RSTS PROFESSIONAL

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RSTSPROFESSIONAL

From the editors.

Whither RSTS

Dave Mallery I hear that DEC plans to build about 2000 personal computers a week during the first year of production. It occurs to me that in a few years, the MAJORITY of DEC users will be personal computer owners. I know that I will certainly be one of them. How awful to become a DEC user and find yourself trapped in the CPM wasteland - perhaps never even find out about the operating systems that made DEC what it is . . .

I saw a '350' a few weeks ago. It was underwhelmingly slow. It seems that the Winchester drive is the villian. Apparantly, its seek time is in the same range as the floppy.

Much of the software currently being sold for micros seems to work its way around the 'speed' of the floppies by limiting the applications to the amount of data that can be held in memory. In many cases, the AMOUNT of data that can be handled is the severe limiting factor for the packages.

A TKB that runs at floppy speed is not really possible. In fact, most of our RSTS software relies on reasonably fast disc access. That leaves the '350' out. Not the '350' but its disc. There are lots of small fast Winchesters around. Lets hope one makes the grade soon.

I guess I am looking for a Personal RSTS machine with a '350' price. I don't want a run-only OEM box, but one that will let me write real code in real languages (B+2, v2?), compile and taskbuild in a time frame that makes the machine usable by a professional programmer.

Today's Wall Street Journal has an article on the new Apple Lisa system (16 bit, \$9995). The wave of the present seems to offer lots of free software (a la Osborne), including word processing and spread sheets, preferably neatly integrated. Maybe we will be seeing some drastic reductions in Dec-Word and Dec-Calc soon.

I read that IBM, after they announce their new low-end PC, will have a multi-user engine in the works. For the life of me, I can't imagine that the machine I want has to be any more expensive than the '350'. The future of personal computing will be written by IBM and DEC. The market does NOT have to be driven by IBM.

I am betting that in a few years, the RSTS Pro will have an audience we never dreamed about back in Vol. 1, #1.

Why Did It Die?

Carl B. Marbach The little 11/40 was dead. No lights, no fans, no noise. The three RPO2's were all in a line. Quiet. No familiar click, click, click from the disks as the heads were positioned by that clicking mechanism. There were terminals; 4 VT52's and one VT100. Terminals can't communicate with an unplugged computer. The room was dark but neatly piled in one corner was the residue of an active computer site: diagnostic tapes, hardware manuals, a RSTS V7.0 distribution kit, software documentation, backup listings and disk packs. I was quiet, reverent as if I were visiting a bereaved family. The 11/40 had died.

Why did it die? Don't 11/40's usually grow up and become 11/44's or 11/70's? O.K., some of them metamorphose into VAX/VMS systems. This one died and was RE-PLACED by another brand. Cables hung loosely from the ceiling and it felt like this room belonged more in an adventure game or in the dungeon . . ." you're in the computer room, it is dark and the computer is turned off . . .

Was the 11/40 a bad machine? Did DECservice not respond when needed? Did the CPU get overburdened and run too slowly? Did the DEC salesman forget this account? I would guess that none of these caused the demise of this system. It probably died of software rigor softus a malady demonstrated to me one day when a major DEC OEM showed me his IBM system. "I shopped for software," he told me, "and this is what it runs on." Can you picture this DEC shop with an IBM system doing its computing. Ruined my day. I even like the OEM, they are down to earth good people with lots of good ideas. I respect their judgement and it worries me. Is the state of our software so bad, that this 11/40 dies and an OEM can't even use DEC equipment?

When I was in school they used to tell us that some day software would cost more than the hardware it ran on. Hard to believe then, hard now to imagine that it was ever not the case. Hardware continues to offer more bang for the buck while programmers get more bucks and seem to have less and less bang. What this all means is that software is gaining in importance every day, and it is already the most important part of any system. When a system dies, replaced by another, it is usually because of better software on the new machine. The 11/40 is a good machine, and when it runs out of power there are lots of good DEC replacements like the 11/44 or the 11/70 and even the VAX.

The beginning of the year is a good time to examine ourselves personally and professionally. How is your software? Is your system paying its way and providing value to your company. Can you make it do better? If we all work just a little harder to make sure our software systems are all they should be we could insure our systems continued success and valuable contributions to the companies we work for.

Remember the users too, be sympathetic - they have problems also. Keep those lights (if you have them) blinking, the disks clicking, the printers printing, the plotters plotting, the tapes spinning and the terminals typing.

I don't like quiet computer rooms.



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LETTERS to the RSTS Pro...

To start off, I would like to thank you for a really terrific magazine. It has helped me with my system, and it is extremely interesting! Whenever I get my RSTS PRO, it is always the high-point of my week.

Next, I think that by far the best thing yet to come from M SYSTEMS is the RSTS/E MONITOR INTERNALS manual. I say this before I have even seen it. Enclosed, please find my order for the RSTS/E Internals Manual. I have a question — the second paragraph tells of "Future Updates." Can you give us an idea (just a guess, if you don't yet want to make a commitment) when (or how often) these updates will be available, and how much they will cost?

Also, I read the letter from Mike Mayfield, explaining why RSTS/E jobs can only use 31K. One of the more exciting things I have read so far in your magazine, is that he might offer a patch to allow 32K in Version 7.1! I hope he can show us how to do this in V7.2 also! Thank you, Mike!

Next, I would like to point out some errors I spotted in the August issue of RSTS PRO.

In DEAR RSTS MAN, a letter from SPIDL details the woes of stopping a line printer spooler at night, and trying to allow non-privileged users to start it up again in the morning. RSTS MAN suggested using QUE-11 V2.2. May I suggest two less expensive methods?

First, to do exactly what SPIDL asked for, you could make a modified version of the program SPOOL (call it SPOOLY). You would modify the code to not do any input from the terminal, but to act as if a proper command had been entered to become LPO: (or whatever). You also might include code to log out, then log in to [1,2] *AFTER* it had detached. Then you could compile SPOOLY with a protection code of 232. To start up the spooler in the morning, the nonprivileged, operator would merely RUN \$SPOOLY. SPOOLY would declare itself a receiver, as SPOOL does, detach, as SPOOL does, and chain to SPLIDL, as spool does. I leave it to the reader to discover a method for shutting down the spooler at night.

An even better method, though, is not to shut down the spooler at all! Just pick an account to become an "operator account," and tell OPSER about it: PL/OPER KB0:[p,pn]. Then, in order to shut down the spooler at night, type (assuming this is LPO:) PL/INT LPOSPL:FORM OFF which tells the spooler to handle only jobs queued to form OFF. If you don't queue anything to FORM OFF, nothing will be printed! In the morning, type PL/INT LP0SPL:FORM NORMAL which tells the spooler to handle only jobs queued to form NORMAL. This is the form queued to if no /FORM switch is used on the QUE command. If using this method, I would suggest using patches 14.4.1F, 14.6.3F (which prevent the operator from QUEING to someone else's account), and patch 14.6.1F (which eliminates the "JOB WITH DIFFERENT FORM NAME WAITING" message; if this patch is not installed, then anytime something wakes up QUEMAN during the night that message will be printed). In another letter to DEAR RSTS MAN, Jim Carrigan asks how to create a Tempfile (.TMP file) which will automatically be deleted by LOGOUT. It is really sad that DEC technical support could not help him. This is really simple. It does not involve any special bits in the UFD, and no RSTS MAGIC is needed. (There is a function of the CALFIP directive which does some of this for you, but it cannot be used from BASIC or BP2 and besides. you don't need it.) Simply name the file with any four letters, followed by your job number, with the extension (excuse me, filetype) .TMP. For instance, a program called FROG using a tempfile should call it FROG02.TMP, if job 2 is running. It must be a 2-digit job number, even if it is job 9 or less. If you never CLOSE the file for the duration of the program, and you do not need it again on subsequent runs, you can KILL the file immediately after opening it. Then, as soon as the program ends or the file is closed, the system purges it. (You can use a KILLed file as if it were not killed. The system remembers that it has been "Marked for Deletion," and the file is killed as soon as it is closed.) If for some reason you cannot do this, LOGOUT will kill the file for you when the job logs out (note: the file is not deleted if the job is KILLED). If I am job 2, LOGOUT does the equivalent of PIP ????02.TMP/DE as it is run. (To check this, go into and out of TECO, do a directory, then type BYE/N and do another directory.)

I don't mean to pick on RSTS MAN, but another letter, from Jerry Forshee, deserves a note about upgrading PDP 11/34 systems to PDP 11/44 systems USING THE SAME COM-PUTER SYSTEM. This is an option that most DEC salespeople do not seem to know about! Simply remove the 2 PDP 11/34 cards, the FP-11 (if any), the DL11, and the memory. Install in its place the single PDP 11/44 card and some PDP 11/44 memory. That's it-you don't even need a new SYSGEN! The entire procedure, including running diagnostics, takes about 3 hours, and there is almost nothing that CAN go wrong. Another possibility, for those that cannot afford the PDP 11/44 CPU, is ENABLE/34 (by Able Computers). See my article ["Able Computer Technology" p. 28, this issue] for more details about this.



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Send letters to: Letters to the RSTS Pro, P.O. Box 361, Ft. Washington, PA 19034-0361.

There is something funny about OSCAR.RTS (from MACRO MAN, August, 1982). Every time I run the MAKSIL program, I get the error ?Partition or stack parameter incorrect for task ?Task image OSCAR.TSK cannot be converted to run-time system OSCAR. I tried this using both the "EDIT MODE" of MAKSIL and using OSCAR.TEC. I also tried changing the ".PSECT" commands in OSCAR to ".PSECT .99998" and ".PSECT .99999" and changing the EXTSCT command with the task-builder to EXTSCT'.99998:0 (or EXTSCT'.99998:17516). Did I do something wrong?

Next, I would like to say that I agree with Steven Edwards [Letters, August, 1982]. It is one thing to see an article discussing things that should be available on RSTS/E, and using an existing software product as an example. But it is quite another thing to see a user's manual, including an installation guide (!), appearing in the guise of a RSTS PRO article! You two run a terrific magazine. It is a pity that such articles, with such a limited interest (not all RSTS users can benefit from them, only those who buy the products), should be included with the rest.

Unfortunately, there is also the grey area. Articles like TYPE (August, 1982) are of some interest to me, because now I have an idea for a program I can write myself for my own system. Only later did I notice that the TYPE program is listed for sale in the classified ads. I found the TYPE article interesting. I might not have if it had been 10 pages instead of 1.

So I have not written. After all, where does one draw the line? I DO have a big enough mouth to tell you how to run your magazine, if I think you are doing it wrong. Unfortunately, I cannot even think of a reasonable suggestion to make, when it comes to drawing this line. I guess that's why you guys print the magazine, and I only buy it. You get the headaches. I CAN say that I hope you never do what DECUS is doing - banning all talk about anything non-DEC. If you had this policy, I wouldn't know what ROSS/V is, or a D-MAX, or a SUPER-MAX, or ENABLE/34, or . . . etc. It has finally dawned on me what you both have been saying all along that WE, the READERS, are the SAME PEOPLE as the contributors. You would not publish an article on how to run QUE-11 if you had some other material which you judged to be better. No longer will I say, "Gee, I hope he gets some more people to contribute," until I have contributed myself. In that vein, find enclosed a copy of an article about the pros and cons of ENABLE/34. [I don't know if you remember, Dave, but I promised this to you at L.A. DECUS 1981! I was the guy wearing the badge with the homemade banner that said, "NOBODY."]

I am not Guru-ish; I might have my moments, but they are the exceptions. But not all your readers are 10-year RSTS hackers! Tell me if you would like an article for beginners at system management. I might be able to tell some of the simpler (DEC-supported!) things that can be done to make a system flow smoothly, quickly, and securely. Would you be interested?

And, in case my letter gets published, let me say to all of you in reader-land: THINK! What have you done lately on RSTS? If it was easy and it worked well, write in to tell us all to do it, too! If it was hard but paid off, write in to tell us why it was hard, and how to make it easier! If it ... continued on page 31



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MAKING RSTS REALTIME

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By Michael Mayfield,

Northwest Digital Software, Box 2-743, Newport, WA 99156

RSX is a realtime system and RSTS is a timesharing system and never the two shall meet, right? Wrong. This article provides a patch to the RSTS monitor that will give you all the realtime response of RSX while still providing the timesharing we know and love on RSTS.

Although a true RSX affectionado probably wouldn't agree with me, RSTS and RSX really aren't that different any more. While RSX has become more "friendly," RSTS has been getting more technical tools. But, even with these increasing similarities, one big difference still separates them: RSX can provide realtime response and RSTS cannot.

By realtime response I mean that whenever a program wants to run that has a priority higher than the program currently running, the current program will be immediately suspended and the higher priority program will be run. The key word here is "immediately."

Response time in RSTS is tempered by the run burst associated with each job. Once a program starts running, it can continue to run until it has used up this run burst, even if a higher priority program becomes runnable. This means that, statistically speaking, average realtime response in RSTS is one half the average run burst, or 1/20th second. Not shabby, but definitely not realtime.

The patch described below provides RSTS with the same realtime response as RSX for programs of sufficient priority while retaining normal time sharing response for programs of lower priority.

When a program completes an I/O request it will immediately start running if it is within the realtime priority range and is of a higher priority than the program that is currently running. Average response time is less than one millisecond, even on an 11/23.

The only drawback to adding realtime processing to RSTS in this way is that normal timesharing can become skewed by frequent interruptions for realtime processing. When the currently running program is suspended so that the realtime task can execute, the current program will lose its runburst and any other runnable programs of the same priority will be scheduled before the current program runs again.

In the patch below, the realtime processing priority range is specified by the number at offset 40. Any program at or above the priority specified by this value will be treated as a realtime task. Any program of a lower priority will be treated as a normal timesharing task.

The realtime processing range is currently set to priority 64 and higher. This threshold can be changed by entering a different value at offset 40.

This patch uses patch space that is allocated for possible monitor patches. Future monitor patches may require the same patch addresses. If this occurs, the realtime patch will have to be removed or moved to a different location in patch space. The patch is position independent and can be installed in any other area in patch space that is not in use.

The comments following the semi-colons are for information only and can be ignored while entering the patch, although they will not cause any problems if entered. < LF> is used to signify a linefeed. ?????? is used to signify that any value is acceptable for this field.

As with all patches, be sure that the offset and old values are correct for each line before making any changes. If any of the old values are incorrect, abort the patch by typing 1C.

RUN [1	,2]ONLPAT				
Command	d file na	me? RELTI	4.L0)G=	
File to	o patch?	<lf></lf>			
Module	name? <l< td=""><td>F></td><td></td><td></td><td></td></l<>	F>			
Base ad	ddress? P	ATCH+300			
Offset	address?	0			
Base	Offset	Old	Ne	ew?	
??????	000000	000000	?	105737	;Is a job currently running
??????	000002	000000	?	JOB	
??????	000004	000000	?	1423	;No- Always call scheduler immediately
??????	000006	000000	?	16446	;Point to JDB for job completing I/O
??????	000010	000000	?	JOBTBL	
??????	000012	000000	?	62716	;Point to JDB+JDPRI (job's priority)
??????	000014	000000	?	34	
??????	000016	000000	?	13746	;Point to JDB for current job
??????	000020	000000	?	JOBDA	
??????	000022	000000	?	62716	;Point to JDB+JDPRI (job's priority)
??????	000024	000000	?	34	
??????	000026	000000	?	123676	;Is current prio >= I/O job's prio
??????	000030	000000	?	0	
??????	000032	000000	?	2007	;Yes- Don't do realtime scheduling
??????	000034	000000	?	127627	;Is I/O job's prio >= realtime threshold
??????	000036	000000	?	0	
??????	000040	000000	?	64.	; (realtime priority threshold)
??????	000042	000000	?	2403	;No- don't do realtime scheduling
??????	000044	000000	?	52737	;Schedule the I/O job immediately
??????	000046	000000	?	20000	
??????	000050	000000	?	L3QUE2	
??????	000052	000000	?	5726	;Junk pointer to JDB for I/O job
??????	000054	000000	?	105737	;Replace the patched instruction
??????	000056	000000	?	JOB	
??????	000060	000000	?	207	;Return from patch
??????	000062	000000	?	^Z	
Offset	address?	^Z			
Base Ad	idress? I	OFIN4			
Offset	address?	62			
Base	Offset	Old	Ne	w?	
??????	000062	105767	?	4737	;Enter patch
??????	000064	??????	?	PATCH+3	00 ;NOTE: New Value must match patch bas
??????	000066	001003	?	^C	;End of patch

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THE RSTS CRYSTAL BALL RSTS V7.2 Enhancements

By Michael C. Greenspon, Integral Information Systems, Los Angeles, CA

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Welcome once again. In this issue, I have some interesting monitor enhancements, as well as a fix for the named directory code.

ERRATUM

First, some corrections for last month. A small but serious error found its way into the TECO macro (PI.TEC) during publication. The sixth physical line of the macro, as printed, should end with the instructions -1%l, followed by a close iteration, ">". The printed version showed the ">" replaced by a paragraph symbol, which is a little difficult to key on an ASCII terminal.

Also, the load average code listed at the end of the article was a little munged. The code is supposed to start with the second .ENABL LC. Only the disclaimer got crunched the code is all OK. Also, note that the monitor load average computation routine ends with the .END, and the block of code after it is a BASIC program intended to print out the current system load averages. These two were run together without any spacing, making it hard to tell where one ended and the other started.

MONITOR ENHANCEMENTS

I assume by this time that most sites are running version 7.2. All monitor patches and enhancements I publish for V7.2 should work for V7.1 as well, unless noted.

Two patch locations in FSS may be used to enable a useful feature. When enabled, the patch allows a project, programmer specification in the form "[,n]" and "[]"; i.e., omitting the project number or the PPN completely. If the project number is omitted, it defaults to the project number of the account which the calling job is logged into. If the entire PPN is omitted; i.e., empty brackets, it will default to the account that the calling job is logged into. For example, a job logged into [100,100] executes a .FSS call on the string "[,5]". With the patch enabled, the call will return [100,5] as the PPN, instead of an error. The string "[]" would return [100,100]. Note that since .FSS does the translations, some programs which parse their own PPNs will not accept these specifications.

The patch (actually two separate patches) is listed below. If patched on-line into the installed SIL, it will not take effect until the system is rebooted.

File to patch? Module name? EMT		
Base address? PJDF		
Offset address? 0		
Base Offset Old	New?	
?????? 000000 000405	? BNE!(Q&377) ; Make into a BNE to enable [,	n]
?????? 000002 016703	? °C ; Up-arrow C to exit	
File to patch?		
Module name? EMT		
Base address? PPDF		
Offset address? 0		
Base Offset 01d	New?	
?????? C00000 000410	? BNE1(Q&377) ; Make into a BNE to enable []	
?????? 000002 016703	? °C ; Up-arrow C to exit	

I have finally disassembled the named directory code, and, after staring at it for nearly an hour, discovered several bugs. Unfortunately, none of these bugs is the MFD-bonking type reported by several sites running named directories. However, I have been running a monitor with named directories all weekend, making heavy use of the FSS and UU.NME translations, and have not been able to bonk any of the packs. I even wrote a program to log in and out and read random blocks of the MFD on the system disk, hoping to find some weird FIP condition that would punt garbage in FIBUF back to the MFD. Alas, three days later, the MFD is still quite readable — and the named directory code appears to work just great!

I am rating the use of the named directory code as "safe." Our development machines are running it now, on the normal production packs, and I am reasonably confident that we won't have any problems. My patches fix some serious bugs, however these bugs would at worst cause some confusion or frustration on the part of the user — no random disk writes. Obviously, I cannot take responsibility for anyone munging a pack with the named directory code. If you do decide to run it, and you manage to bonk a pack with it, please, please contact me. I'd like to find some REPRODUCIBLE condition which causes the code to fail.

The RSTS named directory implementation is a "slap it on top of what we've got" job, but a rather neat and elegant one. It is based on a small hashed file called NAME.SYS, located in [0,1] on all disks with named directories. The file contains enough information to translate 12 character ASCII (4 words of RAD50) names to PPNs and back.

The first block of the file is used as a directory/scratch block, and stores the hash table, links to the PPN table and free blockette list, number and maximum number of entries in the file, etc. Another contiguous section of the file is used to store the PPN table, which contains one word for each 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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222222 000304 000000 ? -2.

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 online. MUST be installed before OVR patch.

