day of year, and year available to the system. The clock should have battery backup to ensure continuous operation through extended periods of power outage.
89. Offer Unibus and Q-bus versions for existing PDP-11's of the 5 1/4 inch Winchester and floppy disk drives used on the new Professional computer.

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10.0 IAS

90. Add capability to add user written DCL commands to PDS.
91. Provide logic manuals for PDS and TCP.
92. Add an RSX-11M-like ASN function to IAS.
93. Add more manual control information and manual control of scheduler levels for all active tasks, such as moving a task from and to batch level, from and to real-time.
94. Include the RMS file copy facility in the DCL COPY command.

11.0 LANGUAGES

95. Provide a PASCAL compiler for RSX/IAS.
96. A standard structured language should be selected by DEC and supported across all operating systems, with supported calls to all appropriate layered products. Indicate the language you would like to see DEC support in the space provided (see bottom of first page on the ballot).
97. Provide a C compiler on RSX/IAS.
98. Remove or reduce the restrictions on the use of executive services in macro routines called from BASIC+2. FMS, 3271 PE, etc. all require these services.
99. Support calls for all system services and options from FORTRAN.
100. Provide initialization macros for the FORTRAN OTS so that a macro program which calls FORTRAN subroutines can properly initialize the OTS.
101. Remove the restriction in FORTRAN that an array cannot exceed 32k-1 elements. With the support of virtual arrays and I*4 integers, this restriction is no longer valid and should be removed.
102. Provide the ability to include the short error messages in the resident library, and the long error messages in the task address space. This would allow production and test programs to use the same resident library.
103. Provide a cross reference facility for FORTRAN.
104. The implementation of character string variables in F77 should be improved. Specifically, character variables should have a descriptor vector which would be carried with the variable. This would allow subroutines to determine the length of a character variable passed as an argument.

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105. Provide a summary error report to MACRO-11 that would include the line numbers of errors.
- 2 106. Provide a pseudo-operation to include the contents of a file in a MACRO-11 source program.
107. MACRO-11 should allow a command line longer than 80 characters and/or should allow continuation lines.
- 2 108. Provide MACRO-11 pseudo-operations to save and restore (.PUSH and .POP) the current assembly context (PRINT, LSB, PSECT, etc.). This would make it possible for a library macro to restore users context when it is necessary for the macro to change context.

12.0 LAYERED PRODUCTS

109. FMS should be able to convert both real and integer data, using field definitions to translate the data for the user.
110. FMS should be able to timeout and/or abort a screen after a given time interval.
111. Provide FMS calls to change the field display attributes under program control. The call should cause the field specified to be repainted with the new display attributes. A call should also be provide to restore the field to the default (FED supplied) attributes. It should be possible to change the attributes of elements of a field array without changing the attributes of the entire array, and the changed attributes should be maintained properly even if the operator requests that the screen be repainted via the CNTRL/W.
112. Provide FMS calls which would allow the application program to map the current form. The call should return the field name, index, length, and field attributes (display only, fixed decimal, etc.). Successive calls could be used to obtain all fields on the form. The fields should be returned in the order in which they would be processed by FGETAL and FPUTAL.
113. The FMS FSHOW and FCLRSH function calls should return the starting and ending line numbers used by the form. This would be very useful for applications which must display multiple forms on a screen.
114. FMS uses the PF3 and PF4 keys to exit from scrolled areas. These keys are not used outside of scrolled areas and should be made available for application program use for fields which are not in a scrolled area.

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13.0 RSX-11M GENERAL

- 2 115. Provide the batch facility on RSX-11M.
- 116. Provide an optional a timesharing scheduler to RSX-11M.
- 2 117. Provide for checkpointable, transient resident libraries.
- 118. Provide variable length send receive support in RSX-11M.
- 119. All operating system and layered products should have all of their messages numbered. All messages in RSX have recently been modified to implement upper and lower case, but the more useful message numbers were not added. All messages should be documented in single manual.
- 120. Reconfigure RSX-11S so that its executable code can be run from read-only memory.

