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

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

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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

These parameters assume output on a lineprinter with a pitch of 10 char/inch. Adjust the parameters to maintain the same margins if another pitch is used.

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FROM THE EDITOR

The highlights of this issue is the 1980 Menu Results and a short paper from Eric Levy on how to easily setup RSX-11M multiuser tasks with shared R/O sections! Finally, June Baker wrote a very useful Survival Guide for Symposia. This is written for the first-time attendee but I think even the old hands can learn a new trick.

There are also the regular columns: Chairman Ray French on the DECUS elections being held this year, Software Performance Reports, Hints and Things, and Help Yourself. Speak Out will return next month.

When submitting articles to the Multi-Tasker, keep in mind the publication schedules. In general, there is a two month lag between when you send the article to DECUS and you see it in print. For example, look at the last issue. The material was recieved by the DECUS office in December, 1980. After a two to three day trip in the mail, I got them at Monsanto. During the first week of January, I prepared the edition and mailed it to the DECUS office on the 10th. They received it January 15 and immediately sent it to the printer. 7,000 copies were printed and returned back to the DECUS office January 30. The labels were then attached and the January 1981 issue mailed via third class bulk on February 7, 1981. You should get your issue sometime later.

So if you have an article to be published before the May 18-21 Spring Symposium, it must be in the mail to DECUS by March 27. Unfortunately, you will probably not read this by then.

Ralph Stamerjohn
Multi-Tasker Editor

CHAIRMAN'S CORNER

1981 is definitely the year of DECUS elections - there are three of them! Those of you who are installation members have already received your ballot for the proposed changes to the SIG Operating Procedures. The balloting for this election was closed February 9.

The latter part of the year will see elections for SIG officers. Nominations will be opened at the Miami Beach Symposium and will close September 1st. The actual positions open for nomination will depend on the results of the current election on proposed changes to the SIG's Operating Procedures. Details concerning nominations and the election will be given both in the Multi-Tasker and at the Miami Beach Symposium in May.

Last but not least, are the DECUS Executive Board elections. There are three positions open for election; DECUS President, DECUS Publications Coordinator,

and DECUS Symposia Coordinator. Nominations are currently open and will close March 1st. All nominations must include the signatures of at least five DECUS members.

One of the nominees for DECUS Symposia Coordinator is our SIG's own Symposia Coordinator, June Baker. Scheduling and coordinating symposia activities consumes a tremedous amount of time and effort, and as the SIG's Symposia Coordinator for over 3 years June has done a fabulous job. Her experience, personality, and dedication to DECUS principles makes her an outstanding candidate for the position. She would also provide the SIG with a sorely needed RSX/IAS voice on the DECUS Executive Board (the Board currently consists primarily of people with RSTS and 10/20 backgrounds). So when you receive your ballot this Spring, above all don't forget to vote, and I encourage you to include June as one of the persons receiving your vote.

Ray French
RSX/IAS SIG Chairman

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.

The following SPR on the RSX-11M V3.2 and RSX-11M Plus full-duplex terminal driver was submitted by David Sykes (American Management Systems, 1515 Wilson Boulevard, Arlington, Virginia, 22209. David also submitted a very informative response he got from DIGITAL.

Please explain the modem handling of the full-duplex terminal driver. I spent four hours trying to figure out why my new VADIC modems were randomly failing to answer and maintain a connection until I noticed that: (1) They were the only ones I had on the DZ11, (2) on my Bell 103 modems on the same DZ, the DTR light blinks every 20 seconds, (3) the random disconnects happen coincident with the blinks, (4) The VADICS need a steady DTR and RTS if they have either at all.

Why does the DH11 assert neither, while the DZ asserts both and pulses them? How about explaining (functionally) how the driver does the modem control?

RESPONSE FROM DIGITAL:

One of the not so trivial tasks of the terminal driver is to try to handle the never ending menagerie of terminals, interfaces, and modems that it might find itself communicating with. It seems that every day another vendor will design a

new terminal, interface, or modem that does not adhere to the accepted standards in one way or another. This is not to say that your VADIC modems do not conform to industry standards, rather that the driver is designed to work with many types of communication equipment even though vendors do not necessarily check with us before they sell their product to RSX-11M sites to insure that they will work properly. The terminal driver attempts to handle the widest class of modems by following the algorithm below:

For the DH11:

On an idle, remote line, DTR (Data Terminal Ready) is clear. When a user dials in, the DH11 will interrupt when the modem asserts Ring. At that point the driver will assert DTR which tells the modem to send Carrier to the user. The driver then waits 15 seconds for the user's modem to send Carrier back. When the modem at the computer end senses the Carrier from the user's end, it asserts Carrier Detect, which causes the DH11 to interrupt again. Now the driver 'enables' the line and the reception and transmission of character data can begin.

If Carrier is lost for some reason, the driver will wait 2 seconds for it to return. If Carrier does return, then the driver assumes that the temporary loss was due to noise and all is well again. If Carrier does not return in the 2 second interval, the driver assumes that the user has hung up and in return it deasserts DTR to the modem which tells it to hang up its end of the line.

Another situation is that the user calls up the computer but hangs up without ever asserting Carrier. In this case the driver will have asserted DTR to the modem in anticipation of receiving Carrier in return. After the 15 second timeout elapses, the driver will deassert DTR to the modem to hang up the line, assuming perhaps that it was just a nuisance call.

For the DZ11:

The big difference between the DH11 and the DZ11 in modem handling is that the DZ11 does not interrupt when modem signal transitions are detected. Thus the DZ11 must be polled to find out the state of the modem signals, which is done on a once per second basis. One of the problems caused by polling is that it is easy to miss transitions which can occur between each polling interval, however, the faster you poll the greater the burden on the CPU. In addition, the DZ11 only provides a few modem control signals. One of these signals, the Ring signal, is not conditioned or latched. Its smoothness, spikiness, duration, intervals, etc. are a direct function of the telephone exchange, and differs significantly between USA and European telephone networks. Combined with the polling constraints mentioned previously, this means that, in general, Ring cannot be used. The largest part of dealing with the telephone system is then placed upon the modem.

Since Ring cannot be used, the driver instead asserts DTR and polls each second looking for Carrier Detect. When the user calls up the computer, the modem will immediately assert Carrier to the user since DTR is already asserted. When the user asserts Carrier back, the driver will (within the one second polling interval) see Carrier Detect go high and will enable the line.

If Carrier is lost, the driver will wait for it to return. If it returns within 2 seconds, the driver will assume that Carrier was lost due to noise and all is

well again. If Carrier does not return, the driver assumes that the user has hung up, and it will deassert DTR to the modem to tell it to hang up its end of the line. Since DTR must be asserted before the next user can dial in, DTR is only dropped for one polling interval (one second) and is then re-asserted in anticipation of the next user's call.

A possible circumstance is that a user dials in but hangs up without ever asserting carrier. The modem has already asserted Carrier to the user, and is waiting to detect Carrier in return, which never happens.

Meanwhile, the driver has not seen Carrier Detect and has no way of knowing that someone has called in but hung up. The end result is that the line has been answered by the modem but has not been hung up, which keeps the line busy thus prohibiting the next user from dialing in.

This deadlock could go on forever, the modem waiting for DTR to be deasserted by the driver to tell it to hang up the line, but the driver not knowing it has to do anything. What does finally happen is that some modems will time-out by themselves, and will hang up the line, however, as a barrage of SPR's we received informed us, some will not. To handle the latter case, the driver will deassert DTR on a non-active remote line every 20 seconds, thus freeing a possibly deadlocked line. DTR is again asserted at the next polling interval (one second later). This explains why you noticed that the DTR light on you modem blinks at that rate. It also explains why a disconnect can occur if the timing is such that a user dials in just before the 20 second interval expires, and waits long enough before asserting Carrier that the 20 second interval does elapse and the line hung up.

For the DH11 and the DZ11:

Please note that the timing intervals given above are in most cases governed by assembly symbols defined in the driver's assembly prefix file, [11,10]TTMAC.MAC. For example, the symbol M$$ANS controls the length of time the driver will wait for Carrier after processing a Ring interrupt from a DH11. The symbol you are probably interested in is DZTIME, which controls the interval at which DTR is deasserted on an idle line. DZTIME is currently defined to be 20. If you find that this interval is too short you can increase the value of DZTIME to as much as 255 decimal. If you do change the value of any symbols, you must afterwards reassemble the modules which reference them, and then rebuild and load the updated driver into your system image, as shown below.

Modify using an editor the appropriate symbols in [11,10]TTMAC.MAC, and then:

```
>SET /UIC=[11,24]
>MAC TTCAN.TTY=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,TTMAC,TTCAN
>MAC TTMOD.TTY=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,TTMAC,TTMOD
>MAC TTYH.TTY=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,TTMAC,TTYH
>MAC TTYZ.TTY=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,TTMAC,TTYZ
>SET /UIC=[1,24]
>LBR TTDRV/RP=[11,24]TTCAN.TTY,TTMOD.TTY,TTYH.TTY,TTYZ.TTY
```

You can use the BLDDRV command file as explained in the Release Notes, page 6, to re-build the driver. The necessary VMR commands are:


```
>VMR
ENTER FILENAME: RSX11M
VMR>REM TTCOM/REG
VMR>UNL TT:
VMR>INS TTCOM/INC=16000
VMR>FIX TTCOM/REG
VMR>LOA TT:
VMR>Z
```

You can now reboot your system.

Note that a brief summary of the driver's modem behavior in various circumstances is given in the beginning of module [11,10]TTMOD.MAC.

The following SPR on Fortran IV Plus V3.0 was submitted by G.E. Scott (Power Technologies, PO Box 1058, Schenectady, NY, 12301).

F4P will no longer accept a function name in a logical IF statement when the function is LOGICAL by not declared as such in the calling program. This is a change from the previous version of the compiler and also does not conform to the Fortran standard. The oure is to declare the function in the calling program with a LOGICAL type statement.

The following SPR on RMDEMO V01 was submitted by Dave Kristol (Massachusetts Computer Associates, 26 Princess Street, Wakefield, MA, 01880).