Hase address? 24 Base Offset address? 24 Base Offset 0.00234 D00234 O00200 77777 000236 000240 000000 77777 000236 000240 000000 77777 000240 000240 000000 77777 000240 000240 000000 727777 000240 000240 000000 727777 000240 727777 000240 000240 000000 727777 000240 000240 000000 727777 000240 000240 000000 727777 000250 000250 000000 727777 000254 000000 7 EE(16 777777 000254 000000 7 EE(16 777777 000254 000000 7 EE(13 777777 000264 000000 7 EE(11 777777 000264	Module	name? RS1	rs.				
Offact address? 234 Base Offact 0:d New? ????? 000214 000000 ? WDV16402 ; FATCH1: Get the passed FPN ????? 000244 000000 ? EVEN ; rance, default it ????? 000244 000000 ? EVEN ; sit [0,1]? ????? 000244 000000 ? EEQ116 ; none, default it ????? 000244 000000 ? EEQ116 ; none, default it ????? 000244 000000 ? EEQ111 ; yes, go on ?????? 000250 000000 ? EEQ16 ; Froject was 0 and not [0,1] er ?????? 000254 000000 ? EEC13 ; yes, error ?????? 000264 000000 ? EEC13 ; yes, error ?????? 000264 000000 ? EEC13 ; yes, mumber 255.? (wildcard) ?????? 000264 000000 ? EEC13 ; yes, error ?????? 000264 000000 ? EEC13 ; yes, error ?????? 000266 000000 ? EEC13 ; no, go on ??????? 000266	Hase ad	dress? P/	TCH				
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?????? 000244 000000 ? 1 ?????? 000250 000000 ? EC111 ; yes, go on ?????? 000250 000000 ? EE111 ; yes, go on ?????? 000250 000000 ? EE111 ; yes, go on ?????? 000254 000000 ? EMPH2702 ; project 255.? ?????? 000254 000000 ? EC13 ; yep, error ?????? 000264 000000 ? EC13 ; yep, error ?????? 000264 000000 ? EC13 ; yep, on ?????? 000264 000000 ? EC13 ; prog, number 255.? (wildcard) ?????? 000264 000000 ? EC13 ; prog, number 255.? (wildcard) ?????? 000270 000000 ? ENE11 ; no, go on ; prog, number 255.? (wildcard) ??????? 000272 000000 ? ADD1	???????	000242	000000	?	CMF 12702		Is it [0,1]?
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????? 000250 000000 ? SWAFIC2 : Swap proj. and prog. number ?????? 000254 000000 ? EC16 : Froject war 0 and not [0,1] er ?????? 000254 000000 ? EC16 : Froject war 0 and not [0,1] er ?????? 000254 000000 ? EC16 : Froject war 0 and not [0,1] er ?????? 000256 000000 ? EC13 : yep, error ?????? 000260 000000 ? EC13 : yep, error ?????? 000264 000000 ? INCHIC2 : Swap the bytes back ?????? 000264 000000 ? EC13 : yep, error ?????? 000264 000000 ? INCHIC2 : Is prog. number 255.? (wildcard) ?????? 000264 000000 ? ENE11 : no, go on ?????? 000272 000000 ? ADD12705 : Skip defaulting of PPN on return ?????? 000274 000000 ? ATS165 ; Get out ?????? 000302 000000 ? INC165 ; FATCH2: Fump index into PPN table ??????? 000302 000000 ? INC165	122222	000246	000000	?	BEQ ! 11	;	yes, go on
?????? 000252 000000 ? EEQ16 : Froject was 0 and not [0,1] er ?????? 000254 000000 ? CMFN12702 : Is project 255.? (wildcard) ?????? 000264 000000 ? SMAF162 : Swap the bytes back ?????? 000264 000000 ? EE013 : yep. error ?????? 000264 000000 ? EE013 : sprog. number 255.? (wildcard) ?????? 000264 000000 ? EE013 : sprog. number 255.? (wildcard) ?????? 000266 000000 ? EE013 : no go on ?????? 000266 000000 ? EE013 : no go on ?????? 000266 000000 ? EE013 : no go on ?????? 000266 000000 ? EE013 : prog. number 255.? (wildcard) ?????? 000266 000000 ? EE013 : prog. number 255.? (wildcard) ?????? 000276 000000 ? Entitos : Skif defaulting of PPN on return ?????? 000274 000000 ? Entitos : Get out ??????? 000302 000000 ? Entitos : FAT	??????	000250	000000	?	SWAB102		Swap proj. and prog. number
?????? 000254 000000 ? CMPFH2702 ; Is project 255.? (wildcard) ?????? 000260 000000 ? 255. ; yep, error ?????? 000260 000000 ? EEQI3 ; yep, error ?????? 000264 000000 ? SWAFIG2 ; Swap the bytes back ?????? 000264 000000 ? INCBIG2 ; Is prog. number 255.? (wildcard) ?????? 000264 000000 ? INCBIG2 ; Is prog. number 255.? (wildcard) ?????? 000264 000000 ? ENEII ; no, go on ?????? 000272 000000 ? ADD12705 ; Skip defaulting of PPN on return ?????? 000274 000000 ? ETS105 ; Get out ?????? 000320 000000 ? INC105 ; FATCH2: Fump index into PPN table ?????? 000302 000000 ? ST161 ; Was last entry free?	27777?	000252	000000	?	BEC16	;	Froject was 0 and not [0,1] er
?????? 000256 000000 ? 255. ?????? 000260 000000 ? EC13 : yep, error ?????? 000264 000000 ? EC13 : Swap the bytes back ?????? 000264 000000 ? EC13 : Js prog. number 255.? (wildcard) ?????? 000266 000000 ? INCBIC2 : Is prog. number 255.? (wildcard) ?????? 000270 000000 ? INCBIC2 : Skip defaulting of PN on return ?????? 000274 000000 ? ADD12705 : Skip defaulting of PN on return ?????? 000274 000000 ? ADD12705 : Get out ?????? 000276 000000 ? EC15 : FATCH2? Fwmp index into PPN table ?????? 000302 000000 ? INC105 : FATCH2? Fwmp free?	???????	000254	000000	?	CMPB 127 02	;	Is project 255.? (wildcard)
?????? 000260 000000 ? EE013 : yep, error ?????? 000262 000000 ? SWAFIC2 : Swap the bytes back ?????? 000264 000000 ? INCB162 : Swap the bytes back ?????? 000264 000000 ? INCB162 : Is prog. number 255.? (wildcard) ?????? 000276 000000 ? TRAPIBADNAM : Error with ?lllcgal filename ?????? 000274 000000 ? ADD12705 ; Skip defaulting of PPN on return ?????? 000276 000000 ? HTS105 ; Get out ?????? 000302 000000 ? INC105 ; FATCH2: Fump index into PPN table ?????? 000302 000000 ? INC105 ; Wat a last entry free?	222222	000256	000000	?	255.		
?????? 000262 000000 ? SWAFIC2 : Swap the bytes back ?????? 000264 000000 ? INCRIC2 : Is prog. number 255.? (wildcard) ?????? 000264 000000 ? INCRIC2 : Is prog. number 255.? (wildcard) ?????? 000260 000000 ? ENETI : no, go on ? ?????? 000270 000000 ? TRAFIBADNAM ; Error with ?Illcgal filename ?????? 000272 000000 ? ADD12705 ; Skip defaulting of PPN on return ?????? 000274 000000 ? ATS:105 ; Get out ?????? 000300 000000 ? INC:105 ; FATCH2: Fump index into PPN table ?????? 000302 000000 ? ST:161 ; Was last entry free?	??????	000260	000000	2	BEQ13	;	yep, error
?????? 000264 000000 ? INCBIC2 ; Is prog. number 255.? (wildcard) ?????? 000266 000000 ? BNE11 ; no, go on ?????? 000270 000000 ? BNE11 ; no, go on ?????? 000270 000000 ? BAFIBADNAM ; Error with ?111cgal filename ?????? 000274 000000 ? BAFIBADNAM ; Skip defaulting of PPN on return ?????? 000276 000000 ? FIS105 ; Get out ?????? 000300 000000 ? INC105 ; FATCH2: Fump index into PPN table ?????? 000302 000000 ? ST161 ; was last entry free?	??????	000262	000000	?	SWAH162	;	Swap the bytes back
?????? 000266 000000 ? ENEI1 : no, go on ?????? 000270 000000 ? ERAPIBADNAM : Foror with ?illegal filename ?????? 000272 000000 ? ERAPIBADNAM : Foror with ?illegal filename ?????? 000272 000000 ? ERAPIBADNAM : Foror with ?illegal filename ?????? 000274 000000 ? : Skip defaulting of PPN on return ?????? 000276 000000 ? : Foror with ?illegal filename ?????? 000276 000000 ? : Foror with ?illegal filename ?????? 000276 000000 ? : Foror with ?illegal filename ?????? 000276 000000 ? : Foror with ?illegal filename ?????? 000302 000000 ? : Foror with ?illegal filename ?????? 000302 000000 ? : Foror with ?illegal filename ??????? 000302 000000 ? : Was last entry free?	??????	000264	000000	?	INCB102	;	Is prog. number 255.? (wildcard)
?????? 000270 000000 ? TRAFIBADNAM ; Error with ?illegal filename ?????? 000272 000000 ? ADD12705 ; Skip defaulting of PPN on return ?????? 000274 000000 ? E ; ?????? 000276 000000 ? E ?????? 000276 000000 ? E ?????? 000300 000000 ? INC105 ; FATCH2: Eump index into PPN table ?????? 000302 000000 ? INC105 ; Was last entry free?	???????	000266	000000	?	BNE ! 1	;	no, go on
????? 000272 000000 ? ADD12705 ; Skip defaulting of PPN on return ?????? 000274 000000 ? fStop ?????? 000276 000000 ? RTS105 ; Get out ?????? 000300 000000 ? INC105 ; FATCH2: Fump index into PPN table ?????? 000302 000000 ? ST161 ; Was last entry free?	777777	000270	000000	?	TRAPIBADNAM	;	Error with ?111cgal filename
?????? 000274 000000 ? 6 ?????? 000276 000000 ? RTS105 ; Get out ?????? 000300 000000 ? INC105 ; FATCH2: Eump index into PPN tabl€ ?????? 000302 000000 ? INC105 ; Was last entry free?	222222	000272	000000	?	ADD12705	;	Skip defaulting of PPN on return
?????? 000276 000000 ? RTS:105 ; Get out ?????? 000300 000000 ? INC:05 ; FATCH2: Eump index into PPN tabl€ ?????? 000302 000000 ? IST:61 ; Was last entry free?	??????	000274	000000	?	6		
?????? 000300 000000 ? INC!05 ; PATCH2: Fump index into PPN tabl€ ?????? 000302 000000 ? TST!61 ; Was last entry free?	??????	000276	000000	?	RTS 105	;	Get out
?????? 000302 000000 ? TST!61 ; Was last entry free?	???????	000300	000000	?	INC105	;	PATCH2: Fump index into PPN table
	??????	000302	000000	?	TST ! 6 1	;	Was last entry free?

2777?	000306	000000	?	BEQ 12		yes, so don't decrement count
22222	000310	000000	?	DECICO	;	Decrement the count of names
22222	000312	000000	?	RTS 107	- 1	and get out
22222	000314	000000	?	CLZ	;	Make sure we don't take the brand
77777	000316	000000	?	RTS 107	;	Get out
22222	000320	000000	?	ADC 103	÷	PATCH3: 2nd half of double prec.
?????	000322	000000	?	MOV 16100	;	Get number of entries in file
22222	000324	000000	?	10		
22222	000326	000000	?	RTS 107	;	and get out
?????	000330	000000	?	CMP 16421	;	PATCH4: does this entry match PP!
?????	000332	000000	?	FUPPN		
77777	000334	000000	?	BNEI1	;	no, go on
?????	000336	000000	?	RTS 105	;	Get out
22222	000340	000000	?	TST125	:	Skip branch
?????	000342	000000	?	TST 161	;	Was last entry a free entry?
?????	000344	000000	?	-2.		
?????	000346	000000	?	BNE 12	;	no, just get out
?????	000350	000000	?	ADD12705	÷	Skip the decrement and branch
?????	000352	000000	?	4		
?????	000354	000000	?	RTS 105	÷	Get back, get back, da da da
?????	000356	000000	?	TSTE164	;	PATCH5: is this a primary add?
?????	000360	000000	?	FQPFLG-FQNAM1		
22222	000362	000000	?	BMI!4	:	yes, go on
?????	000364	000000	?	MOV12764	:	Insure that PPN is updated as -1
?????	000366	000000	?	- 1		
?????	000370	000000	?	FQPPN-FQNAM1		
?????	000372	000000	?	RTS 105	1	Return
?????	000374	000000	?	TST 125	1	Skip branch
?????	000376	000000	?	RTS 105		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? OVE	3		
Base address? NM	1E O		
Offset address?	202		
Base Offset	01d	New?	Coll on the second parcula
777777 000202	005764	7 JSR1537	; call patch space e Palchi
777777 000204	000006	7 PAICH+234	
277777 000206	001002	7 6	
Viset address/	370	New2	
Base Offset	0000	NEW:	Call astab areas & DATCHO
222222 000370	005205	2 DATCH 200	; call patch space e Frichz
2222222 000372	005300	2 *7	
Offect addropp2	504	1 2	
Base Offect	014	New 2	
222222 000504	101404	2 BLOI(04277)	Change BLOS to BLO
222222 000504	162705	2 27	, change back to bac
Offret address?	676	1 2	
Pase Offect	014	Nou2	
222222 000676	026427	2 NOP	. Blast old DBN sheeking oode
222222 000700	020421	2 NOP	, blast old FFW checking code
222222 000700	000000	2 NOP	
222222 000702	001001	2 NOP	
222222 000704	105764	2 NOP	
222222 000710	000007	2 NOP	
222222 000710	001001	2 NOP	
222222 000712	104422	2 NOP	
222222 000716	004527	2 7	
Offect address?	2	1 2	
Base address? ^7			
Module name? ⁷ Z			
File to patch? *	7.		: It is important to Z back to this
File to patch? <	LE>		: question!
Module name? OVR			
Base address? NM	E 1		
Offset address?	154		
Base Offset	01 d	New?	
222222 000154	005503	7 JSR1537	: Call patch space @ PATCH3
222222 000156	016100	? PATCH+320	· energy provide a state of a state state
222222 000160	000010	? BEQ117	: No names, so no PPN table scan
222222 000162	004737	? ~Z	
Offset address?	172		
Base Offset	01 d	New?	
?????? 000172	026421	? JSR1537	; Call patch space @ PATCH4
?????? 000174	000006	? PATCH+330	
?????? 000176	001421	? BR!(Q&377,	; File exists, error
?????? 000200	005300	? ² Z	
Offset address?	266		
Base Offset	01 d	New?	
?????? 000266	105764	? JSR1537	; Call patch space @ PATCH5
77777? 000270	000016	? PATCH+356	
?????? 000272	005005	? BR!(Q&377)	; Not a primary entry, go on
?????? 000274	052715	? Z	
Offset address?	410		
Base Offset	01d	New?	
777777 000410	002044	7 NOP	; Insure PPN table is always update
000412	010502	1 2	
Base address?	2		
Module pame? "7			
File to patch? ^3			
TTTE TO DUCCUL 1			

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

File to patch? (LF)

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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!

Michael C. Greenspon C/O Integral Information Systems 9832 Vicar Street, Suite 100 Los Angeles, California 90034 (213) 558-0732

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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 na	me? <1f>				
File to	patch?	<1f>				
File fou	und in a	ccount [0,1]			
Module r	name? ?					
Director	y of SI	L:				
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	007 000	000001	43K	
OVR	07.111	002000	101000	000001	59K	
DEFALT	07.111	001000	002000	000001	59K	
Enter th	he name	of the m	odule 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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The offset address is added to the base address to shift to points inside a routine. For example if there were a patch to the routine "FOOBAR", an offset address of 100 might be used to get to the word of the incorrect code.

9.0 SIMPLE COMMANDS

This is an example of some of the simpler (but not to say that they aren't powerful nor useful) commands of ONLPAT.

```
>! Create a file to play with
>PTP FOO, BAR=KB:
FOO BAR BLETCH!
^Z
>
>! Now let's patch it
>RUN $ONLPAT
Command file name? <cr>
File to patch? FOO.BAR
Base address? 0
Offset address? 100
 Base
        Offset
                01d
                         New?
000000
        000100
                 000000
                         ? 100 ; Patch in octal 100
000000
        000102
                 000000
                         ? 100. ; Patch in decimal 100
        000104
000000
                 000000
                        ? ^Z
Offset address? 0
 Base
        Offset
                01d
                         New?
000000
        000000
                047506
                         ? "WH
                                ; Change FO to WH
000000
        000002
                 020117
                         ? <lf> ; Verify only
                         ?
000000
        000004
                040502
                                  Go back to look
                         ? <1f> ; Still there, move on
000000
        000002
                 020117
000000
        000004
                040502
                         ? <1f>
000000
        000006
                020122
                         ? <1f>
000000
        000010
                046102
                         ? <1f>
000000
        000012
                052105
                         ? (1f)
000000
        000014
                044103
                         ? <1f>
000000
        000016
                006441
                         ? <1f>
                         ? <1f>
000000
        000020
                000012
                        ? !#
000000
        000022
                000000
                                ; Put in a star
                        ? ^C
000000
        000024
                000000
                                ; Patch complete
Patch complete
```

```
1 patch installed
```

```
Command file name? <sup>2</sup>Z
```

```
>! Look to see what we've done
```

```
>TYPE FOO.BAR
WHO BAR BLETCH!
#ed
>
```

A number of commands were exercised in this example. But first, a few concepts.

ONLPAT assumes all numbers are in octal. If you want decimal, follow it with a period ("."). Entering any number with an eight or nine in it without the period will return an error.

Working with ONLPAT is like using ODT. You can move up and down through locations and examine and deposit values. So any number that is typed into an opened location gets stored there. Depositing values into opened locations is one of the first things demonstrated in the example.

Next shown in the example was the use of control/Z or carret/Z. Both operate identically in ONLPAT. (In INIPAT, only control/Z is valid.) This command instructs ONLPAT to back off one command level or question. Thus it is possible to use control/Z to go backward all of the way out of ONLPAT.

The next command shown was the double quote. A double quote ("") followed by TWO characters converts the characters into their internal ASCII representations at that location. Notice how "FOO" became "WHO" this way.

Later on in the example a single quote is demonstrated. Much like a double quote, the single quote converts the following character and stores it in the opened location. Important note: a single quote creates the one byte of text and clears the other byte in the word.

By the way if you haven't noticed, comments can be entered by starting them with a semi-colon. This is not normally very useful for interactive patching, but does become important for use in command files.

Between the "WH" and the next command there were a number of lines not modified by using the line feed key. Line feed does not alter the current location but simply closes it and moves onward to the next one. This is used mostly for inspection and verification that patches were installed correctly.

The complement of the line feed is the carret ("1"). It is used to go backward and open locations prior to the current one.

The last command displayed in the example was the use of carret/C. This is not a control/C. Typing a control/C to ONLPAT will abort the patch procedure and make no changes. A carret/C tells ONLPAT that the patch is finished. (For INIPAT, the INIT PATCH option, there is no difference, and either tells INIT that the patch is complete.)

There is one more command that exists but I didn't demonstrate it in the example. It is the percent sign ("%") command. As many as three characters can follow the percent sign and they are converted and stored in Radix-50 format.

10.0 MORE ADVANCED FEATURES

000000

000022

ONLPAT has many other features as well. The following example demonstrates these more advanced commands.

```
>RUN $ONLPAT
Command file name? <cr>
File to patch? FOO.BAR
Base address? 0
Offset address? <1f>
 Base
        Offset Old
                         New?
000000
        000000
                 044127
                         2 \
                                 ; Get into byte mode
000000
        000000
                    127
                         ? <lf> ; Verify
000000
                    110 ? \0
        000001
                                ; Octal display
000000
                    110 ? \D
        000001
                                   Decimal display
                                 ;
                     72. ? \'
000000
        000001
                                   Character display
000000
        000001
                     ۴Η
                         ? <1f>
000000
        000002
                     10
                         ? <1f>
000000
        000003
                         ? <1f>
                     'B
                         ? <1f>
000000
        000004
000000
        000005
                     * A
                         ? <1f>
000000
        000006
                     'R
                         ? <1f>
000000
                     .
                         ? <1f>
        000007
                     "B
                         ? <1f>
000000
        000010
000000
        000011
                     * L.
                         ? <1f>
000000
        000012
                     'E
                         ? <1f>
                     1 T
                         ? <1f>
000000
        000013
                     1C
000000
        000014
                         ? <1f>
000000
        000015
                     *H
                         ? <1f>
                     11
                         ? <1f>
000000
        000016
000000
        000017
                    015 ? <1f>
000000
        000020
                    012
                         ? <1f>
000000
        000021
                    000
                        ? <1f>
                     1 *
                         ? <1f>
```

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Offset address? O Base Offset Old

000000	000023	000	?	<1f>			
000000	000024	000	?	^Z			
Offset	address?	0					
Base	Offset	Old	Ne	w?			
000000	000000	044127	?	/D	;	Try	decimal word mode
000000	000000	18519.	?	1%	;	Get	Rad-50
000000	000000	%KV9	?	11	;	How	about printable text
000000	000000	"WH	?	<1f>			
000000	000002	"0	?	<1f>			
000000	000004	"BA	?	<1f>			
000000	000006	"R	?	^Z			
Offset	address?	102					
Base	Offset	Old	Ne	w?			
000000	000102	000144	?	0	;	Char	nge base address
Offset	address?	102					
Base	Offset	Old	Ne	w?			
000144	000102	000000	?	^Z			
Offset	address?	^Z					
Base ad	idress? 0						
Offset	address?	102					
Base	Offset	Old	Ne	w?			
000000	000102	000144	?	66	;	Use	location as offset
Base	Offset	Old	Ne	w?			
000000	000144	000000	?	ee 100	;	Set	offset manually
Base	Offset	01d	Ne	w?			
000000	000100	000100	?	^Z			
Offset	address?	^Z					
Base ac	idress? 2	2					
File to	patch? '	`Z					
Patch o	complete -	no modi	fi	catior	18	requ	lested
0 patch	nes instal	led					

```
Command file name? <sup>2</sup>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
```

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 ? 1!4= 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?

New?

ommand TITC

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 carret ("1") 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 = 1.04004, 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, UUO'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 up its sleeve . . .

