

# RSTS PROFESSIONAL

Volume 5, Number 1

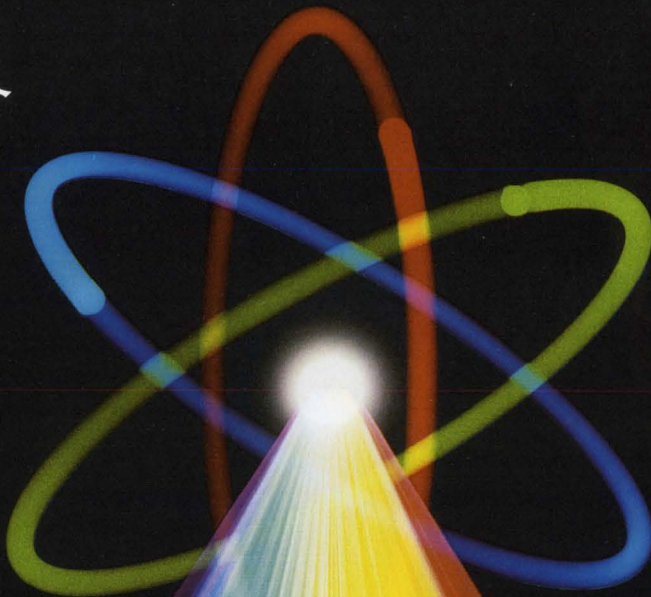
February 1983  
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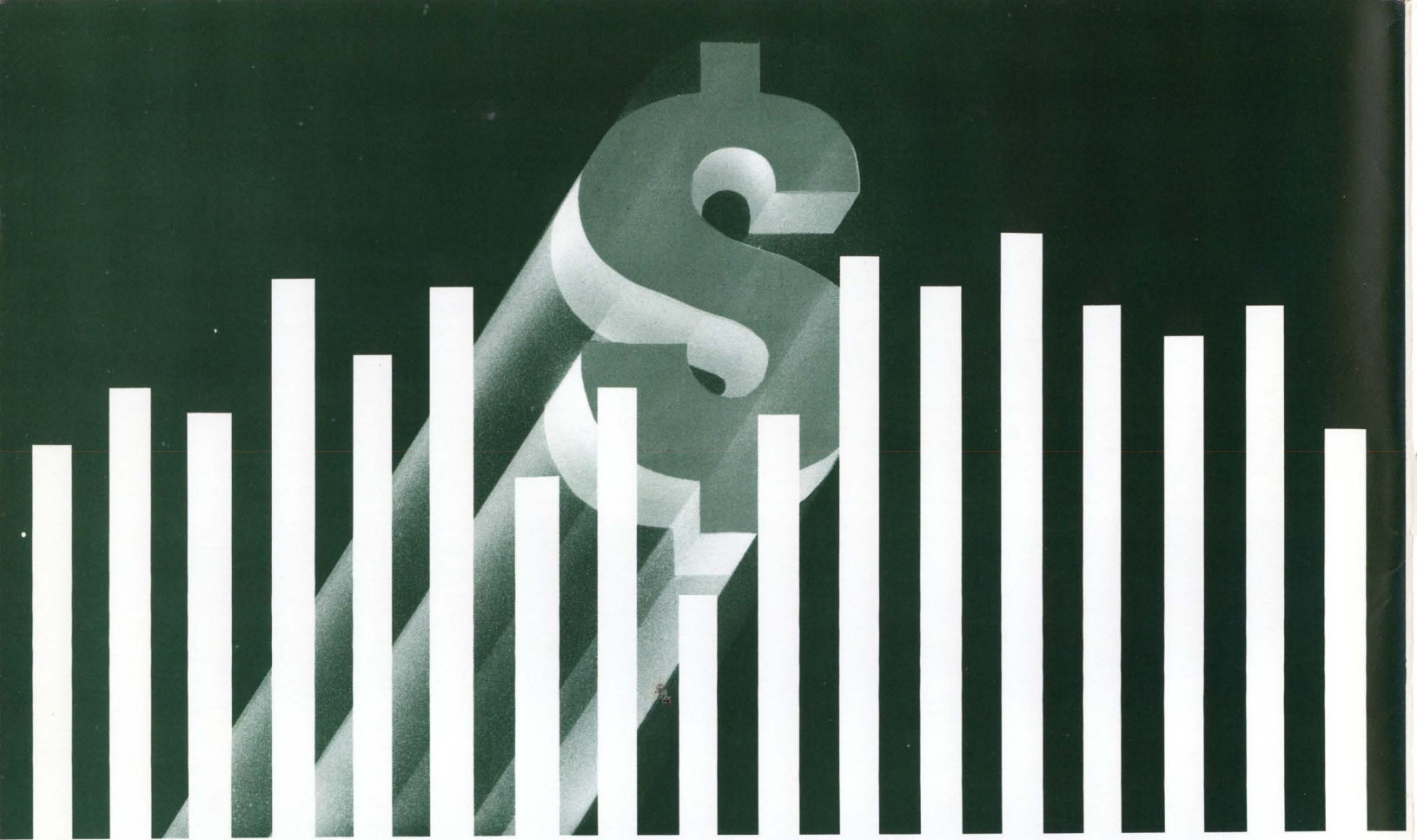
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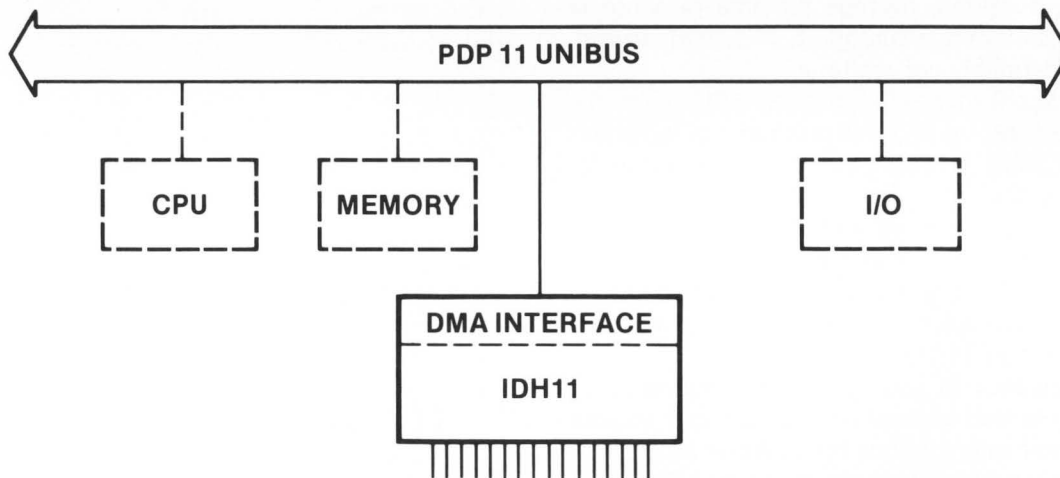
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name entry. The final section of the file is used to store the name blockettes. The minimum size of the file is, therefore, two blocks. A file capable of storing 1024 names must have a size of (only!) 37 blocks (1 block of header, 4 of PPN table, and 32 of name blockettes).

The primary entry for an account contains the name returned by UU.NME for a lookup by PPN function. Alias entries are used to translate "aliases" for the account to a PPN. Each account on the disk may have only one primary entry, but any number of aliases.

Since NAME.SYS resides on each disk with named directories, the same account name may exist across disks. The name translation is disk specific, and directory names do not imply devices. Therefore, DR1:[FOO] and DR2:[FOO] are different accounts, as are DR1:[1,2] and DR2:[1,2]. Also, DR1:[FOO] and DR2:[FOO] do not have to reference the same PPN — DR1:[FOO] could be DR1:[1,2] while DR2:[FOO] is DR2:[100,100].

Names are translated to PPNs via a small hash table, which contains pointers to a linked list of name blockettes. The numeric result of hashing a name is used as a pointer into the hash table. The linked list is chased to find the matching name blockette, and the PPN (and a user definable word) are returned.

PPNs are translated to names by scanning through a table of PPNs. When a match is found, the address of the matching PPN is used as an offset into the name blockette portion of the file to retrieve the correct name blockette. Zero words in the PPN table indicate entries which aren't in use.

Free name blockettes are kept in a linked list, the head of which is pointed to by a word in the first block of the file.

Users may translate directory names to PPNs via the .FSS call (file name string scan). The UU.NME call is used to go the other way; i.e., PPNs to names, as well as to add and delete entries from NAME.SYS.

I have located four bugs in the named directory code. The first two are really the same bug, but in two different places. As a result of this bug, translations from PPNs to names fail under certain conditions. The third bug is a nasty fencepost error, which causes a few (random) words of monitor memory after FIBUF to be RAD50-unpacked and returned as a

name. The fourth bug is an omission — the lookup code never validates the PPN, and the add/delete code doesn't check for wildcard PPNs.

The first bug works like this: The code to locate the passed PPN in the PPN table starts out at the top of the table, and with a count of the number of entries in the file. It steps through the PPN table, trying to find a match for the given PPN. Each time the PPN doesn't match the one in the table, the count is decremented. When the count becomes zero, the code assumes that all the entries in the table have been scanned, and returns a NOSUCH error.

This routine contains a serious logic error — it forgets to check for unused entries in the PPN table. If entries are added and deleted, eventually there will be holes in the table. The zero PPNs won't match the passed PPN, but the count will be decremented anyway. This means that some possibly matching entries will not be searched.

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The trivial fix for this is to add a check for the entry being zero. This causes complications, however, since alias entries occupy a name blockette, but have zero entries in the PPN table. A lookup call on a file containing only alias entries would read past the end of the PPN table, and possibly past the end of the file. Equate that to bad-news in your symbol table . . . Anyhow, my fix is to set the entries in the PPN table for aliases to -1, so that they can be distinguished from unused entries, yet won't be matched during a search by PPN.

The resulting word offset into the PPN table is used as an offset into the name blockette portion of the file. The fencepost error is in the conversion from a word offset to a block and byte offset. For some reason, the code is subtracting 512. (a block worth of bytes) from the byte offset, and counting how many times it can do this without carry. (Hey guys, ever hear of a DIV instruction? Yeah, it does the same thing as your little loop.) Anyhow, the branch after the compare is a BLOS. It should be a BLO. If this routine attempts to translate a name blockette index which is a multiple of 32., (512./16. bytes/blockette = 32. blockettes/block) the byte offset into FIBUF will be an incorrect 512., and whatever is after FIBUF in memory will be used as the name blockette. Whoops! The fix for this is quite simple — the BLOS becomes a BLO.

Finally, I've added a little code to verify that the PPN passed to UU.NME is valid. If not, the call will return a BAD-NAM error.

The patch for UU.NME is listed below. Unfortunately, there was no patch space available at the end of the NME module. I've used RSTS PATCH for the fix. This may conflict with existing or future DEC patches for V7.2. If anyone has any problems, contact me for instructions on how to move my patch elsewhere.

Also, please note that this is a patch to both OVR and a resident module. The patch to the resident module may be installed either on or off-line, but MUST be installed first. The patch to OVR should be installed off-line. One person installed my UU.TRM patch on-line, and then wondered why TTYSET crashed his system. If you install an OVR patch, it takes effect immediately (or when you snap OVR.SYS, if you have one). Since the patch to the resident module doesn't go into effect until the system is rebooted, the OVR patch will jump into null patch space and halt the processor. If you're not sure of what you are doing, install this patch OFF LINE!

Patch to RSTS module for UU.NME. May be installed on-line. MUST be installed before OVR patch.

```
File to patch? <LF>
Module name? RSTS
Base address? PATCH
Offset address? 234
Base Offset Old New?
?????? 000234 000000 ? MOV16402 ; PATCH1: Get the passed PPN
?????? 000236 000000 ? FQPPN ; FQPPN
?????? 000240 000000 ? BEQ116 ; none, default it
?????? 000242 000000 ? CMP12702 ; is it [0,1]?
?????? 000244 000000 ? 1 ;
?????? 000246 000000 ? BEQ111 ; yes, go on
?????? 000250 000000 ? SWAP102 ; Swap proj. and prog. number
?????? 000252 000000 ? BEQ116 ; Project was 0 and not [0,1] -- er
?????? 000254 000000 ? CMPB12702 ; is project 255.? (wildcard)
?????? 000256 000000 ? 255. ;
?????? 000260 000000 ? BEQ11 ; yep, error
?????? 000262 000000 ? SWAB102 ; Swap the bytes back
?????? 000264 000000 ? INCB102 ; is prog. number 255.? (wildcard)
?????? 000266 000000 ? BNE11 ; no, go on
?????? 000270 000000 ? TRAPBADNAM ; Error with illegal filename
?????? 000272 000000 ? ADD12705 ; Skip defaulting of PPN on return
?????? 000274 000000 ? 6 ;
?????? 000276 000000 ? RTS105 ; Get out
?????? 000300 000000 ? INC105 ; PATCH2: Bump index into PPN table
?????? 000302 000000 ? TST161 ; Was last entry free?
```

```
?????? 000304 000000 ? -2. ;
?????? 000306 000000 ? BEQ12 ; yes, so don't decrement count
?????? 000310 000000 ? DEC100 ; Decrement the count of names
?????? 000312 000000 ? RTS107 ; and get out
?????? 000314 000000 ? CLZ ; Make sure we don't take the branch
?????? 000316 000000 ? RTS107 ; Get out
?????? 000320 000000 ? ADC103 ; PATCH3: 2nd half of double prec.
?????? 000322 000000 ? MOV16100 ; Get number of entries in file
?????? 000324 000000 ? 10 ;
?????? 000326 000000 ? RTS107 ; and get out
?????? 000330 000000 ? CMP16421 ; PATCH4: does this entry match PPN
?????? 000332 000000 ? FQPPN ;
?????? 000334 000000 ? BNE11 ; no, go on
?????? 000336 000000 ? RTS105 ; Get out
?????? 000340 000000 ? TST125 ; Skip branch
?????? 000342 000000 ? TST161 ; Was last entry a free entry?
?????? 000344 000000 ? -2. ;
?????? 000346 000000 ? BNE12 ; no, just get out
?????? 000350 000000 ? ADD12705 ; Skip the decrement and branch
?????? 000352 000000 ? 4 ;
?????? 000354 000000 ? RTS105 ; Get back, get back, da da da...
?????? 000356 000000 ? TST164 ; PATCH5: is this a primary add?
?????? 000360 000000 ? FQPPN-FQNAM1 ;
?????? 000362 000000 ? BNE11 ; yes, go on
?????? 000364 000000 ? MOV12764 ; Insure that PPN is updated as -1
?????? 000366 000000 ? -1 ;
?????? 000370 000000 ? FQPPN-FQNAM1 ;
?????? 000372 000000 ? RTS105 ; Return
?????? 000374 000000 ? TST125 ; Skip branch
?????? 000376 000000 ? RTS105 ; and return
?????? 000400 ?????? ? ^C ; Up-arrow C to exit
```

Patch to OVR for UU.NME. Should be installed OFF LINE!

```
File to patch? <LF>
Module name? OVR
Base address? NME0
Offset address? 202
Base Offset Old New?
?????? 000202 005764 ? JSR1537 ; Call patch space @ PATCH1
?????? 000204 000006 ? PATCH+234 ;
?????? 000206 001002 ? ^Z ;
Offset address? 370
Base Offset Old New?
?????? 000370 005205 ? JSR1737 ; Call patch space @ PATCH2
?????? 000372 005300 ? PATCH+300 ;
?????? 000374 001406 ? ^Z ;
Offset address? 504
Base Offset Old New?
?????? 000504 101404 ? BLO1(QA377) ; Change BLOS to BLO
?????? 000506 162705 ? ^Z ;
Offset address? 676
Base Offset Old New?
?????? 000676 026427 ? NOP ; Blaast old PPN checking code
?????? 000700 000006 ? NOP ;
?????? 000702 000001 ? NOP ;
?????? 000704 001404 ? NOP ;
?????? 000706 105764 ? NOP ;
?????? 000710 000007 ? NOP ;
?????? 000712 001001 ? NOP ;
?????? 000714 104422 ? NOP ;
?????? 000716 004537 ? ^Z ;
Offset address? ^Z
Base address? ^Z
Module name? ^Z
File to patch? ^Z ; It is important to Z back to this
File to patch? <LF> ; question!
Module name? OVR
Base address? NME1
Offset address? 154
Base Offset Old New?
?????? 000154 005503 ? JSR1537 ; Call patch space @ PATCH3
?????? 000156 016100 ? PATCH+320 ;
?????? 000160 000010 ? BEQ117 ; No names, so no PPN table scan
?????? 000162 004737 ? ^Z ;
Offset address? 172
Base Offset Old New?
?????? 000172 026421 ? JSR1537 ; Call patch space @ PATCH4
?????? 000174 000006 ? PATCH+330 ;
?????? 000176 001421 ? BRI(QA377) ; File exists, error
?????? 000200 005300 ? ^Z ;
Offset address? 266
Base Offset Old New?
?????? 000266 105764 ? JSR1537 ; Call patch space @ PATCH5
?????? 000270 000016 ? PATCH+356 ;
?????? 000272 002002 ? BRI(QA377) ; Not a primary entry, go on
?????? 000274 052715 ? ^Z ;
Offset address? 410
Base Offset Old New?
?????? 000410 002044 ? NOP ; Insure PPN table is always update
?????? 000412 010502 ? ^Z ;
Offset address? ^Z
Base address? ^Z
Module name? ^Z
File to patch? ^Z
```

I'd like to thank Mark Hartman, the RSTS SIG Librarian, for descriptions of his troubles with the named directory code, and also for his NMEMGR program to manage NAME.SYS. If you are still not sure how to sysgen or use named directories, take a look at the Fall 1982 (Vol. 9 No. 2) RSTS SIG newsletter. (Yes, it's actually being printed again!) Mark has a nice article with instructions on how to sysgen and use named directories. Also, he tells me that his NMEMGR program should be on the Fall (Anahiem) RSTS SIG tape. A few notes on his article: 1) The disk name for UU.NME does in fact default to the system disk for lookups — just not for adds or deletes. 2) The NMEMGR INIT command does not create a space efficient NAME.SYS. The



recommended 64. block file is large enough for almost 1800 names, but NMEMGR writes the maximum count as 800. Ideally, the command should create the smallest file capable of holding a specified number of names. 3) NMEMGR has a minor bug in the WHO command — it forgets to tack the current device on to the string to be FSS'd. This is easily fixed. Again, thanks Mark!

## CONCLUSION

Next month, look out for some hidden mode bits in UU.MNT, the results of more testing of named directories, and how to get FMS FDV to display VT100 graphics.

If you aren't up to keying in these patches, send \$20.00 to IISI (Attn:MCG) and we'll send you a tape of the patch command files, plus ONLRES, the load average stuff, and all the other goodies from the previous months. Hurry, though, because all of this stuff is starting to fill the small tape . . . Please specify 800 or 1600bpi.

I hope you have enjoyed this installment of the RSTS Crystal Ball. I will continue to try to present information which is interesting and useful. If you have any questions, gripes, or suggestions, call or write to me.

Until next time, JRST WIN!

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# EDITING SYSTEMS

David Spencer, Infinity Software Corporation

## ONLPAT Commands

One of the most frequently used and least documented programs that can be found on the RSTS/E distribution kit is ONLPAT. Anyone who has installed patches from either Digital or other software vendors is likely to have come in contact with it. In this article I will attempt to document as best as possible this wonderful system tool.

### 1.0 ORIGINS OF ONLPAT

The program we call ONLPAT is also something called INIPAT. INIPAT is the PATCH option found in the list of commands available from INIT.SYS when the system is "down." Like the disk INICLN "clean" code in INIT that became ONLCLN, ONLPAT is actually INIPAT with special I/O routines to allow it to operate in timesharing mode. Therefore all commands documented here should be identical to those in the INIT counterpart.

### 2.0 PURPOSE OF ONLPAT

ONLPAT is intended for use in patching SILs, Save Image Libraries. These are files like the RSTS/E monitor and other pieces of code like PIP that have been run though SILUS or MAKSIL.