The directions for changing the device names in the RMDEMO display of disks requires editting of the Memory Display page output. The following patch file makes it possible to change the disks using the RMDEMO task build command file. This is desirable because it allows RMDEMO to be distributed in object form only and customized by using the task build command file.

```
MDPAGE.MAC;2/AU:72./-BF=MDPAGE.MAC;1
\
-2,2
        .IDENT  /V01A/
-9,9
; VERSION        /V01A/
-14
; MODIFICATION HISTORY
;
;       D.M. JRISTOL    18-DEC-80
;               DMK07 -- MAKE IT POSSIBLE, AT TASK BUILD
;                       TIME, TO TURN OFF DISPLAY OF A DEVICE
;
%
-615,,/;DMK07/
        TST     $MMDEV-6(R5)    ; NULL DEVICE NAME?
        BEQ     7$              ; IF EQ, YES, DON'T DISPLAY
/
```

For example, with this patch suppose I have only three devices on my system, DM0:, DM1:, and DL0:. Using the patch, I can add the following lines to the task build command file (RMDBLD.CMD) to get the display I want:

```
GBLPAT=MDCOM:$MDDEV+00:46504:0          ; DM0
GBLPAT=MDCOM:$MDDEV+06:46504:1          ; DM1
GBLPAT=MDCOM:$MDDEV+14:46104:0          ; DL0
GBLPAT=MDCOM:$MDDEV+22:0:0              ; Disable
```

HINTS AND THINGS

"Hints and Things" is a monthly potpouri 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.

The following two patches to RSX SIG tape programs were submitted by Larry Bolef of Washington University in St. Louis.

OCB RELINKING

While applying Dan Steinberg's patch to DRSPW.MAC from the Fall 1980 RSX SIG tape, I discovered a point where he failed to restore R5. The following is the correction file with this error fixed. By the way, this patch to relink OCB's and Dan's MC3 program are the basis for a first-class DCL which is compatible with MCR.

```
[11,10]DRSPW.MAC;2/AU:80./-BF=[11,10]DRSPW.MAC;1
\
-2,2
        .IDENT  /DS1.04A/
-11,11
; VERSION DS1.04A
-28
;
;       MSH049 -- ADD MORE GROUP GLOBAL EVENT FLAG SUPPORT
;
;       MSH051 -- CALCULATE DEFAULT UIC FOR NON-MULTI-USER SYSTEMS
;                 (NOV 79: SEQ 2.1.6.2 M)
;
;       DSS001 -- IMPLEMENT SPWN/CNCT WITH OCB RELINKING...
;                 IF EFN = -1, UNLINK OCBS FROM REQUESTOR AND LINK
;                 TO CHILD, RATHER THAN CREATE A NEW OCB...
;                 T3.MCR STATUS BIT ALSO COPIED FOR PROMPT SYNCHRONIZATION
;
;       LKB001 -- RESTORE R5 TO PREVENT ODD-ADDRESS TRAP AND CRASH
```



```
%
-141,,/;DSS001/
;               DIRECTIVE STATE OF 'D.RS8' IS RETURNED WHEN THE REQUEST IS
;               A SPECIAL SPAWN (EFN = -1) TO A CLI AND
;               THE REQUESTOR TASK HAS MORE THAN ONE PARENT
-189,189,/;DSS001/
OCBFLG: .WORD   0               ;IF NON-ZERO, RELINK PARENT OCBS TO CHILD
                                ; +1 IF PARENT T3.MCR SET // -1 IF CLEAR

CNRQT:  CLR     OCBFLG          ;INITIALIZE SPECIAL SPAWN FLAG
        CMP     (R3),#-1        ;EFN == -1?
        BNE     15$             ; NO....VANILLA SPAWN
        ADD     #6,R3           ; YES...SKIP EFN, AST, ESB PARAMS
        MOV     $TKTCB,R1       ;GET REQUESTOR TCB
        MOV     T.OCBH(R1),R4   ;POINT TO 1ST PARENT OCB
        BEQ     510$            ; NO PARENTS
        TST     (R4)            ;MORE THAN ONE PARENT?
        BEQ     510$            ; NO....USUALLY THIS IS THE CASE
        MOV     (PC)+,R5        ; YES...DON'T SPAWN A CLI THAT WAY, THOUGH
        DRSTS   D.RS8           ;(MCR..., FOR EXAMPLE, WILL CRASH TRYING
        BIT     #T3.CLI,T.ST3(R0)       ;  TO DEQUEUE A COMMAND LINE FROM
        BNE     10$                     ;  MULTIPLE PARENTS
510$:   MOV     R4,$TEMP1       ;VALID SPAWN OR CONNECT...SAVE 1ST OCB ADDR
        INC     OCBFLG          ;SET FLAG FOR SPECIAL HANDLING
        BIT     #T3.MCR,T.ST3(R1)       ;IS PARENT SYNCHRONIZED?
        BNE     520$                    ; YES...OCBFLG = +1
        NEG     OCBFLG                  ; NO....OCBFLG = -1
520$:   BR      30$             ;SKIP OCB ALLOCATION AND EFN/AST/ESB CODE

15$:                            ;REF LABEL

        MOV     #O.LGTH,R1      ;PICK UP OCB SIZE
-217,217,/;MSH049/
        MOV     R4,-(SP)        ;SAVE OCB POINTER
-219,,/;MSH049/
        MOV     R0,-(SP)        ;SAVE EVENT FLAG NUMBER
-220,,/;MSH049/
        MOV     (SP)+,R0        ;RESTORE EVENT FLAG NUMBER
        MOV     (SP)+,R4        ;RESTORE OCB POINTER
-222,222,/;MSH049/
-255,,/;LKB001/
        MOV     $TKTCB,R5       ;CURRENT TASK'S TCB GOES TO R5
-345,,/;MSH051/
        .IFF

        TST     R1              ;UIC DEFAULTED?
        BNE     125$            ;IF NE NO
        MOV     H.CUIC(R4),R1   ;GET DEFAULT UIC VALUE
125$:                           ;REF LABEL
-385,391,/;DSS001/
SUCCES: MOV     $TKTCB,R5       ; YES...GET PARENT TCB
        MOV     $TEMP0,R4       ;AND CHILD TCB
        MOV     $TEMP1,R1       ;IS THERE AN OCB TO QUEUE?
        BEQ     8$              ; NO....JUST CHECK FOR T3.MCR BIT
        TST     OCBFLG          ;REQUEUE OCB?
```

```
        BNE     2$              ; YES...DON'T TOUCH PARENT RUNDOWN COUNT
        INC     T.RDCT(R5)      ; NO....PARENT HAS ONE THING TO RUNDOWN
        MOV     R1,R0           ;SET PTR TO LAST OCB (ONLY ONE)
        BR      5$              ;JOIN CODE AHEAD

2$:     MOV     R5,R3           ;COPY PARENT TCB PTR
        ADD     #T.OCBH,R3      ;POINT TO PARENT OCB LISTHEAD
        MOV     R3,R2           ;COPY PTR
        CLR     (R3)+           ;CLEAR LINK TO OCB LIST
        MOV     (R3),R0         ;GET PTR TO LAST OCB IN LIST
        MOV     R2,(R3)         ;CLOSE THE LIST

5$:     MOV     R4,R3           ;COPY CHILD TCB
        ADD     #T.OCBH+2,R3    ;POINT TO CHILD'S LAST OCB PTR
        MOV     (R3),R2         ;GET PTR TO LAST OCB
        MOV     R0,(R3)         ;SET NEW LAST OCB PTR
        CLR     (R0)            ;CLEAR LAST OCB LINK WORD
        MOV     R1,(R2)         ;LINK NEW OCB(S) AT END OF PREVIOUS LIST

8$:     TST     OCBFLG          ;TWIDDLE T3.MCR?
        BLE     10$             ; NO...T3.MCR WAS CLEAR IN PARENT
        BIC     #T3.MCR,T.ST3(R5)       ;PARENT WILL NOW EXIT SILENTLY
        BIT     #T3.CLI,T.ST3(R4)       ;TARGET TASK A CLI?
        BNE     10$                     ; YES...HANDLED BY CMD TERMINATOR
        BIS     #T3.MCR,T.ST3(R4)       ; NO....CHILD WILL EXIT WITH ">"

-480,,/;DSS001/
        TST     OCBFLG          ;RELINK OCB AND PARENT HAS T3.MCR SET?
        BLE     30$             ; NO....NORMAL
        MOVB    #15,(R4)        ; YES...SET <CR> TERMINATOR FOR T3.MCR BIT
30$:                            ;REF LABEL
/
```

LOADABLE XDT

While debugging the previous problem, I attempted to use Ralph Stamerjohn's loadable XDT from the same DECUS tape. Unfortunately, the correction file used to modify EXDBT.MAC did not match the distributed copy of EXDBT.MAC. I talked to Ralph and we discovered he based his patch file on a version of EXDBT.MAC that had the formfeed's removed. The following correction file will work correctly on the distributed version. Also, you will need to change the XDTBLD.CMD command file to properly position XDT. The correct value to the EXTSCT command is 12114 (octal).