>RUN \$ONLPAT		
Command file name? <cr></cr>		
File to patch? FOO.BAR		
Base address? 0		
Offset address? <1f>		
Base Offset Old	Ne	ew?
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 modi	if	ications 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?	<1f>				
Module	name? <1	f>				
Base ad	dress? .	CAGE				
Offset	address?	0				
Base	Offset	Old	New?			
??????	000000	000007	? 7	;	New cache age	
??????	000002	??????	? ^C	;	Patch complete	

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	OPT	IONS	
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CIRCLE 174 ON READER CARD

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? ²Z

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
         Offset Old
 Base
                               New?
?????? 000000 000070 ? 7 ; The old must be 70
123456 000002 ?????? ? °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
                       ? 01d<>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 PATO00=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

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. <pri< td=""><td>vate delimter s</td><td>subroutines>,01,11-Nov-82,<dmp></dmp></td></pri<>	vate delimter s	subroutines>,01,11-Nov-82, <dmp></dmp>
ehtt1	Comments and e	dit history.	
. SULLI	commentes and c	dit motory.	
Module	name:	DELIMI	
Date Wr	itten:	08-Sep-82	
Author:		David Patters	ion
Install	ation:	Sivalls, Inc.	
Remarks	: This module	contains two er	try points. SETDEL
	Inis module	Contains two en	tery points, buibbb
	and CLRDEL. I	hese two routin	les control the
	multiple priva	ite delimiters i	or the user.
	These routin	les are callable	only from BP2 at
	this time and	are called as I	ollows.
	CALL SET DEL	I Set defa	ult delimiters on chn 0%.
	CALL SETDEL (A	1 Sot At a	a delimiters on chn 0%
	CALL SEIDEL (AG) I Set defe	ult delimitens on ohn NC
	CALL SEIDEL("	, NA) I Set dera	delimiters on chin Mg.
	CALL SETDEL (AS	5,N%) ! Set A\$ a	is delimiters on chi Nø.
	CALL CLEDEL	I Clean de	limiters on channel 0%
	CALL CLADEL) I Clean de	limitens on channel Ng
	CALL CLADEL(N)) i crear de	rimiters on channel my.
Linking	instructions:		
	Compile this r	outine with MAC	, (MAC DELIMI=COMMON, DELIMI).
	Edit your ODL	file to contain	a reference to this routine
	(USER: FCTH	SY:filspec-DEL	.IMI-LIBR).
	or include it	in the BUILD co	ommand (BUILD filspec, DELIMI).
	Task build as	usual.	
Disclai	mer:		
	mi - i - Courachi	an in this door	ment is subject to change without
	The informati	on in this docu	trued as a commitment by either
	notice and sho	Ciuchie De cons	crued as a commitment by either
	the author or	Sivalis, inc.	
Modific	aton History:		
	Ver/Edit	Date	Modification
		0.0 0 00	Toltical assessed on (DMP)
	00	08-Sep-62	Initial conception (DHF).
	01	11-Nov-82	Cleanup for release (DMP).
.page			
.sbttl	Global symbols	r.	
-1-1-1	act dol		
.globi	secdel		
.giobi	cri,del		
.page	Cada anaa		
.SDUUL	code area.		
nsect	sisubs.rw.i.lo	l.rel.con ; Siv	alls private subroutines.
			analysis and the part of the table of the state of the st

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set del:	call	clrxrb	; The Set delimiter entry point.		.title	\$STPDB	; PATOOO.MAC
Secuer.	inc	xrb+14	; Function = 1 (set).		.ident	/DMP 000/	
	mov	#mask. xrb+4	; Default mask (all but ^Q & ^S).		.psect	BP20TS	
	olr	r0	: Default channel is 0.				
	t.st	(r5)	: Any arguments?	:			
	hea	dospec	: Nope. Assume default on channel 0.		Patch	to allow DEBUG to a	work with a program that uses
	mov	2(r5),r0	: Yep get the string header.		multipl	e private delimiter:	S.
	mov	(r0) + r4	: The starting address.				
	mov	(r0), r3	: The length.		The i	nformation in this	document is subject to change without
	bog	20\$	"" indicates default on channel n.	,	notice	and should not be co	onstrued as a commitment by either
	oub	#10 sn	Room for the mask.	:	the out	hop on Sivalle Inc.	
	Sub	en ynhall	Address of mask	,	the aut	nor or sivaris, me	
	mov	sp, x1 0 + 4	Clean the mask	,		3.116	
	mov	sp,r0	, llo bytes long	1-1246	. = . +	- 340	
	mov	#20,F1	, 40 byces rong.	101340:		=(
10\$:	cir	(FU)+			. = . +	- 50 	
	SOD	r1,10\$,	\$prmpt:	mov	e#sotsv,ru	To Johns spectort?
20\$:	clr	rO	; Build the mask.		tst	344(r0)	; Is debug present:
	movb	(r4)+, r1	; Get the next character.		beq	30\$; Nope. Continue as usual.
	div	#10,r0	; Get the byte and bit offsets.		call	\$clxrb	; Tep. Save the private delimiters.
	movb	#1,r2	1		mov	#11, (r3)+	; Private delimiters.
	ash	r1, r2	; Set the byte mask		mov	#40, (r3)+	; 40(8) byte buffer.
	add	sp,r0	; Set the byte offset.		mov	sp, (r3)	; Put it on the stack.
	bisb	r2,(r0)	; Set the bits in the mask.		sub	#40,(r3)+	1
	sob	r3,20\$; Do the next character.		sub	#40,sp	; Adjust the stack pointer.
	add	#40,sp	; Re-adjust the SP.		tstb	(r3)+	;
30\$:	elr	rO	; Channel.		movb	#2,(r3)+	; Handler = TTY.
5	dec	(r5)	; Is there a second argument?		cmp	(r3)+, (r3)+	;
	bea	dospec	: Nope. Assume channel 0.		mov	#2,(r3)	; Function = read.
	movh	04(r5),r0	: Yep use it for channel.		emt	14	; Go for it.
	hr	dospec	: And go do it.		tstb	e#402	; Error?
	01	doopee	, 80 00 000		beg	10\$; Nope. Go save and clear them.
alndal	0211	alayah	. The Clear delimiter entry point.		add	#40. SD	: Yep. Assume it was 5 (NOSUCH),
cirdei:	oln	DO DO	, The clear delimiter entry point.		hr	20\$	fix the stack, and skip the clear.
	tat	(nE)	. Any armiments?		01	204	,
	LSL	(1.5)	None Assume channel 0	104.	010	(22)	· Function = clear.
	beq	dospec	, Nope. Assume channel 0.	104:	CIP	10(-2)	. Must be zero
	movb	e2(r5),r0	; rep. use it for the channel.		err	=10(P3)	, flast be zero.
					emt	14	, Clear them.
dospec:	mov	\$11, xrb	; Spec function.		cir	e#402	, Assumes no error on crear.
	movb	# ttyhnd, xrb+7	; Device handler (TTY).	20\$:	mov	€#402,-(sp)	; Save the 'Delimiters in use' liag.
	mov	#40, xrb+2	; Byte count.				
	asl	rO	; Channel times 2.	30\$:	call	rstt	; Assure column zero.
	movb	r0, xrb+6	;		mov	#20043,r3	;
	.spec		; Do it.		call	\$xwrt	; Display "#".
	movb	firqb,r0	; Any errors?		tst	e#402	; Error?
	beq	10\$; Nope. Just exit.		bne	1c1346	; Yes go handle it.
	trap	377	; Let the BP2 error trap handle it.		call	\$clxrb	; No. Prepare for the read.
10\$:	return		; Back to the caller.		mov	@#\$otsv,r0	;
1041					mov	#400, (r3)+	; 256. byte buffer.
	, page				clr	(r3)+	; Must be zip.
	shttl	Local subroutines.			mov	26(r0),r1	; Use the stash buffer.
		Bocar Subroutineer			mov	r1. (r3)	: Address of Ibuff.
alayah	mou	first no	· Clear the XRB		emt	2	: Do it.
CITATO.	mov	funbais/2 n1	, orear one mor		mov	=(r3), r2	: Number of bytes read.
104.	mov	#xrbs12/2,11			add	n2 n1	Adjustment (unchanged).
104:	CIP	1 10#			mouth	04102 r5	Save any error.
	sob	11,100			tat	344(r0)	: Is debug present?
	return				LSL	344(10)	, 15 debug presenter
					beq	405	, Nope.
	.page				tst	(sp)+	, Were delimiters in use.
	.sbttl	Data area.			bne	40\$; Nope.
					call	SCINPD	; iep. Restore them.
;					mov	#11, (r3)+	; Private delimiters.
;	Default	delimiters (all but ctr	1/S and ctr1/Q).		mov	#40, (r3) +	; 40(8) byte builter.
;	for d	letails, see the systems	directives manual V7.1		mov	sp, (r3) +	; On the stack.
;	or la	ter.			tstb	(r3)+	; sump the pointer.
;					movb	#2, (r3)+	; Handler = 111.
mask:	.byte	^B11111111	; 000 to 007.		cmp	(r3)¢,(r3)¢	; Bump it again.
	.byte	^B11111111	; 010 to 017.		inc	(r3)	; Function = write.
	.byte	°B11110101	; 020 to 027.		emt	14	; Restore them.
	.byte	^B11111111	; 35 times (030 to 177).		add	#40,sp	; Fixup the stack pointer.
	.nlist	V 2002 ALCO 10 10 10 10 10				144 C 250	
	. rent	34		40\$:	tst	r5	; Was there an error on the read?
	byte	^B11111111			bne	1c1346	; Yep. Let the standard code handle it
	endr.	34			return		; Nope. Return as usual.
	list				.end		
	and.	DELIMITER					
	· unu ,	ar an ar do t tak a ar th					

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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.
- System should respond with: CON =
- 4. Type an H to halt RSTS.
- To which the system will respond: Hmmmmmmm/Tnnnnn where mmmmmmmm is program counter (PC) address and nnnnn is a status register.
- 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/

10007

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.

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:

the system will type back: 001010/xxxxx

^{1010/}

where xxxxxx = the address of the current job's JDB.

 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:

уууууу/

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

the system will type back:

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

Some possible zzzzz's are:

003200	= -	128 /	6	! suspended j	ob

003370 =	= -8	/ 6	5 I	nor	mal	job
		121	2 22		2 23	

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	e control/P			
CON=	H00106764/T414	10 Itype	H			
CON =	1006/000024	ltype	1006/			
CON=	1010/011540	!type	1010/			
CON=	011574/003174	000600 !ty	rpe 011574/	then	type	000600
CON=	C R0000070	!type	e C			
CON=	Z	Itype	εZ			

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 Texas Distributors, Inc. P.O. Box 344105 Dallas, TX 75234 (214) 620-1511



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yyyyyy/zzzzz

Pros and Cons

ABLE COMPUTER TECHNOLOGY ENABLE/34

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By Allan Woloshin

About 18 months ago, we had a problem. We had a PDP 11/34 with 124KW of memory, one Able SUPER-MAX (a DH emulator), and two CDC 9762 disk drives, and we were trying to run 20 on-line jobs to do various accounting tasks. Each task varied between 12 and 31KW, with the average roughly 25KW. So we were constantly swapping out active jobs. The system ran very slowly; we regularly got complaints from our customers.

We tried everything. We knew that the problem was too much swapping, so we did everything we could to relieve the disk — we put most of our data files on one disk, and all of the swapping files on the other. We tried data caching, even though it was not recommended for small systems; it helped a little, but not enough. I also had a bad experiment with resident libraries: I tried to use RMSRES. The problem was, if RMSRES was resident, we could only have two and a half jobs resident. The two jobs using RMS would be 7K smaller, but RMSRES was 23K, for a net loss of 9K.

Finally, it came to buying more hardware. We had to do this cost effectively: we had very little cash (no pun intended). We quickly ruled out upgrading our computer, or buying a second computer (yet), which left us with only two choices: either add a swapping disk, or ENABLE.

The first choice was itself really two choices. Adding a swapping disk to RSTS does not necessarily mean adding a disk drive. There are memory devices on the market that have a controller which looks to RSTS exactly like a disk drive, but they run at memory-cycle speeds. Unfortunately, most of them are also "volatile," which means that when you shut off the power they erase themselves. (At that time, due to a lack of air conditioning, we had to shut down our computer every night and start it up again in the morning.)

ENABLE held the promise of adding more memory inline. This made a lot of sense to me; even at memory cycle speeds, it must take some certain amount of time to swap a job in and out. And besides, a swapping disk can only be read and written 512 bytes at a time, while memory can be in any increment desired. (If you want byte 10 from disk, you must read in 512 bytes.) Of course we went with ENABLE, or I couldn't have done this story, could I? It might be important to know that we bought it through an OEM with our own C.E. doing the installation; we did NOT buy direct from ABLE.

Incidentally, there was a third option which we had not considered, since we did not know of it at the time. A PDP 11/34 can literally be transformed into a PDP 11/44 overnight. The PDP 11/34 CPU, FP-11 Floating Point Unit (if any), and DL11W are all removed, and replaced by one board: the PDP 11/44. This takes about 3 hours. Of course, the old PDP 11/34 memory must also be replaced, unlike ENABLE, which allows you to use it along with the new memory. Converting your PDP 11/34 into a PDP 11/44 also has the advantage of a much faster CPU.

Putting in ENABLE was more of a challenge than I had been prepared for, which is unfair, since the preliminary manual warned me of all that was to come. ENABLE allows you to use your old memory (18-bit address) in addition to the new (22-bit address) memory. The problem was, ENABLE plus the new memory had to go in its own backplane, near the end of the UNIBUS. Then the old memory has to go in its own backplane. Since the old memory was coming out of the first backplane on the bus (the CPU's backplane), we had to buy 2 more backplanes for the system. We had only bought one.

Well, we finally got the second backplane, and installed everything, and *Poof* RSTS booted. My C.E. said, "Well, there you go!" and left. I installed the ENACT patch, booted again and — WOW! We now had 252KW! Then I re-added XBUF and started up. It worked!

The next day, the problems started. My operator was doing backups at 5:00 AM (don't you just love 5:00 AM phone calls?). As soon as he mounted a magtape, the system hung. Well, we investigated, and discovered (after about 2 dozen CLEANs) that the tape drive always hung the system when ENABLE was active. However, SAV/RES worked just fine from INIT.

Then I remembered that ENABLE itself was a bus terminator; that the memory behind it was literally on a separate bus, created by ENABLE. So I removed the terminator card.

The tape drive now works perfectly. ABLE has narrowed this down to a "what" but not a "why." It seems that the standard bus terminator includes something called a B-SACK TURNAROUND. This is what was hanging the system. They sent me out [they loaned me] one of their own terminators, with the B-SACK TURNAROUND removed. The system worked fine (but they wanted their terminator back!).

Ever since then, I have met about a dozen people who told me that they "heard" that no one was able to install ENABLE that many had tried, but few had succeeded. I can't say why.

Anyway, assuming you get ENABLE installed, it does exactly what it says it does. And you might be surprised to find out how much better a 252KW system runs than a 124KW system does! [The old, 18-bit address memory still removes the top 4KW. since it does not "know" that it should not anymore.] The relief was unbelievable — and we went from about five to ten complaint calls a day, to zero!

This same system is now running 640 KW of memory, supporting 35 jobs. And when needed, we can order more memory almost overnight, up to 2044KW.

We have not been entirely free from problems, however.

By far the biggest drawback is the reliance on ABLE Computers. No matter how sharp they are, how fast they work,

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we must always wait for them. Every time DEC re-releases RSTS, we must wait for the new patch. We got the patch for V7.1 only ONE WEEK before we received from DEC our V7.2 distribution kit! They claim that V7.0 to V7.1 was a big change and V7.1 to V7.2 is a minor one, the implication being that the V7.2 patch will get here much faster. We shall see — if it is soon enough, I will skip V7.1 altogether.

[I also intend to take a scratch disk, gen a V7.2 system, apply the V7.1 patch, and see how well it works. If I crash, no big deal.]

Another drawback is SPRs. As my system stands at this writing, I am still on V7.0. Every time a user task

bombs with "?Odd address trap" or anything similar, rather than reporting an error to the job and continuing, RSTS crashes. Obviously I cannot report this to DEC; it must be the ENABLE patch.

Also, every time we cold-boot the system, during system startup (or during DEFAULT, if we do that first) we get the message

> PARITY CSR CONTROLS MORE THAN 31K FATAL RSTS/E INITIALIZATION ERROR! OPTION:

When we try again, it works. Consulting the System Generation Manual, Appendix A, enlightens us with these words of wisdom:

Call the DIGITAL field service engineer.

Of course, the DIGITAL field service engineer wouldn't touch our system with a 10-foot memory cache. Listing the parity registers, we find that the message is correct — each CSR controls 128KW. So what?

n 1 Toggle the Halt

I sent in an SPR to DEC. Their response: I had sent them incomplete information. What type of CPU was it: A PDP 11/23 or PDP 11/24?

The memory we have been using is National Semiconductor NS11L. When I explained this problem to ABLE, they asked me if that's what I was using. I was. They told me that they had heard of worse stories with that memory, and that it would be a good idea to stay away from it.

Now they tell me.

And finally, some problems I foresee but have not had yet: as our system grows, and supports more jobs, naturally we will add more on to it; more memory, more peripheral devices. And do more SYSGENs. You remember the small buffer problem that 11/70s had with V7.0? Remember how they fixed that with V7.1? There were two simultaneous solutions, but the more important one was to use data space.

Guess what: PDP 11/34s DON'T HAVE DATA SPACE! That means that when I start running low on small buffers, all I can do is weep. Of course, that is some way down the line. I have not yet hit the maximum SIL size on V7.0, and of

EVER MAKE A MISTEAK - Part 2 or There's Even A Better Way (For Part 1 see RSTS Professional.

June, 1982, Vol. 4, #3)

By Paul A. Gilberti, Jr., Data Processing Manager, Henschel Corp., Amesbury, MA

When the priority of a detached compute bound job is set to a value above all other jobs, the system will service only that job. To recover from this error, the system could be crashed and restarted: or all the users could wait until the detached compute bound job was completed. If the job went into a software loop, you waited forever. Crashing the system was also a very drastic solution. Not only did this waste the run-time the compute bound job had already received but it also made many other users very unhappy. Especially those who were updating files and had not yet closed their files.

Dr. James B. Wilkinson of the Erskine Mathematics Department provided a much better way of recovery in the June, '82 issue of the Pro. Halt the CPU, deposit an odd address in the program counter and continue. This causes the high priority compute bound job to bomb out with a "?Program lost-Sorry" fatal error. This solves the problem and restores the system to the users.

But what about all that run-time the compute bound job had already received and is now down the drain? Also what if the high priority compute bound job is also updating files and shouldn't be interrupted?

course V7.1 will be even easier to work with. But it will come eventually, and probably unexpectedly and suddenly. And then all we'll be able to do is buy another computer.

Are the headaches worth the extra memory? I would have to say a hesitant: yes. But my advice to anyone considering buying ENABLE is: if you can afford some other way, such as putting a PDP 11/44 into your PDP 11/34 cabinet, by all means do it! ENABLE is only meant as a device for enlarging your current system, and NOT as a substitute for bigger systems!

WEIGH FOR YOURSELF:

PRO	CON
comparatively low cost	difficult to install
ability to connect 4MB of memory	there are other ways to install memory
ability to use very large XBUF	most CE's have never heard of it;
and data caching	NONE carry spares
ability to load several resident libraries	must wait for patch before installing new systems
many jobs can be in memory	patch may conflict with DEC patches no DEC support
	CPU itself goes no faster
	when computer crashes, you don't know whether to call DEC or ABLE

With A Remote Diagnostic Console Solution Two: Lower the priority of the compute bound job through the remote diagnostic console.

Step 1	Type 1P	; Enter Console State.
Step 2	Туре Н	: Halt the cpu. This cause the system to display the halt address and status register.
Step 3	H???????/T?M???	; Examine status register being displayed.
Step 4	If $M = 4$ then	: Make sure the processor
	Type 'Halt Address' LC	; was halted in user mode,
	go to Step 2.	: otherwise try again.
Step 5	Type 1010L E	; Get the current job's JDB
Step 6	Type ######L	: Re-enter the location displayed.
Step 7	Type <if> 14 times.</if>	: Move through the JDB until the ; priority is found.
Step 8	Type 003370 D	: Set priority/runburst to -8/6.
Step 9	Type the 'Halt Address' followed by LCZ	; Restart the CPU.
With	A Switch Panel	
a		

Solution Two: Lower the priority of the compute bound job through the Switch Panel.

· Halt the coul This cause the syste

Step 1	roggie die nate	to display the halt address.
Step 2	Record the 'Halt Address'	
Step 3	Toggle 777776	: Examine status register being displayed.
	Load	
	Exam	
Step 4	If status = 17xxxx or 14xxxx then	; Make sure the processor
	Load the 'Halt Address'	: was halted in user mode,
	Cont	: otherwise try again.
	go to Step 2.	
Step 5	Load 1010	: Get the current job's JDB
	Exam	
Step 6	Add 34(8) to the JDB address	
Step 7	Load the new address	: Enter the location of the
		; priority byte.
Step 8	Toggle 3370	: Set priority/runburst to -8/6.
	Deposit	
Step 9	Load the 'Halt Address'	; Restart the CPU.
	Cont	

The high priority compute bound job is now running at a normal priority level, as is the rest of the system.

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 inadvertant 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!!

Catch that address list duplication . . . Before it goes off with a stamp!

New Address List Processing Package (ALP) for DEC Operating Systems, from McHugh, Freeman

List Creation: Creates uniquely structured lists with identifiers and 12 data fields

Address Entry: Enters data via keyboard to formatted screen or from magtape lists

Duplicate Entry Detection: Detects duplications at moment of keyboard entry

List Maintenance: Purges complete lists; updates and deletes; appends additional data fields; displays entries and removes to tape or backup file

List Extraction: Extracts/merges lists; selects each field for range or inclusion/exclusion processing

Envelope/Label Production: Prints 3" or wider labels, 1-up to 4-up; prints envelopes in alphabetical or zip code order

Report Generation Interface: A standard feature; interface with DEC DATATRIEVE-II®

Optional WP Interface: Full list/ merger capabilities with DPD's WORD-11[®] or DECword/DP[®]

Try these other McHugh, Freeman packages to create applications, maintain systems, and protect data:

 Automatic Password Changer (APC)
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 VT100 Accounting Calculator (CALC)
 System Support Services

For more information, call McHugh, Freeman and Associates, Inc. at 1-414-784-8250 and . . . let us ALP-atize your mailing lists!



DATATRIEVE and DECword/DP are registered trademarks of Digital Equipment Corp. WORD-11 is a registered trademark of Data Processing Design.

and I've loved them all (except, perhaps, the COBOL); but I wouldn't have them in the house ... (well, I might make an exception for the aforementioned PDP8 with display, etc. if it very tame). Which is what I'm writing about. Carl asks, amongst other things, "What is a 'home computer"?"; well, for my part, in a world with Prestel, The Source, packet switched networks, Medlars and various other "public access" data bases, a "home computer" DOES NOT NEED 256K of memory, OR 10Mb of disk, OR an "operating system" with Multi-terminal, Multi-user, Multiprogramming, Multi-tasking capabilities! It's LUDICROUS!! What with you trying to put RSTS systems in the Lounge room and all the "micro" manufacturers trying to put "all-singing, all-dancing" UNIX "look-alike" or PICK systems in the study, the "home computer" is in danger of sprouting more terminals than the average IBM system has disk drives (perish the thought!).