However ONLPAT does not restrict you to using it on files with symbol tables. It is in fact capable of being used to modify any type of file.

(For those interested in symbol table layouts see either the MAKSIL source or Mike Mayfield's RSTS/E Monitor Internals manual.)

### 3.0 USING ONLPAT

During the SYSGEN process ONLPAT is copied to the system disk in account "[1,2]". The system build command files leave it there because it is intended to be used later by the automated patch facility and/or system managers who wish to enter patches from the Software Dispatch by hand before they receive their tape(s).

In this article I will discuss both the interactive and command file modes of ONLPAT.

First, let's look at a simple ONLPAT session and identify the various questions and options available.

```
RUN $ONLPAT
Command file name? <1f>
File to patch? <1f>
File found in account [0,1]
Module name? RSTS
Base address? ..CAGE
Offset address? 0
Base   Offset Old   New?
132544 000000 000010 ? 7 ; New cache age
132544 000002 103656 ? ^C
Patch complete
```

```
1 patch installed
```

```
Command file name? ^Z
```

```
Ready
```



#### 4.0 COMMAND FILE NAME

The first thing ONLPAT asks for is a command file name. Entering a line feed or carriage return will instruct ONLPAT that you wish to use it interactively. (I will be discussing command files later on.)

#### 5.0 FILE NAME

Either a filename or a line feed is acceptable. A line feed translates to the name of the currently installed monitor SIL. If the filename entered with a "/N" switch, this tells ONLPAT not to attempt to find the symbol table. Normally this switch is not necessary. ONLPAT looks to see if the file is in SIL format and disables symbolic patching if it is not. The only time you might want to use this switch is when you are attempting to patch a SIL and want direct access to locations in the file.

If no PPN is specified with the filename, ONLPAT checks the current account for the file. If it cannot be found there, it looks on account "[0,1]". Thus if you have a file with the same name in both your account and in "[0,1]", you must explicitly enter the correct account number with your filename.

#### 6.0 MODULE NAME

If the file you opened is a SIL and it also has multiple modules, then you can get a directory of the module names by either entering a "?" or a carriage return.

```

Command file name? <lf>
File to patch? <lf>
File found in account [0,1]
Module name? ?
Directory of SIL:
Name  Ident  Load  Size  Transfer  Total
RSTS  07.111  000000  133000  000001  23K
CRA   07.111  120000  002500  000001  24K
XVR   07.111  120000  006100  000001  25K
FMS   07.111  120000  010700  000001  28K
EMT   07.111  120000  015000  000001  31K
GEN   07.111  120000  013200  000001  34K
TER   07.111  120000  027200  000001  40K
DSK   07.111  120000  005200  000001  41K
FIP   07.111  140000  007000  000001  43K
OVR   07.111  002000  101000  000001  59K
DEFAULT 07.111  001000  002000  000001  59K
Enter the name of the module in the SIL to be patched:

```

ONLPAT will accept only one of the module names listed in the directory. If a line feed is typed then ONLPAT uses the name of the first module in the directory.

#### 7.0 BASE ADDRESS

For the base address one of two things is possible. First, a number may be entered for an absolute address into the module. The other option is to enter the name of a global symbol from the symbol table. ONLPAT finds the symbol and uses the value found with the symbol for the base address.

(Typically a global symbol references the starting address of a routine or a word of data. All through the monitor there are routines that are called and usually the name is the global symbol. Also in the monitor there are many words of data, such as the caching age shown in the first example, that can be modified to tune system performance.)

The base address may be entered with an optional argument delimited with a colon. The format is "x:y". If the file is a SIL then "x" and "y" can be either the module name and the overlay number, or the module number and the address of the overlay.

For those files that are not SILs, "x" is the block number minus one in the file, and "y" is the offset in the block. The reason "x" is the block minus one is that ONLPAT begins counting at zero and not one.

#### 8.0 OFFSET ADDRESS

The offset address is much like the base address. It can be either a number or a symbol name. Line feed is also acceptable; if used ONLPAT starts with offset zero.

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```

000000 000023 000 ? <lf>
000000 000024 000 ? ^Z
Offset address? 0
Base Offset Old New?
000000 000000 044127 ? /D ; Try decimal word mode
000000 000000 18519. ? /% ; Get Rad-50
000000 000000 %KV9 ? /' ; How about printable text
000000 000000 "WH ? <lf>
000000 000002 "O ? <lf>
000000 000004 "BA ? <lf>
000000 000006 "R ? ^Z
Offset address? 102
Base Offset Old New?
000000 000102 000144 ? @ ; Change base address
Offset address? 102
Base Offset Old New?
000144 000102 000000 ? ^Z
Offset address? ^Z
Base address? 0
Offset address? 102
Base Offset Old New?
000000 000102 000144 ? @@ ; Use location as offset
Base Offset Old New?
000000 000144 000000 ? @@100 ; Set offset manually
Base Offset Old New?
000000 000100 000100 ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
Patch complete - no modifications requested
0 patches installed

Command file name? ^Z
>

```

The two things demonstrated here were the various flavors of byte and word mode, and the use of the "at" sign for indirection.

Byte mode has several modifiers that change the display for the byte locations. Entering a backslash (" \ ") and optionally an "O" for octal opens byte rather than word locations for display and possible modification. If you add a "D" after the backslash, the values of the byte locations are displayed in decimal instead of octal. If a single or double quote follows the backslash, locations that are printable ASCII are displayed in their character format.

Word mode is like byte mode except that, obviously, it works on entire words. The options for the backslash are the same as byte mode. In addition, there is the percent sign modifier. This performs the display in radix-50.

If a word mode command is entered on an even boundary while in byte mode, ONLPAT will switch back to word mode.

The "at" command has three flavors. The first way it can be used is by itself. This changes the base address to the value of the current location and prompts for the offset address. The second way the "at" sign can be used is by doubling it. This takes the value of the current location and uses that as the new offset. The last way the "at" sign may be used is by entering two and following them by a number. This number becomes the new offset address.

### 11.0 ONLPAT DOES MATH! (and other wonders)

Yes, ONLPAT can perform magic. The following are some brief examples of the neat things ONLPAT can do.

```

>RUN $ONLPAT
Command file name? <cr>
File to patch? FOO.BAR
Base address? 0

```

```

Offset address? 0
Base Offset Old New?
000000 000000 044127 ? 100=
Value = 000100, 64.
000000 000000 044127 ? 2+2=
Value = 000004, 4.
000000 000000 044127 ? 5-2=
Value = 000003, 3.
000000 000000 044127 ? 2*3=
Value = 000006, 6.
000000 000000 044127 ? 7/2=
Value = 000003, 3.
000000 000000 044127 ? 7\2=
Value = 000001, 1.
000000 000000 044127 ? 114=
Value = 000005, 5.
000000 000000 044127 ? 2&3=
Value = 000002, 2.
000000 000000 044127 ? 2#3=
Value = 000001, 1.
000000 000000 044127 ? 2^3=
Value = 000020, 16.
000000 000000 044127 ? ^C
Patch complete - no modifications requested
0 patches installed

```

```

Command file name?
>

```

The first thing you might have noticed is that you can get ONLPAT to print the value of expressions with a suffix of an equal sign. As shown above, ONLPAT gives the value in both octal and decimal.

Most of the math symbols are pretty obvious. A "+" is add, "-" is subtract, "\*" is multiply, and "/" is divide. A backslash returns the remainder of divide. A "!" produces a logical "or" of the two numbers. A "&" returns the logical "and" of the two numbers. Using a "#" gives you a logical "xor"; otherwise known as exclusive or. The strangest one of all is the caret ("^") which performs an arithmetic shift (in MACRO-11 the ASH instruction). The first number is rotated to the left "n" times, "n" being the second number. (If the second value is negative then the shift will be to the right instead.)

### 12.0 ONLPAT UNDERSTANDS CONSTANTS

Besides being able to perform math, ONLPAT can also return values for constants and special variables.

```

>RUN $ONLPAT
Command file name? <cr>
File to patch? FOO.BAR
Base address? 0
Offset address? 10
Base Offset Old New?
000000 000010 046102 ? .=
Value = 000010, 8.
000000 000010 046102 ? Q=
Value = 046102, 19522.
000000 000010 046102 ? MOV=
Value = 010000, 4096.
000000 000010 046102 ? ADD=
Value = 060000, 24576.
000000 000010 046102 ? .FSS=
Value = 104064, 34868.
000000 000010 046102 ? .WRITE=
Value = 104004, 34820.
000000 000010 046102 ? ^C
Patch complete - no modifications requested
0 patches installed

Command file name? ^Z
>

```

ONLPAT has two special variables that it maintains. These are the dot variable (".") and the "Q" variable. Dot is equal to the sum of base address and the offset address. "Q" is equal to the value of the currently opened location.

ONLPAT has an internal database of values for PDP-11 instructions, and RSTS EMT's, UUU's, and various other RSTS specific things like FIRQB and XRB. Using this facility, patches can be created that look very much like MACRO-11 code. (Rifle through some back issues of the RSTS Professional. Persons like Michael C. Greenspon have a tendency to use this function of ONLPAT to its fullest.)

**13.0 OTHER WEIRDNESS**

ONLPAT has some more interesting numerical evaluations on its sleeve . . .

```
>RUN $ONLPAT
Command file name? <cr>
File to patch? F00.BAR
Base address? 0
Offset address? <lf>
Base   Offset Old   New?
000000 000000 044127 ? 100<200=
Value = 000001, 1.
000000 000000 044127 ? 100>200=
Value = 000000, 0.
000000 000000 044127 ? 100<=200=
Value = 000001, 1.
000000 000000 044127 ? 100>=200=
Value = 000000, 0.
000000 000000 044127 ? 100<>200=
Value = 000001, 1.
000000 000000 044127 ? 100=200=
Value = 000000, 0.
000000 000000 044127 ? "FO?
Verification error
Patch complete - no modifications requested
0 patches installed

Command file name? ^Z
>
```

As you can see, ONLPAT can take two numbers and compare them against each other. If the comparison is true, then a one is returned. If the comparison is false, then a zero is returned.

The last line shows off the question mark command of ONLPAT to compare an expression against the open location. If the test is false, which is the case here since that word actually contains the text "WH", the patch is aborted. A very useful verification tool.

**14.0 COMMAND FILES**

At this point, explaining command files becomes not much more than a trivial task. This is because command files are essentially formatted logs of previous interactive patch sessions.

Consider the following command file to change the cache age of the RSTS monitor.

```
File to patch? <lf>
Module name? <lf>
Base address? ..CAGE
Offset address? 0
Base   Offset Old   New?
?????? 000000 000007 ? 7   ; New cache age
?????? 000002 ??????? ? ^C ; Patch complete
```

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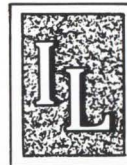
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That's all there is to it. Now watch what happens when this patch is applied with ONLPAT.

```
>RUN $ONLPAT
Command file name? EXAMPL.CMD
File to patch? <LF>
File found in account [0,1]
Module name? <LF>
Base address? ..CAGE
Offset address? 0
Base Offset Old      New?
132544 000000 000007  ? 7
132544 000002 103656  ? ^C
```

Patch complete

1 patch installed

```
Command file name? ^Z
>
```

**15.0 COMMAND FILE FORMAT**

As said above, the command file looks like an interactive patch session. An easy way I've found to create command files is to run \$ATPK, type the input, and edit the log later to create the command file.

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The command file must look nearly exactly like an interactive session. The text of the questions must appear along with the responses. (The text may be in any mix of upper and lower case though.) Any line that contains a line feed must have as the input for that line the text "<LF>". All control characters are represented as carrets and the letter. The only external input possible is the name of the file to patch, which ONLPAT will ask for from the keyboard if neither a name nor the text "<LF>" appears.

**16.0 QUESTION MARK USAGE**

ONLPAT normally checks the base address, offset address, and contents of the locations to verify that they are the same. This can be selectively disabled by using question marks in those fields that might float or otherwise be different.

The following is a listing of a command file that will fail because some values will not match those in the monitor. Notice the use of question marks in place of values that might change and that they are indeed accepted.

```
File to patch? <LF>
Module name? <LF>
Base address? ..CAGE
Offset address? 0
Base Offset Old      New?
?????? 000000 000070  ? 7 ; The old must be 70
123456 000002 103656  ? ^C ; Look at base address
```

And now the session log . . .

```
>RUN $ONLPAT
Command file name? FAIL
File to patch? <LF>
File found in account [0,1]
Module name? <LF>
Base address? ..CAGE
Offset address? 0
Base Offset Old      New?
132544 000000 000007  ? Old<>000070 7
132544 000002 103656  ? Base<>123456 ^C
Patch complete - no modifications made
```

0 patches installed  
1 patch skipped

```
Command file name? ^Z
>
```

Comments are of course harmless in the text and very useful for explaining what is happening. As with MACRO code, I use and recommend them.

By far the best examples to read are the MONITR.CMD and other ONLPAT command files that appear on the patch kit tapes.

**17.0 CONCLUSION**

In closing I'd like to say that I hope that now some of the mystery of ONLPAT has been taken away from it perhaps more people will begin to appreciate ONLPAT and use it more often. I find it is an easy tool to use and a lot of fun to play with too. I hope you will find it so as well.

Many thanks to those who have read my work and responded. I wish you all many happy edits.





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# PRIVATE DELIMITERS

By David Patterson, Sivall's, Inc., Odessa, TX

With the release of RSTS V7.1 DEC gave us a new goodie called multiple private delimiters. These delimiters are local to a job, not a keyboard and are automatically cleared whenever the job enters a monitor wait (negative wait time). Being the hacker I am, I started playing with them as soon as I had a chance. The first thing I did was write a MACRO subroutine so that I could set and clear them from BASIC +2. During the debugging of this routine, I discovered that BP2's debug module can't handle the delimiters. This is not surprising since it was written some time before multiple private delimiters were set up. It is, however, rather frustrating so I came up with a patch for the user entry module that \$DEBUG uses. While I was working on this, I discovered another problem, this one with the .SPEC directive to read the delimiters. It's actually just a documentation error. If no delimiters are set and a read subfunction is executed, an error 5 (NOSUCH) will be returned in byte zero of the FIRQB.

## DELIMI.MAC

This is a BP2 callable subroutine that will set or clear a job's private delimiters. It has two entry points: SETDEL and CLRDEL.

**SETDEL:** This is the entry point to set the delimiters. It has two optional arguments, a string containing the characters to be used as delimiters and the channel to set them for. See the listing for details about the calls. The default delimiters are defined at label MASK; and currently consist of all characters except CTRL/S and CTRL/Q (this allows synchronization to work correctly). To change the default just alter the bit mask as required (see the system directives manual, .SPEC directive).

**CLRDEL:** This is the entry point to clear the delimiters. It has one optional argument, the channel number.

The default channel for both calls is zero.

## PAT000.MAC

The module that is being patched is \$STPDB. This module handles the user input for both \$DEBUG and \$STP (the stop thread), and who knows what else. Since we only want the patch to effect debugging, the first thing it does is to check for the presence of DEBUG. If it's not there everything continues as usual. If DEBUG is present, the patch saves the current delimiters, clears the delimiters, does the user input, and then restores the saved delimiters. This prevents DEBUG from trying to parse each character as a complete command.

What we have done at our installation is to put a patched version of the object module on LB: and to refer to

it whenever we are debugging a program that uses private delimiters. For those of you who like to muck with the libraries, you can just replace the module in the BP2COM library but remember, DEC tends to frown on that. My apologies to those of you who use the BP2 resident library. We don't even have it on our system at present because we use RMS heavily and the 32KW limit won't allow the use of both RMS and the BP2 reslib. So, I haven't had an opportunity to play with it.

An example of installing and using the patched .OBJ file: (The checksums are valid)

```
MAC PAT000=PAT000 ; The patch file.
LBR TEMP=LB:BP2COM/EX:$STPDB ; The needed module.
PAT STPDB=TEMP/CS:131101,PAT000/CS:53335 ; Patch it.
PIP LB:<40>=STPDB.OBJ ; Put it where you can use it.
```

```
OLD EXAMPL
COMPILE/DEBUG
BUILD EXAMPL, LB:STPDB
TKB @EXAMPL
```

EXAMPL will now run with private delimiters and still allow you to debug it.

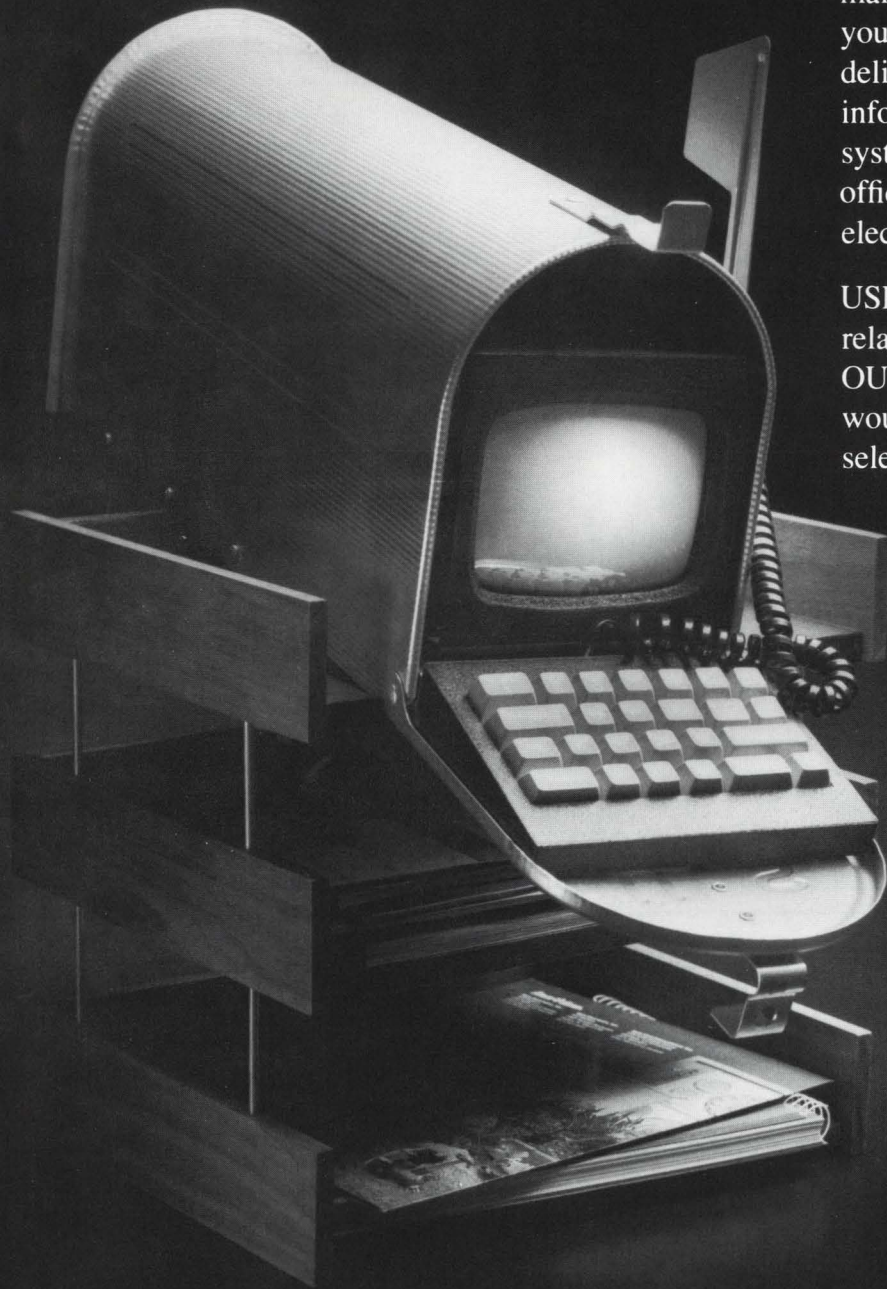
```
.nlist bin
.nlist bex
.nlist me
.list ttm
.enabl lc

title DELIMITER,<Private delimiter subroutines>,01,11-Nov-82,<DMP>
.sbttl Comments and edit history.