FROM THE EDITOR

This is the third time I have screwed up distributing loadable XDT. However, thanks to Larry, if you use his correction file with the distribution in [346,100] on the Fall 1980 tape, everything should work.


```
XDTCDE.MAC=EXDBT.MAC
%
-1,3
        .TITLE  XDTCDE
        .IDENT  /01.01A/
        .PSECT  $$$XDT,RW,D,LCL,REL,CON
;
; ************************************************************************
;                                                                        *
; MODIFIED EXDBT SOURCE TO FORM TEMPLATE CODE SECTION FOR LOADABLE       *
; XDT TASK. MODIFICATION FILE PREPARED BY RALPH STAMERJOHN               *
;                                                                        *
;       V01.01  RWS     28-OCT-80       REMOVE GETVAL, PUTVAL          *
;       V01.01A LKB     9-JAN-81        RENUMBER LINES IN XDTCDE.COR   *
;                                                                        *
; ************************************************************************
-141
XDTBEG::                        ;REF. LABEL
-151,151
UPC:    0                       ;USER PC                        $7
-156,156
CNST:   0                       ;CONSTANT REGISTER              $C
-170,170
ADR1::          ;ADDRESS OF THE BREAKPOINT      ($0B-$7B)
-176,176
UIN::           ;USER INSTRUCTION SAVE LOCATION ($0I-$7I)
-186
;
; LOADABLE XDT REGISTERS.
;
XDTCSR::                        ;TERMINAL CSR ADDRESS
TTYTKS: .WORD   TKS             ;
TTYTKB: .WORD   TKB             ;
TTYTPS: .WORD   TPS             ;
TTYTPB: .WORD   TPB             ;
;
; LOADABLE XDT DISPATCH VECTORS.
;
EXEXIT::.WORD   0               ;NORMAL EXECUTIVE EXIT ROUTINE
RTNXIT::.WORD   0               ;RETURN FROM TRAP ROUTINE
CRSXIT::.WORD   0               ;EXIT TO CRASH ROUTINE
-192,192
SSTVEC:: +      ODDA            ;0-ODD ADDRESS, OR HALT, VECTOR @4
-210,210
        +       $TRTRP          ;6-TRAP
-256,256
SSTXDT:: +      ERR             ;0-ODD ADDRESS
-268,268
SSTADR::.WORD   4               ;ODD ADDRESS
-416,449
;
; XDT INTERNAL STACK.
;
        .BLKB   100             ;ALLOCATE 100 BYTES
XDTSTK:                         ;REF LABEL - STRAT OF XDT STACK
```

```
-647,647
ERR::   MOV     #XDTSTK,SP      ;SET THE STACK FOR SANITY
        CALL    SETCN           ;SET OUTPUT FOR CONSOLE
-654,654
DCD::   MOV     #XDTSTK,SP      ;SET THE STACK FOR SANITY
-699,700
SETCN:  MOV     TTYTPB,OUTB     ;SET OUTPUT BUFFER ADDRESS
        MOV     TTYTPS,OUTS     ;SET OUTPUT STATUS ADDRESS
-896,896
SGMT::  TESTM   $SGFLT          ;TEST IF IN EXEC MODE
-913,913
ODDA::  MOV     #"SO,EXP        ;ASSUME STACK OVERFLOW
-919,926
BPTI::  TESTM   $TRACE          ;TEST IF IN EXEC MODE
        MOV     #"BE,EXP        ;"BE:" FOR MAYBE A BAD ENTRY
        CLRB    P               ;ALLOW PROCEED DEAL
        BR      INTR            ;SPECIAL NUMBER FOR THIS ONE
IOTX::  TESTM   $IOTRP          ;TEST IF IN EXEC MODE
        MOV     #"IO,EXP        ;"IO:" FOR IOTEE
        BR      ALOP            ;ALLOW PROCEED
ILLI::  TESTM   $ILINS          ;TEST IF IN EXEC MODE
-936,936
NEMT::  TESTM   $EMTRP          ;TEST IF IN EXEC MODE
-950,950
        JMP     RTNX            ;RTT MUST HAVE BEEN CHANGED TO AN RTI
-1024,1029
-1079
RTNX:   MOV     RTN,-(SP)       ;GET INSTRUCTION TO EXIT WITH
        JMP     @RTNXIT         ;AND EXIT TRAP
-1159,1161
10$:    TST     (SP)+           ;CLEAN STACK
        RTS     R5              ;PROCESS TRAP

20$:    MOV     (SP)+,R5        ;GET NEW RETURN ADDRESS
        JMP     @EXEXIT         ;TAKE NORMAL EXECUTIVE EXIT
-1222,1222
        JMP     @CRSXIT         ; ALTERNATE ENTRY POINT TO THE CRASH MODULE
-1401,1403
GET:    TSTB    @TTYTKS         ;CHARACTER READY
        BPL     GET             ;IF PL NO
        MOVB    @TTYTKB,R0      ;READ INPUT BYTE
-1428,1428
TYPE::  MOV     (SP),-(SP)      ;DUPLICATE RETURN ADDRESS
-1619,1619
XDTSIZ  == <.-XDTBEG>
XDTEND::                        ;REF. LABEL

        .END
/
```

The following three articles were submitted by Larry Baker of the United States Geological Survey. Larry's address is Office of Earthquake Studies, 345 Middlefield Road, Mailstop 77, Menlo Park, California, 94025.

VERSATEC LPDRV

I have modified the replacement LPDRV distributed by Versatec to be compatible with both RSX-11M V3.2 and RSX-11M-PLUS V1.0. The code is conditionalized on the symbol R$$MPL and takes advantage of the new M+ features for driver entry on unit on-line/off-line transitions to save and restore the plotter interrupt vectors. Send me a note if you are interested in a copy — I also have written an addendum to the Versaplot V7 RSX-11M installation guide for properly installing the new driver under RSX-11M-Plus.

FORTRAN FILENAME BLOCK ROUTINES

The following are Fortran callable routines to save and restore the contents of the Filename Block, which includes such things as the File-ID, and the fully qualified filename. To open a file by File-ID, all one needs to do is to put the FNB saved from a previously opened file and issue a normal Fortran OPEN statement or implicitly open the file by issuing a READ or WRITE. FCS will automatically open the file by File-ID if that field of the FNB is non-zero.

```
        .ENABL  LC
        .TITLE  GETFNB
        .IDENT  /V01/
;
;+
; SUBROUTINE GETFNB.
;
;       GETFNB gets a Fortran filename block
;
;       CALL GETFNB (lun,fnb,ierr)
;
;               lun     = Fortran logical unit number
;               fnb     = 15 word vector to receive FNB
;
;                       1-3 File-ID
;                       4-6 Filename (RAD50)
;                         7 Filetype (RAD50)
;                         8 File version (binary)
;                         9 Filename block status word
;                        10 .FIND context
;                     11-13 Directory File-ID
;                        14 Device name (ASCII)
;                        15 Unit number (binary)
;
```

```
;               ierr    = FCS error code from FDB (0 if no error)
;
; Note: lun must either be open, or CALL ASSIGN must be used to fill in
;       the required information in the FDB.
;
;       Invalid lun's will result in a Fortran error trapped by the
;       $FCHNL routine.
;
;-
;
        .PSECT  GETFNB,I,RO
GETFNB::                                ;Ref. label
        MOV     @2(R5),R2               ;Get LUN
        MOV     @#$OTSV,R3              ;Get work area address

        CALL    $FCHNL                  ;Get FDB address
        ADD     #14,RO                  ; ...

        MOV     RO,R1                   ;R1 points to filename block
        ADD     #F.FNB,R1               ; ...
        MOV     N.FID(R1),R2            ;If Fortran has already
        BIS     N.FID+2(R1),R2          ; opened the file, skip
        BIS     N.FID+4(R1),R2          ; the .FIND call
        BNE     10$                     ; If NE - File-ID set

        CALL    .FIND                   ;Find file and fill in File-ID
        BCS     90$                     ; If CS - error

10$:    MOV     4(R5),R2                ;Point to user FNB area
        MOV     #S.FNBW,R3              ;Get size of FNB area
20$:    MOV     (R1)+,(R2)+             ;Copy FNB
        SOB     R3,20$                  ; And loop till done

        CLR     RO                      ;Set error 0 for return
        BR      100$                    ; and skip to exit

90$:    MOVB    F.ERR(RO),RO            ;Get FCS error code

100$:   MOV     RO,@6(R5)               ;Store error code (or 0)
        RETURN                          ;Return to caller

        .END


        .ENABLE LC
        .TITLE  PUTFNB
        .IDENT  /V01/
;
;+
; SUBROUTINE PUTFNB.
;
;       PUTFNB depositis a Fortran filename block
;
;       CALL PUTFNB (lun,fnb,ierr)
;
```



```
;               lun     = Fortran logical unit number
;               fnb     = 15 word vector to receive FNB
;
;                       1-3 File-ID
;                       4-6 Filename (RAD50)
;                         7 Filetype (RAD50)
;                         8 File version (binary)
;                         9 Filename block status word (may be zero)
;                        10 .FIND context (may be zero)
;                     11-13 Directory File-ID
;                        14 Device name (ASCII)
;                        15 Unit number (binary)
;
;               ierr    = FCS error code from FDB (0 if no error)
;
; Note: lun must either be open, or CALL ASSIGN must be used to fill in
;       the required information in the FDB.
;
;       Invalid lun's will result in a Fortran error trapped by the
;       $FCHNL routine.
;
;-
;
        .PSECT  PUTFNB,I,RO
PUTFNB::                                ;Ref. label
        MOV     @2(R5),R2               ;Get LUN
        MOV     @#$OTSV,R3              ;Get work area address

        CALL    $FCHNL                  ;Get FDB address
        ADD     #14,RO                  ; ...

        TST     F.BDB(RO)               ;Is file already opened?
        BEQ     10$                     ; If EQ - no
        MOV     #IE.FOP,RO              ;Show file already open
        BR      100$                    ; And exit

10$:    MOV     RO,R1                   ;R1 points to filename block
        ADD     #F.FNB,R1               ; ...
        MOV     4(R5),R2                ;Point to user FNB area
        MOV     #S.FNBW,R3              ;Get size of FNB area
20$:    MOV     (R2)+,(R1)+             ;Copy FNB
        SOB     R3,20$                  ; And loop till done

        CLR     RO                      ;Set error 0 for return

100$:   MOV     RO,@6(R5)               ;Store error code (or 0)
        RETURN                          ;Return to caller

        .END
```

FORTRAN IV/FORTRAN IV PLUS VIRTUAL ARRAY BENCHMARKS

We have run several benchmarks through both the Fortran IV and Fortran IV-Plus compilers to measure the execution time of programs compiled with and without Virtual Arrays. The (USGS) default options were used in compilation and task building. These tests were by no means rigorous, and are only meant to give a rough idea of the overhead invloved in the use of Virtual Arrays.

The FOR V2.0 and F4P V2.5 tests were run under RSX-11M V3.1. The F4P V3.0 tests were run under RSX-11M V3.2. EIGEN is a program that computes the eigenvalues and eigenvectors (real) of a real symmetric matrix A of order N. It is designed to test the speed of floating point calculations (400 loops). RTPROC simulates typical calculations used in automatic detection and location of earthquakes. It is designed to test the speed of integer arithmetic operations (10,000 loops).

Program	Compiler/Options	Time (sec)	Relative to F4P V3.0 w/o VA
Real FFT (1024 points)	F4P V2.5 w/o VA	0.48	1.03
	F4P V3.0 w/o VA	0.47	1.00
	F4P V3.0 w/ VA	1.33	2.89
	FOR V2.0 w/o VA	1.22	2.60
	FOR V2.0 w/ VA	2.00	4.26
Real FFT (4096 points)	F4P V2.5 w/o VA	2.12	1.00
	F4P V3.0 w/o VA	2.13	1.00
	F4P V3.0 w/ VA	11.55	5.42
	FOR V2.0 w/o VA	5.55	2.60
	FOR V2.0 w/ VA	15.10	7.09
EIGEN	F4P V2.5 w/o VA	4.99	1.10
	F4P V3.0 w/o VA	4.52	1.00
	F4P V3.0 w/ VA	8.77	1.95
	FOR V2.0 w/o VA	9.77	2.16
	FOR V2.0 w/ VA	14.70	3.25
RTPROC	F4P V2.5 w/o VA	12.70	1.00
	F4P V3.0 w/o VA	12.70	1.00
	F4P V3.0 w/ VA	220.00	17.30
	FOR V2.0 w/o VA	12.80	1.00
	FOR V2.0 w/ VA	277.00	21.80

HELP YOURSELF

"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 at one of the addresses listed on the cover.