Assume, for the moment, that we don't want to play games with our "home computer" - well, not much, anyway. For somewhere around \$1000 you can get a 48K micro (I don't care what brand, there's plenty around) with a reasonable keyboard, 64 or 80 column screen, 150K mini-floppy, an RS232 port and a parallel port. Another \$300 should get you a direct-connect modem with telephone connection or an acoustic coupler. For a family of four that adds up to \$5200 to get everyone doing his own thing AS WELL AS talking to the outside world. The new Tandon Winchesters will soon be appearing in such things as the Corvus "Constellation" which should then allow you, if you're that depraved, to add a shared hard disk and printer to your "home computers" to form a LOCAL AREA NETWORK (albeit small) for around an extra \$7000. So your family computer system is a full "four terminal multi-user" system for roughly \$12,500!! If you add three terminals (VT100's, of course) to the MICRO-11 I suspect you will be up for about \$14,000 WITHOUT each terminal having the ability to talk separately to the outside world.

I LOVE RSTS!!... Please don't get me wrong! I just don't think such things belong in the home!! Finally, let me take issue with some of the ques-

tions you posed in your second last paragraph:

(a) What's so friendly about "No Logins"?

(b) Yes, they DO have "RECORD I/O" (that's all they have, usually);

(c) MDBS I and MDBS III (and variants thereof) can now be obtained for most Zilog and Intel processors and it eats RMS for morning tea!

(d) TECO (as far as I remember) wasn't invented by DEC; they just started supporting it when they saw how good it was — if the blokes who wrote it in the first place ever cobble up a version for the 300,000 (at least) 8-bit micros in the world, they'll probably make a SECOND (?) fortune (!?); (N.B. I think EVERY computer in the WORLD should have at least TECO — if it can't have EDT!)

(e) in the two years I worked with RSTS recently, I never even SAW "GRIPE", let alone used it;

(f) with a "Constellation" or "Acorn" type Local Area Network who needs BATCH and SPOOL anyway — they only take up valuable Job Slots;

(g) utilities such as BACKUP and SAVER come as standard with such things as the "Constellation" and MDBS:

(h) if your system doesn't spend its time fragmenting its disk space (and it only has to service one user) who needs REORDR?

(i) most micro systems include ALL the bumf about their disk organization because their "DOS"s are so slack they EXPECT you to rewrite them:

Page 32

(j) SYSTAT is more or less useless if you have only 1 task, 1 terminal, 1 program and 1 user;

(k) any VT5xxx program is pointless without a

VT5y terminal;

(1) LOCK-11 doesn't come with RSTS;(m) never, but neither was the only TRS-80 andApple 11 I ever worked with;

(n) NO! (thank goodness!);

(0) YES

Now let me ask YOU some questions. Did your \$10,000 include a RSTS license? AND 4 terminals? AND a GOOD dot-matrix printer (with decent underlines and lower case descenders)? AND 4 direct-connect modems for talking to the world at large? AND the infamous RMS?

I repeat — I am a DEC machine fan(atic) and I LOVE RSTS — but I still wouldn't keep a fullfledged system at home!!

Thank you all for a magnificient magazine — I would love to contribute but I'm still a "babe in arms" compared to most of your regulars. I read every issue avidly (and I'm STILL waiting for the "full color Dungeon map"...)

Noel Goddard, AUSTRALIA

Dear Noel: While I realize that a "home" RSTS System is not for everyone, the idea that you can configure a RSTS system (including a license) for under \$10,000 puts it directly in competition with the genuine "home" computer.

I have noticed that a major use of the home computer is communicating with the outside world. I have been doing this for the past ten years with a terminal and modem quite adequately. It seems a bit of overkill to use a computer to talk to a computer; why emulate a terminal with a computer when a terminal would do the job more efficiently.

While a single terminal RSTS system may only marginally compete with the micro world, doubling or quadrupling the number of terminals yields a four user system that can do real computing for a whole family at once. And when a new family member comes along, you simply add a terminal.

Software on the micros is still primitive. Utilities have no standards and are supported by companies that come and go weekly. RSTS software offers a wide varity of mature application programs and system utilities.

A "home" RSTS System is only one choice among many possibilities. That's what makes horse races . . . \$2 to win on RSTS please.

P.S. Hope you enjoy the dungeon map.

* * *

In a letter to the RSTS Pro (Vol. 4, No. 6, December 1982) a reader reported a "possible . . . RMS SYstem Bug. It appears that if two files are opened on the same channel (even if the first one is closed before the second OPEN statement is executed), then BASIC+2 under RMS will expect the second file to be located on the same device as the first file, if there is no explicit device specified for the second file. It does not default to the system disk."

What your reader is seeing is actually a difference between RMS-11 and non-RMS handling of device name defaults. BASIC-PLUS, and BASIC-PLUS-2 not using RMS-11, behave differently from all languages using RMS-11. In fact, this is how RMS-11 works on all operating systems (RSTS/E, RSX-11M and M-PLUS, IAS, and Professional Operating System). When RMS-11 is not given a device name, it defaults to whichever device was last assigned to the logical unit (LUN, or channel). This behavior is compatible with the FCS-11 handling of LUNS, and the reason for it (which may now be a bit dated, given the newer logical naming facilities available on some systems) is to allow programs to specify a channel (rather than an explicit device) which allows the binding to a specific device to be deferred until task-build (or, in RSX environments, task installation) time.

This had been the behavior since Version 1.0 of RMS-11 and BASIC-PLUS-2.

To ensure that the system disk or public disk structure is used, SY: should always be specified in the file specification. This works in BASIC-PLUS, BASIC-PLUS-2 without RMS-11, and all languages using RMS-11.

Simon Szeto

I thought you might like to see this newspaper clipping regarding Teco.

Freeze-Dried Dog Must Stay Home

Columbus, Ohio

Franklin County Municipal Court Judge Donna Bowman says she does not want a freeze-dried dog admitted as evidence in a suit against a veterinarian.

Isabel Burks of Columbus has charged Dr. Dilbagh S. Kooner with malpractice in a lawsuit over the death of her dog, Teco, on April 13, 1980.

Burks had Teco freeze-dried after its death and now keeps the body in a terrarium in her home. She had planned to submit it as evidence in the trial, set for January 4, but Bowman said she might ask that pictures be used instead. The judge noted that the court stenographer would be responsible for the dog if it becomes an exhibit, which could mean keeping the dog for 30 days.

The lawsuit seeks \$771.18 in actual damages and \$5000 in punitive damages.

Burks claims that Kooner misdiagnosed the animal's illness and says surgery could have saved its life. Kooner says he did not have time to make a proper diagnosis because Burks would not leave the dog overnight.

United Press

Maybe this doesn't answer the questions: "How TECO?" and "Why TECO?"

Also, care to guess what the "NOvax II" is? Could it be something for the 11/70 user who doesn't really want to upgrade to a VAX? I'll trade you the answer for a T'shirt.



GET THE INSIDE STORY GET THE RSTS INTERNALS MANUAL!

He's learning everything about the business.

Everything.

LOCK-11 is a system security and management package for RST\$.

LOCK-11 gives you absolute control of access by keyboard or user-I.D.

LOCK-11 provides an optional MENU environment that keeps non-privileged users where they belong. LOCK-11 offers the system manager powerful surveillance utilities that actually improve thruput. LOCK-11 is very well documented, supported and enhanced regularly.

LOCK-11 is available right now. Circle the response number below for a full set of documentation, or call 215-364-2800.



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-G0 G 1-G 1

+----+---+

2

2

EXTEND 10 INTFIG.BAS R.F., from AMORT.BAS GIVEN TERM, PAYMENT, AND BALANCE, FIND INTEREST RATE Z = .1E39 I DEMAND SCALE FACTOR ZERO INPUT 'PRINCIPAL BALANCE '; I.B (GOTO 32767 IF I.B = 0. \INPUT 'NUMBER OF PAYMENTS'; I.N\$ 60 100 INPUT 'MONTHLY PAYMENT '; I.M PRINT 'ANNUAL INTEREST RATE = '; FNSEARCH(I.M,0.01,99.) PRINT GOTO 100 DEF FNX(X) = FNM.PMT(X)1100 MONTHLY PAYMENT CALC 1200 DEF FNM.PMT(A.J) \ I = A.J//200. I PERIOD INTEREST PER \ X = 1. + I \ X = (X^1.N\$)/(X^1.N\$ - 1.) I FACTOR FOR FORMULA: I PERIOD INTEREST PERCENT $M = B * I * (1 + I)^N / ((1 + I)^N - 1)$ 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) M = M + .01 IF FNM.PMT = M FNEND I MONTHLY PMT IF M < Z I ROUND UP ! DEF FNGOLD≸(X,Y) (¥ - X) ● 0.381966 I GOLDEN SECTION POINTS 5000 FNEND USE GOLDEN SECTIONS TO FIND CLOSEST APPROXIMATION; CREATE YOUR OWN FNX() AS USED IN LINES 5012, 5016, WHERE FNX() SLOPE FROM D1 TO D2 NEVER REACHES ZERO (PEAK OR VALLEY) 5010 I> FNSEARCH DEF FNSEARCH(Z, D1, D2) Z1 = ABS(Z)T1, G2 = D2 B1, G1 = D1 ! INITIAL DOMAIN MAX ! INITIAL DOMAIN MIN Q = FNX(G2) - Z1 IF _ ABS(Q) < 0.0001 THEN Q = G2 GOTO 5022 I TRY HIGH MIDPOINT 5012 1 I CLOSE ENOUGH I F(G2) < SEARCH VALUE Z1 I NEW BOTTOM IF Q < 0. THEN B1 = G2 GOTO 5020 5014 Q = FNX(G1) - Z1IF ABS(Q) < 0.0001 I TRY LOW MIDPOINT 5016 IF ABSIL, THEN Q = G1 GOTO 5022 I CLOSE ENOUGH Q > 0. T1 = G1 T1 = G2 B1 = G1 I F(G1) > Z1 I NEW TOP I BETWEEN MIDPOINTS 5018 IF ELSE 5020 GOTO 5012 UNLESS ENGOLDS (B1. T1) Q = -1. FNSEARCH = Q 5022 FNEND FNROUND.2 ROUND FLOATING POINT NUMBERS TO 2 PLACES 20006 DEF FNROUND.2(Z) = FIX(100. * Z + .5) / 100. . 32767 END
EMULEX TALKS DEC

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.



CIRCLE 58 ON READER CARD

MLTJOB.BAS

By Alton O. Moore, McAllen, TX

Some time ago, when terminals were more plentiful around here, I had the privilege of having two on my desk. Though having two terminals upset the purist in me, it was certainly convenient. If I was interrupted in the middle of an edit and needed to use a terminal, I just turned around and there was another. I saved a lot of system resources which entering and exiting EDT would have used, because interruptions are plentiful around here.

Nothing good lasts forever though, and the next terminal shortage gobbled up my extra terminal. Being of stubborn mind, I mused about how I would fill this gap. After all, the extra terminal had turned out to be quite useful. I tried getting GSYS, a split-screen program from an old **RSTS Professional**, to work, but it had a bug which none of us wanted to chase. ATPK seemed interesting because it could control a job, but I wanted to control two jobs, not just one. Also, I had to be able to edit (of course) with the controlled jobs.

I investigated the use of pseudo keyboards, and MLT-JOB (Multi-Job) is the result. MLTJOB allows a privileged user to start two jobs and do normal processing or programming on them. If a toggling accident should occur (if the controlling job is killed, for example) they are detached. If there is a disadvantage to using MLTJOB, it is the CPU time involved in transferring data from the pseudo keyboards' output buffers to the screen. This can be quite significant. On our system, doing a full SYSTAT under MLTJOB will run up 1 second of CPU time for the controlled job (doing the SYSTAT) and 1 second of CPU time for the job running MLTJOB. This has not turned out to be a problem, however, since we are heavily disk-bound. Your system might not appreciate it, though.

This version of MLTJOB has been in use for at least a couple of weeks with no program bugs detected. Heed the warning in the front pages of this magazine, however; this program is by no means a finished, polished, perfect version. Had I waited until MLTJOB was perfect before submitting it, it would never have reached print. This version is provided as a working model which will give you some insight into how pseudo keyboards work and how to use them. The program has in it some code which tailors it to work nicely on our system, such as the printing of a heading when you change to a job which is in command state (CCL command X). Also, our editor initialization files include the definition of CTRL/R as "refresh the screen" so that switching to a job running EDT will automatically put you right back where you were. What could be nicer?

If you have any correspondence concerning MLTJOB.BAS, you may address it to: Jones and Jones, 2100 S. 10Th St., McAllen, TX 78501, Attn: Alton O. Moore P.S. Watch for the MACRO-11 version, coming soon!

1 EXTEND Author: Alton O. Moore, III Data Processing Inc Jones & Jones, Inc McAllen, TX. 78501 PDP 11/70 running RSTS/E version 7.1 System: Program: MLTJOB. BAS MLTJOB allows any privileged RSTS/E user to control two jobs, much like some versions of DEC's OPSER. It will pass data between the controlling and controlled jobs in binary form, thus allowing it to be transparent to corresponditors. Function: screen editors. Typing two consecutive nulls on the keybard two consecutive norise on the keybard will cause MLTJOB to toggle from one job to another. Sending one null followed by `\will cause MLTJOB to attempt to terminate. If either o the two controlled jobs is not at ^C state (command level), MLTJOB will been brei refunce one of beep and refuse to end. MLTJOB can be either run or installed as a CCL command. If installed as a CCL command, MLTJOB/300 will cause the number of characters buffered by the system from the controlled jobs to change from the maxinum, 128, to 10, for ease of use on slower keyboards (i.e. 300 baud keyboards). MLTJOB is immune to CTRL/C; if detached, however, binary input mo be disabled, and NLTJOB will be disabled when reattached to. mode will 5 CORES=SYS(CHRS(7%)) \PK.GET.COUNT%=128 \PK.GET.COUNT%=10% IF CORES="MLTJOB/300" 10 OPEN "KB:" AS FILE #10%, MODE 1%+32% \FIELD #10%, 128% AS KB.BUFFEKS \! Open up the console KB: in binary mode. £ 15 LSET KB.BUFFER\$ = CHR\$(13%)+CHR\$(10%)+CHR\$(10%) +"Setting up multiple jobs; please wait..." \PUT #10%,_COUNT 43% à h ! Open up the next 2 available pseudo keyboards and log then in.. ĥ \GOTO 32 VON ERROR GOTO 38 6 OPEN PKBS AS FILE #2%, MODE 1% VGOTO 40 38 RESUME 32 IF ERL = 36 AND ERR = 8 VPRINT "NOT ENOUGH PK:'S AVAILABLE !!!" IF ERR = 6 ĥ \PRINT "NOT \GOTO 31000 \DUMMY\$=SYS(TEMP\$) 44 A%=ASCII(MID(DUMMY\$,9%,1%)) \B%=ASCII(MID(DUMMY\$,10%,1%)) 45 C%=B%*256%+A% \PASSWORD\$=RAD\$(C%) 46 ON ERROR GOTO 50 50 A%=ASCII(MID(DUMHY\$,11%,1%)) \B%=ASCII(MID(DUMMY\$,12%,1%)) 47 C%=B%*256%+A% \PASSWORD\$=PASSWORD\$+RAD\$(C%) 48 ACCOUNT\$=NUM1\$(ASCII(MID(DUMMY\$,8%,1%)))+"/" 50 ACCOUNT\$=ACCOUNT\$+NUM1\$(ASCII(MID(DUMMY\$,7%,1%))) 50 RESUME 46 IF EKL = 45 50 RESUME 48 IF EKL = 47 50 ACCOUNT\$ \DUMMYS=SYS(TEMPS)

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 EFROR GOTO 0 \STOP 32767 END GOTO 1000 **DEC** BEST VALUES FLSE 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.PK\$)=0% \LSET KE,BUFFER\$=DATA.FROM.PK\$ \$ \PUT #10%, RECORD 4096%, COUNT LEN(DATA.FROM.PK\$) \GOTO 100 PRE-OWNED DEC EQUIPMENT BUYING AND SELLING SYSTEMS • CPU's • PERIPHERALS • TERMINALS 1010 LSET KB.BUFFER\$=CHR\$(155%)+"H"+CHR\$(155%)+"J" \PUT #10%, COUNT 4% 1 Clear the screen. Se. **OPTIONS • MEMORY • COMPATIBLES** 1020 IF ASCII(CHAR\$)=28% THEN 1100 ! Try to kill both jobs. 1030 IF PRESENT.JOB% <> 1% THEN CALL DICK BAKER (305) 979-2844 PRESENT.JOB% ELSE Carico Center Cataware 2845 NW 62nd Street PRESENT.JOB% = 2% ! Switch jobs.... PRESENT.JOB% = 2% ! Switch jobs... 1040 ON ERROR GOTO 1080 \PRINT #PRESENT.JOB%, RECORD 6% ! Check for ^C state. 1050 LAST.CHARS="* \CHARS="* \GOSUB 2000 \GOTO 107 IF LEN(DATA.FRON.PKS)=0% \PRINT #PRESENT.JOB%, RECORD 1%, CHRS(20%);CHRS(18%); \GOTO 140 1070 PRINT #PRESENT.JOB%, RECORD 1%, CHRS(21%)+*X*+CHRS(13%); \LAST.CHARS=** \CHARS=** \GOTO 120 Croorated Telephone (305) 979-2844 Ft. Lauderdale, Florida 33309 CIRCLE 49 ON READER CARD ARSAP for RSTS Announcing 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. Resource Management and Chargeback

 1200
 ON ERROR GOTO 1240 \PRINT #2%, RECORD 6%

 1205
 FIELD #2%, 128% AS DATA.FRON.PKS

 \LSET DATA.FRON.PKS
 String (128%,0%)

 1210
 PUT #2%, RECORD 16%, COUNT 0% ! Kill the job on channel #2.

 1220
 GOTO 30000
 ! End the program......

 1240
 RESUNE 1250

 1250
 LSET KB.BUFFLRS=CHRS(7%)+CHRS(7%)

 %
 \PRESENT.JOB% = 2%

 %
 \LAST.CHARS="" \CHARS=""

 \GOTO 120
 \CHARS="" \CHARS=""

 ARSAP provides detailed, summary and graphic reports needed to: monitor system usage; reduce the cost of running the dp center; bid competitively on contracts; control project costs; 2000 ON ERROR GOTO 31000 2000 ON ERROR GOTO 31000 \FIELD #PRESENT.JOB%, 0% AS DATA.FROM.PK\$ \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.PK\$ \RETURN schedule and plan accurate workloads; and meet government regulations for RETURN precise computer cost accounting reports. 2020 RETURN 2050 RESUME 2020 IF ERL = 2010 \GOTO 31000 The DP Manager today: **Influences**, Controls and 20000 ! Routine to get and echo a character from the KB: buffer & ! if one is in there. If not, an empty string is returned. **Uses ARSAP.** 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 CHARS=LEFT(KB_BUFFER\$,1%) ! Store the character we just got. GEJAC Inc. 6 P.O. Box 188 Riverdale, MD 20737 20050 RETURN ! ... from this subroutine. 301-864-3700

δ

RSTSPROFESSIONALRSTSPROFESSIONA

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 VAX and RSTS are registered trademarks of the Digital Equipment Corporation

CIRCLE 170 ON READER CARD



BASIC IN LONDON

Computer Age Systems, Great Britain, will present "A BASIC Seminar" at the Tara Hotel, Kensington, London, England from March 7, through March 9, 1983.

On Monday March 7, Al Cini, president, Computer Methods Corporation, Moorestown, N.J., will present "Structured Programming in DEC BASIC," the first objective analysis of this new product from DEC. Details of RSTS/E Version 8 and the new release of RMS will also be discussed. Cini will include "Structured Programming in BASIC," which he presented at the U.S. DECUS Meetings last year.

On Tuesday, "The Good BASIC Guide to RSTS/E," designed specifically for existing BASIC PLUS—RSTS/E Programmers who want to become more productive, will be offered by Peter Dick, proprietor, Silver Programs, and Chairman of the DECUS UK PDP11 Commercial Users Group. This session will be divided into Simple Functions, Simple Programs, Useful Internals, Never Never Never Use, and The Record Breakers. Documentation will include a listing of all the functions/sub-routines discussed. The code will be available on machine readable format.

Concluding the sessions, on Wednesday some of the U.K.'s leading independent System Suppliers will share their views. Those contributing are Nick Brackenbury, Darkcrest Ltd., "BASIC Licencing"; Al Cini, Computer Methods Corporation, "BASIC Throughput"; Nick de Smith, Computex Ltd., "Inside BASIC"; Sean Seely, ADOS Ltd., "Compiling BASIC"; Michael Stewart, Plan Plus Ltd., "Converting BASIC"; and Peter Wolf, Touche Ross Int., "BASIC Dilemma."

This seminar is not promoted, not authorised, and is not in any way affiliated with Digital Equipment Corporation. Material presented during the seminar in no way reflects specifications or policies of Digital Equipment Corporation.

For information and registration contact Computer Age Systems, P.O. Box 14, Wallingford, Oxon OX10 8NN.



A RSTS NOSTALGIA

By Charles W. Mustain

A heady bite of ozone, the sharp tang of hot oil, the urgent whine of cooling fans had my heart beating like a kid at Christmas. Four months ago at Parker Street in Maynard I could barely spell 'computer'. Suddenly, I was a system manager.

Adding to the holiday air that November in 1974 were packages of manuals, disk cartridges, blue plastic cases full of gray paper tape and a spool of teletype ribbon I had dropped while trying to install.

I was about to install RSTS-11 Version 4a in my (employer's) shiny new PDP 11/40.

Imagine, if you can, my excitement when I discovered the RSTS-11 manual gave directions for the PDP-11/20 and the PDP-11/45 but seemed never to have heard of the 11/40! After a phone call which assured me there were no important (to RSTS) differences between the 11/40 and the 11/20, I was ready for my next surprise.

The sysgen instructions in the System Manager's Guide detailed methods for building RSTS from DECTAPE, something conspicuously absent from my system. A frantic scan through the manual set (there were only three books) for instructions for a two-RK05 system generation told me I was doomed. At this point I called frantically for the software specialist I had been assured would do our initial installation. He would be available in about four weeks, when he returned from an on-site consulting job, I was told.

Back to the manuals . . .