;
; Module name: DELIMI
; Date Written: 08-Sep-82
; Author: David Patterson
; Installation: Sivalls, Inc.
;
; Remarks:
; This module contains two entry points; SETDEL
; and CLRDEL. These two routines control the
; multiple private delimiters for the user.
; These routines are callable only from BP2 at
; this time and are called as follows.
;
; CALL SETDEL ! Set default delimiters on chn 0%.
; CALL SETDEL(A$) ! Set A$ as delimiters on chn 0%.
; CALL SETDEL(" ",N%) ! Set default delimiters on chn N%.
; CALL SETDEL(A$,N%) ! Set A$ as delimiters on chn N%.
;
; CALL CLRDEL ! Clear delimiters on channel 0%.
; CALL CLRDEL(N%) ! Clear delimiters on channel N%.
;
; Linking instructions:
;
; Compile this routine with MAC, (MAC DELIMI=COMMON,DELIMI).
; Edit your ODL file to contain a reference to this routine
; (USER: .FCTR SY:filspec-DELIMI-LIBR).
; or include it in the BUILD command (BUILD filspec,DELIMI).
; Task build as usual.
;
; Disclaimer:
;
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; the author or Sivalls, Inc.
;
; Modification History:
;
; Ver/Edit Date Modification
;
; 00 08-Sep-82 Initial conception (DMP).
; 01 11-Nov-82 Cleanup for release (DMP).
;
; .page
; .sbttl Global symbols.
;
; .globl setdel
; .globl clrdel
;
; .page
; .sbttl Code area.
;
; .psect sisubs,rw,i,lcl,rel,con ; Sivalls private subroutines.
```



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```

setdel: call  clrxrb      ; The Set delimiter entry point.      .title $STPDB                ; PAT000.MAC
inc         xrb+1#      ; Function = 1 (set).             .ident /DMP000/
mov        #mask,xrb+4 ; Default mask (all but ^Q & ^S). .psect BP2OTS
clr        r0          ; Default channel is 0.
tst        (r5)        ; Any arguments?
beq        dospec      ; Nope. Assume default on channel 0. ; Patch to allow DEBUG to work with a program that uses
mov        2(r5),r0    ; Yep get the string header.      ; multiple private delimiters.
mov        (r0)+,r4    ; The starting address.
mov        (r0),r3     ; The length.
beq        30$         ; "" indicates default on channel n.
sub        #40,sp      ; Room for the mask.
mov        sp,xrb+4    ; Address of mask.
mov        sp,r0       ; Clear the mask.
mov        #20,r1     ; 40 bytes long.
10$:      clr        (r0)+ ;
sob       r1,10$      ;
20$:      clr        r0   ; Build the mask.
movb     (r4)+,r1     ; Get the next character.
div      #10,r0       ; Get the byte and bit offsets.
movb     #1,r2        ;
ash      r1,r2        ; Set the byte mask
add      sp,r0        ; Set the byte offset.
bisb    r2,(r0)      ; Set the bits in the mask.
sob     r3,20$       ; Do the next character.
add     #40,sp       ; Re-adjust the SP.
30$:      clr        r0   ; Channel.
dec     (r5)         ; Is there a second argument?
beq     dospec      ; Nope. Assume channel 0.
movb   #4(r5),r0    ; Yep use it for channel.
br     dospec       ; And go do it.

clrdel: call  clrxrb      ; The Clear delimiter entry point.
clr        r0          ;
tst        (r5)        ; Any arguments?
beq        dospec      ; Nope. Assume channel 0.
movb     #2(r5),r0    ; Yep. Use it for the channel.

dospec: mov   #11,xrb     ; Spec function.
movb     #tyhnd,xrb+7  ; Device handler (TTY).
mov      #40,xrb+2     ; Byte count.
asl      r0            ; Channel times 2.
movb     r0,xrb+6     ;
.specc   ; Do it.
movb     firqb,r0     ; Any errors?
beq      10$         ; Nope. Just exit.
trap    377          ; Let the BP2 error trap handle it.
10$:     return       ; Back to the caller.

.page
.sbttl  Local* subroutines.

clrxb:  mov   #xrb,r0     ; Clear the XRB.
10$:   clr   (r0)+
sob    r1,10$
return

.page
.sbttl  Data area.

;
; Default delimiters (all but ctrl/S and ctrl/Q).
; For details, see the systems directives manual V7.1
; or later.
;
mask: .byte ~B11111111    ; 000 to 007.
      .byte ~B11111111    ; 010 to 017.
      .byte ~B11110101    ; 020 to 027.
      .byte ~B11111111    ; 35 times (030 to 177).
      .nlist
      .rept 34
      .byte ~B11111111
      .endr; 34
      .list

      .end; DELIMITER

```

```

1cl346: . = . + 346
      . = . + 56
      $prmt: mov  @#$otsv,r0
tst    344(r0) ; Is debug present?
beq    30$      ; Nope. Continue as usual.
call  $clxb    ; Yep. Save the private delimiters.
mov   #11,(r3)+; Private delimiters.
mov   #40,(r3)+; 40(8) byte buffer.
mov   sp,(r3)  ; Put it on the stack.
sub   #40,(r3)+;
sub   #40,sp   ; Adjust the stack pointer.
tstb  (r3)+   ;
movb  #2,(r3)+; Handler = TTY.
cmp   (r3)+,(r3)+;
mov   #2,(r3) ; Function = read.
emt   14       ; Go for it.
tstb  @#402   ; Error?
beq   10$     ; Nope. Go save and clear them.
add   #40,sp  ; Yep. Assume it was 5 (NOSUCH),
br    20$     ; fix the stack, and skip the clear.

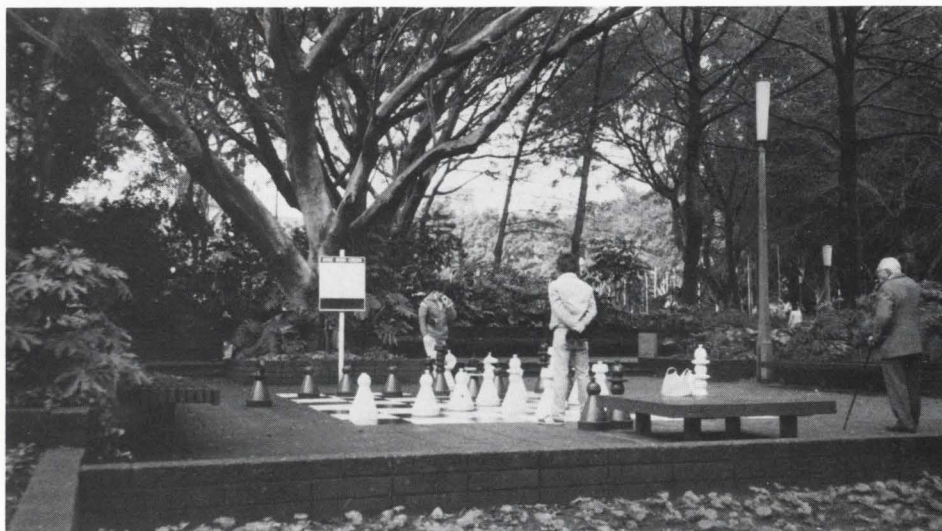
10$:   clr   (r3) ; Function = clear.
clr   -10(r3)  ; Must be zero.
emt   14       ; Clear them.
clr   @#402   ; Assumes no error on clear.
mov   @#402,-(sp); Save the 'Delimiters in use' flag.

20$:   mov

30$:   call  ..rslt ; Assure column zero.
mov   #20043,r3 ;
call  $xwrt    ; Display "#".
tst   @#402   ; Error?
bne   1cl346  ; Yes go handle it.
call  $clxb   ; No. Prepare for the read.
mov   @#$otsv,r0 ;
mov   #400,(r3)+ ; 256. byte buffer.
clr   (r3)+   ; Must be zip.
mov   26(r0),r1 ; Use the stash buffer.
mov   r1,(r3) ; Address of Ibuff.
emt   2        ; Do it.
mov   -(r3),r2 ; Number of bytes read.
add   r2,r1   ; Adjustment (unchanged).
movb  @#402,r5 ; Save any error.
tst   344(r0) ; Is debug present?
beq   40$     ; Nope.
tst   (sp)+   ; Were delimiters in use?
bne   40$     ; Nope.
call  $clxb   ; Yep. Restore them.
mov   #11,(r3)+; Private delimiters.
mov   #40,(r3)+; 40(8) byte buffer.
mov   sp,(r3)+; On the stack.
tstb  (r3)+   ; Bump the pointer.
movb  #2,(r3)+; Handler = TTY.
cmp   (r3)+,(r3)+; Bump it again.
inc   (r3)    ; Function = write.
emt   14     ; Restore them.
add   #40,sp ; Fixup the stack pointer.

40$:   tst   r5 ; Was there an error on the read?
bne   1cl346 ; Yep. Let the standard code handle it
return ; Nope. Return as usual.
      .end

```

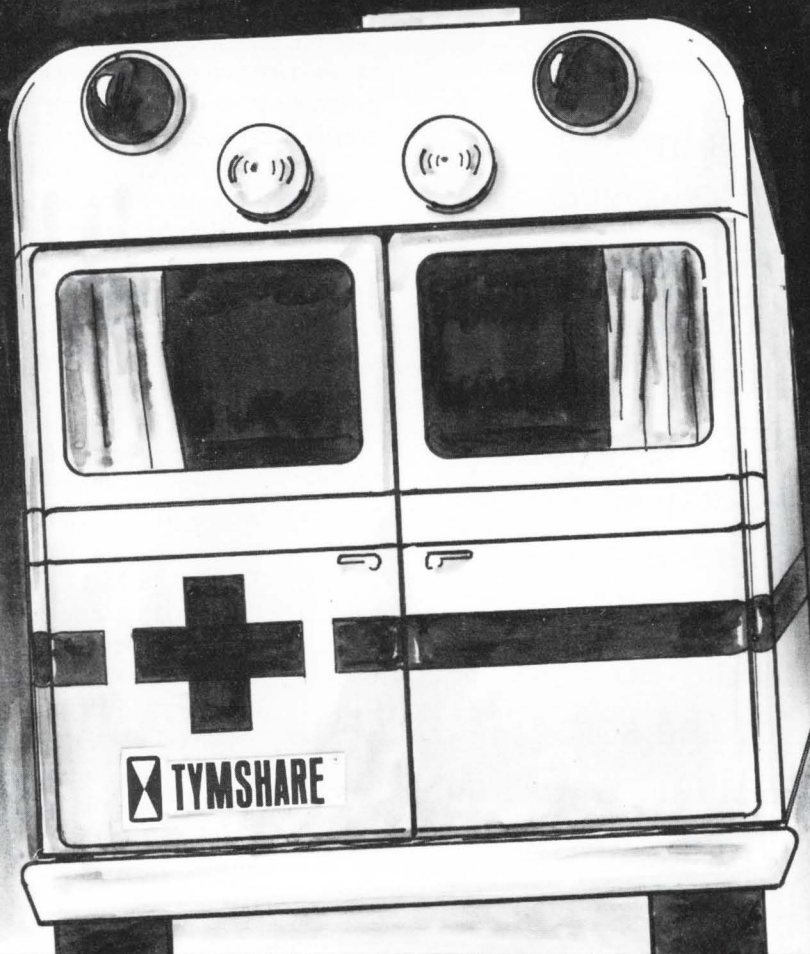


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# HOW TO SUSPEND A HIGH-PRIORITY CPU-BOUND JOB HOLDING YOUR SYSTEM HOSTAGE

By Greg Justice

---

This article is in response to Rick Powell's article in the Fall issue of the RSTS/E SIG newsletter, "The Cache Buffer." I have been in situations like those described in the article many times. However, most of the time crashing the program would do more damage to the software (data files, indices, etc.) than would letting the system die until it finished. Each of the situations was caused by an over-zealous system manager who liked to "hurry up" processing by raising priorities, especially on detached jobs!

---

I was running on an 11/34a with the pushbutton console and found that I could very easily get to the job control structure and suspend the job in about 5 of 6 cases. The exception is when the program gets hung in FIP and RSTS takes over the system. In this case crashing the program probably is the only course of action available short of crashing the system.

I am no longer running the 11/34a and have implemented the same process on an 11/70 with electronic console following the example in the article. The procedure is identical for steps 1 through 6:

1. Turn keyswitch to LOCAL.
2. Type Control/P on console.
3. System should respond with:  
CON =
4. Type an H to halt RSTS.
5. To which the system will respond:  
HMMMMMMMM/Tnnnnn  
where mmmmmmmm is program counter (PC) address and nnnnn is a status register.
6. The second digit following the 'T' indicates the CPU mode:  
4 = Kernel, 1 = User.  
You must be in User mode to proceed, if you get a 4 then go to step 11 and start over at step 4.  
Typical status register is T41410.
7. Now that we are halted in User mode we want to suspend the job.  
This is done by locating the job control structure of the job that was running when we halted. The job number is stored in a fixed location in low core (1006(8)). To check for a job type:  
1006/  
the system will type back:  
001006/xxxxxx  
where xxxxxx = the current job \* 2 (in octal of course!  
if xxxxxx = 0 then the "null" job is running, so go to step 11 and start over at step 4.
8. Having determined that a "real" job is (was?) running we locate its Job Data block (JDB). The location of the current JDB is also stored in a fixed location in low core (1010(8)). To find the JDB type:  
1010/  
the system will type back:  
001010/xxxxxx  
where xxxxxx = the address of the current job's JDB.

9. Add 34(8) to xxxxxx to get the offset to the runburst/priority word in the JDB. Type the following to get to this word:

yyyyyy/

where yyyyyy is the result of adding 34 to the address above.

the system will type back:

yyyyyy/zzzzzz

where zzzzzz = the runburst/priority word of the offending job.

Some possible zzzzzz's are:

003200 = -128 / 6 ! suspended job  
 003370 = -8 / 6 ! normal job  
 003000 = 0 / 6 ! slight boost  
 003010 = +8 / 6 ! could be trouble

The word is broken down with the runburst in the high byte and the priority in the low byte.

10. Type the desired runburst/priority word in the format shown in the list above. (000600 to suspend the job)

The system should return to the CON = prompt at this point.

11. Type a C to continue the processor.

12. Type a Z to exit from the console emulator.

At this point your system should be "unhung" and the offending job can now be taken care of by more "normal" means (UTILTY, etc . . .).

I will not detail the procedure for the 11/34 because it follows this same method, the only difference is the procedure for examining and depositing addresses.

I have used the 11/70 procedure exactly as detailed and it does work. HOWEVER, all of this information, especially the fixed locations of the job structure, is subject to change by DEC.

The following is a sample of the procedure as I ran it.

```

^P                      !type control/P
CON= H00106764/T41410 !type H
CON= 1006/000024       !type 1006/
CON= 1010/011540       !type 1010/
CON= 011574/003174 000600 !type 011574/ then type 000600
CON= C R00000070      !type C
CON= Z                  !type Z
    
```

I would be interested in knowing if this procedure works on other 11's, or if anyone has come up with other solutions to this problem.

Most of the information in this article came from Rick Powell's article. Additional information concerning the job control structure was taken from Mike Mayfield's RSTS Internals Manual.

Greg Justice  
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## LETTERS to the RSTS Pro...

...continued from page 6

didn't work well, write in to tell us not to do it and why not!

Allan Woloshin  
Data Processing Manager

Dear Allan: Version 7.2 update is in the field and we will make every effort to release future updates of the RSTS Internals Manual as close as possible to the RSTS release date.

\*\*\*

For information to your readers I wish to point out an error which appears in the December 1982 article, "Tips & Techniques — RSTS Job Context". The error occurs in the inadvertent duplication of one section of the sample program on page 52; second column starting with ".SBTTL CHECK THAT JOB STATUS . . ." through the message "?Program aborted" on page 53 should be omitted. Other than this the sample program is reproduced properly.

I apologize for any inconvenience this may have caused readers. A machine-readable copy of the sample program can be obtained by sending a blank tape to me at the address below. Please specify the desired density (800/1600/6250).

Wef Fleischman, Systems Analyst  
Software Techniques, Inc.  
Los Alamitos, CA

\*\*\*

I tried the Bill of Fare at the CHEZ RSTS, and I must say it was delectable. But I would like to advise Mr. DeMaria and your readers that a steady diet of CHEZ RSTS may result in a bad case of RSTS Runs.

My technical staff has advised me that the cure for this problem is \$Pepto.Bis/No Dump.

We enjoy reading your magazine and derive great benefit from it. Keep up the good work.

A.R. A'Hearn, President  
LogOn System, Knoxville, TN

\*\*\*

RSTS Pro is my magazine!!!

Little bit of History — I worked on RSTS for four years as a programmer/analyst. Last March I had the opportunity to join the Royal Canadian Mounted Police. Since then I am very proud of that move, but, still, I haven't touched a RSTS terminal for 8 months. I didn't think I could make it, but so far with some reading of your magazine every week, I can live. If I find any good application for RSTS in my Work I will work on it to make it a good tool for us. Do you know any application which uses RSTS for Police Detachment? I would appreciate any information about it.

Thanks in advance . . .

Cst. Benoit Guay  
RSTS Cop

\*\*\*

We are looking for methods of reducing the tendency of all our disks to fill up, despite all the usual quota limitations, rude letters, threats and pleadings to which our users are becoming totally inured.

I want to tackle this by making it *really* easy for users to store files offline . . . an archive system, such as I have seen on a nearby DEC-SYSTEM-10. All the user does is type ARCHIVE FRED.DAT and the file disappears from his directory, into some system area for later transfer to disk or magtape to be held offline. He can get the file back, with a delay of half an hour

(or half a day) by typing RETRIEVE FRED.DAT.

Does anyone know of such a system available for RSTS?

Geoff Draper  
Computer Centre Manager  
Australian Institute of Marine Science  
Cape Ferguson, QLD

\*\*\*

We have an 11/70 with 1.5 meg of memory running RSTS/E V7.0. All applications programs are written in house in DIBOL. I have about 15 users running the same inquiry program in response to telephone inquiries. I'm looking for a package that has multi-terminal support and will allow my staff to provide the 'guts' of the program in DIBOL. Goal: To have one program, one job slot, one set of buffers for open files for all 15 users.

Any suggestions and all calls are welcome. Enjoy your publication tremendously and find it extremely helpful.

Carol A. Edgar  
Data Processing Manager  
RM Electronics Co.  
Grand Rapids, MI

\*\*\*

I was reading your Letters to the Editors column and noticed a letter by Greg Steinkuhler about TECO and VTEDIT. Greg ended his letter with the wish that somebody would rewrite VTEDIT to be key compatible with KED and EDT. If Greg reads the September 1982 issue of the RSTS Professional, he will discover that I had already done so.

The VTEDIT.TEC I wrote needs some more work, but is very fast and runs in only 5K. Anyone who is interested in upgrading it to a complete emulation of KED/EDT has my cooperation and blessings.

I would like to apologize for typeset Macro-11 code in my article from the last (December 1982) issue. I was able to prevent the printers from doing justification on the code. I hope that no one has had a hard time in reading it.

I would also like to apologize for the letter I sent in the last issue on the 7.1 release of EDT. Time was short so I had to hastily type it at home on my typewriter. Apparently the publishers were also pressed for time.

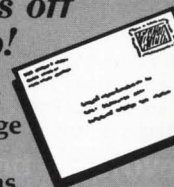
David Spencer  
Infinity Software Corp.  
Santa Monica, CA

\*\*\*

I have just received Vol. 4, #4 of *RSTS Professional* [Aug. 1982] — boy, you have no idea how relieved I was! You blokes probably think two months isn't NEARLY enough time between issues, but over here, I was convinced my subscription had run out and the renewal notice had been shredded by the mail sorting machine and I was doomed to a life without *RSTS Pro*...! Anyway, I couldn't let this issue pass without replying to Carl's observations about "home computers" [p. 4].