14.0 RSX-11M PLUS GENERAL

- 121. Provide a core-only version of a full functionality RSX-11M-PLUS system as a sysgen option. This could be a system similar to RSX-11S but with an RSX-11M-PLUS kernal.
- 122. Provide an optional RSX-11-PLUS timesharing and/or real-time scheduler.
- 123. Provide a means of gathering user-defined performance data.
- 124. Provide a more heuristic version of the Shuffler.

15.0 SOFTWARE SUPPORT

- 2 125. DEC should offer an "installation license" which would allow an organization to pay a one-time fee authorizing it to use a software product at any site in the organization. This should also eliminate the massive problems that occur when a large installation must upgrade all of its systems to a new version of a product.
- 126. Provide a limited telephone support service (possibly on a per call fee basis) for the occasional caller on a tight budget.
- 127. Develop a data base system which catalogs all problem reports and available fixes for Digital real-time products and offer a dial-up service to users to access the data base. Users could access this system and use keyword searches to see if there is anymore information available about a problem they are encountering.

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16.0 SYSTEM ADMINISTRATION

128. Add an option to allow the hardware boot process to be non-file specific. When the system is booted, the operator would be prompted for the file name.
129. Provide a standard method to declare the lines per page for each printer, and modify all utilities to use this information.

17.0 SYSTEM GENERATION

130. Provide pregenerated, full-functionality systems with Autoconfigure of devices so that a SYSGEN is not required during installation.

Note, if pregenerated, full-functionality system with Autoconfigure of devices is adequate for your site and you do not require the ability to tailor the system through SYSGEN, check yes to the box on page 1 of the ballot.

- 2 131. Provide an option to produce loadable drivers with loadable data bases for all drivers.

18.0 TERMINAL SERVICES

- 2 132. Allow complete terminal privileges (break-through writes, etc.) from non-privileged tasks to their TI:.

133. Provide general cursor control with support for terminal independent display control and user definition of foreign terminals.

134. Provide an option to disconnect dial lines when there is no activity for a specified time interval, or when a user logs off and does not hang up or log back on.

135. Provide QIO support for control of dial lines. The functions should allow a task to enable/disable the line, and be notified when an incoming call is detected.

- 2 136. Provide a means to perform high speed circular buffered input to the terminal driver so that users may use unused DZ/DH lines in effect as a comm line to their non-terminal gadgets.

- 2 137. Provide system level type-ahead buffering.

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138. Provide virtual terminal support in RSX-11M.
139. Provide an option to log a terminal off after a specified period of no activity.
140. Provide support for auto-dial (DF03-AC).
141. Provide support for hostsync (host sends X-ON/X-OFF to prevent buffer overflow) in the FDX terminal driver. This would solve many of the problems which are currently being experienced by users attempting to use the FDX terminal driver to communicate with intelligent terminals and devices.
142. Provide a subfunction on the IO.ATT/IO.DET that would prevent the type-ahead buffer from being flushed. This would allow a terminal to be detached and passed to another task without the loss of data.
143. Provide a set multiple characteristics sub-function to disable the checkpoint during write feature of the FDX terminal driver.
144. Allow the editing of command lines prior to entering the command. Specifically, allow the use of the left/right arrow, and delete/insert character functions while entering a command.