We would also like to publish the answers to questions. If you can help someone, send a letter to the Multi-Tasker or call Ralph Stamerjohn at (314) 694-4252. Your answer will be sent directly to the person in need and published in the next edition of the Multi-Tasker.

THIS MONTH'S QUESTIONS

HP3000 to RSX COMMUNICATIONS?

We share Dr. Oberparleiter's need for a HP3000 to RSX communications protocol (October 1980 MultiTasker). I would like to talk to anyone who might have some suggestions for this. We are contemplating using RS232 asychronous terminal lines with block checksums and a retry mechanism.

Tom R. Vanderpool, 3M Company, 3M Center, Building 518, St. Paul, Minnesota, 55144. Phone (612) 733-1110.

RSX/IAS SOFTWARE CLINC VOLUNTEERS?

At the Spring 1981 DECUS Symposium in Miami, the RSX/IAS SIG will be repeating the Software Clinic held in San Diego. Essentially, a clinic is a place where people with questions (patients) can walk in, meet one-on-one with experienced RSX/IAS programmers (doctors), and get their questions answered. At Miami, the Clinic is scheduled for two 4-hour periods.

I need volunteers to be doctors at Miami. If you are attending the Spring Symposium and can donate a couple of free hours to the Clinic, I want to hear from you. I need people with all kinds of expertise: system generation, system management, device drivers (especially using the terminal driver), use of magtapes, file I/O (both FCS and RMS), real-time programming, Fortran and other languages, system configuration, debugging, system tuning and optimization, and every other area. You do not have to be a "wizard". You will be suprised at the questions you can answer.

If you are interested, either write or phone me. Please include your address and phone number so I can contact you later with details of when the Clinic is scheduled and how it will be organized. Also list areas you feel you can field questions in.

Ralph Stamerjohn, Monsanto, Zone T1A, 800 N. Lindbergh, St. Louis, Missouri, 63166. Phone (314) 694-4252.

1980 MENU RESULTS

Ralph W. Stamerjohn
1980 Menu Coordinator

This is the results of the 1980 RSX/IAS SIG Menu. The report is divided into four sections: DIGITAL's response to the top RSX-11M items, DIGITAL's response to the top IAS items, a list of the 1980 Menu items, and the tabulated results.

The Menu results are a priority-order list of new features and products RSX/IAS users want for their future systems. For the 1980 Menu, each site could distribute 40 votes among 76 items. The results of the Menu will help DIGITAL plan their future development on the most critical items to their customers. In addition, the Menu is a focal point for all user input, no matter how minor. All user input, even if it does not appear on the Menu, is sent to DIGITAL for review by the appropriate developers.

The RSX/IAS SIG received more than 1200 ballots to the 1980 Menu. This is a fourfold increase compared to the first Menu and therefore, increases the impact of the Menu on DIGITAL. However, the 1200 ballots only represents about 15% of the possible sites. If a much higher percentage can be achieved for the 1981 Menu, even more positive results can be expected from DIGITAL.

In my new position as Multi-Tasker editor, I am no longer the Menu Coordinator. The 1981 Menu will be handled by Legere Coleman and Jim Mcglinchey. The 1981 Menu ballot will be mailed sometime this summer using the Multi-Tasker mailing list. Legere and Jim are currently compiling the inputs from the San Diego Symposium and will collect more items at Miami. Also, next month's Multi-Tasker will have an article by them on how to submit items to the Menu.

Finally, if you have comments on the 1980 Menu results, especially on DIGITAL's response, please submit an article to the Multi-Tasker. The articles will be published in SPEAK OUT. The Menu is an evolutionary process. By working with DIGITAL and clearly defining and prioritizing our needs, the RSX/IAS products will continue to offer maximun functionality and features.

DIGITAL RSX-11M RESPONSE

The following is DIGITAL's response to the top RSX-11M Menu items. The response is written by Steve Paavola, RSX-11M Product Manager.

Following is DIGITAL'S response to the top 11 RSX-11M SIG Menu items presented at the Fall DECUS Symposium in San Diego. Let me remind you that DIGITAL will be slow in making visible changes in response to the Menu process. Most of

these responses represent status as of when the Menu was received, which is in the middle of a project with internally committed functionality and completion dates. It is very difficult to change projects in mid-stream. Any changes in functionality caused by the Menu process generally won't be released until at least 2 years after the Menu.

1. ITEM 11 - Provide FORTRAN debugging tools for FORTRAN IV and FORTRAN IV-PLUS. The debugger tools should support breakpoints on source language statements and typeout/modification of variables.

   Response: DIGITAL is actively pursuing several options to producing an interactive FORTRAN debugger. The possibility of using an internally developed symbolic debugger has been abandoned. Please keep this item on the Menu while we pursue some other options.

2. ITEM 49 - 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.

   Response: DIGITAL is currently reviewing its software licensing policies. An "Installation License" is one possibility that will be considered.

3. ITEM 54 - Add support for system tuning by providing utilities to monitor system performance and allowing dynamic modification of parameters which affect performance.

   Response: We are currently planning a first small step in this direction for RSX-11M-PLUS. Our schedule and resources for RSX-11M don't allow us to do anything in this area for RSX-11M for this release, nor are we doing as much as would be desirable for RSX-11M-PLUS.

4. ITEM 4 - Add options to the ABORT command to force task aborts even if the task is not in the normal exit state (outstanding I/O, checkpointed).

   Response: The RSX developers are very concerned that an ABORT/"I MEAN IT" option would be equivalent to an ABORT/CRASH option. Nothing in this area is being done for the in-progress versions of RSX-11M and RSX-11M-PLUS. However, we will look into it for the next release after this one, especially if specific functionality/algorithms can be provided in terms of which types of failures are to be handled.

5. ITEM 48 - Increase support in RSX-11M for use in real-time and dedicated application environments. Specific emphasis is on maximizing system throughput and speed. If necessary, this would be at the expense of timesharing-type protections and features.

   Response: Although we haven't done any measurements, we don't believe that the performance of RSX-11M has changed much since its first release as long as the equivalent functionality is selected at SYSGEN. Code changes over time to fix bugs will sometimes improve performance, sometimes make it worse. Of course, if some of the newer features are selected, performance would normally be expected to change.

We don't have any projects underway at the moment to enhance performance. This is an area we would like to pursue for the next release, however.

6. ITEM 29 - Implement pipeline/pseudo terminal device support to allow task-to-task communication using the I/O mechanism and support for virtual terminals.

   Response: We believe the real problem to be solved is finding a more flexible way of doing inter-task communications than the current send/receive or shared commons. It would be a bad idea to move the virtual terminal facility form RSX-11M-PLUS to RSX-11M. The amount of pool space consumed would be prohibitive. For the next release of RSX-11M we will look into alternative ways of solving this problem.

7. ITEM 73 - Add support to PIP for selection on file access/creation dates (/BEFORE and /AFTER switches).

   Response: There are only two dates maintained by the FILES-11 file system: creation and last opened for update. The next version of PIP will be able to select on the basis of the creation date. Reword this item, and if it makes it to the top of the list, we will look into selecting on the basis of the last opened for update date after the current release.

8. ITEM 40 - Provide a FORTRAN '77 compiler.

   Response: Our current plans include a new version of the FORTRAN IV-PLUS compiler which will conform to the subset specification of the Fortran '77 standard.

9. ITEM 50 - Raise the reliability of patches published in the Software Dispatches to 100%. In addition, use standard patching practices for all products amd make full use of patching tools.

   Response: This is a motherhood request, and of course DIGITAL believes in motherhood. However, motherhood must be tempered with reality. 100% reliability is impossible to achieve, but we will look into improving the reliability of our published patches.

   Now that we have improving participation in Autopatch on the part of the various layered product development groups, patching practices are standardizing. I believe this will continue to improve.

10. ITEM 38 - Provide a RSX/IAS PASCAL compiler.

    Response: DIGITAL believes that there is strong market interest in a PASCAL compiler for our 16 bit architecture. Note that we have released a PASCAL compiler on VAX. We are currently pursuing possibilities for offering a 16 bit PASCAL compiler, but it is too early to talk about specific release dates or functionality.

11. ITEM 30 - Support overlapped disk seeks and disk I/O seek optimization.

    Response: We do not plan on implementing this feature for RSX-11M.

Note that overlapped seeks have already been implemented for RSX-11M-PLUS.

DIGITAL IAS RESPONSE

The following is DIGITAL's response to the top IAS menu items. The response is written by Chuck Turley, IAS Product Manager.

The following items are DIGITAL's answer to the Fall 1980 IAS DECUS menu items. The number of votes between 11 nd 12 was very few, so we have answered 12 items instead of the agreed upon 11. We would like to thank the RSX/IAS SIG menu staff for their preparation of the final tabulation of notes. The format has greatly assisted us in preparing our answers.

1. ITEM 11 - Provide FORTRAN debugging tools for FORTRAN IV and FORTRAN IV PLUS. The debugger tools should support breakpoints on source language statements and typeout/modification of variables.

   Response: The appearance of this item on two successive menus clearly indicates the seriousness of this need. We feel, however, this is not just a FORTRAN language issue for RSX and IAS operating systems. We provide a number of languages on a number of operating systems. We must therefore view the question of debugging aids in the much broader context of multiple languages on multiple PDP-11 operating systems.

   One potential solution to this general need for debugging aids has already been investigated and, frankly, eliminated. We are pursuing another approach to the problem but have not reached any conclusions as yet.

2. ITEM 40 - Provide FORTRAN '77 compiler

   Response: Features of the FORTRAN '77 ANSI standard will be included in a future release of PDP-11 FORTRAN IV-PLUS which will be supported on IAS. We do not have an availability date for that version of FORTRAN IV PLUS as yet.

3. ITEM 54 - Add support for system tuning by providing utilities to monitor system performance and allowing dynamic modification of parameters which affect performance.

   Response: We are currently planning some performance tuning tools for a possible follow-on release to V3.1. No details are available at this time although some simple accounting hooks for time sharing may be provided.

4. ITEM 26 - Provide more user task address space by supporting use of supervisor space for libraries and common areas and use of I/D space for user tasks.

Response: The effort required to implement this item is beyond the scope of IAS policy of not changing the OS system internals.

5. ITEM 4 - Add options to abort command to force task aborts even if task is not in normal exit state (outstanding I/O, checkpointed).

   Response: We are adding this item for inclusion in a possible follow-on release to V3.1. It is too early to estimate an availability date for this release.