I have been a fan of DEC computers (particularly PDP/8 with 338 Programmable Buffered Display and a certain "War Games" program) ever since 1967. When I toggled my first machine language program into that PDP/8-1 using the SWITCH REGISTER (oh happy days) I was HOOKED!! Since then, at various times, I have worked with a PDP/8e using OS/8 and PAL-8, COS-310 systems using DIBOL-8, a PDP11/34 using RT-11, a CTS-300 system using DIBOL-11, a VAX-11/750 system using VMS and (yech) COBOL and, of course, a PDP11/70 with RSTS!!

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# A GOLDEN SECTION SEARCH

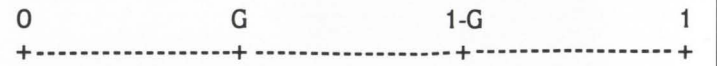
By R. Frazer, Applications Analyst, On-Track Systems

Recently a client requested an extension of our amortization program (see !AMORT.BAS, RSTS PROFESSIONAL Volume 3,#2,page 57); he would like the ability to find an interest rate when given the opening principal, term, and term payment. In looking at my only formula, which solves for monthly payment, I could not see an easy way of solving for this variable (it's also been a long time since Algebra II).

The easiest way (and the most fun) to get the man his merchandise is to send the monthly payment formula a succession of interest rates until the solution approaches the

given. The binary search cuts the domain subset in half every iteration, whereas the golden section finds two midpoints, zeroing in on 40%, or possibly 22%, of the same subset.

The "natural" illustration of this irrational number G is the fact that of two midpoints, the ratio of the first to the second is the same as the ratio of the second to the whole, or 1-G:1 = G:1-G



```
1 EXTEND  
10 ! INTFIG.BAS R.F., from AMORT.BAS &  
! &  
! GIVEN TERM, PAYMENT, AND BALANCE, FIND INTEREST RATE &  
!  
60 Z = .1E39 ! DEMAND SCALE FACTOR ZERO  
100 INPUT 'PRINCIPAL BALANCE ' ; I.B &  
\ GOTO 32767 IF I.B = 0. &  
\ INPUT 'NUMBER OF PAYMENTS' ; I.N% &  
\ INPUT 'MONTHLY PAYMENT ' ; I.M &  
\ PRINT 'ANNUAL INTEREST RATE = ' ; FNSEARCH(I.M,0.01,99.) &  
\ PRINT &  
\ GOTO 100 &  
!  
1100 DEF FN(X) = FNM.PMT(X) &  
!  
1200 ! MONTHLY PAYMENT CALC &  
! &  
DEF FNM.PMT(A,I) &  
\ I = A.I/1200. ! PERIOD INTEREST PERCENT &  
\ X = 1. + I &  
\ X = (X*I.N%)/(X*I.N% - 1.) ! FACTOR FOR FORMULA: &  
!  
! M = B * I * (1 + I)^N / ((1 + I)^N - 1) &  
!  
! WHERE: M = MONTHLY PAYMENT &  
! B = PRINCIPAL BALANCE TO AMORTIZE &  
! I = PERIOD INTEREST RATE &  
! N = TERM (NUMBER OF PERIODS) &  
!  
\ Z = I.B * I * X &  
\ M = FNROUND.2(Z) ! MONTHLY PMT &  
\ M = M + .01 IF M < Z ! ROUND UP &  
\ FNM.PMT = M &  
\ FNEND &  
!  
5000 DEF FNGOLD$(X,Y) ! GOLDEN SECTION POINTS &  
! &  
\ Z = (Y - X) * 0.381966 &  
! &  
\ G1= X + Z &  
! &  
\ G2= Y - Z &  
! &  
! FNGOLD$ = (Z = 0.) &  
! &  
! FNEND &  
!  
5010 !> FNSEARCH USE GOLDEN SECTIONS TO FIND CLOSEST &  
! &  
! APPROXIMATION; CREATE YOUR OWN FN(X) AS USED &  
! &  
! IN LINES 5012, 5016, WHERE FN(X) SLOPE FROM D1 &  
! &  
! TO D2 NEVER REACHES ZERO (PEAK OR VALLEY) &  
! &  
! &  
DEF FNSEARCH(Z,D1,D2) &  
! &  
\ Z1 = ABS(Z) &  
! &  
\ T1, G2 = D2 ! INITIAL DOMAIN MAX &  
! &  
\ B1, G1 = D1 ! INITIAL DOMAIN MIN &  
! &  
5012 Q = FN(X,G2) - Z1 ! TRY HIGH MIDPOINT &  
! &  
\ IF ABS(Q) < 0.0001 &  
! &  
THEN Q = G2 &  
! &  
! GOTO 5022 ! CLOSE ENOUGH &  
! &  
5014 IF Q < 0. ! F(G2) < SEARCH VALUE Z1 &  
! &  
THEN B1 = G2 ! NEW BOTTOM &  
! &  
! GOTO 5020 &  
! &  
5016 Q = FN(X,G1) - Z1 ! TRY LOW MIDPOINT &  
! &  
\ IF ABS(Q) < 0.0001 &  
! &  
THEN Q = G1 &  
! &  
! GOTO 5022 ! CLOSE ENOUGH &  
! &  
5018 IF Q > 0. ! F(G1) > Z1 &  
! &  
THEN T1 = G1 ! NEW TOP &  
! &  
ELSE T1 = G2 ! BETWEEN MIDPOINTS &  
! &  
! B1 = G1 &  
! &  
5020 GOTO 5012 UNLESS FNGOLD$(B1,T1) &  
! &  
! Q = -1. &  
! &  
5022 FNSEARCH = Q &  
! &  
! FNEND &  
!  
20006 !> FNROUND.2 ROUND FLOATING POINT NUMBERS TO 2 PLACES &  
! &  
DEF FNROUND.2(Z) = FIX(100. * Z + .5) / 100. &  
! &  
! &  
32767 END &  
! &
```

## *RADICAL RADIAL...*

*True, the radial hookup scheme of DEC's UDA-50 allows you to drop a drive without saying "good-bye" to your entire system. But, is this really an advantage with new drives boasting long MTBF specs. Emulex controllers let you daisy-chain your drive connections using fewer, shorter (and cheaper) cables.*

## *SEEK AND YE SHALL FIND...*

*The UDA-50's ability to stack 16 seek commands does boost throughput—mainly for single drive systems. For all you multi-drivers, however, speedup isn't as pronounced. An Emulex-controlled multi-drive system stacks its seek commands (in effect) via its built-in system of overlapped seeks. Plus, overlapped seek and search commands (new to DEC in the UDA-50) already operate in Emulex controllers under all DEC operating systems.*

## *TO ERR IS HUMAN...*

*The 80-bit ECC of the UDA-50 can catch a lot of errors—it has to: High bit densities (try 11.4K bits per inch) on state-of-the-art media make 80-bit error correction a necessity, not a feature. And, the trade-off for correcting all those densely packed bits is loss of performance in skipping rotations every time an error occurs—All this in contrast to Emulex's proven 32-bit ECC.*

## *PUTTING ON THE BRAKES...*

*To slow the 2 MByte transfer rate of the disk to 800 KBytes at the Unibus, the UDA-50 uses a hefty 12 sector buffer. This means the UDA-50 can transfer 16-19 contiguous sectors at most before it skips a rotation and makes your software cry, "Uncle!"*

*In almost all applications, Emulex controllers can handle full (repeat full) track transfers of contiguous sectors and spiral read/write across cylinder head boundaries—and never skip a rotation. Why? Emulex passes data to your memory at rates much closer to those coming off your drives.*

## *THINGS YOUR MOTHER NEVER TOLD YOU...*

*For a complete report on these and other UDA-50 matters, write to Emulex.*

## *FROM THE EMULEX FILE...*

*Results for the First Quarter, Fiscal Year 1983 are in: Revenues up 100 percent, net earnings up 109 percent, earnings per share up 100 percent (all compared to the same quarter last year). Check your latest Emulex mailing for price reductions on some Q-bus and Unibus products. Not on our mailing list? Write: Emulex Corporation, 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, CA 92626. Or better yet, telephone us toll free at (800) 854-7112. In California, that's (714) 662-5600, and let's talk DEC.*



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```

60 ON ERROR GOTO 31000
    \PRINT #1, RECORD 1, "HELLO "; ACCOUNTS; CHR$(13); &
    \PRINT #1, RECORD 1, PASSWORDS + CHR$(13) + CHR$(13); &
    \PRINT #1, RECORD 1, "SET VT100; CTRL/R"+CHR$(13)+"X"; &
    \PRINT #2, RECORD 1, "HELLO "; ACCOUNTS; CHR$(13); &
    \PRINT #2, RECORD 1, PASSWORDS + CHR$(13) + CHR$(13); &
    \PRINT #2, RECORD 1, "SET VT100; CTRL/R"+CHR$(13); &
    \SLEEP 1
62 PRESENT.JOB% = 1 \GOSUB 22000
64 PRESENT.JOB% = 2 \GOSUB 22000
68 ON ERROR GOTO 31000
    \PRINT #1, RECORD 1, CHR$(13); &
    \PRESENT.JOB% = 1 &
    \GOTO 100 &
    ! The PK:'s should be logged in and ready for use. &
    ! Now go directly to job #1. &

! ~ ~ ~ ~ ~
100 ! Main monitoring loop..... &
110 GOSUB 2000 &
    \SLEEP 1 IF LEN(CHAR$)=0 AND LEN(DATA.FROM.PKS)=0 &
    \GOTO 130 IF LEN(CHAR$)=0 &
120 IF (CHAR$=CHR$(0) OR CHAR$=CHR$(28)) AND LAST.CHAR$=CHR$(0) &
    GOTO 1000 &
    ELSE &
        LAST.CHAR$=CHAR$ &
130 GOSUB 2000 ! Put a character to the job and get any data from it. &
140 GOTO 100 IF LEN(DATA.FROM.PKS)=0 &
    \LSET KB.BUFFER$=DATA.FROM.PKS &
    \PUT #10, RECORD 4096, COUNT LEN(DATA.FROM.PKS) &
    \GOTO 100 &

! ~ ~ ~ ~ ~
1000 ! Job control routine: control passes here whenever a &
    ! ~ / ~ or ~ / \ combination is received. &
1010 LSET KB.BUFFER$=CHR$(155)+"h"+CHR$(155)+"J" &
    \PUT #10, COUNT 4 ! Clear the screen. &
1020 IF ASCII(CHAR$)=28 THEN 1100 ! Try to kill both jobs. &
1030 IF PRESENT.JOB% <> 1 THEN &
    PRESENT.JOB% = 1 &
    ELSE &
        PRESENT.JOB% = 2 ! Switch jobs.... &
1040 ON ERROR GOTO 1080 &
    \PRINT #PRESENT.JOB%, RECORD 6 ! Check for ^C state. &
1050 LAST.CHAR$="" \CHAR$="" \GOSUB 2000 &
    \GOTO 1070 IF LEN(DATA.FROM.PKS)=0 &
    \PRINT #PRESENT.JOB%, RECORD 1, CHR$(20);CHR$(18); &
    \GOTO 140 &
1070 PRINT #PRESENT.JOB%, RECORD 1, CHR$(21)+"X"+CHR$(13); &
    \LAST.CHAR$="" \CHAR$="" \GOTO 120 &
1080 RESUME 1090 &
1090 PRINT #PRESENT.JOB%, RECORD 1, CHR$(20); &
    \LAST.CHAR$="" &
    \CHAR$=CHR$(18) &
    \GOTO 120 ! Put a ^T ^R combination to the job. &
1100 ON ERROR GOTO 1140 \PRINT #1, RECORD 6 ! Check for ^C state. &
1105 FIELD #1, 128 AS DATA.FROM.PKS &
    \LSET DATA.FROM.PKS = STRINGS(128,0) &
1110 PUT #1, RECORD 16, COUNT 0 ! Kill the job running on channel #1. &
1120 GOTO 1200 ! We have killed the first job, now check the 2nd. &
1140 RESUME 1150 &
1150 LSET KB.BUFFER$=CHR$(7)+CHR$(7) &
    \PUT #10, COUNT 2 &
    \PRESENT.JOB% = 1 &
    \LAST.CHAR$="" \CHAR$="" &
    \GOTO 120 &
1200 ON ERROR GOTO 1240 \PRINT #2, RECORD 6 &
1205 FIELD #2, 128 AS DATA.FROM.PKS &
    \LSET DATA.FROM.PKS = STRINGS(128,0) &
1210 PUT #2, RECORD 16, COUNT 0 ! Kill the job on channel #2. &
1220 GOTO 30000 ! End the program..... &
1240 RESUME 1250 &
1250 LSET KB.BUFFER$=CHR$(7)+CHR$(7) &
    \PUT #10, COUNT 2 &
    \PRESENT.JOB% = 2 &
    \LAST.CHAR$="" \CHAR$="" &
    \GOTO 120 &

! ~ ~ ~ ~ ~
2000 ON ERROR GOTO 31000 &
    \FIELD #PRESENT.JOB%, 0 AS DATA.FROM.PKS &
    \GOTO 2010 IF LEN(CHAR$)=0 &
    \PRINT #PRESENT.JOB%, RECORD 1, CHAR$; &
2010 ON ERROR GOTO 2050 &
    \GET #PRESENT.JOB%, RECORD 8192, COUNT PK.GET.COUNT% &
    \FIELD #PRESENT.JOB%, RECOUNT AS DATA.FROM.PKS &
    \RETURN &
2020 RETURN &
2050 RESUME 2020 IF ERL = 2010 &
    \GOTO 31000 &

! ~ ~ ~ ~ ~
20000 ! Routine to get and echo a character from the KH: buffer &
    ! if one is in there. If not, an empty string is returned. &
20020 ON ERROR GOTO 20500 \GET #10, RECORD 8192, COUNT 1 &
    ! Record 8192 says don't wait for input. Instead, produce &
    ! an error (which we trap in a routine). &
20030 ! PUT #10, COUNT 1 ! Echo the character as it was received. &
20040 CHAR$=LEFT(KB.BUFFER$,1) ! Store the character we just got. &
20050 RETURN ! ...from this subroutine. &
20500 IF ERL=20020 AND RECOUNT = 0 THEN CHAR$="" \RESUME 20050 &
    ! Here we simply return because we didn't get any data. &
20510 GOTO 31000 &

```

```

! ~ ~ ~ ~ ~
22000 ! Routine to waste output from the present PK: &
22010 ON ERROR GOTO 22020 \GET #PRESENT.JOB%, RECORD 8192 \GOTO 22010 &
22020 SLEEP 1 \RESUME 22030 &
22030 ON ERROR GOTO 22050 \PRINT #PRESENT.JOB%, RECORD 4 \RETURN &
22050 SLEEP 1 \RESUME 22010 &

! ~ ~ ~ ~ ~
30000 ON ERROR GOTO 30020 \PRINT CHR$(155);"H";CHR$(155);"J" &
30010 CHAIN "MENU" &
30020 GOTO 32767 &
31000 PRINT "ERROR IN MLTJOB; ERR: ";ERR;" ERL:";ERL &
    \RESUME 31010 &
31010 ON ERROR GOTO 0 \STOP &
32767 END &

! ~ ~ ~ ~ ~

```

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---

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CIRCLE 170 ON READER CARD







# RTS:

## TEST RUNTIME SYSTEM EXAMPLE

By Philip Hunt, O.L.F.B.P., 6400 E. Broad St., Columbus, OH 43213, (614) 864-9200

### Background:

Runtime systems — Those mythical beings running around your RSTS/E system . . .

During my experiments with RSTS/E, I decided to learn how to write a runtime system since the documentation to do so was at best scarce. Through my trials and tribulations, I discovered the formats for TKB command files, pseudo-vector positions and a whole slew of other items many users might be interested in.

### Description:

Enclosed is a small Runtime system demonstrating many features and formats required to generate runtime systems. The enclosed runtime system can be added to with very little effort. All that must be done is to add a command to the table called 'CMDTBL' and add the address to jump to to execute the command in dispatch table called 'DISPAT'. When your custom code is complete, just execute a 'JMP RTSINP' to prompt for a new command.

The assemble instructions enclosed also makes the resulting runtime system 'patchable' with ONLPAT. A few examples of patchable areas are included in the source, namely the name printed in response to a 'VERSION' command (at location 'RTSNAM::'), the program name for SYSTAT display (currently 'NONAME' at location PRGNAM::) etc . . .

Currently the runtime system will prompt for input (with 'Ok'), accept a line of input, remove leading spaces, convert it to UPPER CASE. Then if the first character is a '!' or ';', the line is ignored for compatibility with other runtime systems. The command is then checked against the internal commands found in RTS, if not found there, it is executed as a CCL if possible.

Commands currently implemented in RTS follow:

- RUN — Run a program
- OUT — Out to system default KBM
- VERSION — Type version number of RTS
- ASSIGN — Assign devices or logicals
- DEASSIGN — Deassign devices or logicals
- HELP — RTS Help message

The ASSIGN/DEASSIGN/RUN commands are completely compatible with the format used by Digital-supplied runtime systems.

### Code Description:

The following is a code-by-code description of RTS.

SYMBOL STARTING SECTION	DESCRIPTION
RTS::	Runtime system start-up
RTSNEW::	Check if logged out to print 'Bye' if true
RTSNME::	If RTS is entered with a 'SWITCH'-type command, we set the program name to 'NONAME' for SYSTAT.
RTSRUN::	If RTS is entered with a 'RUN' command using a '*.TST' filename, the program name run is setup for SYSTAT. We then reset the terminal in case a CTRL/C suspended output. We also set out memory area to 2K. This is not really needed, but included to show example of increasing user memory area.
RTSINP::	We print 'OK'.
RTSRED::	We do some housekeeping such as clearing out our input buffer and core common area. We wait for input from the user.
SPCLOP::	Drop leading spaces and tabs
OKREAD::	Check for a comment line or just a <CR> or <LF> or any other similar items.
CVTLOP::	Convert lower case to UPPER CASE.

**CHECK FOR RTS COMMAND** See if we should execute what was entered as a RTS command

**CHECK FOR CCL COMMAND** See if we execute as a system CCL command, if so, we do it

**BADP::** Tell user it is an illegal input, and prompt for more.

**Subroutines/Macros Descriptions:**

**PRSCMD::** This routine will see if the entered data is a valid RTS command, if so, a flag is set with the index into the dispatch (DISPAT::) table and a flag whether an argument is present.

**CLRXR B** A macro to clear the user XRB.

**CLRFQB** A macro to clear the user FIRQB

**MEMORY** A macro to set the user core size

**ERROR** A macro to print a RSTS error message on the user terminal

**MESSAGE** A macro to print a message on the user terminal.

**TSTFQB** A macro to check any errors occurring after a system call. If there was, the error is printed and a JMP is made to RTSINP for a new prompt and more input.

**The infamous .99998/.99999 Vectors:**

To generate a runtime system, the user must set up a 'dummy' section for the task-builder which we call '.99998'. A section of code contains pseudo-vector information which we call '.99999'. This section contains the addresses for RSTS to access the RTS for all conditions. More information describing this pseudo-vector region may be found in the RSTS 'System Directives' manual.

The key to runtime system generation is the fact that section '.99998' is expanded with dummy area so that section '.99999' is located at exactly 177732 (octal) for its address. This is what the 'EDIT' mode in the MAKSIL step in the assembly example is for. MAKSIL computes the area required to make .99999 'align' at 177732 and edits your task-build command file to do so.

**Summary:**

The runtime system source enclosed is very straightforward and easily expanded. There really are no limits as to what you can do in a runtime system!!! Just think, a CTRL/C trap that you set up cannot be broken by entering multiple I.C. As a runtime system, YOU ARE IN CONTROL!!!!

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**Questions????**

If you are having problems or have questions about RTS or any of my other distributed programs, you may write or call me at the address listed at the top of this article.

A tape containing RTS and all associated files may be yours by sending me \$15.00 and a blank tape to the above address.

Happy Computing!!!!!! Until next time!!!!

ILOG OF RTS COMPILE/TASK-BUILD/MAKSIL EXECUTION

Ok

INOTE:RTSDEF.MAC IS MACROS FOR RTS USAGE

MAC RTS,RTS=\$COMMON,SY:[1,50]RTSDEF,SY:[1,50]RTS

Ok

!DO THE FIRST TASK-BUILD, NOTE: WE EXPECT MAKSIL TO BELCH AT THIS !AS IT WILL ENTER EDIT MDDE AND FIX UP THE RTS.CMD FILE SO IT IS !'ALIGNED'