19.0 UTILITIES

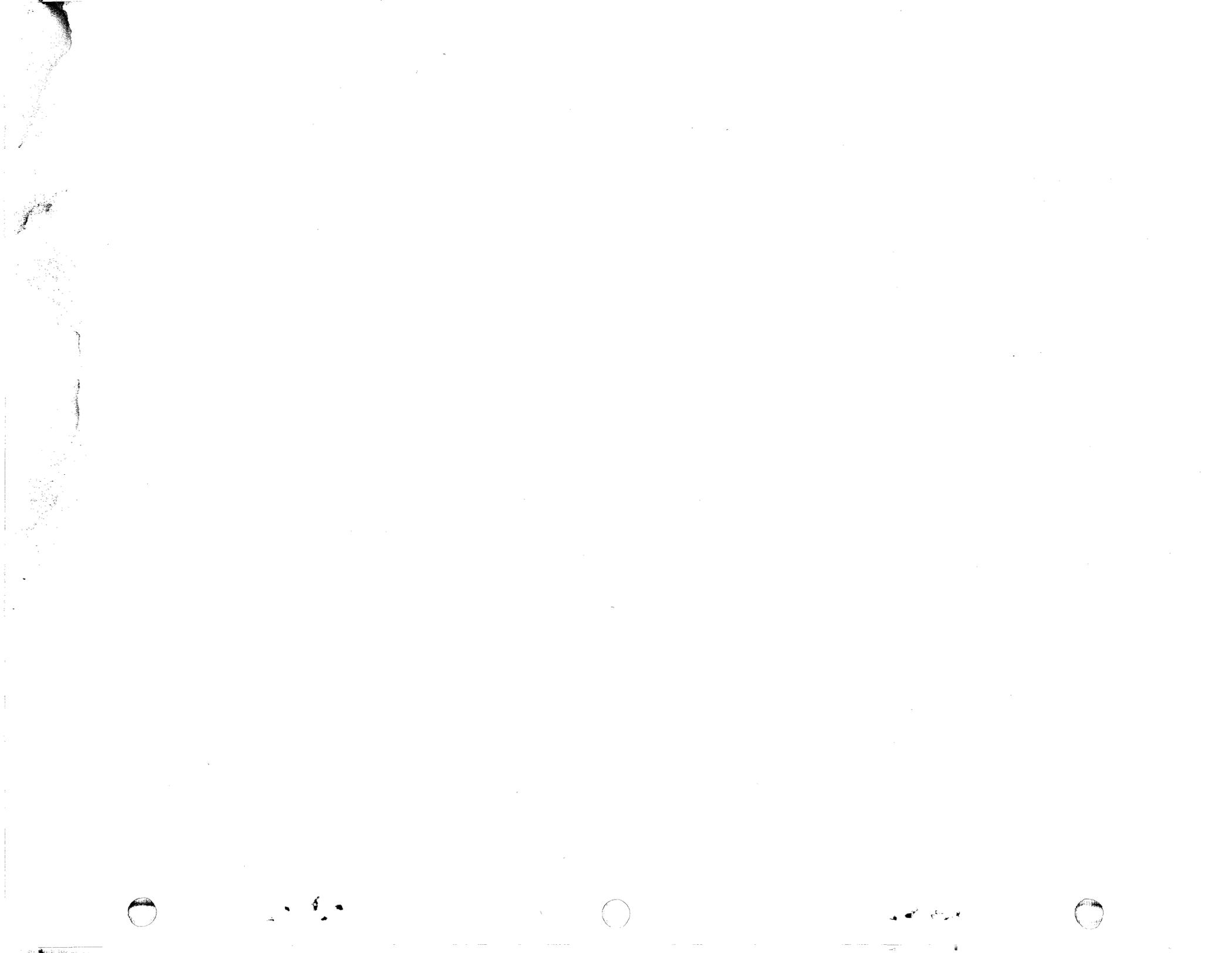
145. Add wildcard (and possibly wild character) support to the command line parser for utilities.
146. Make most utility switch defaults selectable at task build time and make all names for task build switch defaults common between utilities.
147. Standardize the user interface across utilities. Support continuation lines, use common filename specifications, and standardized switch specifications.
148. Add transparent DECNET support to all utilities. For example, allow Macro and TKB to access files on another system in the network.
149. Provide an in-place disk compression utility as in RT-11.
150. Allow file specification by file ID in all utilities.
151. Modify all utilities to use EXIT WITH STATUS, and document the various exit status values.
152. Provide a system data structure display utility that provides on-line display of system data structures and status.