6. ITEM 16 - Provide system logic manuals available for each release of all operating systems and continue to add topics to these manuals.

   Response: A system logic manual is not planned for V3.1, but we are investigating a SLM in conjunction with a possible future release.

7. ITEM 46 - Make all layered products available on all operating systems. In particular, support all of the RSx-11M layered products on RSX-11M PLUS and support the major layered products on IAS.

   Response: All major layered products (Languages, Data Management) that are currently supported on IAS will continue to be supported. No new (either not supported on IAS now or possible unannounced) layered products will be added to IAS.

8. ITEM 44 - Add option to FOR/F4P to flag undeclared variables and mixed mode variable usage. Also add option to perform parameter type checking on subroutine and function calls.

   Response: We are not planning any additional features for FORTRAN IV at this time. On behalf of FORTRAN IV-PLUS, the following is our present assessment of the individual requests within this menu item:

   1. Flagging of undeclared variables -- this feature is presently in our 10/20 FORTRAN product and we get requests there to remove it. Nonetheless, given its priority rating in this menu, we will consider it for a future release of FORTRAN IV-PLUS.

   2. Flagging of mixed mode variable usage -- the latest FORTRAN standard explicitly allows this feature. Given our present plans of adding FORTRAN-77 features to FORTRAN IV-PLUS, we will be more concerned with flagging non-ANSI features. Therefore, we can offer no encouragement on this request.

   3. Parameter type checking on subroutine and function calls -- simply too costly. These features would require an integrated programming environment with a data base maintained and accessed by both the compiler and linker.

9. ITEM 35 - Improve queue facility. Specific features desired include user-specified banner pages, queue management by UIC and time of day, indication of size of print queue entries, and dynamic queue redirection to other queues.

   Response: The time of day feature is included in V3.1. The other features listed will be considered as part of the planning process for a possible future release.

10. ITEM 36 - Improve recovery from tape errors and provide clean means to abort tape I/O jobs.

    Response: There has been improvement made in recovery from tape errors in V3.1. Further enhancement is being considered for a possible future release.

11. ITEM 49 - 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.

    Response: DIGITAL is currently reviewing its software licensing policies. This option is one of the items under consideration.

12. ITEM 73 - Add support to PIP for selection on file access/creation dates (/BEFORE and /AFTER switches)

    Response: PIP support for selection on file creation dates will be included in a possible follow-on release to V3.1.

MENU ITEMS

The following is a list of the items that appeared on the 1980 Menu. Please refer to this list when looking at the tabulated results in the next section.

1.0 COMMUNICATIONS

1. Provide X25 communications support, preferably integrated with the DECNET architecture.

2.0 CONSOLE SERVICES

2. Provide a mechanism for incorporating user-defined commands into the system command line interpreter (MCR/PDS). Alternately, allow invalid MCR/PDS commands to be passed to a user-written CLI and document this interface.

3. Add support to dismount task (DMO) to check for installed tasks on disk and either remove the tasks or declare an error.

4. Add options to ABORT command to force task aborts even if task is not in normal exit state (outstanding I/O, checkpointed).

5. Provide a version of the Digital Command Language (DCL) standard for RSX-11M.

6. Add support to the MCR SET commands. Specific features desired include extending the SET /MAIN command to allow the size of system partitions to be dynamically changed, allowing SET commands which effect terminal options to be independent of terminal driver features and breakthrough any terminal activity, and adding a SET /TMO command to allow device timeouts to be set and displayed.

7. Add support for default MCR Indirect Command Processor device and UIC. This would allow sites to establish libraries of command files.

8. Add conditional tests to MCR Indirect Command Processor to test for mounted and allocated devices and presence of a partition.

9. Add support to the MCR to automatically attach a task to its TI: when the task is invoked and allow multiple copies of a task to be invoked from a terminal.

10. Increase the functionality of the PDS indirect command processor to include features of Indirect MCR. In particular, symbolic parameters, conditional tests, and string manipulation are desired.

3.0 DEBUGGING TOOLS

11. Provide Fortran debugging tools for Fortran IV and Fortran IV Plus. The debugger tools should support breakpoints on source language statements and typeout/modification of variables.

12. Provide assembly language symbolic debugging tool with support for PDP-11 instruction mnemonics and local and global symbols.

4.0 DOCUMENTATION

13. Provide option for sites to purchase documentation in machine readable and/or microfiche form.

14. Provide documentation updates for new release as direct page replacements except when manual is rewritten.

15. Provide system logic manuals available for each release of all operating systems and continue to add topics to the manuals.

16. Completely document in the release notes the specific changes to the new release of an operating system. An alternative would be to use change bars to mark all new information in the documentation.

17. Provide a master reference manual for each operating system. Such a manual would contain summaries of all services provided by the system and its layered products. The manual would effectively contain all the appendices of the normal manuals.

18. Announce new manuals, particularly manuals released between operating systems, in the Software Dispatch and Multitasker.

19. Rewrite the RSX/IAS I/O Operations Manual with emphasis on more tutorial information for the first-time user and details of the RSX/IAS file system.

5.0 EDITORS

20. Provide a screen-mode, keypad editor with support for user-defined terminal types. The editor should make effective use of the operating system, terminal driver, and terminal features to minimize impact on the system.

21. Add enhancements to EDT. Specific features desired include adding support to EDT to get the terminal characteristics from the terminal driver rather than default to a specific terminal type, support for editor command files, and increased support for use of EDT on non-VT series terminals.

22. Add enhancements to EDI. Specific features desired include adding support for editing files with embedded carriage control (task maps, directories) and octal character/line dumps to allow non-printing characters to be displayed.

23. Support TECO as a Digital product in all RSX/IAS systems. At a minimum, distribute TECO with all RSX/IAS software kits.

6.0 EXECUTIVE SERVICES

24. Support RT-11 under RSX/IAS by providing RT-11 file system support, system library calls, and emulator package.

25. Provide more system pool space for RSX/IAS operating systems.

26. Provide more user task address space by supporting use of supervisor space for libraries and common areas and use of I/D space for user tasks.

27. Support use-written directives by documenting the executive directive interface and reserving directive codes for users.

28. Add option to return error on attach request (IO.ATT) if device is already attached.

29. Implement pipeline/psuedo terminal device support to allow task-to-task communication using the I/O mechanism and support for virtual terminals.

30. Support overlap disk seeks and disk I/O seek optimization.

7.0 FILE SYSTEM

31. Add modifications to BRU to increase its usefulness. Specific features desired include the ability to output BRU directories to a file, and a switch that causes BRU to require terminal action before continuing the next tape in a multiple tape operation, and support for tape-to-tape copies.

32. Provide system library routines that allow user programs to perform complete wild-card "find" operations. The routines should include support for wild-card directories and wild-card and character filenames.

8.0 HARDWARE

33. Offer "super" disk technology (> 300 MB) for RSX/IAS systems.

34. Offer Winchester disk technology in small disk drives (10-50 MB) for RSX/IAS systems.

9.0 IAS

35. Improve QUEUE facility. Specific features desired include user-specified banner pages, queue management by UIC and time-of-day, indication of size of print queue entries, and dynamic queue redirection to other queues.

36. Improve recovery from tape errors and provide clean means to abort tape I/O jobs.

37. Implement a console logging mechanism that includes time-stamping and console output to files.

10.0 LANGUAGES

38. Provide a RSX/IAS Pascal compiler.

39. Provide a RSX/IAS C compiler.

40. Provide a Fortran '77 compiler.

41. Eliminate syntax differences between RSX/IAS Fortran compilers (FOR/F4P).

42. Provide a cross reference facility for FOR/F4P.

43. Implement switch for FOR/F4P which causes the compilers to detect and flag non-ANSI syntax.

44. Add option to FOR/F4P to flag undeclared variables and mixed-mode variable usage. Also add option to perform parameter type checking on subroutine and function calls.

45. Have F4P distinguish between errors and warnings when it reports back to the user. This feature is already in FOR.

11.0 LAYERED PRODUCTS

46. Make all layered products available on all operating systems. In particular, support all of the RSX-11M layered products on RSX-11M Plus and support the major layered products on IAS.

12.0 RSX-11M

47. Implement batch facility for RSX-11M.

48. Increase support in RSX-11M for use in real-time and dedicated application environments. Specific emphasis is on maximizing system throughput and speed. If necessary, this would be at the expense of timesharing-type protections and features.

13.0 SOFTWARE SUPPORT

49. 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.

50. Raise the reliablity of patches published in the Software Dispatches to 100%. In addition, use standard patching practices for all products and make full use of patching tools.

51. Offer an emergency software problem service that would allow critical software problems and retractions to be reported to customers. The service would provide automatic notification to the customers.

52. Establish a method of publishing reported software problems. This would allow problems to be published before fixes are actually known.

14.0 SYSTEM ADMINISTRATION

53. Provide hooks into the RSX/IAS operating system to allow site-specific accounting to be performed. The enhancements would merely allow the information necessary for general-purpose accounting and system management to be collected.

54. Add support for system tuning by providing utilties to monitor system performance and allowing dynamic modification of parameters which affect performance.

55. Add support for disk quotas on a UIC basis. Support should allow separate LOGIN versus LOGOUT quotas.

56. Implement a standard method to declare the lines/page of a particular printer and modify all utilties to use this information. The method should support separate page sizes for each printer and allow operator control of the size.

15.0 SYSTEM GENERATION

57. Provide system generation procedures that allow generation of a new system online with the previous release of the operating system.

58. Modify RSX-11M SYSGEN procedure to allow the user to specify choice of editor to use and support CRF in base-line system.

59. Provide method for RSX-11M SYSGEN to produce loadable drivers with loadable data bases.

16.0 TERMINAL SERVICES

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

61. Implement auto-baud detection for local and remote terminal lines.

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

63. Add new features to the terminal driver. Specific features desired include option to set size of terminal typeahead buffer on a per terminal basis, option to set timeout on terminal input on a per terminal basis, and a switch to convert lower-case output to upper case.

64. Provide ability to set several terminal characteristics with one terminal command and to display all characteristics of a particular terminal.

17.0 UTILITIES

65. Standardize the user interface across utilities. Support continuation lines, use common filename specification, and standardize switch specification.

66. Support site selection of default utility switches by allowing defaults to be set in task build command file.

67. Modify editors and program development utlities to truncate output files.

68. Provide general purpose tape utility (ASCII/BCD/EBCDIC).

69. Provide utility that on-line will display the system data structures and status in a CDA-like notation.

70. Provide source maintenance utility that supports comparision of source files and merging of several sets of modifications into a source file.