A day later and several years older, it had become clear

that there were very few differences between DECTAPE and RK05s as far as system generation was concerned. A call to my Parker Street (DEC) instructor helped me figure out how to initialize disks and my service tech gave me the right boot address for the **RK05**.

For those of you long of tooth and gray of beard, you began building RSTS by starting up a single-user system called DOS. From there you followed directions, learning quickly that if you mistyped anything, you got to start over from the top! Since I was winging it on some of the answers (RK05 instead of DECTAPE) I got almost as much typing practice as a COBOL programmer trying to write a program that prints "HELLO."

There aren't words to tell you the feeling of joy in accomplishment I

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CIRCLE 51 ON READER CARD

had when "CAN'T FIND FILE OR ACCOUNT," "READY," clattered out on my Teletype.

Time for my next shock!

I had no DECTAPE #2 with the system library programs. There ensued a frantic attempt to find the library programs on the distribution pack; a search of the box the

February 1983

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wouldn't drop a bit somewhere, halting the read operation on the last three characters of the tape and forcing one to start over from the beginning of the tape! Two days later, too exhausted to be thrilled, RSTS-11

V004-A BEREA SCHOOLS IS ON THE AIR, appeared on the TELETYPE, to my intense relief!

On a sheet of paper inserted into one of the manuals was information describing how to read in the library sources through the low-speed (very low speed) reader on the ASR33.

software came in to see if I had misplaced a disk cartridge:

ed? Those were my system library tapes. Someone forgot to

tell my salesman that RSTS systems had to include a PC11

Remember that blue box of gray paper tapes I mention-

a break for pulling of hair and shedding of tears.

high-speed paper tape reader/punch.

Those of you familiar with ASR33 paper tape readers will remember that the accuracy of these devices was less than perfect. Someone at DEC thoughtfully designed the library tapes and the program that read them in with a scheme whereby checksums were computed for blocks of text on the source tapes.

This, I am sure, was done to make sure the CUSPS (library programs for you areenies to RSTS) would compile and run as intended by Digital. The net effect was that each program had to be run through the ASR33's reader at least three times with crossed fingers and many prayers that it

<u>RTS:</u> 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 run-time systems.

Code Description:

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

SYMBOL STARTING SECTION

RTS:: RTSNEW::

RTSNME::

RTSRUN::

DESCRIPTION

Runtime system start-up Check if logged out to print 'Bye' if true If RTS is entered with a

'SWITCH'-type command, we set the program name to 'NONAME' for SYSTAT.

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:: RTSRED::

SPCLOP:: OKREAD::

CVTLOP::

We do some housekeeping such as clearing out our input buffer and core common area.

We print 'OK'.

We wait for input from the user.

Drop leading spaces and tabs Check for a comment line or just a < CR> or < LF> or any other similar items.

Convert lower case to UPPER CASE.

CHECK FOR RTS COMMAND	See if we should execute what was entered as a RTS com- mand
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 Descript	ions:
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 argu- ment is present
CLRXRB	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 ter- minal
MESSAGE	A macro to print a message on the user terminal.
TSTFQB	A macro to check any errors occuring after a system call. If there was, the error is printed and a JMP is made to RTSINP for a new

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.

prompt and more input.

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 †C. As a runtime system, YOU ARE IN CONTROL!!!!

Electronic Mail

Product Name: Dreams Version 5.0

Since its first sale in 1979 Dreams has grown in capability and user acceptance. It is now in use on over 40 RSTS/E systems around the country.

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A VAX version will be available later.

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For more information contact:

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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

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

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TKB PRTS

0k

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

```
RUN $MAKSIL
```

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

IRE_TASK-BUILD USING RTS2 WHICH MAKSIL SET UP TO ALIGN THE RTS

```
TKB PRTS2
```

0k

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

RUN \$MAKSIL

RUN \$MAKSIL MAKSIL V7.1-11>16K RSTS V7.1-11 C OLFEP 11, 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) Y(ses)? 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. At symbols in the director RSTS V7.1-11 C OLFBP 11/70 RTS built in 1 K-words, 41 symbols in the directory RTS.TSK renamed to RTS.TSK<40>

0k

!ASSEMBLY, TASK-BUILD ARE NOW DONE

```
0k
```

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
RT 11	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
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

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

Ok

VERSION RTS - V01.00.1

. . . continued on page 53

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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







SETTING RMS ATTRIBUTES

By Allen Rueter Mallinckrodt Institute of Radiology St. Louis, MO

This is a program that sets RMS attributes to a binary file and then allows you to NFT binary data from RSTS BASIC-PLUS programs to a VAX. You can then read the files without a hassle under VMS.

DEC seems to have cleared up the above problem with Version 3 of VMS.

I've also appended another program which I used to fix the open file and update counts in the UFD back to zero (after a user's program gets zapped by a disk error). The program gives a strange directory listing and prompts for a change when it finds an open file. A return will cause no change. May I suggest that you set up a dummy account to test it, and gain some exposure to how it works.

extend 1 RMS FuDGe This program adds or changes the MMS attributes of a file. Fy using the /B switch you will set the attributes to FIX-512, which is handy for MFTing binary data files to the VAX. 4 print 'This program fudges RMS attributes on to a non RMS file' $\ print$ ' /B gives you defaults for a binary file' 10 4 on error go to 32290 rf\$ = 'UDF FIX VAR VFC STM ' \ fo\$ = 'SEQ REL IDX ' 20 30 on rf \$! Record formats ! File organization dim attribute\$(20\$) 40 100 110 if left(switch\$.2\$) = '/H' then 10000 ! help em open filename\$ for input as file 1\$, mode 1\$! update 120 130 140 ' RECS1:';mr%; input 'Change it any way _';yn\$ yn\$ = cvt\$\$(yn\$,38\$) go to 100 if left(yn\$,1\$) <> 'Y' if left(switch\$,2\$) = '/B' | Make it Binary ?
 then rf\$ = 1\$ I FIX
 \ fo\$ = 0\$ I SE0
 \ ra\$ = 5125
 \ fa\$ = val(fa\$)
 nb1\$ = 5125
 \ nb1b\$ = 5125
 \ ba\$,na\$ = 05
 \ mb* = ra\$
 \ go to A00 I Set it 160 input 'Record Format:';i\$
 \\$ = 'FIX' if len(i\$) = 0\$ I make default
 \rec.fmt\$ = or\$\$(i\$,38)
 \rf\$ = instr(1\$,rf\$,rec.fmt\$)
 \go to 200 if rf\$ = 0\$
 \rf\$ = (rf\$-1\$)/05 200 input 'File organization:';i\$
 \i\$ = 'SEQ' if len(i\$) = 0\$
 \filong\$ = cvt\$\$(1\$,385)
 \fo\$ = instr(1\$,fo\$,fil.org\$)
 y cot 220 if fo\$ = 0\$
 \fo\$ = ((fo\$-1\$)/2\$) * 8\$ 220 ! make default input 'Recordsize:';i\$
\ i\$ = '512' if len(i\$) = 0\$
\ rs\$ = val(i\$) 240 input 'File size:':fs% 260 input 'No of blocks in use:';nb\$
input 'No of bytes in last block:';i\$
\ i\$ = '512' if len(i\$) = 0
\ nblb\$ = val(i\$) 280 300 320 input 'Bucket size:':bs% input 'Header size:':hs# 340 input 'Maximum record size:';i\$
\ i\$ = '512' if len(i\$) = C
\ mr\$ = val(i\$) 360 380 400 go to 100 420 print 'Enter a file name for which you would like to add or change RMS attributes.' & 10000 print 'Enter \ print ' \ go to 100 ه /B - Set Binary, Seq. fixed 512 byte records' & Need to NFT data files to a Files-11 system(RSX,VMS).' & ش Control Z to Exit.'

extend I This program is mainly for clearing the open file count and open i update mode bit after your program gets a swap error or other such I annoying problems. I For other goodies see Scott Banks article in Sep 80 RSTS Pro page 38 1 10 Name Blockette Link to next name blockette Filename rad50 (-1 for UFD in MFD) Filename rad50 Extension rad50 Protection code / status Read/Only open count / Open file count Link to accounting Blockette (project # / programmer # in UFD) Link to 1st retrieval Blockette (-31692 = "UFD'Rad50) 0 1 2 1 3 1 4 1 5 1 6 1 7 I STATUS BYTE 176543210 1286432168421 20 | | | -- File is out of sat ! | | | | | | -- File is out of sat
! | | | | | --- File is placed
! | | | | ---- File is placed
! | | | | ---- File acces given out
! | | | ---- File open in UPDATE mode
! | | ---- No file extending allowed
! | ---- No delete and/or rename allowed
! | ---- File marked for deletion print 'Enter UFD to be cleaned as [*,*]'; \ input line ufd\$ \ ufd\$ = cvt\$\$(ufd\$,4\$) 50 100 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 ! list directory 300 1000 go to 32767
nb\$,ptr\$ = fnlink\$(u\$(0\$,0\$)) ! find ist name blockett go to 1190 unless ptr\$! if null then exit 1020 go sub 2000 ! if null then ptr\$ = fnlink\$(u\$(ptr\$,0\$)) ! link to next go to 1020 1190 return 2000 ! prnt file nam ! & extension print using' <###>', swap%(u%(ptr%,4%)) and 255%; 2020 1 prot ab\$ = fnlink\$(u\$(ptr\$,6\$)) print using ' ##### ###', u\$(ab\$,2\$); I file size in blocks u\$(ab\$,7\$); I file clustersize 2040 2050 print using ' ### ###', u\$(ptr\$,4\$) and 255\$; u\$(ptr\$,5\$); 2060 print goto 2090 if u\$(ptr\$,5\$) = 0\$ yn\$ = '' Input 'Clear the Update bit(y/n)';yn\$ if u\$(ptr\$,4\$) and 8\$ yn\$ = cvt3\$(yn\$,32\$) u\$(ptr\$,4\$)=u\$(ptr\$,4\$) and -9\$ if left(yn\$,1\$) = 'Y' Input 'Clear the write access bit';yn\$ if u\$(ptr\$,4\$) and 4\$ yn\$ = cvt3\$(yn\$,32\$) u\$(ptr\$,4\$)=u\$(ptr\$,4\$) and -5\$ if left(yn\$,1\$) = 'Y' yn\$ = cvt3\$(ptr\$,4\$) =u\$(ptr\$,4\$) and -5\$ if left(yn\$,1\$) = 'Y' yn\$ = cvt3\$ 2070 2080 2090 Return 10000 def fnlink\$(1%) ! cvt raw ptr to virt array ptr ! bits 15-12 Block within cluster (*4096\$) ! bits 11- 9 Cluster (*512\$) ! bits 8- 4 blockette within block (*15\$) ! bits 3- 0 special bit flags (*1) 10010 cluster\$ = (1\$ and 3584\$) / 512\$ \ blckf = swap\$(1\$ and -4006\$) / 16\$ \ blcckette\$ = (1\$ and 406\$) / 16\$ \ fnlink\$ = (cluster\$ • clu\$ + blck\$) • 32\$ + blcckette\$ 10020 10030 fnend 32767

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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 deltatime, 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 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.

CIRCLE 11 ON READER CARD

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 (JPIŞ_IMAGNAME), 3 ADDRESS POINTER, 3 RET LEN POINTER, 7 CTOUP. /* Group no. */ 3 ADDRESS POINTER, 2 JPI GROUP, 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), JPI PROCID, /* Process ID */ 3 LENGTH FIXED BINARY (15) INIT (4), 3 CODE FIXED BINARY (15) INIT (JPI\$_PID), 2 JPI PROCID, 3 ADDRESS POINTER, 3 RET_LEN FIXED BINARY (31) INIT (0), JPI TERM, /* Terminal identifier */ 3 LENGTH FIXED BINARY (15) INIT (7), 3 CODE FIXED BINARY (15) INIT (JPI\$_TERMINAL), 2 JPI TERM, 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\$_JOBPRCCNT), 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), TD FIXED BINARY (31), BINARY DELTA_TIME DELTA_TIME BIT (64) ALIGNED, CHAR (13) INIT ('0 00:10:00.00'), TERM READY IMAGE NAME BIT, CHARACTER (128), OUT_TERM PROC_TERM FILE PRINT, CHARACTER (7), CHARACTER (7) INIT ((50)(' TERMINALS (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 11'); DECLARE (LAST_PROCESSES (50), CURR PROCESSES (50), LAST CPUTIM (50), CURR CPUTIM (50)) FIXED BINARY (31) INIT $((\overline{50})-1)$; /* Set up the addresses for the list structure */ JPI CPUTIM.ADDRESS = ADDR (CPUTIM) ;

RSTSPROFESSIONALRSTSPROFESSIONA

```
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$GETJPI (,ID,,JPI LIST,,,) ; /* Get the info on the next process */
                                      /* All is OK ? */
           IF ISTAT = SS$ NORMAL
              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$DELPRC (CURR PROCESSES(I),) ;
                    ON UNDEFINEDFILE (OUT TERM) TERM READY = FALSE ;
                    TERM_READY = FALSE ; /* L
DO WHILE ( ^TERM_READY ) ;
                                           /* Loop until terminal is available */
                       TERM READY = \overline{T}RUE;
                       OPEN FILE (OUT_TERM) OUTPUT TITLE (TERMINALS(I)) ;
                    END ;
                    PUT FILE (OUT TERM) LIST (OUT MSG) ;
                    CLOSE FILE (OUT_TERM) ;
                END ;
             J = J + 1;
          END ; /* End of DO WHILE */
      END ; /* End of outer do loop ( 1 to INDEX ) */
  /* Now set up the arrays for the next loop */
      DO I = 1 TO NO PROCESSES ;
         LAST PROCESSES (I) = CURR PROCESSES (I);
         LAST CPUTIM (I) = CURR CPUTIM (I) ;
         CURR PROCESSES (I) = -1;
CURR CPUTIM (I) = -1;
TERMĪNALS (I) = '
                                    ' ;
      END ;
  /* Hibernate the process for a time */
      ISTAT = SYS$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

0k

NOTE: ABOVE CCLMGR IS AN EXPANDED VERSION OF RTS ALLOWING INTERFACE TO ITHE CCLMAN FILE PUBLISHED IN THE JUNE, 1982 ISSUE OF RSTS PROFESSIONAL. ITHIS ALLOWS ALL CCLMAN CCLS TO BE EXECUTED AS IF THEY WERE REAL CCLS. NOT IREQUIRING '00' ' TO BE APPENDED.

LOG 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

IDO THE FIRST TASK-BUILD, NOTE: WE EXPECT MAKSIL TO BELCH AT THIS IAS IT WILL ENTER EDIT MODE AND FIX UP THE RTS.CMD FILE SO IT IS I'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 IN THOUGHT, WILL ALLOW AU 4K ALS 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

0k

ISET UP RTS AS RTS.RTS, NOTE THE /RTS ON THE FIRST COMMAND LINE ITHE 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>?</rts.tsk>
The run-time system is not align	ed
Edit mode (Yes/No) <yes>? YES</yes>	
Task-builder command input file	<rts.cmd>?</rts.cmd>
The task-builder commands have b	een changed as follows
PAR=RTS: 160000:020000	PAR=RTS: 160000:020000
ST ACK=3072	ST ACK = 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

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

TKB PRTS2

Ok

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

RUN \$MAKSIL MAKSIL V7.1-11>16K RSTS V Resident Library name? RTS/RTS RSTS V7.1-11 C OLFBP 11/70 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



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CIRCLE 164 ON READER CARD

ASSEMBLY, TASK-BUILD ARE NOW DONE

0 k

NOTE BELOW THAT RTS HAS THE FLAGS AUTOMATICALLY SET

SY/R

Run-Tim	e Syst	ems:		
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
RT 11	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
BP2COM	TSK	4(28)K	0	Non-Res, KBM
RTS	TST	1(28)K	0	Non-Res, KBM
0 k				

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 ITHE 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

OUT

0 k

NOTE: ABOVE CCLMGR IS AN EXPANDED VERSION OF RTS ALLOWING INTERFACE TO ITHE CCLMAN FILE PUBLISHED IN THE JUNE, 1982 ISSUE OF RSTS PROFESSIONAL. ITHIS ALLOWS ALL CCLMAN CCLS TO BE EXECUTED AS IF THEY WERE REAL CCLS, NOT IREQUIRING '60 ' TO BE APPENDED.

i

1 2	.TITLE RTSDEF, RTS Definition Macros, 01, 23-Jun-82, PJH .NLIST MD, ME, MEB
3 4 5	; RTS SYSTEM MACRO DEFINITION FILE : (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
3	; *****RTS***** TEST RUNTIME SYSTEM EXAMPLE
4	

(C) 1982

OLFBP

Philip Hunt

.MACRO CLRFQB CALL \$FRBCL .ENDM .MACRO CLRXRB \$XRBCL CALL .ENDM .MACRO ERROR NUM PUSH R1 NUM. R1 MOVE \$ERRPT CALL POP R1 .ENDM .MACRO MESSAGE MSG, LEN CLRXRB MOV LEN, XRB+XRLEN MOV XRB+XRLEN, XRB+XRBC MOV MSG, XRB+XRLOC .WRITE .ENDM .MACRO INPUT BUF, ARG MOV ARG, XRB+XRLEN MOV BUF, XRB+XRLOC MOV #-1, XRB+XRTIME . READ .ENDM MEMORY .MACRO ARG CLRXRB MOVB ARG, XRB+0 .CORE .ENDM .MACRO TSTFQB TSTB FIROB BEQ 10\$ CALL \$PRFRQ JMP RTSINP 10\$:

.NLIST MD, ME, MEB

; (C) 1982, OLFBP

; RTS SYSTEM MACRO DEFINITION FILE

.TITLE RTSDEF, RTS Definition Macros,

Philip Hunt

;WRITE MESSAGE PROMPT

4

; ^C STATE ON ^T ;GET USER INPUT

;

5

6 7 8 9	000000					.PSECT .ENABL .NLIST	RTSMON, RO,GBL GBL ME	
10 11					; ;LOW CO	RE DATA	AREA DEFINITIONS	
12 13		001002			; BUFFER	= 1002		;PUT BUFFER BOTTOM USERSP
14 15					;	COPY	\$COMMON	
16 17					;	COPY	RTSDEF	;MACRO DEF INCLUDES
18 19					; start	-up RTS,	initialize items, set system	program name
20 21	000000				RTS::	CLRXRB		HOUSEKEEPING
22	000004	000#23				CLRFQB	RTSNME	NO LOG OUT CHECK
24	000010	016702	000100		DTONEL .	MOV	VEV DO	CUECK KEVLODD TOD DITS
25 26 27 28	000012 000016 000022	032702 001416	010000		RISNEW:	BIT BEQ	#JFNOPR, R2 RTSNME	;SEE IF LOGGED OUT ;LOGGED IN
29 30	000024 000054	000167	000070			MESSAGE JMP	#BYEMSG, #8. RTSRED	;print 'bye' ;GET A COMMAND
32 33 34	000060 000066	016767 016767	001672 001666	000412 000414	RTSNME:	MOV MOV	PRGNAM,FIRQB+FQNAM1 PRGNAM+2,FIRQB+FQNAM1+2	
35 36	000074 000076	104044 104026			RTSRUN:	.TTRST		;NAME US AS "NONAME" ;JUST IN CASE, ENTRY BY ^C
38	000100					MEMORY	#2	;GET 2K WORDS
40					; print	prompt,	initialize buffers	
41 42 43	000114 000120				RTSINP:	CLRXRB MESSAGE	#PROMPT, #7.	;PRINT PROMPT
44 45 46 47 48	000150 000154 000160 000164	012701 012702 012703 005022	000100 000460 001002		RTSRED: CORLOP:	MOV MOV MOV CLR	#64.,R1 #CORCMN,R2 #BUFFER,R3 (R2)+	;LETS CLEAR CORCOMMON AREA
49 50 51	000166 000170	005023 077103				CLR SOB	(R3)+ R1,CORLOP	;ALSO THE INPUT BUFFER
52 53					; get u	ser input	t	
54 55 56	000172 000176 000222					CLRXRB INPUT TSTFQB	#BUFFER, #128.	;GET USER INPUT ;ANY ERRORS???
57					; do as	thetic h	ousekeeping	
59 60 61 62 63 64 65	000240 000244 000250 000254 000256 000262	016705 012704 121427 001403 121427 001002	000444 001002 000040 000011		SPCLOP:	MOV MOV CMPB BEQ CMPB BNE	XRB+XRBC, R5 #BUFFER, R4 @R4, #32. DROPCH @R4, #9. OKREAD	;SAVE CHARS ACTUALLY RECIEVED ;GET BUFFER RCVD ADDR ;SFACE AS FIRST CHARACTER? ;YES, SO DROP IT ;TAB AS FIRST CHAR??? ;NOPE, MUST BE OK
66 67 68	000264 000266	005204 000770			DROPCH:	:INC BR	R4 SPCLOP	;YES, SO SKIP IT ;AND TRY AGAIN
69 70 71	000270 000274	122714	000015		OKREAD:	:CMPB BEQ	#13.,@R4 RTSRED	;CR ONLY????? :YEP. SO IGNORE IT
72	000276	122714	000012			CMPB BEO	#10.,@R4 RTSRED	LF ONLY????? YEP, SO IGNORE IT
74	000304	122714	000004			CMPB	#04., @R4	;ctrl/d ONLY?????
76	000312	122714	000014			CMPB	#12.,@R4	;ctrl/1 ONLY????
78	000316	122714	000033			CMPB	#27.,@R4	;EF, SO IGNORE II ;ESC ONLY?????
79 80	000324 000326	001711 122714	000041			BEQ CMPB	RTSRED #33.,@R4	;YEP, SO IGNORE IT ;EXCLAMATION, SO ASSUME A COMMENT
81 82	000332	001706	000073			BEQ CMPB	RTSRED #59@R4	;YES, IGNORE IT ;SEMI-COLON. SO ASSUME A COMMENT
83 84	000340	001703	000015			BEQ	RTSRED	;YES, IGNORE IT
85					; lower	to upper	r case conversion	

Museul Museul human FRANK 82

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 subprograms 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

repeatedly scan program comments, spaces, etc., that are not integral to the program's execution. Removing all comments and most of the spaces (except for the space and tab in the first statement) will greatly improve program efficiency, although it will render the program highly unreadable. IT SHOULD BE NOTED THAT SOME SPACES ARE SIGNIFICANT WHEN BETWEEN TECO COMMANDS, AND THE PROGRAMMER WHO COMPRESSES THIS PROGRAM SHOULD BE THOROUGHLY FAMILIAR WITH THESE EXCEP-TIONS.

2) The HELP file specification of [170,1]RESEQ.HLP must be altered if a help message is to be used.

3) The executable version of the program must have a

".TEC" extension, and must have the 64 (decimal) bit set in the protection code to indicate EXECUTABLE IMAGE.

RESEQ.TEC is a program which will take a Basic-Plus (or BASIC-PLUS II) file, and renumber the lines with uniform intervals between line numbers. As it renumbers the lines, RESEQ.TEC also changes the following statements to conforms to the new line sequence:

> GOTO In ON...GOTO In1,In2,... GOSUB In ON...GOSUB In1,In2,... RESUME In IF...THEN In IF...THEN IN IF...THEN...ELSE IN ERL (<, =, >,etc.) In LINE (<, =, >,etc.) In

DIRECTIONS: RESEQ.TEC is run by typing RUN (170,1) RESEQ. RESEQ.TEC will respond with a header and the prompt:

> TYPE '?' FOR HELP FILE:

You then type in the name of the program you wish to resequence. If you type a question mark ('?'), this help message will appear. Typing the name of a non-existent file produces the error:

filename/B + could not be found — please try again (The '/B+' which appears after the file

name is an operating feature of TECO, and can be ignored.)

Next, you will see the prompt:

OLD STARTING LINE NUMBER OF PROGRAM SEGMENT <1>?

RESEQ.TEC is now asking you for the first line number of the program segment you wish to resequence. In most cases, you would want to start at the first line of the entire program, or line 1. Hitting a blank < RETURN> defaults this answer to 1.

The next prompt is:

OLD ENDING LINE NUMBER OF SEGMENT < 32767 > ?RESEQ.TEC is asking you for the highest line number of the program segment you wish to resequence. In most cases, you would want to renumber to the end of the program, or line 32767, the greatest possible line number. Hitting a blank < RETURN> defaults this answer to 32767.

Now RESEQ.TEC will ask for:

ENTER NEW STARTING LINE NUMBER FOR SEGMENT $<\!10\!>?$

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CIRCLE 29 ON READER CARD

@^UB#

DOU1

IBEGIN TTY INPUT MACRO!

"EOEXIT\$" (Q0-3)"E ^C\$'

(00-13)*(00-10)*(00-27)

(Q0-18)"E13 T10 T.-Q1,.T

ONXTCHR\$

(Q0-21)"E-Q1D0U17 T13 T10 T ON XTCHR\$

RESEQ.TEC wants to know what the first line number of the NEW segment is to be (i.e., if you wanted to renumber your program so that the first line becomes line number 100, you'd answer 100 for this prompt). This answer defaults to 10 for a blank < RETURN>.

Finally, RESEQ.TEC asks:

ENTER THE INCREMENT FOR THE NEW LINE NUMBERS < 10 > ?

RESEQ.TEC now wants the increment for the new line numbers (i.e., if you wanted your program lines to become 100, 120, 140, etc., you'd specify an increment of 20). This answer defaults to 10 for a blank < RETURN >.

RESEQ.TEC will then print the message 'PASS 1'. RESEQ.TEC is looking at your program, and assembling a new line number table for the segment you wished to change. If by some chance the new line numbers overflow, or become greater than 32767 (the greatest possible line number), then RESEQ.TEC will print:

NEW LINE NUMBERS OVERFLOWED — RE-SPECIFY SEGMENT DIMENSIONS

and RESEQ.TEC will exit. Your original program will still be preserved.

If all goes well, RESEQ.TEC will then print the message 'PASS 2'. RESEQ.TEC is now substituting the new line numbers for the old ones in your program. Here a special problem may arise: if RESEQ.TEC finds a GOTO or other line reference to a non-existent line number, it will print the following message:

LINE NUMBER %%%%% NOT FOUND AT NEW LINE #####

where %%%%%% represents the non-existent line number referenced, and ##### represents the new line number where the error can be found. RESEQ.TEC substitutes three question marks ('???') for the erroneous reference in the new program.

When RESEQ.TEC is done processing your program, the 'Ready' prompt (for the BASIC run-time system) will appear on your terminal. Your new program will be saved, and your old program will be preserved under a '.BAK' extension.

POSSIBLE PROBLEM: If your program is exceptionally large, RESEQ.TEC may not be able to handle it all at once. This problem can be EASILY FIXED by inserting form-feed (ASCII code 12) characters at various points in your program, splitting the program up into managable portions for RESEQ.TEC.

HAPPY RESEQUENCING!