```

;-----
;*****Control file to task-build RTS*****
;
RTS/-HD,RTS,RTS=SY:[1,3]RTS
/
;
;THE FOLLOWING 'PAR' STATEMENT WILL ALLOW AD 4K RTS
;NOTE: IF PHYSICAL MEMORY GOES ABOVE 1K THOUGH, THE STACK PARAMETER WILL
;HAVE TO BE DECREASED (MAKSIL WILL DO THIS AUTOMATICALLY FOR YOU)
;
PAR=RTS:160000:020000
STACK=3072
;
;THE FOLLOWING STATEMENT WILL BE EDITED BY MAKSIL TO EXTEND THE DUMMY
;SECTION TO ALIGN THE RUNTIME SYSTEM, IT CONTAINS NO CODE OR DATA
;
EXTSCT=.99998:0
//
;-----
    
```

TKB @RTS

Ok

!SET UP RTS AS RTS.RTS, NOTE THE /RTS ON THE FIRST COMMAND LINE !THE EDITED COMMAND FILE WILL BE GENERATED INTO RTS2.CMD

```

RUN $MAKSIL
MAKSIL V7.1-11>16K RTS V7.1-11 C OLFBP 11/70
Resident Library name? RTS/RTS
Task-built Run-Time System input file <RTS.TSK>?
The run-time system is not aligned
Edit mode (Yes/No) <Yes>? YES
Task-builder command input file <RTS.CMD>?
The task-builder commands have been changed as follows
PAR=RTS:160000:020000 PAR=RTS:160000:020000
STACK=3072 STACK=3072
EXTSCT=.99998:0 EXTSCT=.99998:001276
    
```

RTS will load in a 4 K-word partition using 1 K-words physical memory. 001276 (octal) bytes may be used for expansion.

Corrected command file name <RTS.CMD>? RTS2  
Please task build again using RTS2.CMD

Ok

!RE-TASK-BUILD USING RTS2 WHICH MAKSIL SET UP TO ALIGN THE RTS

TKB @RTS2

Ok

!OK, LETS RUN MAKSIL AGAIN, THIS TIME IT IS ALIGNED SO THE RUNTIME SYSTEM IS !NOW GENERATED. NOTE: MAKSIL WILL ALSO DO A 'UT ADD' COMMAND FOR IT. !NOTE ALSO, THAT WE WANT SYMBOLS (SEE BELOW) SO WE CAN PATCH WITH 'ONLPAT'

```

RUN $MAKSIL
MAKSIL V7.1-11>16K RTS V7.1-11 C OLFBP 11/70
Resident Library name? RTS/RTS
Task-built Run-Time System input file <RTS.TSK>?
The run-time system is correctly aligned
Edit mode (Yes/No) <Yes>? NO
Include symbol table (Yes/No) <Yes>?
Symbol table input file <RTS.STB>?
Run-Time System output file <SY:[0,1]RTS.RTS>?
RTS built in 1 K-words, 41 symbols in the directory
RTS.TSK renamed to RTS.TSK<40>
    
```

Ok

!ASSEMBLY, TASK-BUILD ARE NOW DONE

Ok

INOTE BELOW THAT RT: HAS THE FLAGS AUTOMATICALLY SET

SY/R

Run-Time Systems:

Name	Typ	Size	Users	Comments
BASIC	BAC	16(16)K	2	Perm, Addr:49, KBM, CSZ
CCLMGR	CCL	1(28)K	3	Perm, Addr:192, DF KBM
RSX	TSK	3(28)K	0	Perm, Addr:193, KBM
DCL		12(2)K	0	Non-Res, KBM
BAS2DB	BAC	16(16)K	0	Non-Res, KBM, CSZ
RT11	SAV	4(28)K	2	Temp, Addr:228, KBM, CSZ, EMT:255
RMS11	TSK	4(28)K	0	Non-Res
FOCOMR	DCF	14(16)K	0	Non-Res, Rem
APLSGL	APC	16(16)K	0	Non-Res, KBM
APLDEL	APD	16(16)K	0	Non-Res, KBM
BASIC2	TSK	16(16)K	0	Non-Res
BP2COM	TSK	4(28)K	0	Non-Res, KBM
RTS	TST	1(28)K	0	Non-Res, KBM

Ok

!LETS SWITCH INTO OUT RTS

SW RTS

Ok

INOTE THAT MY RTS IGNORES EXCLAMATION POINTS ;AND SEMI-COLON LINES IN COLUMN ONE ; THEY ARE CONSIDERED COMMENTS !THE FOLLOWING ARE RTS COMMANDS, NOT CCLS

HELP  
RTS - V01.00.1

Commands:

- RUN - Run a program
- OUT - Out to system default KBM
- VERSION - Type version number of RTS
- ASSIGN - Assign devices or logicals
- DEASSIGN - Deassign devices or logicals
- HELP - This message

Ok

VERSION  
RTS - V01.00.1

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CIRCLE 152 ON READER CARD

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By Greg Justice, Texas Distributors, Inc., Dallas, TX 75234

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CIRCLE 32 ON READER CARD



# The VAX-SCENE

Number 12

(RSTS PROFESSIONAL, Vol. 5, No. 1)

February 1983



## INSIDE:

**SETTING RMS ATTRIBUTES**

**BIG BROTHER** An Automatic Logout Facility for the VAX



```

1 extend
5 ! RMS FUDGE
! This program adds or changes the RMS attributes of a file.
! By using the /B switch you will set the attributes to FIX*512,
! which is handy for RFTing binary data files to the VAX.

10 print 'This program fudges RMS attributes on to a non RMS file'
! print ' /B gives you defaults for a binary file'

20 on error go to 32790
30 rfs = 'UFD FIX VAR VFC STM' ! Record formats
! fo$ = 'SEQ REL IUX' ! File organization

40 dim attribute$(20%)
100 print 'Fudge': \ input line filename$
! filename$ = cvt$(filename$,38%) ! remove tabs,spaces,cr,lf,esc
! sw$ = instr(1,filename$, '/') ! any switches ?
! switch$ = right(filename$,sw$) if sw$
! filename$ = left(filename$,sw$-1) if sw$

110 if left(switch$,2%) = '/B' then 10000 ! help em

120 open filename$ for input as file 1$, mode 1$ ! update

130 fzf = num$(swap$(cvt$(mid(sys$chr$(12%),13%),2%)))
! get size of file just opened

140 attribute$ = sys$chr$(6$)+chr$(25$)+chr$(1$)+chr$(0$)
! read file attributes &
! change mid(attribute$,5%,20%) to attribute$ ! get words 1 - 10
! attribute$(1$) = attribute$(15*2%-1$)+swap$(attribute$(15*2%))
! For 15:15 to 105 ! pack bytes into words &
! if mid(attribute$,5%,20%) <> string$(20%,0$)
! then print filename$:' is all ready a RMS file'
! rf$ = attribute$(1$) and 7$
! fo$ = (attribute$(1$) and 63$)/8$
! rs$ = attribute$(2$)
! fs$ = attribute$(4$)
! nb$ = attribute$(6$)
! nb1b$ = attribute$(7$)
! bs$ = attribute$(8$) and 255$
! hs$ = swap$(attribute$(8$) and 255$)
! mr$ = attribute$(9$)
! de$ = attribute$(10$)
! print 'RF:':mid(rf$,rf$*4$+1$,3$);
! print ':':rs$: if rs$
! print 'FO:':mid(fo$,fo$*2$+1$,3$);' USED:':nb$;':nb1b$;
! ' RECS:':mr$;
! print
! input 'Change it any way :':yn$
! yn$ = cvt$(yn$,38%)
! go to 100 if left(yn$,1$) <> 'Y'

160 if left(switch$,2%) = '/B' ! Make it Binary ?
! then rfs = 'FIX' ! FIX
! fo$ = 0$ ! SEQ
! ra$ = 512$
! fs$ = val(fs$)
! nb$ = fo$
! nb1b$ = 512$
! bs$,hs$ = 0$
! mr$ = rs$
! go to 400 ! Set it

200 input 'Record Format:':i$
! i$ = 'FIX' if len(i$) = 0$ ! make default
! rec.fmt$ = cvt$(i$,38%)
! rfs = instr(1,rfs,rec.fmt$)
! go to 200 if rfs = 0$
! rfs = (rfs-1$)/4$

220 input 'File organization:':i$
! i$ = 'SEQ' if len(i$) = 0$ ! make default
! fil.org$ = cvt$(i$,38%)
! fo$ = instr(1,fo$,fil.org$)
! go to 220 if fo$ = 0$
! fo$ = (fo$-1$)/2$ * 8$

240 input 'Recordsize:':i$
! i$ = '512' if len(i$) = 0$
! ra$ = val(i$)

260 input 'File size:':fs$

280 input 'No of blocks in use:':nb$
300 input 'No of bytes in last block:':i$
! i$ = '512' if len(i$) = 0
! nb1b$ = val(i$)

320 input 'Bucket size:':bs$

340 input 'Header size:':hs$

360 input 'Maximum record size:':i$
! i$ = '512' if len(i$) = 0
! mr$ = val(i$)

380 input 'Default Extend size in blocks:':de$
400 ss$ = sys$chr$(6$)+chr$(25$)+chr$(1$)+chr$(10$)+
! word 1 - rec fmt & fil org &
! cvt$(swap$(rfs*fo$))+
! cvt$(swap$(rs$))+
! word 2 - rec size &
! cvt$(swap$(0$))+cvt$(swap$(fs$))+
! file size (in blocks) &
! cvt$(swap$(0$))+cvt$(swap$(nb$))+
! number of blocks in use &
! cvt$(swap$(nb1b$))+
! number of bytes in last block &
! chr$(bs$)+chr$(hs$)+
! bucket size, header size &
! cvt$(swap$(mr$))+
! max rec size &
! cvt$(swap$(de$)) ! default extension size &

420 go to 100

10000 print 'Enter a file name for which you would like to add or change RMS attributes.' &
! print
! print ' Switches are:' &
! print ' /B - Set Binary, Seq. fixed 512 byte records' &
! print ' Need to RFT data files to a Files-11 system(RSX,VMS).' &
! print
! print ' Control Z to Exit.' &
! print
! go to 100

32790 if err = 11 and err1 = 100 then 32767
32300 if err1 = 120 then print right(sys$chr$(6$)+chr$(9$)+chr$(err),3$) &
! resume 100

32700 on error go to 0
32767 end

```

```

1 extend
10 ! This program is mainly for clearing the open file count and open
! update mode bit after your program gets a swap error or other such
! annoying problems.
! For other goodies see Scott Banks article in Sep 80 RSTS Pro
! page 38
! Name Blockette
! 0 Link to next name blockette
! 1 Filename rad50 (-1 for UFD in MPD)
! 2 Filename rad50
! 3 Extension rag50
! 4 Protection code / status
! 5 Read/Only open count / Open file count
! 6 Link to accounting Blockette (project # / programmer # in UFD)
! 7 Link to 1st retrieval Blockette (-31692 = 'UFD/Rad50)

20 ! STATUS BYTE
! 7 6 5 4 3 2 1 0
! -----
! 1128 64 32 16 8 4 2 1
! -----
! | | | | | | | |
! | | | | | | | | -- File is out of stat
! | | | | | | | | -- File is placed
! | | | | | | | | -- Write access given out
! | | | | | | | | -- File open in UPDATE mode
! | | | | | | | | -- No file extending allowed
! | | | | | | | | -- No delete and/or rename allowed
! | | | | | | | | -- Entry is MPD entry
! | | | | | | | | -- File marked for deletion

50 print 'Enter UFD to be cleared as [*,*]:'
! input line ufd$
! ufd$ = cvt$(ufd$,4$)

100 open ufd$ for input as file 1$, mode 16384$
105 dim #1$, u$(3583$,7$)
120 clu$ = u$(31$,0$)
200 go sub 1000 ! list directory

300 go to 32767
1000 nb$,ptr$ = fnlink$(u$(0$,0$)) ! find 1st name blockette

1020 go to 1190 unless ptr$ ! if null then exit
! go sub 2000 ! print this nb
! ptr$ = fnlink$(u$(ptr$,0$)) ! link to next
! go to 1020

1190 return

2000 print rad$(u$(ptr$,1$))+rad$(u$(ptr$,2$)); ! print file nam
! ':':rad$(u$(ptr$,3$)); ! & extension

2020 print using '<###>', swap$(u$(ptr$,4$) and 255$); ! prot

2040 ab$ = fnlink$(u$(ptr$,6$))
! print using '### ##', u$(ab$,2$); ! file size in blocks
! u$(ab$,7$); ! file clustersize

2050 print using '### ##', u$(ptr$,4$) and 255$; u$(ptr$,5$);

2060 print

2070 goto 2090 if u$(ptr$,5$) = 0$
! yn$ = ''
! input 'Clear the Update bit (y/n):'yn$ if u$(ptr$,4$) and 8$
! yn$ = cvt$(yn$,32%)
! u$(ptr$,4$)=u$(ptr$,4$) and -9$ if left(yn$,1$) = 'Y'
! yn$ = ''
! input 'Clear the write access bit:'yn$ if u$(ptr$,4$) and 4$
! yn$ = cvt$(yn$,32%)
! u$(ptr$,4$)=u$(ptr$,4$) and -5$ if left(yn$,1$) = 'Y'
! yn$ = ''
! input 'Clear the mark for deletion bit:'yn$ if u$(ptr$,4$) and 128$
! yn$ = cvt$(yn$,32%)
! u$(ptr$,4$) = u$(ptr$,4$) and -129$ if left(yn$,1$) = 'Y'

2080 print 'read only count =':swap$(u$(ptr$,5$) and 255$)
! 'Open count =':u$(ptr$,5$) and 255$
! noc$ = swap$(u$(ptr$,5$)) and 255$
! ooc$ = u$(ptr$,5$) and 255$
! Input 'New read only count:'noc$ \ noc$ = val(noc$) if len(noc$)
! Input 'New open count:'ooc$ \ ooc$ = val(ooc$) if len(ooc$)
! u$(ptr$,5$) = swap$(noc$ and 255$) or (ooc$ and 255$)

2090 Return

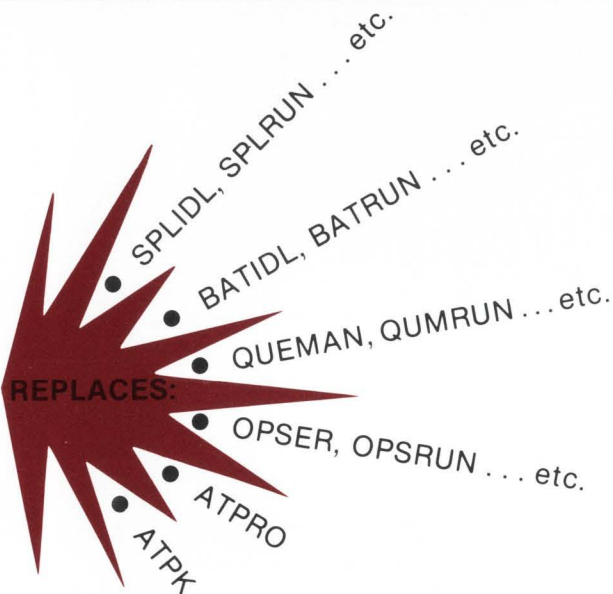
10000 def fnlink$( i$ ) ! cvt raw ptr to virt array ptr
10010 ! bits 15-12 Block within cluster (*4096$)
! ! bits 11- 9 Cluster (*512$)
! ! bits 8- 4 blockette within block (*16$)
! ! bits 3- 0 special bit flags (*1)
10020 cluster$ = ( i$ and 3584$ ) / 512$
! \ blk$ = swap$( i$ and -4096$ ) / 16$
! \ blockette$ = ( i$ and 096$ ) / 16$
! \ fnlink$ = (cluster$ * clu$ + blk$) * 32$ + blockette$
10030 fndend
32767 end

```

VERSION 2.2 NOW AVAILABLE

# QUE.11 — V2.2

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# BIG BROTHER

**An Automatic Logout Facility  
for the VAX**

By Niall McPhillips, Petroconsultants Ltd., Ireland

An unattended terminal left logged in poses a security risk to any computer system. Many systems have an automatic logout feature which logs out a user whose terminal has been idle for a period of time. Unfortunately this is a feature which VMS doesn't and, according to DEC's software dispatches, won't have.

BIG-BROTHER is just such a program; it will log out users who have not used any system resources for a given time. It will not, however, stop any process which is running an executable image, even if that process has been idle, as this could cause problems with any open files. Written in VAX PL/1 it runs in this installation under VMS V3. If you haven't got a PL/1 compiler don't despair, as it would be relatively simple to write a similar program based on the principles outlined below in any other language supported by VMS.

The program scans through all the processes on the system at regular intervals and requests the following information for each process:—

- 1) Process ID.
- 2) CPU time to data.
- 3) Name and name length of the image currently running.
- 4) Group no. of process UIC.
- 5) Subprocess count.
- 6) Terminal identifier.

If no image is running (image name length of 0), if the group number of the UIC is greater than one (i.e., not a system process), and no subprocesses are currently active then the process ID, CPU time and terminal are stored in a list of idle processes. This is then compared against the last list taken. Any process which appears on both lists with an unchanged CPU time is deleted and an appropriate message is output to the terminal. A wakeup is then scheduled to occur after time DELTA-TIME and the program hibernates until then. In this installation we use 10 minutes as the delta-time, but this can be easily changed if required.

You may want to customize the program for your particular installation. For instance, you may wish to exclude certain terminals or users from being logged out, or you may wish to hold a log file of all processes logged out (to discover the culprits who most often leave their terminals unattended). These can be easily added to the program by, in the first case, adding conditions excluding your desired UICs/terminals to the conditions to be satisfied before the process is put on to the 'idle list'; and in the second case, all that is required is for a record containing the process information to be output to a log-file as the process is deleted.

BIG BROTHER is best run as a detached process which is activated at system startup and left running permanently. Since it only uses resources briefly every 10 minutes it has little or no effect on system performance.