71. Add option to CMP to ignore text following selectable comment character.

72. Add support to FLX to create directories when transfering files to RSX-11M systems.

73. Add support to PIP for selection on file access/creation dates (/BEFORE and /AFTER switches).

74. Add support to PIP for file selection on basis of lock bit or zero-length.

75. Support a version of TKB that uses memory-resident overlays.

76. Add support to FTB for mapping resident libraries and common areas.

1980 MENU RESULTS

The following tables present the 1980 Menu results. Note, the results listed include all ballots received, including ballots received after the cutoff date of September 15, 1980. However, DIGITAL's responses are based on the official total of 1210 ballots. The differences are minor.

The first page is various statistics on the voting. The next two pages are the voting totals listed by item. Within each category, the total votes and voting frequency is tabulated. Voting frequency is the percentage of ballots in the category that cast at least one vote for the item. The table also lists the rank of each of the six separate tabulation methods: total votes, total voting frequency, RSX-11M votes, RSX-11M voting frequency, IAS votes, IAS voting frequency.

The remaining tables are the totals of the various survey questions asked on the ballot. These tables include CPU and disk breakdowns, the choices for application and DIGITAL product line, and a summary of which layered products were named on the ballots. Finally, the last table covers which DECUS chapter the ballot was from.

TOTAL RSX-11M BALLOTS:	1060	80.5%
TOTAL RSX-11S BALLOTS:	55	4.2%
TOTAL RSX-11M+ BALLOTS:	30	2.3%
TOTAL 11M/11S/M+ CLASS:	1145	87.0%
TOTAL IAS BALLOTS:	131	10.0%
TOTAL RSX-11D BALLOTS:	40	3.0%
TOTAL IAS/11ID CLASS:	171	13.0%
TOTAL ALL BALLOTS CAST:	1316	100.0%

CLASS	BALLOT	VOTES	ITEMS	V/B	I/B	V/I
RSX-11M	1060	40095	21429	37.825	20.216	1.871
RSX-11S	55	2086	990	37.927	18.000	2.107
RSX-11M+	30	1168	580	38.933	19.333	2.014
IAS	131	5039	2434	38.466	18.580	2.070
RSX-11D	40	1533	844	38.325	21.100	1.816
TOTAL	1316	49921	26277	37.934	19.967	1.900

AVERAGE VOTES PER ITEM: 656.86
AVERAGE VOTING FREQUENCY: 26.27

TOTAL RESULTS

	TOTALS				RSX-11M CLASS				IAS CLASS			
ITEM	RANK	VOTES	RANK	FREQ.	RANK	VOTES	RANK	FREQ.	RANK	VOTES	RANK	FREQ.
1	50	473	62	15.6	51	408	62	15.7	42	65	58	14.6
2	21	795	19	32.6	24	669	21	31.6	14	126	14	39.2
3	46	502	45	23.7	47	436	45	23.9	41	66	42	22.2
4	3	1508	5	47.6	3	1304	3	48.7	5	204	12	40.4
5	14	937	21	31.9	12	908	17	35.5	63	29	66	8.2
6	49	473	43	25.1	46	445	37	27.4	64	28	65	9.4
7	16	859	12	37.2	15	797	11	38.9	43	62	34	25.7
8	51	455	40	25.4	50	419	38	26.8	57	36	54	15.8
9	68	251	69	12.5	66	232	65	13.6	69	19	72	4.7
10	72	196	73	8.1	73	63	73	4.1	13	133	20	34.5
11	1	2442	1	63.2	1	2057	1	61.6	1	385	1	74.3
12	30	715	26	30.0	30	632	24	30.7	35	83	35	25.1
13	58	395	51	20.4	57	341	53	20.4	47	54	48	19.9
14	41	581	28	29.9	43	464	35	28.5	20	117	15	39.2
15	10	1095	6	44.3	13	903	7	42.6	6	192	3	55.6
16	15	863	9	39.2	16	740	9	39.4	18	123	16	38.0
17	35	642	27	29.9	37	555	25	30.5	34	87	32	26.3
18	48	493	37	26.3	52	396	44	25.0	28	97	19	35.1
19	31	714	22	31.8	33	627	20	32.1	33	87	26	29.2
20	22	790	34	27.2	19	701	36	27.8	31	89	40	23.4
21	52	451	49	21.4	49	420	49	22.7	62	31	60	12.9
22	53	434	55	18.9	56	360	57	18.4	38	74	41	22.2
23	25	762	31	28.4	28	644	34	28.8	19	118	33	25.7
24	26	761	41	25.2	25	663	41	25.2	27	98	37	24.6
25	20	797	46	23.6	22	671	47	22.9	15	126	28	28.7
26	13	1032	23	31.2	14	821	31	28.9	4	211	6	46.2
27	40	611	38	25.8	36	563	40	26.6	50	48	46	21.1
28	29	722	33	27.7	20	683	30	29.5	56	39	57	15.2
29	8	1136	11	37.2	6	1033	12	38.5	26	103	31	28.1
30	12	1034	7	40.4	10	976	6	43.5	46	58	47	19.9
31	56	408	50	20.5	55	373	50	21.8	60	35	62	11.7
32	17	823	15	36.5	17	732	14	37.6	30	91	25	29.2
33	66	267	67	13.5	67	232	67	12.9	59	35	50	17.5
34	55	422	58	17.6	53	382	58	17.9	53	40	53	15.8
35	71	203	72	8.1	74	35	74	2.9	11	168	9	42.7
36	73	193	75	6.5	76	17	76	1.1	8	176	10	42.1
37	75	143	76	6.5	75	26	75	2.2	21	117	18	35.1

ITEM	TOTALS RANK	TOTALS VOTES	TOTALS RANK	TOTALS FREQ.	RSX-11M CLASS RANK	RSX-11M CLASS VOTES	RSX-11M CLASS RANK	RSX-11M CLASS FREQ.	IAS CLASS RANK	IAS CLASS VOTES	IAS CLASS RANK	IAS CLASS FREQ.
38	11	1061	18	33.4	9	992	16	35.7	40	69	49	17.5
39	39	619	56	18.8	34	602	52	20.7	70	17	70	6.4
40	5	1192	8	39.5	11	968	10	39.2	2	224	11	41.5
41	47	498	53	19.8	48	427	56	19.1	39	71	39	24.6
42	24	771	16	35.2	26	657	19	34.5	23	114	13	39.8
43	69	238	65	14.6	70	186	66	13.5	48	52	44	21.6
44	19	801	20	32.0	31	629	22	31.4	9	172	17	36.3
45	65	272	68	12.9	65	233	69	12.3	55	39	51	17.0
46	57	404	59	17.2	69	219	68	12.9	7	185	7	46.2
47	32	706	36	26.8	23	670	29	29.7	58	36	67	7.6
48	7	1168	14	36.6	5	1146	8	41.0	67	22	68	7.0
49	2	1591	4	47.7	2	1423	5	47.8	10	168	5	47.4
50	9	1110	13	36.9	8	993	13	37.6	22	117	23	32.7
51	44	515	47	23.2	45	457	46	23.5	45	58	45	21.1
52	28	728	17	34.8	29	641	18	35.3	32	87	24	31.6
53	33	699	30	29.6	35	590	33	28.9	24	109	21	34.5
54	4	1469	2	54.9	4	1250	2	54.7	3	219	2	56.7
55	38	628	42	25.2	38	546	42	25.2	36	82	36	25.1
56	60	330	60	17.2	60	290	60	17.5	54	40	56	15.2
57	43	549	44	25.0	40	517	39	26.6	61	32	59	14.0
58	74	147	70	9.7	71	144	70	10.8	76	3	75	1.8
59	36	640	35	26.9	32	629	26	30.3	74	11	74	4.1
60	61	325	57	17.7	58	313	54	19.7	73	12	73	4.7
61	45	504	54	18.9	44	463	55	19.4	52	41	52	15.8
62	37	638	39	25.5	41	514	43	25.0	17	124	29	28.7
63	64	280	63	15.5	62	268	61	16.8	72	12	69	7.0
64	42	567	29	29.8	42	509	28	29.9	44	58	27	29.2
65	34	643	25	30.4	39	538	27	30.0	25	105	22	33.3
66	63	293	61	16.6	61	273	59	17.6	68	20	64	9.9
67	54	430	48	22.7	54	380	48	22.8	49	50	43	22.2
68	27	752	24	30.9	27	657	23	31.3	29	95	30	28.7
69	23	776	32	28.3	18	701	32	28.9	37	75	38	24.6
70	67	255	66	13.7	64	242	64	14.8	71	13	71	6.4
71	76	101	74	6.8	72	78	72	6.1	66	23	63	11.1
72	59	332	52	19.9	59	305	51	21.0	65	27	61	12.9
73	6	1180	3	48.9	7	1017	4	48.2	12	163	4	53.2
74	18	806	10	37.9	21	682	15	36.9	16	124	8	44.4
75	62	296	64	15.3	63	248	63	15.3	51	48	55	15.2
76	70	229	71	9.4	68	224	71	10.7	75	5	76	0.6

CPU TOTALS

ITEM	TOTALS TOTAL	TOTALS %	RSX-11M CLASS TOTAL	RSX-11M CLASS %	RSX-11M CLASS 11M	RSX-11M CLASS 11S	RSX-11M CLASS M+	IAS CLASS TOTAL	IAS CLASS %	IAS CLASS IAS	IAS CLASS 11D
03	10	0.8	10	0.9	0	10	0	0	0.0	0	0
04	3	0.2	3	0.3	0	3	0	0	0.0	0	0
05	2	0.2	2	0.2	2	0	0	0	0.0	0	0
10	2	0.2	2	0.2	0	2	0	0	0.0	0	0
15	0	0.0	0	0.0	0	0	0	0	0.0	0	0
20	4	0.3	4	0.3	4	0	0	0	0.0	0	0
23	31	2.4	31	2.7	31	0	0	0	0.0	0	0
34	550	41.8	531	46.4	496	35	0	19	11.1	15	4
35	15	1.1	15	1.3	15	0	0	0	0.0	0	0
40	127	9.7	112	9.8	109	3	0	15	8.8	8	7
44	4	0.3	4	0.3	4	0	0	0	0.0	0	0
45	121	9.2	82	7.2	82	0	0	39	22.8	21	18
50	11	0.8	3	0.3	3	0	0	8	4.7	5	3
55	31	2.4	31	2.7	29	2	0	0	0.0	0	0
60	86	6.5	82	7.2	82	0	0	4	2.3	3	1
70	247	18.8	164	14.3	134	0	30	83	48.5	76	7
??	72	5.5	69	6.0	69	0	0	3	1.8	3	0