```
....
.
!**
                  RESEQ.TEC VO1
                                                ...
!**
!**
              Lawrence P. Gallagher
07-Apr-82
                                               **!
i**
i**
                                               **
      LINE NUMBEP RESEQUENCER FOR BASIC-PLUS
                                                **
      AND BASIC-PLUS II SOURCE FILES
                                               **
...
                                               **
      MODIFIES ALL EMBEDED LINE REFERENCES
                                               ...
...
      (GOTO'S, ERL'S, ETC.)
                                               **
```

!LOAD QD WITH A SPACE, TAB, <, =, > !

```
LOAD MACROS AND DATA !
      <>=$
```

```
(00-127)"E01"G-D-1$1$
                8 T32 T8 TON XTCHR$ ' !
                                                  BACKSPACE AND ERASE ONE CHARACTER ON DEL !
                                                  (THIS IS FOR SCOPE USAGE ONLY) !
 HERE WE ADD THE CHARACTER!
   OOT $% 1
 IN XTCHR !>$
 !EXIT!
(Q0-13)"E^TUO"
(Q0-10)"E13^T"
                                             IDUMP THE TRAILING LINE FEED ON <RET>!
                                             !PRINT THE NEEDED <CR> IF IT'S A LINE FEED !
!LOAD QO WITH THE INPUT STRING!
 .-Q1,.X0
 .-Q1,.D
                                             !AND CLEAN UP THE BUFFER!
 ILOAD SUBSTITUTION MACRO!
@^UR#
                                           ADVANCE UNTIL CHR DOESN'T MATCH ANY!
OF THOSE STORED IN QD!
<:::S^EGD$;>
                                           ISTORE BUFFER POINTER IN Q11
ISTORE THIS LINE NUMBER (IF ANY) IN Q21
 .U1
 102
(Q2-QA+1)"G(QZ-Q2+1)"G
                                           IF LOWER LIMIT <= Q2 <= UPPER LIMIT...!
                                           INSERT A '.'I
INSERT A CR/LF!
     °U0.$
    131$101$
                                           POSITION POINTER TO BEGINNING OF NUMBER!
AND APPEND THIS NUMBER INTO QO!
    01J
    1:X0
     \U2
                                           !(THIS MOVES POINTER TO END OF NUMBER)!
!DELETE THE ADDED CR/LF!
!APPEND ANOTHER '.'!
   2D
:^U0.$
    JQE,1:S^EQO$U7
Q7"E ^ALINE NUMBER ^A
                                           IDO A COLON-SEARCH IN THE TABLE!
IF THE NUMBER WASN'T FOUND...!
       Q2:=
^A NOT FOUND AT NEW LINE
                                                  THEN THIS REFERENCE IS TO A!
                                          A ! NON-EXISTENT NUMBER!
        (Q1+:Q0-4)J
                                              RE-POSITION POINTER!
                                          MOVE TO BEGINNING OF LINE!
IGRAB THE ERRONEOUS NUMBER!
        OL.
        <\U0
        00-1:-L>00=
                                           !AND PRINT IT WHEN FOUND!
        (Q1+:Q0-4)J
                                           RE-POSITION POINTER!
        Q1,.D
I???$'
                                           IDELETE THE NUMBER!
                                           SUBSTITUTE ??? FOR THE ERRONEOUS NUMBER!
IREPLACE!
                                          READ THE NEW NUMBER FROM THE TABLE!
    07 "N \U3
     (Q1+:Q0-4)J
Q1,.D
Q3\'''
<::S^EGD$;>
                                           IDELETE THE OLD NUMBER!
                                          IDELETE THE OLD NUMBERT
IAND PLUG IN THE NEW OME!
IPROCEED UNTIL CHR DOESN'T MATCH ANY IN QD!
IAND IF IT'S A COMMA (SUCH AS ON...GOTO)!
ISET THE POINTER, AND CALL AGAIN RECURSIVELY!
(0A-44)"E
   C MR
                                  !RESEQ.TEC TOP END !
ARESEQ.TEC
                    V01^A
2<13 T10 T>
                                          ICLEAR BUFFER!
                                          IENABLE YANKING!
2ED
     ATYPE '?' FOR HELP A13 T10 T
<<
```

ILOAD QB WITH THE 'TERMINAL DRIVER' MACRO !

EXIT THIS MACRO IF DELIMITER TYPED !

I RE-DISPLAY INPUT BUFFER IF CRTL/R !

GET A CHARACTER FROM TTY!

HALT IF CTRL/C TYPED

1 ZERO BUFFER IF CTRL/U !

1

AFILE: A	
HKMBG013 T10 T	IGET FILE SPEC AND STORE IN BUFFER!
J:S?\$;	!EXIT THIS LOOP IF NOT A '?'!
ER[170,1]RESEQ.HLP\$U7	!OPEN HELP FILE (CHANGE THIS SPEC)!
Q7 "NYHTHK'	!AND PRINT THE HELP TEXT (IF ANY)!
Q7"E^ASorry, Help not	available! A2<13 T10 T>'
>	
Z"E APLEASE ENTER A FI	TLE NAME ^ A2<13 T10 T>'
Z "N : S. \$U7	ISEE IF HE SPECIFIED AN EXTENSION!
07"EZJI.BAS\$'	INO. DEFAULT TO '.BAS'!
7.JI / B+\$	ADD THE !/B+! SWITCH!
US-ER\$	ILOAD AN ''ER' INTO OS!
7.10: XS	APPEND THE FILE NAME!
27: US\$	APPEND AN 'ESCAPE'I
HK	ZERO THE BUFFER!
MSUO	ATTEMPT TO OPEN AND SAVE STATUS!
(-00-1):	IEXIF IF OO = -1 (AND REPEAT IF O) !
A? A:G# A could not	be found please try again A !PRINT ERROR!
2<13 T10 T>!>	IAND REPEAT!
<pre>< ^AOLD STARTING LINE NUM MEGO J\UAHK QA"EIUA'</pre>	MBER OF PROGRAM SEGMENT <1> ?^A !PUT IN BUFFER! !SAVE IN QA AND CLEAR BUFFER! !DEFAULT TO (1)!
QA;	AND EXIT IF VALUE IS POSITIVE!
ATHE NUMBER MUST BE BE	TWEEN 1 AND 32767 A13 T10 T
>	
AOLD ENDING LINE NUMBER	OF SEGMENT <32767> ? A
MBGO	IPUT IN BUFFERI
J\UZHK	ISAVE IN QZ AND CLEAR BUFFER!
QZ "E3276702"	IDEFAULT TO 327671
QZ;	IAND EXIT IF VALUE IS POSITIVE!
AENDING NUMBER MUST BE	; BETWEEN 1 AND 32767 A13 T10 T
QZ-QA;	IMAKE SURE QLIQA!
13 110 T	AL MUCH DE ODEATER MULLI OR ROULL TO AL
AENDING LINE (A QZ:=	AJ MUST BE GREATER THAN OR EQUAL TO A

ASTARTING LINE (^A QA:= ^A) ^A2<13 T10 T> 13 T10 T

ā

UV

RSTSPROFESSIONALRSTSPROFESSIONA

<pre><^AENTER NEW STARTING LINE NUMBER FOR SEGMENT <10> ?^A</pre>	
MBGO IPUT IN BUFFER!	
J\ULHK ISAVE IN QL AND CLEAR BUFFER!	
QL"E1OUL' 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! IYANK FIRST PAGE! ISTORE THIS LINE NUMBER (IF ANY) IN QT! <<>IIT IIF IN RANGE...! ISTORE THE NEW LINE NO.....! (QT-QA+1)"G(QZ-QT+1)"G .UOQL\Q0,.XTQ0,.D [T \$0 IPUSH AND INCREMENT QC AND QL! (QI)%L QL"L^ANEW LINE NUMBERS OVERFLOWED -- RE-SPECIFY SEGMENT DIMENSIONS"A 13^T10^T OVERYEND\$''' IIF OUR NEW LINE NUMBERS BECOME! 13 TIO T OVERYEND\$''' IGREATER THAN 32767, WARN THE USER! INEXT LINE! IEXIT IF POINTER AT END OF PAGE! L (.-Z); IGET NEW PAGE! IEXIT IF PAGE IS EMPTY (WE'RE DONE)! -Z;

ILOAD TABLE INTO QX! QC<]T T.\$ QT 131\$101\$.\$ GT T \$ 131\$101\$

Y

> Y

POP FROM STACK INTO QT! INSERT A '.'! INSERT THE OLD NUMBER! INSERT A CR/LF! INSERT A '.'! INSERT THE NEW NUMBER! IINSERT A NEW CR/LF!

JOC#2XX ZUE HK APASS TWO A 13 T 10 T USEB\$ G#0:XS 27: US\$ ΗK MS IRETRIEVE TABLE! JGX OL <\"N OL (0A-43)*(0A-45)"N MR'' L .-Z; OF.I . SGOTO \$U7 Q7 "N <MR :SGOTO \$:>' QEJ:SGOSUB\$U7 07 "N <MR : SGOSUB \$: > " QEJ:STHEN \$U7 Q7 "N <MR : STHEN \$; >' QEJ:SELSE \$U7 Q7 "N <MR : SEL SE \$; > ' OF.I : SRESUME \$U7 Q7 "N <MR : SRESUME \$; > ' QEJ:SERL \$U7 Q7 "N <MR : SERL \$; >" QEJ:SLINE \$U7 Q7 "N <MR: SLINE \$; >' INEXT PAGE!

JQED P -Z;> ΕX IVERYENDI C\$\$

ISTORE NO. CHRS IN QE! ICLEAR BUFFER! I** PASS TWO ** SEARCH FOR KEY WORDS AND SUBSTITUTE NUMBERS I ILOAD AN EB COMMAND! IAPPEND THE FILE SPEC! IAPPEND THE 'ESC'I ICLEAR THE BUFFERI **IOPEN THE FILE FOR INPUT!** IGET FIRST PAGE! INSERT TABLE IN FRONT OF BUFFER! IF THIS IS A REAL LINE NO, PROCEED! IIF THIS LINE NO IS IN RANGE ...! ITHEN CALL THE SUBSTITUTION FUNCTION! !ADVANCE A LINE! AND EXIT LOOP IF DONE!

ISTORE THIS TABLE IN QX!

IFIND A GOTO! IREPLACE IT, IAND TRY AGAIN! IFIND A GOSUB...!

IFIND A 'THEN'...!

IFIND AN 'ELSE'...!

IFIND A 'RESUME' ...!

IFIND AN 'ERL <' ,'ERL =', etc. !

IFIND A 'LINE < ', 'LINE = ', etc. !

ICLEAR TABLE! IGRAB THE NEXT PAGE! AND EXIT (WE'RE DONE) IF PAGE IS BLANK! IBYE BYE !

ac cando it all!

BAC into RTS / BAC into MAC / BAC into BAS



BACmac is a unique software tool, running under RSTS/E, which provides the following conversions:

translation from Basic-Plus "compiled" back to Basic-Plus source code (only the comments will be missing)

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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ADOS Advanced Digital Office Systems

RTS: Test Runtime System Example

... continued from page 55 ;SAVE STRING LENGTH PUSH **R**5 R4, R2 ;GET BUFFER ADDR MOV GET A CHAR CVTLOP::MOVB @R2, R3 CMPB R3, #173 000173 ; ABOVE 'z' BHTS SOBLOP R3,#140 CMPB 000140 :BELOW 'a' BLOS SOBLOP CONVERT TO UPPER SUB #32.,R3 000040 PUT IT BACK MOVB R3, @R2 SOBLOP::INC R2 ;DO UNTIL DONE R5, CV TLOP SOB ; RESTORE LENGTH POP **R**5 ; check for RTS command ;SETUP FOR PARSE COMMAND LOOP MOV R4.R2 CALL PRSCMD TST RO DOCMD BNE ; check for CCL command ;CLEAR XRB STUFF CLRXRB R5. XRB+XRLEN MOV 000442 XRB+XRLEN, XRB+XRBC 000442 000444 MOV R4, XRB+XRLOC 000446 MOV ;DO WE HAVE A CCL??? .CCL ; not a valid anything if we get here MOVB FIRQB, R2 000402 ; ANYTHING RCVD??? TSTB R2 BEO BADP MESSAGE #BDSMSG, #17. ;TELL USER BDRST BR BADP: MESSAGE #BADCMD, #8. BDRST: JMP RTSINP 000167 177360 ; process a RTS command DOCMD:: ASL R3 MOV #DISPAT-2, R4 000544 R3, R4 ;OFFSET IT ADD ; DO THE JMP MOV @R4,PC ; 'OUT ' DISPAT::.WORD OUTCMD .WORD HLPCMD ; 'HELP' .WORD VERCMD ; 'VERSION' ;'RUN' .WORD RUNCMD ASSCMD 'ASSIGN' .WORD ; 'DEASSIGN' .WORD DEACMD :END OF DISPATCH .WORD 0 OUTCMD::CLRXRB .EXIT :NEVER GETS HERE JMP RTSINP 177316 ;PRINT RTS NAME HLPCMD::MESSAGE #RTSNAM, RTSLEN MESSAGE #VERMSG, #231. :LETS GET HELP ;BACK TO USER JMP RTSINP 000167 177232 PRINT RTS NAME VERCMD::MESSAGE #RTSNAM, RTSLEN MESSAGE #VERMSG, #13. ;BACK TO USER JMP RTSINP 000167 177146 ;CLEAR IT RUNCMD::CLRXRB CLRFQB :DITTO R5, XRB+XRLEN ; ABOUT RIGHT MOV 000442 ;DITTO R5, XRB+XRBC 000444 MOV WHERE ARG BEGINS MOV R2, XRB+XRLOC 000446 .FSS

CHECK FOR UPPER/LOWER

;PROCESS THE COMMAND ;COULD WE PROCESS IT? ;YES, LETS GO DO IT

SETUP AS READ RETURNED

;GET ERROR THAT OCCURED ;NO, SO USE STD MESSAGE

;NOPE, SORRY, LETS PRCESS THIS

;GENERATE OFFSET FOR FOLLOWING TABLE ;GET DISPATCH ADDR

;BACK TO NORMAL RTS

;TELL USER RTS VERSION

:GET FILENAME ; ANY ERRORS???

:ANY EXTENSION ???

86

94

99

100 101

106

107 108

115 116

120 121 000446

123 124 000500

127 128

133

141 142 000564

87 000342

88 000344

89 000346

90 000350

91 000354

92 000356

93 000362

95 000370

96 000372

97 000374

98 000376

102 000400

103 000402

104 000406

109 000412

110 000416

111 000422

112 000430

113 000434 114

117 000436

118 000442

119 000444

122 000476

125 000530 126

129 000534

130 000536

131 000542

132 000544

134 000546

135 000550

136 000552

137 000554

138 000556

139 000560

140 000562

143 000570

144 000572 145

146 000576

147 000626

148 000656 149

150 000662

151 000712

152 000742

154 000746

155 000752 156

157 000756

158 000762

159 000766

160 000772

161 000774 162

153

105 000410

000364

010402

111203

120327

103006

120327

101403

162703

110312

005202

077514

010402

005700

001051

010567

016767

010467

104062

116702

105702

001415

000414

006303

012704

060304

011407

000564

000576 '

000662'

000746 '

001170'

001046

000000

104046

000167

010567

010567

010267

104064

163 001012 005767 000416

TSTFOB

FIRQB+FQEXT

OKFILE::TST

WHAT YOU DON'T KNOW ABOUT YOUR DISKS IS COSTING YOU MONEY

If your disk looks like this, you're wasting system performance.

If your disk looks like this, you're using DISKIT.

When the job you're running requires reading the "red" file, it naturally happens faster on a wellordered disk. Disks become "fragmented" as you use your computer. The system slows down. And that costs you money.

Now, you can restructure your disks and get back that lost performance (up to 50%) without spending a dime on new hardware. DISKIT is the original software system that makes this possible.

But don't confuse DISKIT with other system utilities, DISKIT is a complete "software tool kit" that optimizes your RSTS/E system. **DISKIT** is:

- DSU The utility which restructures the information on your disk, making data fast and easy to access.
- DIR The incredible directory tool that finds files at the rate of 400 per second.
- RDR Reorders disk directories 30 times faster than ever before possible.
- OPEN Displays complete job statistics and file activity so you can see what your system is doing.
- DUS The set of CALLable subroutines which pre-extend file directories, reducing fragmentation.

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Software Techniques

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164	001016	001003				BNE	NOTWLD	;YES	
166	001020	012767	177777	000416		MOV	#-1,FIRQB+FQEXT	;SET WILDCARD EXTENSION	
167	001026	104042			NOTWLD:	:.RUN		;TRY TO DO IT	
169 170	001030					TSTFQB		;ANY ERRORS???	
171 172					; deass	ign comm	and		
173 174 175	001046 001050	005702 001021			DE ACMD :	:TST BNE	R2 DESONE	;ANY ARGS??? ;YES, DO CHECK WHAT TO DEASSIGN	
177 177 178 179 180 181	001052 001056 001062 001070 001072	112767 104076	000014	000405		CLRFQB CLRXRB MOVB .ULOG TSTFQB	#UU.DAL,FIRQB+FQFUN	;SET UP DEASSIGN ;CLEAR ALL ;PRINT ANY ERROR ENCOUNTERED	
182 183 184	001110	000167	177000		DESONE:	JMP :CLRXRB	RTSINP	;DONE :CLEAR IT	
1 85 1 86	001120					CLRFQB		;DITTO	
187 188 189 190 191	001124 001130 001134 001140 001142	010567 010567 010267 104064	000442 000444 000446			MOV MOV MOV .FSS TSTFQB	R5,XRB+XRLEN R5,XRB+XRBC R2,XRB+XRLOC	;ABOUT RIGHT ;DITTO ;WHERE ARG BEGINS ;GET FILENAME ;ANY ERRORS???	
192 193 194 195	001160 001160 001164	012705 000167	000013 000050		OKDE AS:	MOV JMP	#UU.DEA,R5 ASSNGO	;NO, SO LETS DO IT ;SETUP DEASSIGN ,JUMP TO ASSIGN LOGI ;DO IT PLEASE	C
197					; assigr	comman	1		
198 199 200	001170 001174				ASSCMD::	CLRXRB CLRFQB		;CLEAR IT ;DITTO	
201 202 203 204 205 206	001200 001204 001210 001214 001216	010567 010567 010267 104064	000442 000444 000446			MOV MOV .FSS TSTFQB	R5,XRB+XRLEN R5,XRB+XRBC R2,XRB+XRLOC	; ABOUT RIGHT ; DITTO ; WHERE ARG BEGINS ; GET FILEN AME ; ANY ERRORS???	
207 208 209	001234 001240	012705	000012		OKASSG: ASSNGO:	MOV	#UU.ASS,R5	;SETUP ASSIGN, DO W/CODE SET ;R5 = 13=DEASSIGN,12=ASSIGN	
210 211 212	001240 001246	032767 001410	100000	000452		BIT BEQ	#100000,XRB+10 OKASGN	;GET BASIC FLAG-WORD 2 ;LEGAL DEVICE	
213 214 215	001250 001264	000167	176624			ERROR JMP	#NODEVC RTSINP	;NOT A VALID DEVICE ;GET NEW PROMPT	
216	001270	110567	000405		OKASGN:	MOVB	R5,FIRQB+FQFUN	;ASSIGN OR DEASSIGN CODE	
218 219 220 221	001274 001300 001302 001320	104076 000167	176570			.ULOG TSTFQB JMP	RTSINP	;SEE IF ERROR	
222	00,920								
225					; asynch	ronous_t	raps		
227	001324 001326	104026 000167	176562		CCTRAP::	.TTRST JMP	RTSINP	;SYS(CHR\$(0%)) ;IGNORE CTRL/C, MUST USE 'OUT'	
230 231 232 233	001332 001332 001362	104046			BDERRO::	MESSAGE .EXIT	#FTLERR, #28.	;ANY WEIRD ERRORS	
235 236					; some u	iseful su	abroutines		
237 238 239 240 241 242 243 244 245 246 247	001364 001366 001372 001374 001376 001400 001402 001404 001406	012701 005021 005021 005021 005021 005021 005021 005021	000402		\$FRBCL::	PUSH MOV CLR CLR CLR CLR CLR CLR CLR CLR CLR CLR	R1 #FIRQB, R1 (R1)+ (R1)+ (R1)+ (R1)+ (R1)+ (R1)+ (R1)+ (R1)+ (R1)+	;SAVE R1 ;START OF FIRQB	



(R1) +

(R1) +

(R1) +

(R1) +

(R1) +

(R1) +

CLR

CL.R

CLR

CLR

CLR

CL.R

CLR

248 001412

249 001414

250 001416

251 001420

252 001422

253 001424

005021

005021

005021

005021

005021

005021

005021

311											
312 313	001652 001656	121227 001415	000012		NOARG::	CMPB BEQ	@R2,#10. OKNOAR	;USER ENTERE ;YES, SAY SU	D TERMINATOR??? ICCESSFUL	(LF)	
315 316 317	001660 001664	121227 001412	000015			CMPB BEQ	@R2,#13. OKNOAR	;USER ENTERE ;YES, SAY SU	D TERMINATOR??? CCESSFUL	(CR)	
318 319	001666 001672	121227 001407	000033			CMPB BEQ	@R2,#27. OKNOAR	;USER ENTERE ;YES, SAY SU	D TERMINATOR??? CCESSFUL	(ESC)	
321 322	001674 001676	105721 001376			SKIPCM:	TSTB BNE	(R1)+ SKIPCM	;GET TO END	OF CURRENT CMD		
324 325	001700 001702	105711 001406				TSTB BEQ	@R1 BDCMD	;END OF CMD ;YEP, MUST B	REACHED, LETS C E BAD USER CMD	HECK END OF TBL	
327 328 329	001704 001706 001710	005203 010402 000747				INC MOV BR	R3 R4,R2 PRSLOP	;INC INDEX, ;RESTORE USE ;AND CHEC	MORE CMDS TO CH R BUFFER ADDRES K MORE	ECK S	