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153. Provide a source maintenance utility that supports comparison of source files, and merging of several sets of modifications into a source file.
154. DEC should accept ownership of TECO, RUNOFF, and SRD, and provide them as supported utilities.
155. Provide a display (possibly a RMD page) which shows all currently open files and the tasks which are using them.
156. Provide an option in CMP to ignore text following a selectable comment delimiter.
157. CMP should extend itself, and use a disk overflow area if necessary, when it needs more buffer space.
158. Provide a method to restart CRF after an error occurs in the cross reference step.
159. CRF should provide a consolidated list of error messages from the program or task being CRF'ed.
160. Provide a facility in DMP to use upper/lower case characters when dumping to a device which supports lower case.
161. Provide support in FLX to create UFD's when transferring files to a FILES-11 volume.
162. Provide support in FLX (or PIP) to handle RT-11 magtapes.
163. Enhance LBR to assume /-EP if the module contains no entry points.
164. Enhance LBR to add arguments to the listing switches (/LI, /LE, /FU) to allow a single library entry to be listed (ie. /LI:modulename or /LE:entrypoint).
165. Enhance PIP to display number of unused headers, MXF, default extension quantity, and other volume statistics.
166. Provide a PIP switch to mark a file contiguous which you know is really contiguous.
167. Add support to PIP for file selection based on file creation/access date.
168. Add support to PIP for file selection based on the lock bit and zero length file.
169. Enhance the PIP /PU switch to not delete files if the latest version is locked or has zero blocks.
170. Enhance PIP to allow file selection based on any field in the file header.

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171. Provide a switch to PIP to allow deletion of all copies of a file except the oldest and newest. This would allow keeping the original and latest of a series of edited versions.
172. Enhance PIP to provide a method to copy the protection attributes of a file when the file is copied.
173. Enhance the PIP /RE switch to change the file name in the file header in addition to the UFD. This would allow RMD to display the correct file name for renamed files as well as eliminate many other problems.
174. Enhance the QMR to prevent non-privileged users from altering job priorities. This would be more consistent with the overall RSX security philosophy.
175. Enhance the QMR to provide for deletion of a specific file within a job.
176. Enhance QMR to display print job size (number pages/lines).
177. Provide a TKB switch to mark the task non-shufflable.
178. Provide a facility in TKB to force a PSECT to a specific virtual address. This is required to implement systems in mixed RAM/ROM machines.
179. Enhance TKB to expand the maximum work file size. With the heavily overlaid tasks which result with the use of OTS/FCS/RMS/FMS/ODT/etc. it is no longer uncommon to exhaust work file size limit.
180. Enhance VMR to provide a graceful recovery if an indirect command file attempts to REMOVE a task which is not INSTALLED.
181. Provide a facility to restart using (append to) an existing accounting file.
182. Provide a switch to ACS which would display checkpoint space allocated on the device and tasks checkpointed into that space.
183. Provide a switch to ACS to force the close of a checkpoint file. This function should attempt to first force migration of tasks checkpointed into that file.



RSX-11/IAS SIG 1982 MENU BALLOT

Site: _____

Operating System (include version): _____

CPU Type: _____ System Disk: _____ Memory (KW): _____

Please indicate below the applications your system is used for. If more than one, list in order of importance with primary first. Please use the codes from the list below.

Application: 1) _____ 2) _____ 3) _____ 4) _____ 5) _____

- | | | |
|--------------------------------|-------------------|-------------------------|
| A) Data Collection (using A/D) | E) Graphics | I) Word/Text Processing |
| B) Data Collection (other) | F) Data Analysis | J) Business/Commercial |
| C) Process Control | G) Image Analysis | K) Data Management |
| D) Program Development | H) Communications | |

Other (please specify): _____

Please indicate below the Digital Equipment Corporation product lines you deal with. If more than one, list in order of importance. Please use the codes from the list below. If you are unsure, contact your Digital salesman.

Product Line: 1) _____ 2) _____ 3) _____ 4) _____ 5) _____

- | | | |
|------------------------|-----------------------|--------------------------|
| A) Commercial OEM | E) Government Systems | I) Medical Systems |
| B) Commercial Services | F) Graphic Arts | J) Technical OEM |
| C) Education | G) Laboratory | K) Telephone & Utilities |
| D) Engineering Systems | H) Manufacturing | L) Word Processing |

Other (please specify): _____

Please indicate which layered products you use on your system. Check the line to the left if you use the product.

- | | | | |
|------------------|-----------------------|------------------|---------------------|
| _____ Basic-11 | _____ Basic-Plus-2 | _____ Cobol-11 | _____ Coral 66 |
| _____ Fortran IV | _____ Fortran IV Plus | _____ Fortran 77 | _____ RPG II |
| _____ PL/1 (any) | _____ Pascal (any) | _____ "C" (any) | _____ RATFOR (any) |
| _____ FMS-11 | _____ DBMS-11 | _____ RMS-11 | _____ Datatrieve-11 |
| _____ SORT-11 | _____ RJE/HASP | _____ 2780-PE | _____ SNA-PE |
| _____ DECnet | _____ DPM-11 | _____ MUX200 | _____ UN1004 |

Other (please specify): _____

Please indicate the editor (only one) most heavily used at this site.