DISK TOTALS

ITEM	TOTALS TOTAL	TOTALS %	RSX-11M CLASS TOTAL	RSX-11M CLASS %	RSX-11M CLASS 11M	RSX-11M CLASS 11S	RSX-11M CLASS M+	IAS CLASS TOTAL	IAS CLASS %	IAS CLASS IAS	IAS CLASS 11D
RK05	297	22.6	273	23.8	272	1	0	24	14.0	8	16
RK06	81	6.2	73	6.4	73	0	0	8	4.7	6	2
RK07	84	6.4	84	7.3	84	0	0	0	0.0	0	0
RP02	20	1.5	8	0.7	8	0	0	12	7.0	12	0
RP03	41	3.1	31	2.7	30	0	1	10	5.8	6	4
RP04	84	6.4	52	4.5	49	0	3	32	18.7	22	10
RP05	13	1.0	9	0.8	7	0	2	4	2.3	4	0
RP06	105	8.0	64	5.6	57	0	7	41	24.0	36	5
RX01	7	0.5	7	0.6	2	5	0	0	0.0	0	0
RX02	2	0.2	2	0.2	0	2	0	0	0.0	0	0
RM02	43	3.3	38	3.3	38	0	0	5	2.9	5	0
RM03	93	7.1	75	6.6	58	0	17	18	10.5	16	2
RL01	217	16.5	216	18.9	216	0	0	1	0.6	1	0
RL02	15	1.1	15	1.3	15	0	0	0	0.0	0	0
NONE	45	3.4	45	3.9	0	45	0	0	0.0	0	0
????	169	12.8	153	13.4	151	2	0	16	9.4	15	1

APPLICATION (FIRST CHOICE)

ITEM	TOTALS TOTAL	TOTALS %	RSX-11M CLASS TOTAL	RSX-11M CLASS %	11M	11S	M+	IAS CLASS TOTAL	IAS CLASS %	IAS	11D
DATA A/D	220	16.7	207	18.1	170	33	4	13	7.6	5	8
DATA OTHER	188	14.3	169	14.8	163	5	1	19	11.1	15	4
PROCESS C.	118	9.0	105	9.2	88	13	4	13	7.6	5	8
PROG. DEV.	344	26.1	302	26.4	293	0	9	42	24.6	37	5
GRAPHICS	59	4.5	45	3.9	44	1	0	14	8.2	13	1
ANALYSIS	139	10.6	117	10.2	116	0	1	22	12.9	19	3
COMM.	59	4.5	48	4.2	42	2	4	11	6.4	10	1
TEXT PROC.	8	0.6	7	0.6	7	0	0	1	0.6	1	0
COMMERCIAL	82	6.2	58	5.1	52	0	6	24	14.0	17	7
DATA MANG.	34	2.6	26	2.3	24	1	1	8	4.7	6	2
OTHER	0	0.0	0	0.0	0	0	0	0	0.0	0	0
NONE	65	4.9	61	5.3	61	0	0	4	2.3	3	1

APPLICATION (ALL CHOICES)

ITEM	TOTALS TOTAL	TOTALS %	RSX-11M CLASS TOTAL	RSX-11M CLASS %	11M	11S	M+	IAS CLASS TOTAL	IAS CLASS %	IAS	11D
DATA A/D	357	27.1	334	29.2	287	42	5	23	13.5	13	10
DATA OTHER	474	36.0	410	35.8	376	29	5	64	37.4	49	15
PROCESS C.	316	24.0	293	25.6	249	37	7	23	13.5	10	13
PROG. DEV.	944	71.7	805	70.3	776	3	26	139	81.3	119	20
GRAPHICS	439	33.4	372	32.5	348	18	6	67	39.2	56	11
ANALYSIS	630	47.9	543	47.4	509	25	9	87	50.9	71	16
COMM.	387	29.4	319	27.9	292	11	16	68	39.8	46	22
TEXT PROC.	203	15.4	174	15.2	168	0	6	29	17.0	27	2
COMMERCIAL	193	14.7	152	13.3	139	0	13	41	24.0	33	8
DATA MANG.	204	15.5	153	13.4	147	1	5	51	29.8	39	12
OTHER	2	0.2	1	0.1	1	0	0	1	0.6	0	1
NONE	65	4.9	61	5.3	61	0	0	4	2.3	3	1

PRODUCT LINES (FIRST CHOICE)

ITEM	TOTALS TOTAL	TOTALS %	RSX-11M CLASS TOTAL	RSX-11M CLASS %	11M	11S	M+	IAS CLASS TOTAL	IAS CLASS %	IAS	11D
COMM. OEM	89	6.8	80	7.0	73	1	6	9	5.3	9	0
COMM. SER.	85	6.5	62	5.4	54	2	6	23	13.5	20	3
EDUCATION	45	3.4	37	3.2	34	1	2	8	4.7	7	1
ENG. SYS.	159	12.1	126	11.0	122	3	1	33	19.3	31	2
GOV. SYS.	93	7.1	75	6.6	72	1	2	18	10.5	15	3
GRAPH. ART	3	0.2	0	0.0	0	0	0	3	1.8	2	1
LAB. SYS.	284	21.6	251	21.9	231	16	4	33	19.3	20	13
MANUFACT.	199	15.1	180	15.7	151	26	3	19	11.1	6	13
MED. SYS.	11	0.8	9	0.8	9	0	0	2	1.2	2	0
TECH. OEM	144	10.9	140	12.2	138	1	1	4	2.3	4	0
TELEPHONE	29	2.2	27	2.4	23	1	3	2	1.2	2	0
WORD PROC.	4	0.3	4	0.3	4	0	0	0	0.0	0	0
OTHER	3	0.2	3	0.3	3	0	0	0	0.0	0	0
NONE	168	12.8	151	13.2	146	3	2	17	9.9	13	4

PRODUCT LINES (ALL CHOICES)

ITEM	TOTALS TOTAL	TOTALS %	RSX-11M CLASS TOTAL	RSX-11M CLASS %	11M	11S	M+	IAS CLASS TOTAL	IAS CLASS %	IAS	11D
COMM. OEM	116	8.8	101	8.8	92	3	6	15	8.8	15	0
COMM. SER.	121	9.2	92	8.0	84	2	6	29	17.0	26	3
EDUCATION	113	8.6	87	7.6	83	2	2	26	15.2	24	2
ENG. SYS.	253	19.2	216	18.9	207	8	1	37	21.6	35	2
GOV. SYS.	131	10.0	110	9.6	105	2	3	21	12.3	18	3
GRAPH. ART	31	2.4	26	2.3	26	0	0	5	2.9	4	1
LAB. SYS.	378	28.7	337	29.4	313	19	5	41	24.0	28	13
MANUFACT.	250	19.0	224	19.6	194	26	4	26	15.2	7	19
MED. SYS.	46	3.5	39	3.4	39	0	0	7	4.1	4	3
TECH. OEM	179	13.6	170	14.8	168	1	1	9	5.3	9	0
TELEPHONE	43	3.3	40	3.5	35	1	4	3	1.8	3	0
WORD PROC.	55	4.2	48	4.2	42	0	6	7	4.1	5	2
OTHER	3	0.2	3	0.3	3	0	0	0	0.0	0	0
NONE	168	12.8	151	13.2	146	3	2	17	9.9	13	4

LAYERED PRODUCTS (ALL CHOICES)

ITEM	TOTALS TOTAL	%	RSX-11M CLASS TOTAL	%	11M	11S	M+	IAS CLASS TOTAL	%	IAS	11D
BASIC-11	232	17.6	198	17.3	188	0	10	34	19.9	33	1
BASIC +2	120	9.1	107	9.3	94	0	13	13	7.6	11	2
COBOL-11	70	5.3	56	4.9	51	0	5	14	8.2	14	0
CORAL 66	24	1.8	24	2.1	24	0	0	0	0.0	0	0
FORTRAN 4	624	47.4	566	49.4	528	27	11	58	33.9	44	14
FORTRAN 4+	735	55.9	612	53.4	569	25	18	123	71.9	98	25
RPG II	9	0.7	8	0.7	7	0	1	1	0.6	1	0
PASCAL	188	14.3	176	15.4	166	3	7	12	7.0	10	2
"C"	72	5.5	71	6.2	67	0	4	1	0.6	1	0
EDI	921	70.0	789	68.9	764	1	24	132	77.2	109	23
EDT	546	41.5	496	43.3	477	1	18	50	29.2	50	0
TECO	548	41.6	479	41.8	454	2	23	69	40.4	54	15
DECNET	377	28.6	317	27.7	267	44	6	60	35.1	50	10
DBMS-11	19	1.4	11	1.0	9	0	2	8	4.7	8	0
RMS-11K	236	17.9	209	18.3	188	0	21	27	15.8	27	0
DATATRIEVE	168	12.8	144	12.6	134	0	10	24	14.0	24	0
SORT-11	238	18.1	183	16.0	164	0	19	55	32.2	50	5
2780	95	7.2	80	7.0	76	0	4	15	8.8	13	2
OTHER	78	5.9	74	6.5	66	4	4	4	2.3	4	0
NONE	78	5.9	73	6.4	67	6	0	5	2.9	4	1

LOCATIONS VOTING

ITEM	TOTALS TOTAL	%	RSX-11M CLASS TOTAL	%	11M	11S	M+	IAS CLASS TOTAL	%	IAS	11D
USA	877	66.6	752	65.7	693	43	16	125	73.1	106	19
EUROPE	301	22.9	280	24.5	264	8	8	21	12.3	12	9
CANADA	104	7.9	83	7.2	76	1	6	21	12.3	9	12
AUSTRALIA	28	2.1	25	2.2	22	3	0	3	1.8	3	0
S. AMER.	5	0.4	5	0.4	5	0	0	0	0.0	0	0
ASIA	1	0.1	0	0.0	0	0	0	1	0.6	1	0

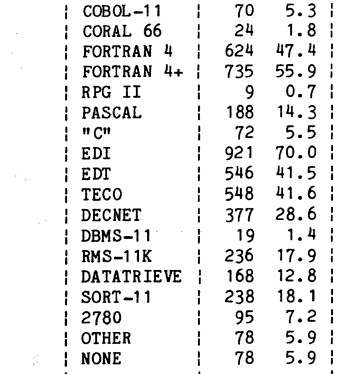
RSX-11M MULTIUSER TASKS

Eric Levy
Jet Propulsion Lab

The following trick has proven quite useful on our memory tight 11/55. Except for possibly RT-11 and DOS, RSX-11M is the only PDP-11 operating system which

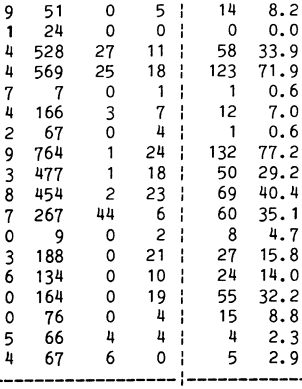
does not have automatic shared code for tasks. However, by using the LDLIB package in [344,51] of the Fall 1980 RSX SIG tape (submitted by James Downward) and a little magic one can simulate this feature.