331 332 333 334	001712 001714 001720	005002 012700	000001		OKNOAR: OKWARG: BDCMD::1	:CLR :MOV RETURN	R2 #1,R0	;SIGNAL NO A ;SIGNAL SUCC ;BACK TO PRO ;RO = 0,BAD	RGUMENTS ESSFUL CESSING CMD <>0 = GOO	D CMD	
335 336 337								;R2 = 0, NO ;R3 = <>0 = 1	INDEX OF COMMAN	D RECIEVED	
339 340 341					; messa	ges					
342 343	001722 001725	015 153	012 015	117 012	PROMPT :	.ENABL :.ASCIZ	LC <15><12>/0k/	<15><12><12>			
344	001732 001735 001740	040 040 040	040 040 040	040 040 040		.ASCIZ	/ /		;EXTRA PROM	PT PATCH SPACE	
345	001743 001744 001747	000 015 171 012	012 145 012	102 015	BYEMSG:	.ASCIZ	<15><12>/Bye	/<15><12><12>			
346	001152	012	012	000		.EVEN					
347	001756	054746			PRGNAM:	. RAD50	/NON/		; ALLOWS NON	AME PATCHING	
348	001760	004115	127	150	BADCMD	.RAD50	/AME/ /?What?/<15	><12>	:bad comman	d input	
349	001762	141	164	077	DRUGHU.	ADULL	7.111111111111111		,		
	001770	015	012	000							
350	001773	077	125	156	FTLERR:	.ASCIZ	/?Undefined	error occured?/<	15><12>		
	001776	144	145	146							
	002001	151	156	145							
	002004	144	040	145							
	002007	162	162	157							
	002012	162	040	157							
	002015	143	143	1111							
	002020	077	015	012							
	002025	000	015	UTL							
351	002027	077	111	154	BDSMSG:	ASCIZ	/?Illegal s	witch/<15><12>			
	002032	154	145	147							
	002035	141	154	040							
	002040	163	167	151							
	002043	164	143	150							
250	002046	015	012	000							
352	0020F1	010	055	010	VERMSG	ASCTT	1 - 1			;3	
352	002054	126	060	061	VERSON	.ASCIZ	/101.00.1/<	15><12>		;10	
554	002057	056	060	060							
	002062	056	061	015							
	002065	012	000		ATT						
355	002067	015	012	103	HLPMSG::	.ASCII	<15><12>/Coi	mmands:/<15><12><	127	; 14	
	002072	157	155	155							
	002075	141	156	144							
	002100	163	012	015							
256	002103	122	125	116		ASCTT	/RUN -	Run a program/<15	><12>	;25	
390	002105	0/10	040	040			,				
	002113	040	040	055							
	002116	040	122	165							
	002121	156	040	141							
	002124	040	160	162							
	002127	157	147	162							
	002132	141	155	015							

RSTSPROFESSIONALRS
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	002135	012						
257	002136	117	125	124	ASCIT	/011T	Out to system default KRM/(15)(12)	. 37
221	002130		125	124	. ADULI	/001 -	Out to system default KDM/(19/(12/	, 51
	002141	040	040	040				
	002110	010	010	055				
	002144	040	040	055				
	002147	040	117	165				
	002152	16/1	010	164				
	002152	104	040	160				
	002155	157	040	163				
	002160	171	163	164				
	002100	4.115	105	010				
	002163	145	155	040				
	002166	144	145	146				
	002100	4 1 4	465	4 - 1				
	002171	141	165	154				
	002174	164	040	113				
	000177	100	115	015				
	002177	102	115	015				
	002202	012						
250	002202	106	105	100	ASCTT	NERSTON	Type version number of PTS/(15)(12)	. 38
350	002203	120	105	122	. ADULI	/VENSION -	Type version number of his/(1)/(12/	,50
	002206	123	111	117				
	002211	116	010	055				
	002211	110	040	0))				
	002214	040	124	171				
	002217	160	145	040				
	002211	100	4.115	1(0				
	0022222	100	145	102				
	002225	163	151	157				
	0000000	156	010	156				
	002230	150	040	150				
	002233	165	155	142				
	002236	145	162	040				
	002230	145	A LIC	010				
	002241	157	146	040				
	002211	122	124	123				
	000017	015	010					
	00224/	015	012	21.000				~ ~
359	002251	101	123	123	.ASCII	/ASSIGN -	Assign devices or logicals/<15><12>	;38
500	000051	444	107	116				
	002254	111	107	110				
	002257	040	040	055				
	002262	010	101	162				
	002202	040	101	105				
	002265	163	151	147				
	002270	156	040	144				
	002210	150	040	144				
	002273	145	166	151				
	002276	143	145	163				
	002210	010	107	160				
	002301	040	157	102				
	002304	040	154	157				
	000007	4 1177	151	110				
	002307	14(151	143				
	002312	141	154	163				
	000015	015	010	-				
	002315	015	012					
360	002317	104	105	101	.ASCII	/DEASSIGN-	 Deassign devices or logicals/<15><12> 	>;40
-	002322	123	123	111				
	002322	123	125	111				
	002325	107	116	055				
	002330	040	104	145				
	002550	0.10	104	145				
	002333	141	163	163				
	002336	151	147	156				
	002550	0.00		4.45				
	002341	040	144	145				
	002344	166	151	143				
	0002117	1 11 5	162	010				
	002341	145	103	040				
	002352	157	162	040				
	002355	154	157	147				
	002333	154	1.10	4.1.4				
	002360	151	143	141				
	002363	154	163	015				
	0000066	010						
	002300	012						
361	002367	110	105	114	.ASCIZ	/HELP -	Inis message/<15/<12>	;24
	002272	120	0110	010				
	002312	120	040	040				
	002375	040	040	055				
	002400	040	124	150				
	0000000	454	160	010				
	002403	151	103	040				
	002406	155	145	163				
	002411	162	141	1/17				
	002411	105	141	141				
	002414	145	015	012				
	002417	000						
21-	0000	000	0.4 -		001.0	/4F5 //		
305	002420	015	012	000	CHLF:: .ASCIZ	<15><12>		;2
363					EVEN			
261								
304	04 V C							
365	002424	122	124	123	RTSNAM::.ASCIZ	/RTS/	:RTSNAM - PATACHABLE	
	002127	000					,	
	002421	000	0.17300	200	6.00 Tests			
366	002430	000	000	000	.BYTE	0,0,0.0		
	002122	000				-,-,-,-		
	002433	000						
367	002434	000003			RTSLEN :: . WORD	3	:LEN MESSAGE- PATCHALBE	
200	002131	000005			in old in the none	5	, BER (BOONDE THIOMBED	
308					3			
360					CMDTRL. RTS S	PECTAL COMMA	NDS	
203					, , , , , , , , , , , , , , , , , , , ,	DUTI		
370					; EACH COMMAN	D WILL END W	ITH A NULL BYTE	
371					.: THE TABLE W	ILL END WITH	A NULL BYTE	
200					,	MLLI		
372					;			
373	002436	117	125	124	CMDTBL ASCTZ	/OUT/		
515	002430	111	120	124	SUDIDLROULZ	/001/		
	002441	000						
	0021112	110	105	111	ACCT7	HEI D/		
271	JUC 44/	110	105	114	. ADULZ	/ NELF/		
374			Contraction and the second second					
374	002445	120	000					
374	002445	120	000	100	10017	VEDSTON /		
374 375	002445 002447	120 126	000 105	122	.ASCIZ	/VERSION/		
374 375	002445 002447 002452	120 126 123	000 105 111	122 117	.ASCIZ	/VERSION/		
374 375	002445 002447 002452	120 126 123	000 105 111	122 117	.ASCIZ	/VERSION/		

è

376	002457	122		125	116	.ASC	IZ /RU	N/							
277	002462	101		100	100	100		07.0N (
211	002403	111		107	123	. ASC.	LZ /AS	SIGN/							
	002471	000		107	110										
378	002472	104		105	101	. ASCI	Z /DE	ASSIGN/							
	002475	123		123	111										
1	002500	107		116	000										
379	002503	000		000		.BYTE	C 0,0								
380															
381						.EVEN	1								
382						.DSAE	BL LC								
303															
3 86							***VFC	TORS AND MT	SC BTS	TILLE STULLE	*******				
3 87					,		A PC	IONS AND ILL	JU MIL	5 SIUTI -					
388					: EXTEND	VECTO	R AREA	.99998 - U	SED BY	TASK-B	UILD. MAKSIL				
389															
390	000000					.PSEC	T .99	998, RO, GBL							
391															
392 (000000					.PSEC	T .99	999, RO, GBL							
393					UTOT AA										
394 (000000	000100			VEC1 \$\$::	WORD	DE VBI	м		• D	FIAC PTS FIAC W	ABDS			
206 (000000	100012				RADE	0 /TOT	/		, I	DEVT DEENUT EY	TENSTON			
390 0	000002	000000				WORD	0 /151			;P.	ISTZ -MUST BE 0	LINDION			
398 (000006	000001				.WORD	1			:P.1	MSIZ -MINIMUN US	ER AREA			
399 (000010	001332'				.WORD	BDERRO)		;P.1	FIS -FLOATING PO	DINT			
400 0	000012	001332'				.WORD	BDERRO	0		;P.0	CRAS -SYS CRASH	ENTRY			
401 (000014	000000 '				.WORD	RTS			;P.,	STRT -PRIMARY RT:	S ENTRY			
402 (000016	000012'				.WORD	RTSNEV	N		;P.1	NEW -SWITCH ENTI	RY			
403 (000020	000074				. WORD	RTSRUI	4		;P.1	RUN -RUN FILE EN	VTRY			
404 (000022	001332				. WORD	BDERR			; P	BAD -IRAP VECTOR	FNTDV			
405 0	000024	001332				WORD	BDERR			,r.,	IOT _TOT INSTRU	TTON EN	rry		
407 (000030	001332'				.WORD	BDERRO)		:P.1	EMT -EMULATOR TI	RAP			
408 (000032	001332'				.WORD	BDERRO)		;P.1	TRAP -TRAP INST I	ENTRY			
409 (000034	001332'				.WORD	BDERRO)		;P.1	FPP -FLOAT POINT	ENTRY			
410 0	000036	001324'				.WORD	CCTRAN	2		;P.0	CC - 1 ^C ENTER	RED			
411 (000040	001324'				.WORD	CCTRAN	2		;P.2	2CC - 2 OR MORE	^C ENTER	RED		
		000021				WORD	28			:P	ST7F _ MAY HSFR	AREA ST71	7		
412 (000042	000034					20.			,	SIZE - MAX ODEN	ANDA DI DI	Ú.		
412 (413	00042	000034				END	DTC			,		MUR DIZI	2		
412 (413 414	00042	000000				.END	RTS			,	SIZE - NAX ODEN A	MUX OID	2		
412 (413 414 SYMB()00042 DL TABI	000034 000000'				.END	RTS			,	SIZE - NAK ODEN A	MDR 012	5		
412 (413 414 SYMB(ASSCI	000042 DL TABI MD 00'	000034 000000' LE 1170RG	002	FQBUFL	000020	.END	RTS PF.KBM	000400		UMPFQ	000012	UU.YLG	177777		
412 (413 414 SYMB(ASSCI ASSF(000042 DL TABI MD 00 Q 000	000000' LE 1170RG 0024	002	FQBUFL FQCLUS	000020 000034	.END	RTS PF.KBM PF.NER	000400		UMPFQ USRLOG	000012 000740	UU.YLG UU.ZER	177777 000015	004	
412 (413 414 SYMB(ASSCI ASSF(ASSN(DODOU DL TABI MD 00' Q 000 GO 00'	000000' LE 1170RG 0024 1240R	002 002	FQBUFL FQCLUS FQDEV	000020 000034 000030	.END	RTS PF.KBM PF.NER PF.REM	000400 004000 010000		UMPFQ USRLOG USRPPN USPPT	000012 000740 000734	UU.YLG UU.ZER VECT\$\$	177777 000015 00000RG	004	
412 (413 414 ASSCI ASSCI ASSCI ASSN(ATRF(DL TABI 1D 00' 2 000 30 00' 2 000	000000' LE 1170RG 0024 1240R 0000	002 002	FQBUFL FQCLUS FQDEV FQDEVN	000020 000034 000030 000032	.END F F F	RTS PF.KBM PF.NER PF.REM PF.RW	000400 004000 01000 002000		UMPFQ USRLOG USRPPN USRPRT USPSP	000012 000740 000734 000736	UU.YLG UU.ZER VECT\$\$ VERCMD	177777 000015 000000RG 000662RG 002051RG	004 002 002	
412 (413 414 SYMB(ASSCI ASSF(ASSN(ATRF(AUDH) BADC(DL TABI 1D 00' 2 00' 30 00' 30 00' 1D 00' 4D 00'	0000000' LE 1170RG 0024 1240R 0000 0032 176286	002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FOEXT	000020 000034 000030 000032 000004 000014	. END F F F F F F	RTS PF.KBM PF.NER PF.REM PF.RW PF.SLA	000400 004000 010000 002000 040000		UMPFQ USRLOG USRPPN USRPRT USRSP UILOFO	000012 000740 000734 000736 000400 000014	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON	177777 000015 000000RG 000662RG 002051RG 002054RG	004 002 002 002	
412 (413 414 SYMB(ASSCI ASSN(ASSN(ATRF(AUDH) BADCI BADP	DL TABI MD 00' Q 00' GO 00' Q 00' MD 00' MD 00'	000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R	002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQEXT FQFIL	000020 000034 000030 000032 000004 000014 000004	.END F F F F F F F F	RTS PF.KBM PF.NER PF.REM PF.RW PF.SLA PF.1US PKBHND	000400 004000 010000 02000 040000 001000 00020		UMPFQ USRLOG USRPPN USRPRT USRSP UUOFQ UU, ACT	000012 000740 000734 000736 000400 000014 177761	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB	177777 000015 000000RG 000662RG 002051RG 002054RG 002054RG	004 002 002 002	
412 (413 414 ASSCI ASSSI ASSSI ATRF(AUDHI BADCI BADP BDCMI	DODOO42 DL TABI MD 00 Q 000 GO 00 Q 000 MD 000 MD 00 000 C 000	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG	002 002 002 002 002	FQBUFL FQCLUS FQDEV FQEVN FQERNO FQEXT FQFIL FQFLAG	000020 000034 000030 000032 000004 000014 000004 000024	.END FF FF FF FF FF	RTS PF.KBM PF.NER PF.REM PF.RW PF.SLA PF.1US PKBHND PLTHND	000400 004000 010000 02000 040000 001000 000020 000034		UMPFQ USRLOG USRPPN USRPRT USRSP UUOFQ UU.ACT UU.ASS	000012 000740 000734 000736 000400 000014 177761 000012	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC	177777 000015 000000RG 002051RG 002054RG 002054RG 000442 000002	004 002 002 002	
412 (413 414 ASSCI ASSF(ASSF(AUDHI BADCI BADP BDCMI BDERI	DODOO42 DL TABI MD 00° Q 000 GO 00° Q 000 MD 00° MD 00° C 00° RO 00°	000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG	002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQEXT FQFIL FQFLAG FQFUN	000020 000034 000030 000032 000004 000014 000004 000024 000023	.END F F F F F F F F F F F F F	RTS PF.KBM PF.NER PF.REM PF.RW PF.SLA PF.SLA PF.SLA PF.SLA PKBHND PLTHND PRGNAM	000400 004000 010000 02000 040000 001000 000020 000034 001756 RG	002	UMPFQ USRLOG USRPPN USRPRT UUSRSP UUU-ACT UU.ASS UU.ATR	000012 000740 000734 000736 000400 000014 177761 000012 177747	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBC XRBLK	177777 000015 000000RG 00262RG 002054RG 0000442 000002 000010	004 002 002 002	
412 (413 414 ASSCI ASSF(ASSF(ASSN(ATRF(AUDH) BADCI BADP BDCM1 BDER1 BDRS(DODOO42 DL TABI MD 00° Q 000 GO 00° Q 000 MD 00° MD 00° C 00° RO 00° C 00°	000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R	002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQEXT FQFIL FQFLAG FQFUN FQJOB	000020 000034 000030 000032 000004 000014 000024 000024 000023 000003	.END F F F F F F F F F F F F F F F F	RTS PF.KBM PF.NER PF.REM PF.RW FF.SLA FF.1US PKBHND PLTHND PRGNAM PROMPT	000400 004000 010000 02000 040000 001000 000020 000034 001756 RG 0017 22 RG	002 002	UMPFQ USRLOG USRPPN USRPRT UUSRSP UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT	000012 000740 000734 000736 000400 000014 177761 000012 177747 000006	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBC XRBLK XRBLKM	177777 000015 000000RG 000662RG 002051RG 002054RG 0000442 000002 000010 000010	004 002 002 002	
412 (413 414 ASSCI ASSCI ASSN(ATRF(AUDHI BADCI BADP BDCMI BDERI BDERI BDERI BDERI	DODOO42 DL TABI MD 00° Q 000 GO 00° Q 000 MD 00° MD 00° C 00° RO 00° C 00° C 00° C 00°	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R 2027 RG	002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQEXT FQFIL FQFLAG FQFUN FQJOB FQMODE	000020 000034 000030 000032 000004 000014 000024 000024 00003 000002 000022	.END FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER PF.REM PF.RW FF.SLA PF.TUS KBHND CRGNAM ROMPT RSCMD	000400 004000 010000 02000 040000 001000 000020 000034 001726RG 001722RG 001614RG	002 002 002	UMPFQ USRLOG USRPPN USRPRT UUSRSP UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK	000012 000740 000734 000736 000400 000014 177761 000012 177747 000006 177765	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLKM XRBSIZ	177777 000015 000000RG 00262RG 002051RG 002054RG 0000442 000002 000010 000007 000016	004 002 002 002	
412 (413 414 ASSCI ASSCI ASSCI ASSCI ASSCI BADP BADCI BADP BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI	DODOO42 DL TABI MD 00° Q 000 GO 00° Q 000 MD 00° MD 00° C 00°	000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R 2027RG 1002	002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQEXT FQFLAG FQFUN FQJOB FQMODE FQMODE	000020 000034 000030 000032 000004 000014 000024 000024 000003 000002 000022 000022	.END FF FF FF FF FF FF FF	RTS PF.KBM PF.NER PF.REM PF.RW FF.SLA FF.TUS KBHND PCRNAM ROMPT RSCMD RSCMD	000400 004000 010000 040000 040000 001000 000020 000034 001756RG 001722RG 001614RG 001630R	002 002 002 002	UMPFQ USRLOG USRPPN USRPRT USRSP UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.BYE	000012 000740 000734 000736 000400 000014 177761 000012 177747 000006 177765 000005	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLKM XRBSIZ XRCI XRCI	177777 000015 00000RG 002051RG 002054RG 0000442 000002 000010 000007 000016 000006	004 002 002 002	
412 (413 414 ASSCI ASSCI ASSCI ASSCI ASSCI ASSCI BADP BADCI BADP BDCMI	DL TABI MD 00 Q 000 Q 000 MD 000 MD 000 MD 000 C C 000 C C 000 C C 000 C C 000 C C C 000 C C C C C C C C C C C C C C C C C C C	000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R 2027RG 1002 1744RG	002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQEXT FQFLAG FQFLAG FQFUN FQJOB FQMODE FQNAM1 FQNAM2	000020 000034 000030 000032 000004 000014 000024 000003 000002 000022 000022 000010 000020	. END F F F F F F F F F F F F F F F F F F F	RTS PF.KBM PF.NER PF.REM PF.RW FF.SLA FF.TUS VKBHND VRF.LUS VKBHND VRGNAM RSCMD RSCMD RSCMD RSLOP TPHND	000400 004000 010000 040000 040000 000020 000034 001756 RG 0017 22 RG 0016 14 RG 00163 0 R 000012	002 002 002 002	UMPFQ USRLOG USRPPN USRPRT UUSRSP UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.BYE UU.CLL	000012 000740 000734 000736 000400 000014 177761 000012 177747 000006 177765 000005 177750	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLKM XRBLKM XRBSIZ XRCI XRLEN XRLEN XRLEN	177777 000015 00000RG 002051RG 002054RG 0000442 000002 000010 000007 000016 000006 000000	004 002 002 002	