_____ EDI _____ EDT _____ TECO _____ KED Other (please specify): _____

How much would you pay for a symbolic debugger for FORTRAN ? \$ _____
 How much for a symbolic debugger that worked on all languages ? \$ _____
 How much for a symbolic debugger that worked on all languages and was external to the task being debugged ? \$ _____

If Digital picked one structured language and supported it across all operating systems, what language would you like to have them support ? _____

Would use fully configured system with autoconfigure (yes/no) ? _____

Do you have a Software Maintenance contract (yes/no) ? _____

RSX-11/IAS SIG 1982 MENU BALLOT (continued)

Circle your choice: -1 = Don't Want 0 = Don't Care 1 = Nice To Have
2 = Very Useful 3 = Must Have

- | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|----|---|---|---|---|-----|----|---|---|---|---|------|----|---|---|---|---|------|----|---|---|---|---|
| 1. | -1 | 0 | 1 | 2 | 3 | 47. | -1 | 0 | 1 | 2 | 3 | 93. | -1 | 0 | 1 | 2 | 3 | 139. | -1 | 0 | 1 | 2 | 3 |
| 2. | -1 | 0 | 1 | 2 | 3 | 48. | -1 | 0 | 1 | 2 | 3 | 94. | -1 | 0 | 1 | 2 | 3 | 140. | -1 | 0 | 1 | 2 | 3 |
| 3. | -1 | 0 | 1 | 2 | 3 | 49. | -1 | 0 | 1 | 2 | 3 | 95. | -1 | 0 | 1 | 2 | 3 | 141. | -1 | 0 | 1 | 2 | 3 |
| 4. | -1 | 0 | 1 | 2 | 3 | 50. | -1 | 0 | 1 | 2 | 3 | 96. | -1 | 0 | 1 | 2 | 3 | 142. | -1 | 0 | 1 | 2 | 3 |
| 5. | -1 | 0 | 1 | 2 | 3 | 51. | -1 | 0 | 1 | 2 | 3 | 97. | -1 | 0 | 1 | 2 | 3 | 143. | -1 | 0 | 1 | 2 | 3 |
| 6. | -1 | 0 | 1 | 2 | 3 | 52. | -1 | 0 | 1 | 2 | 3 | 98. | -1 | 0 | 1 | 2 | 3 | 144. | -1 | 0 | 1 | 2 | 3 |
| 7. | -1 | 0 | 1 | 2 | 3 | 53. | -1 | 0 | 1 | 2 | 3 | 99. | -1 | 0 | 1 | 2 | 3 | 145. | -1 | 0 | 1 | 2 | 3 |
| 8. | -1 | 0 | 1 | 2 | 3 | 54. | -1 | 0 | 1 | 2 | 3 | 100. | -1 | 0 | 1 | 2 | 3 | 146. | -1 | 0 | 1 | 2 | 3 |
| 9. | -1 | 0 | 1 | 2 | 3 | 55. | -1 | 0 | 1 | 2 | 3 | 101. | -1 | 0 | 1 | 2 | 3 | 147. | -1 | 0 | 1 | 2 | 3 |
| 10. | -1 | 0 | 1 | 2 | 3 | 56. | -1 | 0 | 1 | 2 | 3 | 102. | -1 | 0 | 1 | 2 | 3 | 148. | -1 | 0 | 1 | 2 | 3 |