First of all, this will only work with RSX-11M V3.2 since it now has the M+ task builder supplied (at least for now it does). The trick revolves around using the /MU switch (this is just the multiuser option from RSX-11D and IAS) and some task image hacking; so, one must be pretty familiar with task image formats:



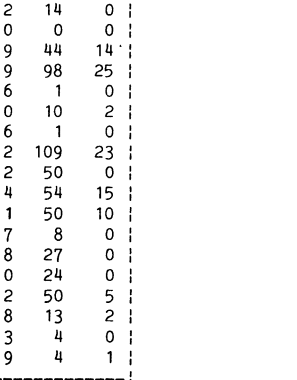
Disk task image built with /MU

-Figure 1-



Label block 0 of /MU task build

-Figure 2-



A resident common task image

-Figure 3-

In the above, figures 1 and 2 (figure 2 is a zoom in on label block 0 from figure 1) are the result of the following build file.

```
mutask/MU    = mutask
/
LIBR=FCSRES:RO
//
```

The /MU switch separates the read only psects from the read write ones and alligns the R/O code as high as it can in the task, taking into account the other libraries. In this case, FCSRES gets placed at 160000 (28K) and the R/O part just under it (starting on a 4K boundary). In this example and below, the R/O code is assumed to be between 4K and 8K in size, thus it requires two APR's and 8K of address space. This means that given the FCSRES, the next highest 8K starts at 120000 (20K).

The first step to make a RSX-11M multiuser task is to build the task with the /MU switch. Next, one builds a dummy resident library using the following source file and build command file.

```
.PSECT  taskro
.BLKB   size
.END
```

```
taskro/MM,,taskro/-HD/-PR=taskro
/
STACK=0
PAR=taskro:120000:size
//
```

The value of size is extracted from the map of mutask. You may want to make this a little bigger for later expansion. At this point we have a task image file which appears to link to 2 resident libraries. We also have two resident libaries, but only the library request for FCSRES is correct under RSX-11M. Here is where trickery comes into play.

Get out your file patching tool (either ZAP or anything else you may have lying around) and copy the 14 word FCSRES library request over top of the R/O library request (move (f) to (e)). Then zero the FCSRES request (f). Now the task image appears to only access the 1 library, but has the correct number of windows for LDLIB.

Using another file patcher you may need to write, copy the R/O code from (c) into (j), i.e. from the mutask into taskro. Note that the first two blocks from the resident common should not be altered. The TKB map file seems to incorrectly show where this R/O code is in the task image. However, the end of label block 0 contains two words which contain the 'relative block of R-O image' and the 'R-O load size'. This is documented on page B-5 of the TKB manual and are words 364 and 366 (octal) of block 1 in the task image. These words have no effect on RSX-11M but are used by the M+ install program.

Now if you place the library image (taskro.tsk and .stb) in LB:[1,1] (I was not able to reassign this for some reason???) and having modified your program to initially call LDLIB (see James Downward's package for instructions) a dynamic region will get loaded with your read only code and a send-by-reference will attach your multi-user task. Note that everything else in the task image is compatible with RSX-11M V3.2. The size of the task and the number of windows are correct. Install and the loader don't seem to be bothered by any M+ stuff and everything else just looks like a small task linking to FCSRES and dynamically attaching itself to a region.

There are of course some drawbacks to this. First the LDLIB routine sometimes can't find any contiguous memory to create a region and just quits. I have considered having the LDLIBS task try to checkpoint some stuff and retry, but haven't had the time to go further with this (the deadwood checkpointer in James' package only works on a patched version of RSX-11M). Also, the package could get stuck in a terrible place and cause deadlock. This ones a tough one, but its not impossible to build a priveledged task with at least as much smarts as the shuffler. This task could then move these commons around whenever one was no longer needed and leave a hole. It would probably require LDLIBS to some connect on exits so it could keep track of every task which is linked to all regions it loaded (lots of linked lists). However, this sounds like a job for DEC if you ask me.

Another solution to the deadlock problem is to make the resident library a real resident library in its own partition. This would be useful for highly used program's which are not overlayed. Someone out there must actually run some of their own stuff. In our case we have a text editor where we do this. What is done here is to create a dummy program (an .END statemnt is enough) that links

to our resident library so we can see what a real resident library request looks like. The we use the following build command file:

```
dummy=dummy
/
RESCOM=taskro/ro
//
```

Then, the libary request from dummy (there will be only 1) is copied directly into label block 0 at (e) in figure 2. In this case, one does not slide down the FCSRES request as there will be two legitimate library requests. As soon as you install the taskro common block in its own partition, you can then run the multiuser task.

On another matter, an object file was accidently deleted on one of our contributions to the SIG tapes last fall which causes a failure in the TKB process. In directory [301,42] is missing the file QIOSYM.OBJ which is just the extracted full duplex definitions for a QIO that I put on the tape so a RSX-11M V3.1 user could still build the program (without being able to use some of the screen editing capabilities). To build the various editors, just delete the reference to QIOSYM.OBJ from the build files. This editor with screen editing and some word processing capabilities for tele-ray and VT100's. Also, there are two documentation files: UED.D and TUT.D. The last one is pretty good.

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SURVIVAL GUIDE FOR SYMPOSIA

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DECUS Symposia can be overwhelming for first-timers. Normally there are twelve to fifteen parallel sessions for four full days. Most people are interested in attending more than one kind of session -- RSX/IAS, Networks, LSI-11, DBMS, VAX. How can you choose? Why come in the first place? And how do I get my questions answered?

DECUS Symposia are where you mingle with thousands of computer people, many of whom have your exact problem, but whom you would never meet except for a symposium. That's one excellent reason to come. Another reason is that you'll meet more DIGITAL personnel than you ever knew existed - product managers, developers, vice presidents, software documentation experts, etc. That's

fantastic! All those people to collar for answers. And they do try to answer your questions.

There is probably more DEC technical expertise gathered in one place than you have ever seen before. Once you have paid to come to the symposium, the expertise is given willingly. Users are happy to enlighten other people. Most go home with names and telephone numbers of good contacts and new friends. Remember, though, that most of the people you are meeting and exchanging information with are computer users like youself and are there to gather information from you and others also.

The planning for the Miami Symposium to be held 18-21 May, 1981 began immediately after the San Diego symposium last fall. The DECUS staff long ago did the initial logistical work; now the steering committees of the Special Interest Groups (SIGs) begin to plan the kinds of sessions they want to organize and present in Miami.

The RSX/IAS Steering Committee is a group of active volunteers who have varying amounts of experience. We are program managers, site managers, computer scientists, junior programmers, and company executives. We try to arrange a good mix of sessions, most of which are technically oriented, since our operating system SIG is dedicated mainly to dispersion of technical information. Since the majority of symposium attendees are "first-timers", we try to organize sessions that will satisfy the needs of these people while maintaining the interest of our repeat attendees.

With the hundreds of hours of sessions you want to attend and the thousands of people you want to talk with, how do you survive? Well, you probably came to the symposium for three reasons: to learn about new ideas and products, to get answers for the problems you are having, and to have fun meeting, dining, and relaxing with other computer people like you. Here are some hints to help you:

- Read the Meeting Program from cover to cover. The Meeting Program will be sent to you before the symposium. If not, you can pick one up when you register. In particular, the Meeting Program has abstracts for all the sessions and the session-at-a-glance diagram. A good trick is to read through the abstracts and highlight all sessions you find interesting. Then flip back to the session-at-a-glance and block out those sessions, marking the "must attend" especially. During the symposium, you will find it easy to select the next session to attend and you won't miss anything critical.

- If possible, link up with other people from your site or area and divide the sessions among yourself. After the symposium, you can fill each other in with the highlights of the entire symposium.

- Sit up front in the session rooms. You will hear the speaker much better, be able to see any graphics, and have quick access to handouts.

- Make sure you attend the RSX/IAS SIG Road Map and Opening Session on the first day. Here, any last minute changes will be announced. More importantly, all activities of the SIG will be covered and the key people in the SIG and from DIGITAL will be introduced. This will give you a chance to study their faces so you can find them later on.

- Don't forget the paper sessions or poster papers. You can learn many exciting new ideas from these sessions by listening to another user describe his solution to a problem similar to yours.

- Check the schedule boards in the main lobby periodically. Especially glance at the Birds-of-a-Feather (BOF) board for a session you might be interested in. BOF sessions are spontaneous sessions organized right at the symposium and can be the highlight of your trip.

- To get your questions answered, first make a list before the symposium of your questions. Then make sure you bring enough information with you to describe the problem. At the symposium, there are many places to get questions answered:

  - Software Clinic. This is the best place to get a specific technical question answered. The clinic is staffed with experienced users and DIGITAL developers and you can walk-in, talk one-on-one with someone, and walk-out.

  - Question and Answer Sessions. This is the best place to get general technical questions answered, particularly if you think the answer is of general interest.

  - Product Panels. Here you can question DIGITAL on policy issues, delivery dates, pricing, and other non-technical issues.

  - DIGITAL Suites. Most DIGITAL product lines staff suites where you can meet one-on-one with product managers and discuss the particular problems of your site.

  - Demonstration Area. This is another good place to meet and talk with DIGITAL people. Also, a great deal of literature is handed out at the various booths. There are two booths you should always visit. First is the Documentation area. Here, DIGITAL has all their manuals on display and for sale. It is your chance to examine manuals and often, buy a new manual which is hot off the presses. The other booth to visit is Software Services. Here you can check to see why you are not getting your Software Dispatches or other services. They have terminals which directly access the database DIGITAL uses for all subscription services.

  - RSX/IAS Campground. The campground is the place to go whenever you have a free moment. You will find others talking shop. Just pull up a chair and join in the conversation. Also, take some time to read the wall notices or post your own.

- Finally, leave yourself some free time. I realize this hint directly conflicts with the others and with sessions from 8:30 am to midnight is hard to do. But your best times at DECUS will be when you are just talking with other users in the campground, at the receptions, at lunch, or down by the ocean.

Next month, I will have a brief rundown of the sessions that will be organized at the Miami Symposium.