```
BIG_BROTHER: PROCEDURE OPTIONS (MAIN);
```

```
/*
This is a program to automatically log off terminals which
have been idle for a time.
```

```
To do this it compiles information at ten minute intervals
on all processes running.
```

```
If a process
    i) Is not running a program (Image name length of 0).
    & ii) Has been idle (CPU time not changed since last inspection).
    & iii) Has no subprocesses running (Subprocess count of 0).
    & iv) Has a group no. greater than 1 (Is not a system process).
```

```
then it will be stopped and an appropriate message will be
output to whatever terminal it was using.
```

```
*/
```

```
%INCLUDE SYS$GETJPI ;
%INCLUDE SYS$DELPRC ;
%INCLUDE SYS$BINTIM ;
%INCLUDE SYS$SCHDWK ;
%INCLUDE SYS$HIBER ;
```

```
%REPLACE NO_PROCESSES BY 50 ;
%REPLACE TRUE BY '1'B ;
%REPLACE FALSE BY '0'B ;
```

```
DECLARE 1 JPI_LIST STATIC EXTERNAL, /* List structure for SYS$GETJPI */
2 JPI_CPUTIM, /* CPU time */
3 LENGTH FIXED BINARY (15) INIT (4),
3 CODE FIXED BINARY (15) INIT (JPI$_CPUTIM),
3 ADDRESS POINTER,
3 RET_LEN FIXED BINARY (31) INIT (0),
2 JPI_IMAGE, /* Image name */
3 LENGTH FIXED BINARY (15) INIT (128),
3 CODE FIXED BINARY (15) INIT (JPI$_IMAGNAME),
3 ADDRESS POINTER,
3 RET_LEN POINTER,
2 JPI_GROUP, /* Group no. */
3 LENGTH FIXED BINARY (15) INIT (4),
3 CODE FIXED BINARY (15) INIT (JPI$_GRP),
3 ADDRESS POINTER,
3 RET_LEN FIXED BINARY (31) INIT (0),
2 JPI_PROCID, /* Process ID */
3 LENGTH FIXED BINARY (15) INIT (4),
3 CODE FIXED BINARY (15) INIT (JPI$_PID),
3 ADDRESS POINTER,
3 RET_LEN FIXED BINARY (31) INIT (0),
2 JPI_TERM, /* Terminal identifier */
3 LENGTH FIXED BINARY (15) INIT (7),
3 CODE FIXED BINARY (15) INIT (JPI$_TERMINAL),
3 ADDRESS POINTER,
3 RET_LEN FIXED BINARY (31) INIT (0),
2 JPI_SUBPRC, /* Subprocess count */
3 LENGTH FIXED BINARY (15) INIT (4),
3 CODE FIXED BINARY (15) INIT (JPI$_JOBPRCNT),
3 ADDRESS POINTER,
3 RET_LEN FIXED BINARY (31) INIT (0),
2 ENDLIST FIXED BINARY (31) INIT (0) ;
```

```
DECLARE (SUBPROC, GROUP NO) FIXED BINARY (31),
(PID, NAMLEN, ISTAT) FIXED BINARY (31),
(I, J, INDEX, CPUTIM) FIXED BINARY (31),
ID FIXED BINARY (31),
BINARY_DELTA_TIME BIT (64) ALIGNED,
DELTA_TIME CHAR (13) INIT ('0 00:10:00.00'),
TERM_READY BIT,
IMAGE_NAME CHARACTER (128),
OUT_TERM FILE PRINT,
PROC_TERM CHARACTER (7),
TERMINALS (50) CHARACTER (7) INIT ((50)(' ')) ;
```

```
DECLARE (SS$_NORMAL, SS$_NOMOREPROC) FIXED BINARY (31) GLOBALREF VALUE ;
```

```
DECLARE OUT_MSG CHAR (50) INIT (' User logged off - this terminal is now free !!') ;
```

```
DECLARE (LAST_PROCESSES (50), CURR_PROCESSES (50), LAST_CPUTIM (50),
CURR_CPUTIM (50)) FIXED BINARY (31) INIT ((50)-1) ;
```

```
/* Set up the addresses for the list structure */
```

```
JPI_CPUTIM.ADDRESS = ADDR (CPUTIM) ;
```

```

JPI_IMAGE.ADDRESS = ADDR (IMAGE_NAME) ;
JPI_IMAGE.RET_LEN = ADDR (NAMLEN) ;
JPI_GROUP.ADDRESS = ADDR (GROUP_NO) ;
JPI_PROCID.ADDRESS = ADDR (PID) ;
JPI_TERM.ADDRESS = ADDR (PROC_TERM) ;
JPI_SUBPRC.ADDRESS = ADDR (SUBPROC) ;

/* Start the infinite loop */

DO WHILE ( TRUE ) ;

    INDEX = 1 ; /* Counter for arrays */
    ISTAT = SS$_NORMAL ;
    ID = -1 ;

/* Go through all the processes that we can get info on */

DO WHILE ( ( ISTAT ^= SS$_NOMOREPROC ) & ( INDEX <= NO_PROCESSES ) ) ;

    ISTAT = SYS$GETJPI ( ,ID,,JPI_LIST,,, ) ; /* Get the info on the next process */

    IF ISTAT = SS$_NORMAL /* All is OK ? */
        THEN DO ;
            IF (NAMLEN = 0) & (GROUP_NO > 1) & (SUBPROC = 0)
                THEN DO ; /* Set up the arrays */
                    CURR_PROCESSES (INDEX) = PID ;
                    CURR_CPUTIM (INDEX) = CPUTIM ;
                    TERMINALS (INDEX) = PROC_TERM ;
                    INDEX = INDEX + 1 ;
                END ;
            END ;

        END ; /* No more processes - all have been examined */

/* We now know all processes which are currently
doing nothing - now see if they were doing
nothing the last time we looked. */

DO I = 1 TO INDEX ;

    J = 1 ;
    DO WHILE ( LAST_PROCESSES(J) ^= -1 ) ;
        IF CURR_PROCESSES(I) = LAST_PROCESSES(J) THEN
            IF CURR_CPUTIM(I) = LAST_CPUTIM(J) THEN DO ;

                /* Delete the process & output a message */

                ISTAT = SYS$DELPRC (CURR_PROCESSES(I),) ;

                ON UNDEFINEDFILE (OUT_TERM) TERM_READY = FALSE ;

                TERM_READY = FALSE ; /* Loop until terminal is available */
                DO WHILE ( ^TERM_READY ) ;
                    TERM_READY = TRUE ;
                    OPEN FILE (OUT_TERM) OUTPUT TITLE (TERMINALS(I)) ;
                END ;

                PUT FILE (OUT_TERM) LIST (OUT_MSG) ;
                CLOSE FILE (OUT_TERM) ;

            END ;
            J = J + 1 ;
        END ; /* End of DO WHILE */

    END ; /* End of outer do loop ( 1 to INDEX ) */

/* Now set up the arrays for the next loop */

DO I = 1 TO NO_PROCESSES ;
    LAST_PROCESSES (I) = CURR_PROCESSES (I) ;
    LAST_CPUTIM (I) = CURR_CPUTIM (I) ;
    CURR_PROCESSES (I) = -1 ;
    CURR_CPUTIM (I) = -1 ;
    TERMINALS (I) = ' ' ;
END ;

/* Hibernate the process for a time */

ISTAT = SYS$BINTIM (DELTA_TIME, BINARY_DELTA_TIME) ;
ISTAT = SYS$SCHDWK ( ,BINARY_DELTA_TIME, ) ;
ISTAT = SYS$HIBER ( ) ;

END ; /* End of the infinite DO WHILE loop */

END BIG_BROTHER ;

```

### RTS: Test Runtime System Example

. . . continued from page 42

```

Ok
OUT
Ok

!NOTE: ABOVE CCLMGR IS AN EXPANDED VERSION OF RTS ALLOWING INTERFACE TO
!THE CCLMAN FILE PUBLISHED IN THE JUNE, 1982 ISSUE OF RSTS PROFESSIONAL.
!THIS ALLOWS ALL CCLMAN CCLS TO BE EXECUTED AS IF THEY WERE REAL CCLS. NOT
!REQUIRING '@@ ' TO BE APPENDED.
!
!

ILOG OF RTS COMPILE/TASK-BUILD/MAKSIL EXECUTION

Ok

!NOTE:RTSDEF.MAC IS MACROS FOR RTS USAGE

MAC RTS,RTS=$COMMON,SY:[1,50]RTSDEF,SY:[1,50]RTS

Ok

!DO THE FIRST TASK-BUILD, NOTE: WE EXPECT MAKSIL TO BELCH AT THIS
!AS IT WILL ENTER EDIT MODE AND FIX UP THE RTS.CMD FILE SO IT IS
!'ALIGNED'

;=====
;*****Control file to task-build RTS*****
;
RTS/-HD,RTS,RTS=SY:[1,3]RTS
/
;
;THE FOLLOWING 'PAR' STATEMENT WILL ALLOW AD 4K RTS
;NOTE: IF PHYSICAL MEMORY GOES ABOVE 1K THOUGH, THE STACK PARAMETER WILL
;HAVE TO BE DECREASED (MAKSIL WILL DO THIS AUTOMATICALLY FOR YOU)
;
PAR=RTS:160000:020000
STACK=3072
;
;THE FOLLOWING STATEMENT WILL BE EDITED BY MAKSIL TO EXTEND THE DUMMY
;SECTION TO ALIGN THE RUNTIME SYSTEM, IT CONTAINS NO CODE OR DATA
;
EXTSCT=.99998:0
//
;=====

TKB @RTS

Ok

!SET UP RTS AS RTS.RTS, NOTE THE /RTS ON THE FIRST COMMAND LINE
!THE EDITED COMMAND FILE WILL BE GENERATED INTO RTS2.CMD

RUN $MAKSIL
MAKSIL V7.1-11>16K RSTS V7.1-11 C OLFBP 11/70
Resident Library name? RTS/RTS
Task-built Run-Time System input file <RTS.TSK>?
The run-time system is not aligned
Edit mode (Yes/No) <Yes>? YES
Task-builder command input file <RTS.CMD>?
The task-builder commands have been changed as follows
PAR=RTS:160000:020000 PAR=RTS:160000:020000
STACK=3072 STACK=3072
EXTSCT=.99998:0 EXTSCT=.99998:001276

RTS will load in a 4 K-word partition using 1 K-words physical memory.
001276 (octal) bytes may be used for expansion.

Corrected command file name <RTS.CMD>? RTS2
Please task build again using RTS2.CMD

Ok

!RE-TASK-BUILD USING RTS2 WHICH MAKSIL SET UP TO ALIGN THE RTS

TKB @RTS2

Ok

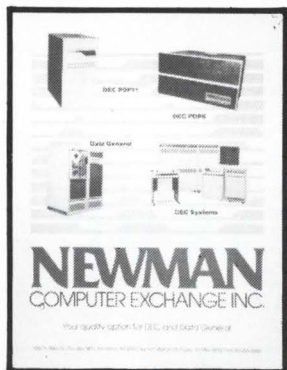
!OK, LETS RUN MAKSIL AGAIN, THIS TIME IT IS ALIGNED SO THE RUNTIME SYSTEM IS
!NOW GENERATED. NOTE: MAKSIL WILL ALSO DO A 'UT ADD' COMMAND FOR IT.
!NOTE ALSO, THAT WE WANT SYMBOLS (SEE BELOW) SO WE CAN PATCH WITH 'ONLPAT'

RUN $MAKSIL
MAKSIL V7.1-11>16K RSTS V7.1-11 C OLFBP 11/70
Resident Library name? RTS/RTS
Task-built Run-Time System input file <RTS.TSK>?
The run-time system is correctly aligned
Edit mode (Yes/No) <Yes>? NO
Include symbol table (Yes/No) <Yes>?
Symbol table input file <RTS.STB>?
Run-Time System output file <SY:[0,1]RTS.RTS>?
RTS built in 1 K-words, 41 symbols in the directory
RTS.TSK renamed to RTS.TSK<40>

Ok
    
```

# FREE

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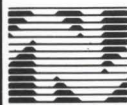
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IASSEMBLY, TASK-BUILD ARE NOW DONE

```
.TITLE RTSDEF,RTS Definition Macros,
.NLIST MD,ME,MEB
```

Ok

INOTE BELOW THAT RTS HAS THE FLAGS AUTOMATICALLY SET  
SY/R

```
; RTS SYSTEM MACRO DEFINITION FILE
; (C) 1982, OLFBP Philip Hunt
;
```

Run-Time Systems:

```
.MACRO CLRFBQ
CALL $FRBCL
.ENDM
```

Name	Typ	Size	Users	Comments
BASIC	BAC	16(16)K	2	Perm, Addr:49, KBM, CSZ
CCLMGR	CCL	1(28)K	3	Perm, Addr:192, DF KBM
RSX	TSK	3(28)K	0	Perm, Addr:193, KBM
DCL		12(2)K	0	Non-Res, KBM
BAS2DB	BAC	16(16)K	0	Non-Res, KBM, CSZ
RT11	SAV	4(28)K	2	Temp, Addr:228, KBM, CSZ, EMT:255
RMS11	TSK	4(28)K	0	Non-Res
FOCOMR	DCF	14(16)K	0	Non-Res, Rem
APLSGL	APC	16(16)K	0	Non-Res, KBM
APLDBL	APD	16(16)K	0	Non-Res, KBM
BASIC2	TSK	16(16)K	0	Non-Res
HP2COM	TSK	4(28)K	0	Non-Res, KBM
RTS	TST	1(28)K	0	Non-Res, KBM

```
.MACRO CLRXRFB
CALL $XRFBCL
.ENDM
```

Ok

!LETS SWITCH INTO OUT RTS

SW RTS

```
.MACRO ERROR NUM
PUSH R1
MOV NUM,R1
CALL $ERRPT
POP R1
.ENDM
```

Ok

INOTE THAT MY RTS IGNORES EXCLAMATION POINTS  
;AND SEMI-COLON LINES IN COLUMN ONE  
; THEY ARE CONSIDERED COMMENTS  
!THE FOLLOWING ARE RTS COMMANDS, NOT CCLS

```
.MACRO MESSAGE MSG,LEN
CLRXRFB
MOV LEN, XRB+XRLEN
MOV XRB+XRLEN, XRB+XRBC
MOV MSG, XRB+XRLOC
.WRITE MSG,LEN ;WRITE MESSAGE PROMPT
.ENDM
```

HELP  
RTS - V01.00.1

Commands:

- RUN - Run a program
- OUT - Out to system default KBM
- VERSION - Type version number of RTS
- ASSIGN - Assign devices or logicals
- DEASSIGN- Deassign devices or logicals
- HELP - This message

```
.MACRO INPUT BUF,ARG
MOV ARG,XRB+XRLEN
MOV BUF,XRB+XRLOC
MOV #-1,XRB+XRTIME
.READ BUF,ARG
.ENDM ;^C STATE ON ^T
;GET USER INPUT
```

Ok

VERSION  
RTS - V01.00.1

```
.MACRO MEMORY ARG
CLRXRFB
MOV ARG, XRB+0
.CORE ARG
.ENDM
```

Ok

OUT

Ok

```
.MACRO TSTFBQ
TSTB FIRQB
BEQ 10$
CALL $PRFRQ
JMP RTSINP
```

10\$:

INOTE: ABOVE CCLMGR IS AN EXPANDED VERSION OF RTS ALLOWING INTERFACE TO  
!THE CCLMAN FILE PUBLISHED IN THE JUNE, 1982 ISSUE OF RSTSPROFESSIONAL.  
!THIS ALLOWS ALL CCLMAN CCLS TO BE EXECUTED AS IF THEY WERE REAL CCLS, NOT  
!REQUIRING '@@' TO BE APPENDED.

!  
!

```
1 .TITLE RTSDEF,RTS Definition Macros,01,23-Jun-82,PJH
2 .NLIST MD,ME,MEB
```

```
3
4 ; RTS SYSTEM MACRO DEFINITION FILE
5 ; (C) 1982, OLFBP Philip Hunt
6 ;
```

7

11

15

22

30

37

43

```
1 .TITLE RTS,RTS Test Runtime System,01,23-Jun-82,PJH
```

```
2 ; *****RTS***** TEST RUNTIME SYSTEM EXAMPLE
3 ;
4 ;
5 ; (C) 1982 OLFBP Philip Hunt
```

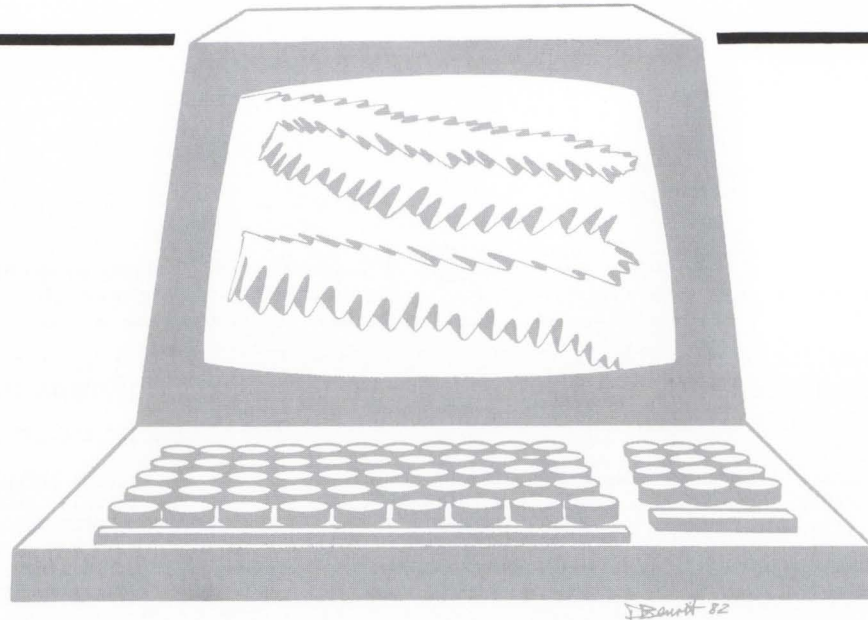