| 11. | -1 | 0 | 1 | 2 | 3 | 57. | -1 | 0 | 1 | 2 | 3 | 103. | -1 | 0 | 1 | 2 | 3 | 149. | -1 | 0 | 1 | 2 | 3 |
| 12. | -1 | 0 | 1 | 2 | 3 | 58. | -1 | 0 | 1 | 2 | 3 | 104. | -1 | 0 | 1 | 2 | 3 | 150. | -1 | 0 | 1 | 2 | 3 |
| 13. | -1 | 0 | 1 | 2 | 3 | 59. | -1 | 0 | 1 | 2 | 3 | 105. | -1 | 0 | 1 | 2 | 3 | 151. | -1 | 0 | 1 | 2 | 3 |
| 14. | -1 | 0 | 1 | 2 | 3 | 60. | -1 | 0 | 1 | 2 | 3 | 106. | -1 | 0 | 1 | 2 | 3 | 152. | -1 | 0 | 1 | 2 | 3 |
| 15. | -1 | 0 | 1 | 2 | 3 | 61. | -1 | 0 | 1 | 2 | 3 | 107. | -1 | 0 | 1 | 2 | 3 | 153. | -1 | 0 | 1 | 2 | 3 |
| 16. | -1 | 0 | 1 | 2 | 3 | 62. | -1 | 0 | 1 | 2 | 3 | 108. | -1 | 0 | 1 | 2 | 3 | 154. | -1 | 0 | 1 | 2 | 3 |
| 17. | -1 | 0 | 1 | 2 | 3 | 63. | -1 | 0 | 1 | 2 | 3 | 109. | -1 | 0 | 1 | 2 | 3 | 155. | -1 | 0 | 1 | 2 | 3 |
| 18. | -1 | 0 | 1 | 2 | 3 | 64. | -1 | 0 | 1 | 2 | 3 | 110. | -1 | 0 | 1 | 2 | 3 | 156. | -1 | 0 | 1 | 2 | 3 |
| 19. | -1 | 0 | 1 | 2 | 3 | 65. | -1 | 0 | 1 | 2 | 3 | 111. | -1 | 0 | 1 | 2 | 3 | 157. | -1 | 0 | 1 | 2 | 3 |
| 20. | -1 | 0 | 1 | 2 | 3 | 66. | -1 | 0 | 1 | 2 | 3 | 112. | -1 | 0 | 1 | 2 | 3 | 158. | -1 | 0 | 1 | 2 | 3 |
| 21. | -1 | 0 | 1 | 2 | 3 | 67. | -1 | 0 | 1 | 2 | 3 | 113. | -1 | 0 | 1 | 2 | 3 | 159. | -1 | 0 | 1 | 2 | 3 |
| 22. | -1 | 0 | 1 | 2 | 3 | 68. | -1 | 0 | 1 | 2 | 3 | 114. | -1 | 0 | 1 | 2 | 3 | 160. | -1 | 0 | 1 | 2 | 3 |
| 23. | -1 | 0 | 1 | 2 | 3 | 69. | -1 | 0 | 1 | 2 | 3 | 115. | -1 | 0 | 1 | 2 | 3 | 161. | -1 | 0 | 1 | 2 | 3 |
| 24. | -1 | 0 | 1 | 2 | 3 | 70. | -1 | 0 | 1 | 2 | 3 | 116. | -1 | 0 | 1 | 2 | 3 | 162. | -1 | 0 | 1 | 2 | 3 |
| 25. | -1 | 0 | 1 | 2 | 3 | 71. | -1 | 0 | 1 | 2 | 3 | 117. | -1 | 0 | 1 | 2 | 3 | 163. | -1 | 0 | 1 | 2 | 3 |
| 26. | -1 | 0 | 1 | 2 | 3 | 72. | -1 | 0 | 1 | 2 | 3 | 118. | -1 | 0 | 1 | 2 | 3 | 164. | -1 | 0 | 1 | 2 | 3 |
| 27. | -1 | 0 | 1 | 2 | 3 | 73. | -1 | 0 | 1 | 2 | 3 | 119. | -1 | 0 | 1 | 2 | 3 | 165. | -1 | 0 | 1 | 2 | 3 |
| 28. | -1 | 0 | 1 | 2 | 3 | 74. | -1 | 0 | 1 | 2 | 3 | 120. | -1 | 0 | 1 | 2 | 3 | 166. | -1 | 0 | 1 | 2 | 3 |