```

6
7 000000          .PSECT  RTSMON,RO,GBL
8                  .ENABL  GBL
9                  .NLIST  ME
10
11                ;
12                ;LOW CORE DATA AREA DEFINITIONS
13                ;
14                ;BUFFER = 1002                                ;PUT BUFFER BOTTOM USERSP
15                ;      COPY  $COMMON
16                ;      COPY  RTSDEF                            ;MACRO DEF INCLUDES
17
18                ; start-up RTS, initialize items, set system program name
19
20 000000          RTS::
21 000000          CLRXRB                                         ;HOUSEKEEPING
22 000004          CLRFQB                                         ;
23 000010 000423    BR      RTSNME                               ;NO LOG OUT CHECK
24
25 000012 016702 000400  RTSNEW: MOV    KEY,R2                      ;CHECK KEYWORD JOB BITS
26 000016 032702 010000          BIT    #JFNOPR,R2                ;SEE IF LOGGED OUT
27 000022 001416          BEQ    RTSNME                            ;LOGGED IN
28
29 000024          MESSAGE #BYMSG,#8.                               ;print 'bye'
30 000054 000167 000070          JMP    RTSRED                     ;GET A COMMAND
31
32 000060 016767 001672 000412  RTSNME: MOV   PRGNAM,FIRQB+FQNAM1
33 000066 016767 001666 000414          MOV   PRGNAM+2,FIRQB+FQNAM1+2
34
35 000074 104044          RTSRUN::.NAME                           ;NAME US AS "NONAME"
36 000076 104026          .TRST                                  ;JUST IN CASE, ENTRY BY ^C
37
38 000100          MEMORY #2                                       ;GET 2K WORDS
39
40                ; print prompt, initialize buffers
41
42 000114          RTSINP::CLRXRB
43 000120          MESSAGE #PROMPT,#7.                             ;PRINT PROMPT
44
45 000150 012701 000100  RTSRED: MOV    #64.,R1
46 000154 012702 000460          MOV    #CORCMN,R2                ;LETS CLEAR CORCOMMON AREA
47 000160 012703 001002          MOV    #BUFFER,R3
48 000164 005022          CORLOP: CLR    (R2)+
49 000166 005023          CLR    (R3)+
50 000170 077103          SOB    R1,CORLOP                        ;ALSO THE INPUT BUFFER
51
52                ; get user input
53
54 000172          CLRXRB
55 000176          INPUT  #BUFFER,#128.                            ;GET USER INPUT
56 000222          TSTFQB                                         ;ANY ERRORS???
57
58                ; do asthetic housekeeping....
59
60 000240 016705 000444          MOV    XRB+XRBC,R5                ;SAVE CHARS ACTUALLY RECIEVED
61 000244 012704 001002          MOV    #BUFFER,R4                ;GET BUFFER RCVD ADDR
62 000250 121427 000040          SPCLOP: CMPB  @R4,#32.            ;SPACE AS FIRST CHARACTER?
63 000254 001403          BEQ    DROPCH                            ;YES, SO DROP IT
64 000256 121427 000011          CMPB  @R4,#9.                    ;TAB AS FIRST CHAR???
65 000262 001002          BNE    OKREAD                            ;NOPE, MUST BE OK...
66
67 000264 005204          DROPCH::INC    R4                       ;YES, SO SKIP IT
68 000266 000770          BR      SPCLOP                          ;AND TRY AGAIN
69
70 000270 122714 000015          OKREAD::CMPB  #13.,@R4           ;CR ONLY?????
71 000274 001725          BEQ    RTSRED                            ;YEP, SO IGNORE IT
72 000276 122714 000012          CMPB  #10.,@R4           ;LF ONLY?????
73 000302 001722          BEQ    RTSRED                            ;YEP, SO IGNORE IT
74 000304 122714 000004          CMPB  #04.,@R4           ;ctrl/d ONLY?????
75 000310 001717          BEQ    RTSRED                            ;YEP, SO IGNORE IT
76 000312 122714 000014          CMPB  #12.,@R4           ;ctrl/l ONLY?????
77 000316 001714          BEQ    RTSRED                            ;YEP, SO IGNORE IT
78 000320 122714 000033          CMPB  #27.,@R4           ;ESC ONLY?????
79 000324 001711          BEQ    RTSRED                            ;YEP, SO IGNORE IT
80 000326 122714 000041          CMPB  #33.,@R4           ;EXCLAMATION, SO ASSUME A COMMENT
81 000332 001706          BEQ    RTSRED                            ;YES, IGNORE IT
82 000334 122714 000073          CMPB  #59.,@R4           ;SEMI-COLON, SO ASSUME A COMMENT
83 000340 001703          BEQ    RTSRED                            ;YES, IGNORE IT
84
85                ; lower to upper case conversion

```

. . . continued on page 60



## LINE NUMBER RESEQUENCER FOR BASIC-PLUS AND B + II PROGRAMS

By Lawrence P. Gallagher

Resequencers are programs which renumber the lines of a BASIC source file. This function facilitates the addition of new sub-routines and the linkage of several sub-programs to a main source. Also, resequencers modify the line number arguments of GOTO's and other similar statements, to conform to the new line sequence.

There are several undesirable features in the DEC supplied RESEQ.BAC (VER 3B-01). First, it does not process programs with ampersand-flagged multi-line commands; these files it hashes beyond recognition. Furthermore, RESEQ.BAC does not back up the file it is processing, making error recovery virtually impossible. Lastly, there is a maximum program length allowed by RESEQ.BAC, which is inconvenient when trying to concatenate several large programs.

RESEQ.TEC (V01), however, has none of these deficiencies. The TECO run-time system has a unique file opening mode ("/B+" mode) which recognizes ampersand-flagged statements in a BASIC source file. TECO also has an inherent "OPEN and BACKUP" command. TECO employs a variable length text buffer and internal stack along with a variety of commands such as INSERT, SEARCH, and SUBSTITUTE, and TECO can handle exceptionally large files by splitting them into pages. These features make TECO an ideal language for resequencers.

When RESEQ.TEC is run, two macros are defined and loaded into their respective Q-registers: a terminal driver into QB, and a "line number lookup and substitute" macro into QR. RESEQ.TEC then prompts the user to enter his file name (which defaults to a ".BAS" extension) until his file can be found. After the file is opened (in "/B+" mode), the user is prompted to enter the line number parameters: the

lowest and highest line numbers of the original program segment, and the starting number and interval size of the new program lines.

During the first pass of resequencing, RESEQ.TEC successively scans each line of the source file looking for those lines whose line numbers are within the range specified by the user. If the number is in range, RESEQ.TEC loads the old line number in the numeric storage space of QT, computes the corresponding new line number, and loads the new line number in the text storage space of QT. QT is then pushed on the stack, and the new line number counter is incremented. (If by some chance the newly computed line numbers overflow, or become greater than 32767, RESEQ.TEC prints a warning, and aborts, restoring the original program.) After the entire program has been scanned, the entire stack is popped into the now-empty text buffer in table form, and the entire table is stored in the text storage area of QX.

RESEQ.TEC then reopens the file in BACKUP mode. One page at a time, it scans the file line by line, calling the line number substitution macro to replace old line numbers with new ones. Then RESEQ.TEC scans for GOTO's, GOSUB's, etc., and makes the necessary substitutions for their arguments. When the entire file has been scanned, RESEQ.TEC exits, leaving the original file with a ".BAK" extension, and the newly renumbered version with the original name.

### PROGRAM INSTALLATION

1) If this program is to be run on a RSTS/E system, it should be compressed to reduce space and TRIPLE execution time. Since TECO is an interpreted language, it must





```

<^AENTER NEW STARTING LINE NUMBER FOR SEGMENT <10> ?^A
MBGO          IPUT IN BUFFER!
J\ULHK        ISAVE IN QL AND CLEAR BUFFER!
QL"E10UL'     IDEFAULT TO 10!
QL;           IEXIT IF POSITIVE!
^ASTARTING NUMBER MUST BE BETWEEN 1 AND 32767^A13^T10^T
>
<^AENTER THE INCREMENT FOR THE NEW LINE NUMBERS <10> ?^A
MBGO          IPUT IN BUFFER!
J\UIHK        ISAVE IN QI AND ZERO BUFFER!
QI"E10UI'     IDEFAULT TO 10!
QI;           IEXIT IF POSITIVE!
^AINCREMENT MUST BE BETWEEN 1 AND 32767^A13^T10^T
>
13^T10^T
I** PASS ONE ** ASSEMBLE THE LINE NUMBER SUBSTITUTION TABLE !
^APASS ONE^A 13^T 10^T
OUC           IZERO COUNTER!
Y            IYANK FIRST PAGE!
<<\UT        ISTORE THIS LINE NUMBER (IF ANY) IN QT!
(QT-QA+1)"G(QZ-QT+1)"G IIF IN RANGE...!
.UOQL\QO,..XTQO,..D   ISTORE THE NEW LINE NO....!
(T %C
(QI)%L       I!PUSH AND INCREMENT QC AND QL!
QL"L^ANEW LINE NUMBERS OVERFLOWED -- RE-SPECIFY SEGMENT DIMENSIONS^A
13^T10^T OVERYEND$''' IIF OUR NEW LINE NUMBERS BECOME!
L            I!GREATER THAN 32767, WARN THE USER!
NEXT LINE!
(-Z);       IEXIT IF POINTER AT END OF PAGE!
>
Y            IGET NEW PAGE!
-Z;         IEXIT IF PAGE IS EMPTY (WE'RE DONE)!
>
ILOAD TABLE INTO QX!
QC<J^T      I!POP FROM STACK INTO QT!
I.$         I!INSERT A '.'!
QT\         I!INSERT THE OLD NUMBER!
13I$10I$   I!INSERT A CR/LF!
I.$         I!INSERT A '.'!
GT          I!INSERT THE NEW NUMBER!
I.$         I!INSERT A NEW CR/LF!
13I$10I$
    JQC*2XX      ISTORE THIS TABLE IN QX!
    ZUE         ISTORE NO. CHRS IN QE!
    HK          I!CLEAR BUFFER!
    I** PASS TWO ** SEARCH FOR KEY WORDS AND SUBSTITUTE NUMBERS !
    ^APASS TWO^A 13^T 10^T
    ^USEB$      I!LOAD AN EB COMMAND!
    G*O:XS      I!APPEND THE FILE SPEC!
    27:"US$     I!APPEND THE 'ESC'!
    HK         I!CLEAR THE BUFFER!
    MS         I!OPEN THE FILE FOR INPUT!
    Y          I!GET FIRST PAGE!
    <           I!RETRIEVE TABLE!
    JGX        I!INSERT TABLE IN FRONT OF BUFFER!
    OL         I!IF THIS IS A REAL LINE NO, PROCEED!
    <^N QL      I!IF THIS LINE NO IS IN RANGE...!
    (0A-43)*(0A-45)^N I!THEN CALL THE SUBSTITUTION FUNCTION!
    MR''       I!ADVANCE A LINE!
    L          I!AND EXIT LOOP IF DONE!
    .-Z;
    >
    QEJ:SGOTO$U7 I!FIND A GOTO!
    Q7"N<MR      I!REPLACE IT,!
    :SGOTO$;>'   I!AND TRY AGAIN!
    QEJ:SGOSUB$U7 I!FIND A GOSUB...!
    Q7"N<MR:SGOSUB$;>'
    QEJ:STHEN$U7 I!FIND A 'THEN'...!
    Q7"N<MR:STHEN$;>'
    QEJ:SELSE$U7 I!FIND AN 'ELSE'...!
    Q7"N<MR:SELSE$;>'
    QEJ:SRESUME$U7 I!FIND A 'RESUME' ...!
    Q7"N<MR:SRESUME$;>'
    QEJ:SERL$U7 I!FIND AN 'ERL <' , 'ERL =' , etc. !
    Q7"N<MR:SERL$;>'
    QEJ:SLINE$U7 I!FIND A 'LINE <' , 'LINE =' , etc. !
    Q7"N<MR:SLINE$;>'
    INEXT PAGE!
    JQED
    P
    -Z;>
    EX
    IVERYEND!
    ^C$$
    ICLEAR TABLE!
    IGRAB THE NEXT PAGE!
    IAND EXIT (WE'RE DONE) IF PAGE IS BLANK!
    I!BYE BYE !
    
```

# BACmac can do it all!

BAC into RTS / BAC into MAC / BAC into BAS

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Now Available**

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- translation from Basic-Plus into Macro source code, which compiled under RSTS runs faster than Basic-Plus
- translation from Basic-Plus into Macro source code which may be compiled under RSTS for execution under RT11 — a migration facility
- translation from Basic-Plus into a RUN-TIME-SYSTEM. Now you can write an RTS in Basic-Plus. The ideal solution to memory thrashing due to "multi-copy" applications programs.

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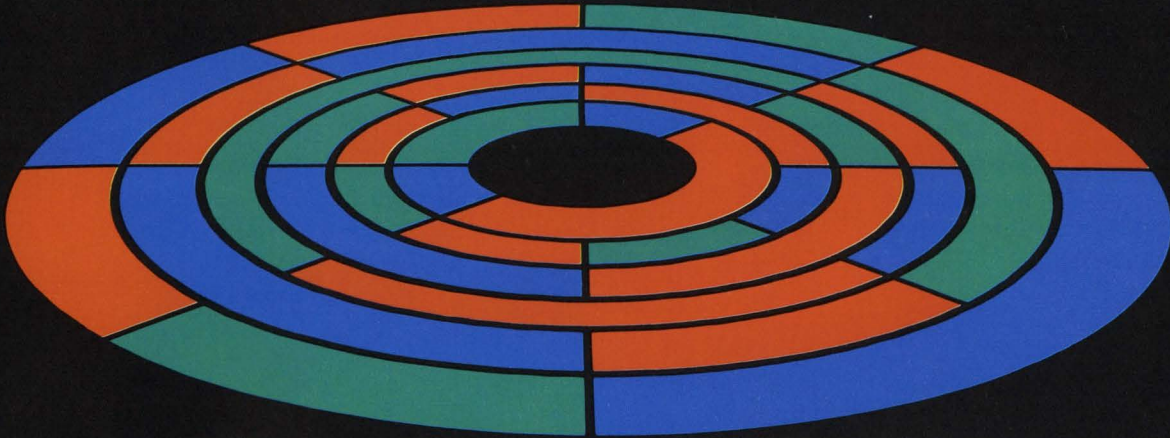
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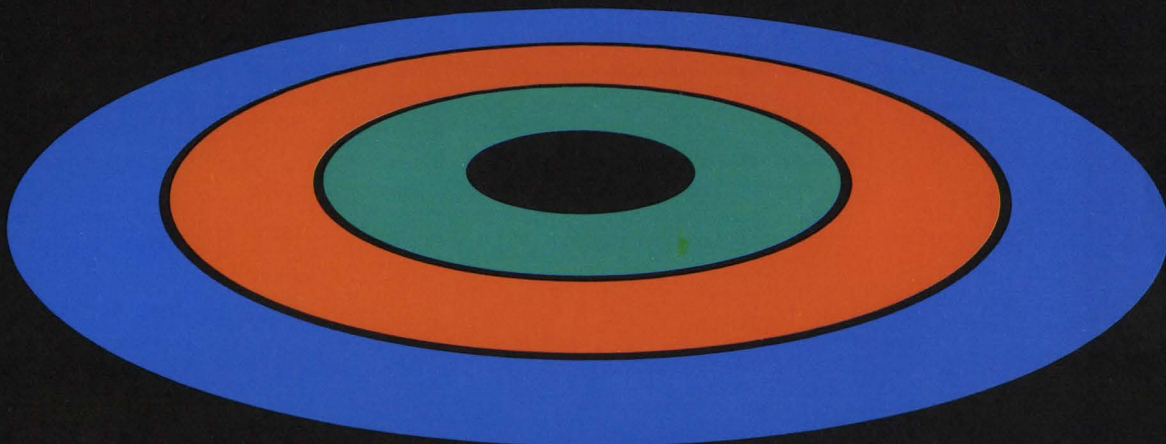
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```

164 001016 001003             BNE     NOTWLD             ;YES
165
166 001020 012767 177777 000416   MOV     #-1,FIRQB+FQEXT   ;SET WILDCARD EXTENSION
167
168 001026 104042             NOTWLD::.RUN             ;TRY TO DO IT
169
170 001030                     TSTFQB             ;ANY ERRORS???
171
172                     ; deassign command
173
174 001046 005702             DEACMD::TST     R2             ;ANY ARGS???
175 001050 001021             BNE     DESONE             ;YES, DO CHECK WHAT TO DEASSIGN
176
177 001052                     CLRFBQ
178 001056                     CLRXRBB
179 001062 112767 000014 000405   MOVE    #UU.DAL,FIRQB+FQFUN ;SET UP DEASSIGN
180 001070 104076             .ULOG             ;CLEAR ALL
181 001072                     TSTFQB             ;PRINT ANY ERROR ENCOUNTERED
182 001110 000167 177000             JMP     RTSINP            ;DONE
183
184 001114             DESONE::CLRXRBB             ;CLEAR IT
185 001120                     CLRFBQ             ;DITTO
186
187 001124 010567 000442             MOV     R5,XRB+XRLEN       ;ABOUT RIGHT
188 001130 010567 000444             MOV     R5,XRB+XRBC       ;DITTO
189 001134 010267 000446             MOV     R2,XRB+XRLOC      ;WHERE ARG BEGINS
190 001140 104064             .FSS              ;GET FILENAME
191 001142                     TSTFQB             ;ANY ERRORS???
192
193 001160             OKDEAS:                    ;NO, SO LETS DO IT
194 001160 012705 000013             MOV     #UU.DEA,R5         ;SETUP DEASSIGN ,JUMP TO ASSIGN LOGIC
195 001164 000167 000050             JMP     ASSNGO            ;DO IT PLEASE
196
197                     ; assign command
198
199 001170             ASSCMD::CLRXRBB             ;CLEAR IT
200 001174                     CLRFBQ             ;DITTO
201
202 001200 010567 000442             MOV     R5,XRB+XRLEN       ;ABOUT RIGHT
203 001204 010567 000444             MOV     R5,XRB+XRBC       ;DITTO
204 001210 010267 000446             MOV     R2,XRB+XRLOC      ;WHERE ARG BEGINS
205 001214 104064             .FSS              ;GET FILENAME
206 001216                     TSTFQB             ;ANY ERRORS???
207
208 001234 012705 000012             OKASSG: MOV     #UU.ASS,R5   ;SETUP ASSIGN, DO W/CODE SET
209 001240             ASSNGO:                    ;R5 = 13=DEASSIGN, 12=ASSIGN
210
211 001240 032767 100000 000452     BIT     #100000,XRB+10     ;GET BASIC FLAG-WORD 2
212 001246 001410             BEQ     OKASGN            ;LEGAL DEVICE
213
214 001250             ERROR #NODEVC           ;NOT A VALID DEVICE
215 001264 000167 176624             JMP     RTSINP            ;GET NEW PROMPT
216
217 001270 110567 000405             OKASGN: MOVE    R5,FIRQB+FQFUN ;ASSIGN OR DEASSIGN CODE
218 001274                     CLRXRBB
219 001300 104076             .ULOG
220 001302                     TSTFQB             ;SEE IF ERROR
221 001320 000167 176570             JMP     RTSINP
222
223
224
225                     ; asynchronous_traps
226
227 001324 104026             CCTRAP::.TTRST             ;SYS(CHR$(0%))
228 001326 000167 176562             JMP     RTSINP            ;IGNORE CTRL/C, MUST USE 'OUT'
229
230 001332             BDERRO::                    ;ANY WEIRD ERRORS
231 001332                     MESSAGE #FTLERR,#28.
232 001362 104046             .EXIT
233
234
235
236                     ; some useful subroutines
237
238 001364             $FRBCL:: PUSH     R1             ;SAVE R1
239 001366 012701 000402             MOV     #FIRQB, R1        ;START OF FIRQB
240 001372 005021             CLR     (R1)+
241 001374 005021             CLR     (R1)+
242 001376 005021             CLR     (R1)+
243 001400 005021             CLR     (R1)+
244 001402 005021             CLR     (R1)+
245 001404 005021             CLR     (R1)+
246 001406 005021             CLR     (R1)+
247 001410 005021             CLR     (R1)+

```





```

311
312 001652 121227 000012      NOARG:: CMPB  @R2,#10.      ;USER ENTERED TERMINATOR??? (LF)
313 001656 001415              BEQ    OKNOAR      ;YES, SAY SUCCESSFUL
314
315 001660 121227 000015      CMPB  @R2,#13.      ;USER ENTERED TERMINATOR??? (CR)
316 001664 001412              BEQ    OKNOAR      ;YES, SAY SUCCESSFUL
317
318 001666 121227 000033      CMPB  @R2,#27.     ;USER ENTERED TERMINATOR??? (ESC)
319 001672 001407              BEQ    OKNOAR      ;YES, SAY SUCCESSFUL
320
321 001674 105721              SKIPCM: TSTB  (R1)+      ;GET TO END OF CURRENT CMD
322 001676 001376              BNE   SKIPCM
323
324 001700 105711              TSTB  @R1          ;END OF CMD REACHED, LETS CHECK END OF TBL
325 001702 001406              BEQ    BDCMD      ;YEP, MUST BE BAD USER CMD
326
327 001704 005203              INC   R3          ;INC INDEX, MORE CMDS TO CHECK
328 001706 010402              MOV   R4,R2      ;RESTORE USER BUFFER ADDRESS
329 001710 000747              BR    PRSLOP     ;...AND CHECK MORE
330
331 001712 005002              OKNOAR::CLR  R2      ;SIGNAL NO ARGUMENTS
332 001714 012700 000001      OKWARG::MOV  #1,R0  ;SIGNAL SUCCESSFUL
333 001720              BDCMD::RETURN ;BACK TO PROCESSING
334                                ;R0 = 0,BAD CMD <>0 = GOOD CMD
335                                ;R2 = 0, NO ARG <>0 = ADDR OF ARG FOUND
336                                ;R3 = <>0 = INDEX OF COMMAND RECIEVED
337
339
340                                ; messages
341
342                                .ENABL LC
343 001722      015      012      117  PROMPT::.ASCIZ <15><12>/Ok/<15><12><12>
344                                001725      153      015      012
345                                001730      012      000
346                                001732      040      040      040      .ASCIZ / / ;EXTRA PROMPT PATCH SPACE
347                                001735      040      040      040
348                                001740      040      040      040
349                                001743      000
350                                001744      015      012      102  BYEMSG::.ASCIZ <15><12>/Bye/<15><12><12>
351                                001747      171      145      015
352                                001752      012      012      000
353
354                                .EVEN
355                                PRGNAM::.RAD50 /NON/ ;ALLOWS NONAME PATCHING
356                                .RAD50 /AME/
357                                001762      077      127      150  BADCMD::.ASCIZ /?What?/<15><12> ;bad command input
358                                001765      141      164      077
359                                001770      015      012      000
360                                001773      077      125      156  FTLERR::.ASCIZ /?Undefined error occured?/<15><12>
361                                001776      144      145      146
362                                002001      151      156      145
363                                002004      144      040      145
364                                002007      162      162      157
365                                002012      162      040      157
366                                002015      143      143      165
367                                002020      162      145      144
368                                002023      077      015      012
369                                002026      000
370                                002027      077      111      154  BDSMSG::.ASCIZ /?Illegal switch/<15><12>
371                                002032      154      145      147
372                                002035      141      154      040
373                                002040      163      167      151
374                                002043      164      143      150
375                                002046      015      012      000
376
377                                002051      040      055      040  VERMSG::.ASCII / - / ;3
378                                002054      126      060      061  VERSON::.ASCIZ /V01.00.1/<15><12> ;10
379                                002057      056      060      060
380                                002062      056      061      015
381                                002065      012      000
382                                002067      015      012      103  HLPMSG::.ASCII <15><12>/Commands:/<15><12><12> ;14
383                                002072      157      155      155
384                                002075      141      156      144
385                                002100      163      072      015
386                                002103      012      012
387                                002105      122      125      116      .ASCII /RUN - Run a program/<15><12> ;25
388                                002110      040      040      040
389                                002113      040      040      055
390                                002116      040      122      165
391                                002121      156      040      141
392                                002124      040      160      162
393                                002127      157      147      162
394                                002132      141      155      015

```





DOCMD 000534RG	002 NODEVC= ***** GX	RTSLEN 002434RG	002 UU.PAS 000000	.SET 104036
DROPCB 000264RG	002 NOTWLD 001026RG	002 RTSNAM 002424RG	002 UU.POK 177772	.SLEEP 104010
DSKHND 000000	NSTORG 001000	RTSN EW 000012R	002 UU.PPN 000031	.SPEC 104014
DTAHND 000004	NULHND 000026	RTSNME 000060R	002 UU.PRI 177763	.STAT 104040
DTRFQ 000002	OKASGN 001270R	002 RTSRED 000150R	002 UU.RAD 000016	.TIME 104030
DT2HND 000036	OKASSG 001234R	002 RTSRUN 000074RG	002 UU.RTS 177756	.TTAPE 104016
ELAFQ 000006	OKDEAS 001160R	002 RUNCMD 000746RG	002 UU.SLN 000025	.TTDDT 104024
ERRFQ 000016	OKFILE 001012RG	002 RXDHND 000022	UU.SPL 177744	.TTECH 104020
FIRQB 000402	OKNOAR 001712RG	002 SKIPCM 001674R	002 UU.SWP 000027	.TTNCH 104022
FLGFRC 020000	OKREAD 000270RG	002 SOBLOP 000372RG	002 UU.SYS 000032	.TTRST 104026
FLGKB 040000	OKWARG 001714RG	002 SPCLOP 000250R	002 UU.TB1 177775	.ULOG 104076
FLGMOD 010000	OPNFQ 000002	SYSV EE 030456	UU.TB2 177764	.UUO 104066
FLGPOS 004000	OUTCMD 000564RG	002 SYSVEL 033460	UU.TB3 177743	.WRITE 104004
FLGRND 100000	PF.CSZ 020000	TTYHND 000002	UU.TRM 000020	.XPEEK 104100
FQBSIZ 000040	PF.EMT 100000			

. ABS. 177777	000
	000000 001
RTSMON 002506	002

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system. The BUS protects against this problem by providing power and logic isolation from one subsystem to another, fault recognition within a subsystem, and either hardware or software controlled switching around the problem. Each BIS is an addressable device on the bus, and thus, each system can support up to 8 BIS subsystems.

To support the system's modularity needs, WRT has also developed the modular Power Controller System. Available in 30 amp and 50 amp versions, the PCS has four switched circuits for system use, and one unswitched circuit for test equipment use.

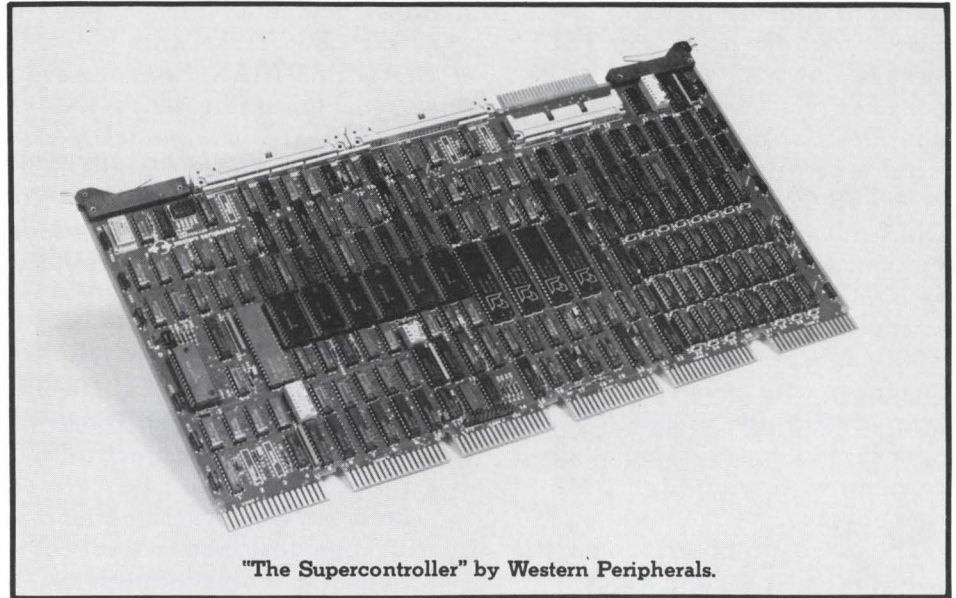
The FTS Systems are fully DEC supported with the exception of the WRT components. The system prices range from \$100,000 and up and deliveries are expected to begin after the first of the year. The MDS (priced at less than \$7000), and PCS (less than \$2500) subsystems are also available individually from the company.

For further information contact John Sutherland, Western Resource Technology, Inc., 2970-Q East La Palma Avenue, Anaheim, CA 92806. Or telephone (714) 630-7852, or TWX 910-591-1241.

Western Peripherals Has  
'The Supercontroller'

Tustin, CA — Western Peripherals, a division of WESPERCORP, announced the introduction of "The Supercontroller" GCR/Streaming Tape Controller for DEC PDP-11 and VAX-11 Unibus computers.

Called the TS-6251, the new Supercontroller "is the first streaming mode controller that allows compatible operation under standard unmodified software," explained Jack Olson, vice president of marketing. This is accomplished with the use of a 64 Kbyte on-board memory



"The Supercontroller" by Western Peripherals.

which de-couples the drive mechanics from the computer software.

The versatility of the TS-6251 enables it to be used as DEC TS11 or TM11 emulator, 6250 bpi (GCR) controller, software compatible streamer controller, 6250 bpi streamer controller, or

a single board embedded stop/start controller.

An important feature of the TS-6251 hardware is its dual emulation capability, allowing it to emulate DEC TS11 or DEC TM11 subsystems. This feature is employed by implementing different sets of firmware for

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different subsystems. The TS-6251 emulates up to four TS11 subsystems with one tape drive per subsystem, and it emulates one TM11 subsystem with up to eight tape drives.

The TS-6251 has a unique DMA auto-throttle feature that optimizes the controller's use with GCR and tri-density drives at speeds up to 125 ips, at 6250, 1600, and 800 bpi. The auto-throttle acts in unison with the large data buffer to simplify operational considerations when running with other high DMA rate devices.

The large, on-board memory is configured as a multi-block staging buffer and enables the user to run 1/2" streaming 1600 and 3200 bpi drives with unmodified software in a streaming mode. The buffer accumulates multiple blocks of data to be written or read, and determines when to stop and start the drive, maximizing throughput. This new concept is highly cost effective as "memory chips have come down in price during the past year—allowing for greater storage on a controller board," said Olson.

"The Supercontroller will even do error retries without software intervention," he added. This eliminates most of the time-consuming repositioning cycles that make streaming drives unable to run unmodified software on other controller systems.

Price for the TS-6251 Supercontroller is \$2250 in single quantities, including cables, documentation and diagnostics. Delivery is 30 days.

For further information, contact Jack Olson, vice president of marketing, Western Peripherals, 14321 Myford Road, Tustin, CA 92680. Telephone: (714) 730-6250.

**New Software Systems  
For VAX-11, DEC 10/11  
Available From IMSL**

Houston, TX — IMSL, Inc. has

announced that MATH/PROTRAN and STAT/PROTRAN, two software systems for mathematics and statistics, are now available for the VAX-11, DEC 10 and DEC 20 computers. Both PROTRAN products are designed to reduce programming effort at a savings to the user.

A free 60-day trial of both systems is offered to the first 500 users or until March 31, 1983, whichever occurs first. Those interested should contact IMSL to arrange for the free trial.

Both systems are user-friendly packages designed to increase problem-solving productivity. Advantages to the user are that no formal programming knowledge is needed for its application; interface between products is compatible; error checking is provided and *Fortran* can be easily intermixed with the more powerful PROTRAN statements.

MATH/PROTRAN solves problems in elementary operations and random number generation, interpolation and data smoothing, integration and differentiation, differential equations, linear and nonlinear algebraic equations, eigenvalues and eigenvectors, optimization, transforms and sorting.

STAT/PROTRAN assists in problem solving areas such as basic statistics, frequency tables and crosstabulations, correlation, regression analysis, analysis of variance, and random number generation.

Initial annual subscription rates for the DEC VAX-11 Series are MATH/PROTRAN - \$3,000; STAT/PROTRAN - \$2,500. The subscription rate for both MATH/PROTRAN and STAT/PROTRAN is \$4,500 the first year. IMSL is offering an introductory university price of \$500 for initial subscriptions for each product.

For additional information, including details on the free 60-day trial, contact IMSL, Inc.,

Sixth Floor, NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036-5085 USA. Telephone (713) 772-1927. Outside Texas, call toll free (800) 231-9842, or telex 79-1923 IMSL INC HOU.

**Evans Griffiths & Hart  
Offers RSTS/E Package**

Lexington, MA — Evans Griffiths & Hart, Inc. (EGH) has announced the release of a new product, VMSPIP, a RSTS/E package that reads disks written under VAX/VMS and copies VMS file to RSTS/E media.

Describing VMSPIP as extremely fast, an EGH representative said the package was designed for those installations where tape-based file transfers from VAX/VMS to RSTS/E were too slow and unwieldy to be practical. He added that the package is particularly convenient where a VAX and a PDP-11 share a switchable dual-ported disk.

In addition to preserving the normal RMS attributes of a VMS files, VMSPIP can also recognize and properly copy files created by ROSS/V, EGH's RSTS/E Operating System Simulator under VAX/VMS. This allows a PDP-11 to provide operational backup for a VAX that is running critical applications under ROSS/V.

A single-CPU license for VMSPIP is \$1250. OEM and quantity discounts are available. Contact Evans Griffiths & Hart, Inc., 55 Waltham Street, Lexington, MA 02173. Tel: (617) 861-0670.

**SOFPROTEx Releases  
Tape Library System**

Belmont, CA — SOFPROTEx, a division of Government Copyright Services, has just released DATASAFE, a tape library system which performs a wide variety of functions to aid



"*The Bridge*<sup>™</sup> is software that creates a virtual microcomputer at every terminal connected to my mini. I have all the functions of a micro, but without micro limitations.

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CIRCLE 28 ON READER CARD

The new prices were effective November 1, 1982.

List price reductions are:

—The SC21/V, designed for Unibus use with DEC's VAX-11 series of computers has been reduced from \$6000 to \$5000, a decrease in price of 16 percent.

—The TC11/N, which cost \$3000, now sells for \$2200, a decrease in price of 27 percent.

—The TC11/P, formerly listing at \$3600, now lists at \$2800, a decrease of 22 percent.

The TC11/N is a single density NRZI tape controller. The TC11/P is a dual density tape controller that supports both NRZI and PE modes.

"These disk and tape controller price reductions reflect Emulex's improved manufacturing efficiency, and we have decided to pass these savings directly to our customers," Evans said.

He also pointed out that these new low list prices are further reduced for OEM and volume customers who take advantage of Emulex's product mix-and-match discounts. Under this program, all purchases from Emulex in any year — regardless of whether for disk, tape, or communications products — count toward gross discount credits.

For further information call or write Phillip Begich, director of national sales, 2001 East Deere Avenue, Santa

Ana, CA 92705.  
Telephones: (800) 854-7112, or in California (714) 557-7580.

Catch-23 Now Available  
On RSX-11M Version 4

Sudbury, MA — EEC Systems announce that their Catch-23 software is now available on RSX-11M version 4. Catch-23 is a software package which allows DEC PDP-11/23 users to upgrade from 18 bit to 22 bit addressing capabilities without having to replace existing 18 bit peripheral devices.

A company spokesman said that this represents a cost savings of several thousands of dollars over buying new hardware. He added that sales of Catch-23 have been brisk since the product was first announced last summer and has been installed at numerous Fortune 100 companies. Catch-23 is priced at \$1995.00 for a single CPU license.

For more details contact: Eric Dickman, EEC Systems, Inc., 327/E Boston Post Road, Sudbury, MA 01776, (617) 443-5106.

Solutions DECK Offers  
User Productivity Tools

Fredericton NB, Canada — A family of programmer productivity tools is now available for RSTS users from SOLUTIONS DECK.

The SOLUTIONS DECK is a family of products to aid in the quick and accurate production of the

# RSTS/E INTERNALS MANUAL

The RSTS community has been clamoring for years for a book that details the inner workings of RSTS/E. Well, clamor no more. Michael Mayfield of Northwest Digital Software, and M Systems, the publisher of The RSTS Professional and The DEC Professional Magazines, have teamed up to produce the RSTS/E Monitor Internals Manual.

This manual describes the internal workings and data structures of the RSTS/E monitor. It also notes differences in the internal structures between version 7.1 and earlier versions of the monitor. Future updates will include changes for new versions of the monitor.

Information is available for all levels of users:

- Gain a basic understanding of the workings of the monitor for optimizing system performance.
- Information on disk structures allows recovery of data from corrupted disk packs.
- Special uses of runtime systems and resident libraries allow complex applications to be developed without degrading system performance.
- Write your own custom device drivers for that "foreign" device you need to add but thought you couldn't.

## CONTENTS:

Chapter 1 describes the structures used by the monitor that are resident on disk. These include the directory structure, disk allocation tables, Save Image Library (SIL) formats, bootstrap formats and bad block mapping.

Chapter 2 describes the tables used within the monitor to control system resources and provide program services. These tables provide job, memory, file and device control, as well as program services such as interjob communication.

Chapter 3 contains information on writing and installing a custom device driver. It describes the entry points and information the driver must provide to the monitor as well as the subroutines and macros the monitor provides for the driver.

Chapter 4 contains information that enhances information already provided by Digital on writing custom resident libraries and runtime systems. It concentrates mainly on non-standard uses of resident libraries and runtime systems to increase system performance and functionality.

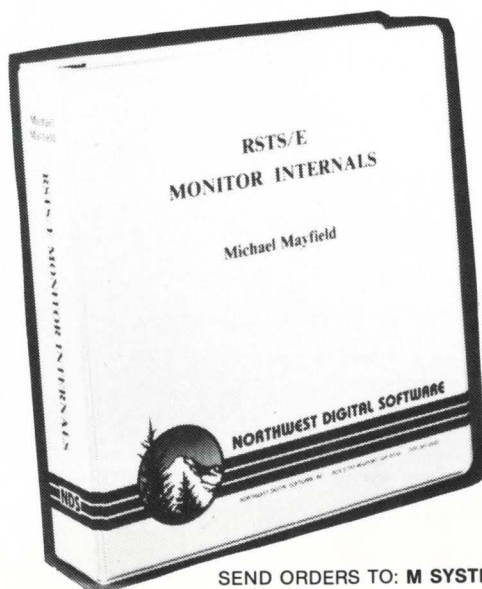
Appendix A provides six quick reference foldout charts:

- The directory structure.
- The monitor tables.
- Fixed memory locations and common data structures.
- Monitor subroutines.
- Device driver entry points.
- Device driver macros.

Appendix B provides examples of the peek sequences required to access most of the monitor tables. It also contains an example program that uses many of the monitor tables to display a job and open files status.

Appendix C provides an example device driver.

Appendix D provides an example runtime system that doubles as a menu system for restricting specified users to a menu of options.



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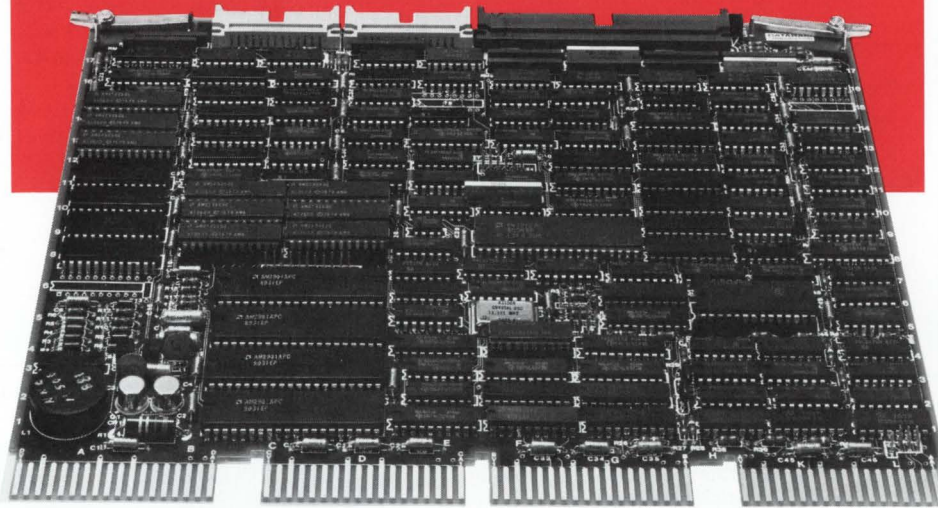








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CONTROLLER	DESCRIPTION	COMPATIBILITY
C03	Cartridge disk controller	RK05
C33	Cartridge disk controller	RK05
T03	NRZI mag tape controller	TM11/TU10
T04/C	Mag tape streamer coupler	TM11/TU10
T04/N	NRZI mag tape controller	TM11/TU10
T04/D	Dual density mag tape controller	TM11/TU10
T34/C	Mag tape streamer coupler	TM11/TU10
T34/N	NRZI mag tape controller	TM11/TU10
T34/D	Dual density mag tape controller	TM11/TU10
T36	Dual density mag tape controller	TM11/TU10
T34/T	GCR mag tape controller	TM11/TU10
S03/A, S04/A	80 MB/300 MB SMD controller	RM02/RM05
S03/A1, S04/A1	80 MB/160 MB SMD controller	RM02
S03/B	80 MB/300 MB SMD controller	RK07
S03/C	200 MB/300 MB SMD controller	RP06
S03/D, S04/D	96 MB CMD controller	RK06
S33/A	80 MB/300 MB SMD controller	RM02/RM05
S33/A1	80 MB/160 MB SMD controller	RM02
S33/B	80 MB/300 MB SMD controller	RK07
S33/C	200 MB/300 MB SMD controller	RP06
S33/D	96 MB CMD controller	RK06

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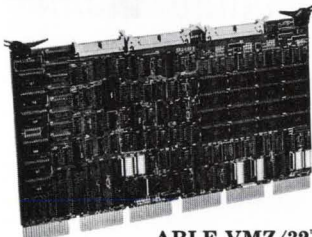
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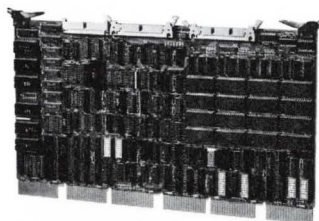
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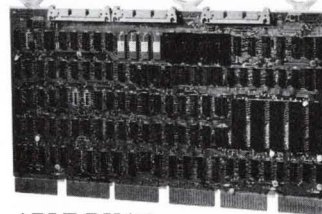
## #1 UNIBUS DMA.

Then there's our DH/DM, the original multiplexer which puts 16 lines with modem control on a single board. This popular device meets UNIX VAX system needs for DMA communications requirements, serves UNIBUS systems equally well, and beats them all for MTBF, throughput and



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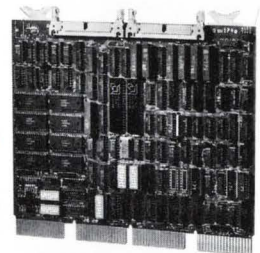
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A controller for the PDP-11 user, the DV/16 contributes microprocessor-derived flexibility, which permits mixing of sync and async lines in combinations

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