| 29. | -1 | 0 | 1 | 2 | 3 | 75. | -1 | 0 | 1 | 2 | 3 | 121. | -1 | 0 | 1 | 2 | 3 | 167. | -1 | 0 | 1 | 2 | 3 |
| 30. | -1 | 0 | 1 | 2 | 3 | 76. | -1 | 0 | 1 | 2 | 3 | 122. | -1 | 0 | 1 | 2 | 3 | 168. | -1 | 0 | 1 | 2 | 3 |
| 31. | -1 | 0 | 1 | 2 | 3 | 77. | -1 | 0 | 1 | 2 | 3 | 123. | -1 | 0 | 1 | 2 | 3 | 169. | -1 | 0 | 1 | 2 | 3 |
| 32. | -1 | 0 | 1 | 2 | 3 | 78. | -1 | 0 | 1 | 2 | 3 | 124. | -1 | 0 | 1 | 2 | 3 | 170. | -1 | 0 | 1 | 2 | 3 |
| 33. | -1 | 0 | 1 | 2 | 3 | 79. | -1 | 0 | 1 | 2 | 3 | 125. | -1 | 0 | 1 | 2 | 3 | 171. | -1 | 0 | 1 | 2 | 3 |
| 34. | -1 | 0 | 1 | 2 | 3 | 80. | -1 | 0 | 1 | 2 | 3 | 126. | -1 | 0 | 1 | 2 | 3 | 172. | -1 | 0 | 1 | 2 | 3 |
| 35. | -1 | 0 | 1 | 2 | 3 | 81. | -1 | 0 | 1 | 2 | 3 | 127. | -1 | 0 | 1 | 2 | 3 | 173. | -1 | 0 | 1 | 2 | 3 |
| 36. | -1 | 0 | 1 | 2 | 3 | 82. | -1 | 0 | 1 | 2 | 3 | 128. | -1 | 0 | 1 | 2 | 3 | 174. | -1 | 0 | 1 | 2 | 3 |
| 37. | -1 | 0 | 1 | 2 | 3 | 83. | -1 | 0 | 1 | 2 | 3 | 129. | -1 | 0 | 1 | 2 | 3 | 175. | -1 | 0 | 1 | 2 | 3 |
| 38. | -1 | 0 | 1 | 2 | 3 | 84. | -1 | 0 | 1 | 2 | 3 | 130. | -1 | 0 | 1 | 2 | 3 | 176. | -1 | 0 | 1 | 2 | 3 |
| 39. | -1 | 0 | 1 | 2 | 3 | 85. | -1 | 0 | 1 | 2 | 3 | 131. | -1 | 0 | 1 | 2 | 3 | 177. | -1 | 0 | 1 | 2 | 3 |
| 40. | -1 | 0 | 1 | 2 | 3 | 86. | -1 | 0 | 1 | 2 | 3 | 132. | -1 | 0 | 1 | 2 | 3 | 178. | -1 | 0 | 1 | 2 | 3 |
| 41. | -1 | 0 | 1 | 2 | 3 | 87. | -1 | 0 | 1 | 2 | 3 | 133. | -1 | 0 | 1 | 2 | 3 | 179. | -1 | 0 | 1 | 2 | 3 |
| 42. | -1 | 0 | 1 | 2 | 3 | 88. | -1 | 0 | 1 | 2 | 3 | 134. | -1 | 0 | 1 | 2 | 3 | 180. | -1 | 0 | 1 | 2 | 3 |
| 43. | -1 | 0 | 1 | 2 | 3 | 89. | -1 | 0 | 1 | 2 | 3 | 135. | -1 | 0 | 1 | 2 | 3 | 181. | -1 | 0 | 1 | 2 | 3 |
| 44. | -1 | 0 | 1 | 2 | 3 | 90. | -1 | 0 | 1 | 2 | 3 | 136. | -1 | 0 | 1 | 2 | 3 | 182. | -1 | 0 | 1 | 2 | 3 |
| 45. | -1 | 0 | 1 | 2 | 3 | 91. | -1 | 0 | 1 | 2 | 3 | 137. | -1 | 0 | 1 | 2 | 3 | 183. | -1 | 0 | 1 | 2 | 3 |
| 46. | -1 | 0 | 1 | 2 | 3 | 92. | -1 | 0 | 1 | 2 | 3 | 138. | -1 | 0 | 1 | 2 | 3 | | | | | | |

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