412 (413 414 SYMB(ASSCI ASSCI ASSCI ASSCI ASSCI ASSCI BASSCI ASSCI ASSCI ASSCI BASSCI BADEN BDEN BDEN BDEN BDEN BDEN BDEN BDEN B	DI TABI MD 00° Q 000 Q 000 Q 000 MD 00° MD 00° MD 00° C 000 SG 00° SG 00° SG 00° SG 00° SG 00° SG 00° SG 00° SG 00°	0000034 000000 * LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000	002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQERNO FQERNO FQFLAG FQFLAG FQFUN FQJOB FQMODE FQMODE FQNAM1 FQNAM2 FQNENT FQNENT	000020 000034 000030 000032 000004 000014 000024 000003 000002 000022 000022 000010 000020 000026	. END FF FF FF FF FF FF FF FF FF FF FF	PF.KBM PF.KBM PF.NER FF.REM PF.RW PF.RW PF.SLA FF.1US KBHND LTHND RGNAM RSCMD RSCMD RSLOP TPHND TRHND RBAD	000400 004000 002000 040000 000020 000034 001756RG 001722RG 001614RG 001630R 000012 000010	002 002 002 002	UMPFQ USRLOG USRPPN USRPRT UUOFQ UU.ACT UU.ASS UU.ATT UU.BCK UU.BYE UU.CCL UU.CHE	000012 000740 000734 000736 000400 000014 177761 000012 177747 000006 177765 000005 177750 000023 000010	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLKM XRBSIZ XRCI XRLEN XRLOC XRMOD	177777 000015 00000RG 002051RG 002054RG 000442 000002 000010 000007 000016 000006 000000 000004 000004 000004	004 002 002 002	
412 (413 414 SYMB(ASSCI ASSCI ASSCI ASSCI ASSCI ASSCI ASSCI BASSCI BADEN BDEN BDEN BDEN BDEN BDEN BDEN BDEN B	DL TABI MD 00° Q 000 Q 000 Q 000 MD 00° MD 00° C 000° C 00° C 00° C 00° SG 00° SG 00° SG 00° SG 00° LP 10° AP 00°	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1762RG 0500R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQFLAG FQFLAG FQFUN FQJOB FQMODE FQMODE FQMODE FQMAM1 FQNAM2 FQNENT FQPFLG FQPPLG	000020 000034 000030 000032 000004 000014 000024 000002 000022 000022 000010 000020 000026 000026	. END FF FF FF FF FF FF FF FF FF FF FF FF FF	PF.KBM PF.KBM PF.NER FF.REM PF.RW FF.SLA FF.SLA FF.SLA RGNAM ROMPT RCSCMD RSLOP TPHND TRHND .BAD .BAD	000400 004000 002000 040000 000020 000034 001756RG 001722RG 001630R 000012 000012 000012	002 002 002 002	UMPFQ USRLOG USRPPN USRPRT UUOFQ UU.ACT UU.ASS UU.ATT UU.BCK UU.BYE UU.CLL UU.CHU UU.CLN	000012 0007 40 0007 34 0007 34 0000 40 0000 14 1777 61 0000 12 1777 47 000006 1777 65 000005 1777 50 0000023 000010 000002	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLK XRBLKM XRBSIZ XRCI XRLEN XRLOC XRMOD XRTIME	177777 000015 00000RG 00262RG 002051RG 002054RG 0000442 000002 000010 000007 000016 000006 000000 000004 000014 000014	004 002 002 002	
412 (413 414 SYME(ASSC) ASSC(ASSC) ASSC(ASSC) ASSC(ASSC) BASSC(ASSC) ASSC(ASSC) BASSC(BASSC) BADE BADE BADE BADE BDCMI BDCMI BDCSMI BDSMI CALFI CCTRI CLSF(CLSF)	DL TABI MD 00° Q 000 Q 000 Q 000 MD 000 MD 000 MD 000 C 000	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 00014 0000	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQEVN FQERNO FQEXT FQFLAG FQFUN FQJOB FQMODE FQMODE FQMODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPPN	000020 000034 000030 000032 000004 000014 000024 000002 000022 000022 000022 000020 000026 000026 000027	. END FF FF FF FF FF FF FF FF FF FF FF FF FF	PF.KBM PF.KBM PF.NER PF.REM PF.REM PF.SLA PF.SLA RESCMD RSLOP TPHND TRHND .BAD .BPT .CC	000400 004000 002000 040000 000020 000034 001756RG 001722RG 001614RG 001630R 000012 000012 000010 177754 177756	002 002 002 002	UMPFQ USRLOG USRPPN USRSP UUOFQ UU.ACT UU.ACT UU.ACT UU.ATT UU.BCK UU.CL UU.CLE UU.CLE UU.CLN UU.CNV	000012 0007 40 0007 34 0007 34 0007 36 000014 1777 61 000012 1777 47 000006 1777 65 000005 1777 50 0000023 000010 000002	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLK XRBLKM XRBSIZ XRCI XRLEN XRLOC XRLOC XRTIME \$ERRPT	177777 000015 00000RG 00262RG 002051RG 002054RG 0000442 000002 000010 000007 000016 000006 000006 000004 000014 000014 000012 001466RG	004 002 002 002	
412 (413 414 ASSVII ASSFI ASSFI ASSFI BADP BDCM BDERI BDES BDSM BDERI BUFFI BYEM CALF: CCTRH CLSF(CCMDTI	DIL TABI MD 00° Q 000 Q 000 Q 000 MD 00° MD 00° C 00° C 00° C 00° C 00° SG 00°	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0004 2436RG	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQFLAG FQFLAG FQFUN FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPPN FQSIZ	000020 000034 000032 000004 000014 000004 000024 000002 000022 000022 000022 000020 000026 000026 000026 000026 000026	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER FF.REM FF.SLA FF.SLA KBHND PF.SLA RSCMD RSCMD RSCMD TPHND TRHND .BAD .BPT .CC .CRAS	000400 004000 010000 040000 000020 000020 000034 001756RG 001614RG 001630R 000012 000010 177756 177770 17770	002 002 002 002	UMPFQ USRLOG USRPPN USRSP UUOFQ UU.ACT UU.ASS UU.ATT UU.BCK UU.BYE UU.CCL UU.CHE UU.CHU UU.CLN UU.CNV UU.DAL	000012 0007 40 0007 34 0007 34 0007 36 000400 000014 1777 61 0000012 1777 47 000006 1777 65 000005 1777 50 000005 1777 50 000023 000023 000024 000014	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLKM XRBSIZ XRCI XRLEN XRLOC XRLEN XRLOC XRTIME \$ERRPT \$FRBCL	177777 000015 00000RG 00262RG 002051RG 002054RG 000042 000012 000016 000007 000016 000006 000004 000004 000012 001466RG 001364RG	004 002 002 002	
412 (413 414 ASSCI ASSCI ASSFI AUDHI BADCI BADCI BADCMI BDERS BDSMI BUFFI BYEMI CALFI CCTR CDRHI CLSF(CORCI	DL TABI MD 00 Q 000 GO 00 Q 000 MD 00 MD 00 MD 00 C 000 C 000	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0530R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 0460	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQFIL FQFLAG FQFUN FQNODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPROT FQSIZ FQSIZ	000020 000034 000032 000004 000014 000004 000024 000022 000022 000022 000020 000020 000026 000026 000026 000026 000027 000016 000005	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER FF.REM FF.RW PF.SLA VFF.SLA KBHND CTHND RGNAM ROMPT RSCMD TPHND TRHND BAD .BAD .CRAS .CRAS	000400 004000 010000 040000 001000 00020 00034 001756RG 001614RG 001630R 000012 000010 177754 177756 177770 177744 177734	002 002 002 002	UMPFQ USRLOG USRPPN USRPPT UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.BYE UU.CCL UU.CHE UU.CHU UU.CLN UU.CNV UU.DAL UU.DAT	000012 000740 000734 000736 000400 000014 177761 000012 177747 000006 177765 000005 177750 000023 000023 000024 000014 177762	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLK XRBLK XRBLK XRBLK XRLEN XRCI XRLEN XRLOC XRMOD XRTIME \$FRBCL \$PRFRQ	177777 000015 00000RG 002051RG 002054RG 002054RG 000442 000002 000010 000007 000016 000006 000000 000004 000014 000014 000012 001466RG 001364RG 001570RG	004 002 002 002 002	
412 (413 414 ASSCI ASSCI ASSCI BADC BADC BADC BADC BADC BADC BADC BADC	DL TABI MD 00 Q 000 GO 00 Q 000 MD 00 MD 00 MD 00 C 000 C 000	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0550R 1720RG 1332RG 0550R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 0460 0164R	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQFLAG FQFLAG FQFUN FQNODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPPOT FQSIZ FQSIZ FQSIZ FQSIZ FTLERR	000020 000034 000032 000004 000014 000024 000022 000022 000022 000022 000020 000026 000026 000026 000026 000027 000016 000005 001773RG	END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER PF.NER PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PCF	000400 004000 010000 040000 001000 000020 000034 001756RG 001614RG 001614RG 001630R 000012 000010 177754 177756 177770 177744 177752	002 002 002 002	UMPFQ USRLOG USRPPN USRPPN UUSRSP UUOFQ UU.ACT UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.CL UU.CL UU.CLU UU.CNV UU.DAL UU.DAT UU.DEA	000012 0007 40 0007 34 0007 36 000400 000014 177761 000012 1777 47 000006 177765 000005 177750 000023 000010 000023 000014 177762 000014	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLK XRBLK XRBLK XRLEN XRLOC XRTIME \$FRBCL \$PRFRQ \$XRBCL	177777 000015 00000RG 002051RG 002054RG 002054RG 000442 000002 000010 000001 000006 000006 000000 000004 000014 000012 001466RG 001364RG 001570RG 001436RG	004 002 002 002 002 002 002 002 002 002	
412 (413 414 ASSF(ASSF(ASSF(AUDHI BADC) BADCM BDERI BDERI BDERS BDERS BDERS CALF; CALF; CALF; CALFI CCAF; CORCI CORCI CORCI CORCI CORCI CORCI	DI TABI MD 00 Q 000 GO 00 Q 000 MD 00 MD 00 MD 00 C 000 C 000	0000034 0000000 LE 1170RG 0024 1240R 0000 0032 1762RG 0550R 1720RG 1332RG 0550R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 0040	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQFIL FQFLAG FQFUN FQJOB FQNAM1 FQNAM1 FQNAM1 FQNAM1 FQNAM1 FQNENT FQPFLG FQPPN FQPFLG FQSIZ FQSIZ FQSIZ FLERR HLPCMD	000020 000034 000032 000004 000014 000024 000022 000022 000022 000022 000020 000026 000026 000026 000026 000026 000027 000016 000025 001773RG 000576 RG	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER PF.NER PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA P.S.CA BPT .CC C.CRAS .DEXT .FIS	000400 004000 010000 040000 001000 000020 000034 001756RG 001614RG 001630R 00012 000010 177754 177756 177770 177744 177762 177742	002 002 002 002	UMPFQ USRLOG USRPPN USRPPN UUSRSP UUOFQ UU.ACT UU.ACT UU.ASS UU.ATT UU.BCK UU.CL UU.CL UU.CL UU.CL UU.CL UU.CN UU.CN UU.DAL UU.DAT UU.DE UU.DE	000012 0007 40 0007 34 0007 36 000400 000014 1777 61 000012 1777 47 000006 1777 65 000005 1777 750 000005 1777 750 0000023 000010 000023 000014 1777 62 000014 1777 62 000013 000007	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLKM XRBSIZ XRCI XRLEN XRLOC XRTIME \$FRBCL \$PRFRQ \$XRBCL .CCL	177777 000015 00000RG 002051RG 002054RG 002054RG 00002 000010 000010 000010 000006 000000 000004 0000014 000012 001466RG 001364RG 001570RG 001436RG 104062	004 002 002 002 002	
412 (413 414 ASST ASSF ASSF AUDHI BADCI CALFI CORCI CORCI CORCI CORCI CORCI CORCI CI CI CI CI CI CI CI CI CI CI CI CI C	DI TABI MD 00 Q 000 GO 00 Q 000 MD 00 MD 00 MD 00 C 000 C 00	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0550R 1720RG 1332RG 0550R 17220RG 1332RG 0550R 1744RG 4000 1324RG 0014 0000 2436RG 00460 0164R 0004 0034	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQEXT FQFLAG FQFUN FQJOB FQNODE FQNAM1 FQNAM2 FQNAM1 FQNAM1 FQNENT FQPFLG FQPPN FQPFLG FQSIZ FQSIZ FQSIZ FLERR HLPCMD HLPMSG	000020 000034 000032 000004 000014 000004 000024 000022 000022 000022 000022 000020 000026 000026 000026 00005 001773RG 000576 RG 002067RG	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER PF.REM PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PRSCMD RSCM	000400 004000 010000 040000 001000 000020 000034 001756RG 001722RG 001614RG 001630R 000012 000010 177754 177756 177770 177744 177732 177732	002 002 002 002	UMPFQ USRLOG USRPPN USRPPN UUSRSP UUOFQ UU.ACT UU.ACT UU.ASS UU.ATT UU.BCK UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.DAL UU.DAL UU.DET UU.DET	000012 0007 40 0007 34 0007 36 000014 1777 61 000012 1777 61 000005 1777 65 000005 1777 750 000023 000010 000023 000010 000024 000014 1777 62 000013 000007 1777 62	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLK XRBLK XRLEN XRLCI XRLEN XRLOC XRTIME \$FRBCL \$PRFRQ \$XRBCL .CCL .CLAIN	177777 000015 00000RG 002051RG 002054RG 002054RG 00002 000010 000010 000016 000006 000000 000004 000014 000014 000012 001466RG 001364RG 001364RG 00170RG 001436RG 104062 104070	004 002 002 002 002 002 002 002 002 002	
412 (413 414 ASST ASSF AUDHI BADCI CALFI CORRII CLAFI CORRI COR CORRI C	DL TABI MD 00 Q 000 GO 00 Q 000 MD 000 MD 000 MD 000 MD 000 C 0	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 05500R 1720RG 1332RG 0550R 1720RG 1332RG 0550R 1724RG 0004 00460 0164R 0004 0004 0004	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQFLAG FQFLAG FQFUN FQJOB FQMODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPFLG FQSIZ FQSIZ FQSIZM FLERR HLPCMD HLPMSG IBMHND	000020 000034 000032 000004 000014 000024 000022 000022 000022 000022 000022 000020 000036 000026 000026 000027 000016 000005 001773RG 000576 RG 002067RG 002067RG	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER PF.REM PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PROMPT RSLOP RSLOP TRHND BAD BPT .CC .CRAS .EMT .FIS .FLAG .FPT	000400 004000 010000 02000 001000 000020 000034 001756RG 001722RG 001614RG 001630R 00012 000010 177754 177756 177770 1777744 177752 177762 177762	002 002 002 002	UMPFQ USRLOG USRPPN USRPPT UUOFQ UU.ACT UU.ACT UU.ACT UU.ACT UU.ACT UU.ACT UU.ACT UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.DA UU.DA UU.DA UU.DE UU.DI E UU.DI E	000012 0007 40 0007 34 0007 36 000400 000014 177761 000012 177761 000006 177765 000005 177750 000005 177750 000023 000010 000024 000014 177762 000013 000007 177760 000017	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLK XRBLK XRLCI XRLCI XRLCI XRLCO XRTIME \$FRBCL \$PRFRQ \$XRBCL .CCL .CHAIN .CLEAR	177777 000015 00000RG 002051RG 002054RG 002054RG 000442 000002 000010 000007 000016 000006 000000 000004 000014 000012 001466RG 001364RG 001364RG 104062 104056	004 002 002 002 002 002 002 002 002 002	
412 (413 414 ASST ASST ASST ASST ASST ASST ASST ASS	DIL TABI MD 00 Q 000 GO 00 Q 000 MD 000 MD 000 MD 000 MD 000 C	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 05500R 1720RG 1332RG 0550R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 00460 0164R 0004 0034 0004 2420RG 0022	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQEXT FQFLAG FQFUN FQJOB FQMODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPPN FQSIZ FQSIZM FLERR HLPCMD HLPMSG IBMHND JFBIG	000020 000034 000032 000004 000014 000024 000022 000022 000022 000022 000022 000020 000036 000026 000026 000005 000027 000016 000005 001773RG 0000576 RG 002067 RG 002067 RG 002067 RG	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER PF.NER PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PROMPT RSLOP RSLOP TRHND BAD BPT .CC .CRAS .DEXT .FIS .FILAG .FPP .IST 7	000400 004000 010000 02000 001000 00020 00034 001756RG 001722RG 001614RG 001630R 00012 000010 177754 177756 177770 1777744 177752 177762 177762 177760 1777760	002 002 002 002	UMPFQ USRLOG USRPPN USRPPN UUSRSP UUOFQ UU.ACT UU.ACT UU.ACT UU.ACT UU.ACT UU.ACT UU.ACT UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.DAT UU.DAT UU.DE UU.DIE UU.DIR UU.DLU UU.DLU	000012 0007 40 0007 34 0007 36 000400 000014 177761 000012 177761 000006 177765 000005 177750 000005 177750 0000023 000010 0000024 000014 177762 000013 000007 177760 000001 177760	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLK XRBLK XRLCI XRLCI XRLCI XRLCO XRTIME \$FRBCL \$PRFRQ \$XRBCL .CCL .CHAIN .CDATE	177777 000015 00000RG 002051RG 002054RG 002054RG 000442 000002 000010 000007 000016 000006 000000 000004 000014 000012 001466RG 001364RG 001364RG 104056 104005 104006 104006	004 002 002 002 002 002 002 002 002 002	
412 (413 414 ASST ASSF ASSF ASSF ASSF ASSF ASSF ASSF	DIL TABI MD 00 Q 000 Q 000 MD 000 MD 000 MD 000 MD 000 MD 000 C	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1722RG 0530R 2027RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 00460 00164R 0004 2004 0034 0004 2220RG 0032 03346RG	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQERNO FQERNO FQFLAG FQFLAG FQFUN FQNODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPROT FQPROT FQSIZ FQSIZM FTLERR HLPCMD HLPMSG IBMHND JFBIG JFFPP	000020 000034 000032 000004 000014 000024 000022 000022 000022 000022 000022 000020 000036 000026 000026 000027 000016 000027 000016 00005 001773RG 000556 RG 002067 RG 002067 RG 002067 RG 000042 020000 001000 0040000	.END F F F F F F F F F F F F F F F F F F F	RTS PF.KBM PF.NER PF.REM PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PF.SLA PRSLOP TRHND BAD BAD BPT CC CCAS DEXT FFIS FFLAG FPP IOT ISIZ MSIZ	000400 004000 010000 002000 001000 000020 00034 001756RG 001722RG 001614RG 001630R 00012 000010 177754 177756 177770 1777744 177752 177762 177762 177760 1777760 1777760	002 002 002 002	UMPFQ USRLOG USRPPN USRPRT UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.DAL UU.DAL UU.DET UU.DIE UU.DIE UU.DIE UU.DIR UU.DMP UU.ERR	000012 0007 40 0007 34 0007 36 000400 000014 177761 000012 177765 000005 177750 000005 177750 0000023 000010 000023 000014 177762 000014 177762 000013 000007 177760 000017 000001 177745 000011	UU.YLG UU.ZER VECT\$\$ VERCMD VERSON XRB XRBC XRBLK XRBLK XRBLK XRLC XRCI XRLCC XRTIME \$FRBCL \$PRFRQ \$XRBCL .CCL .CHAIN .CLEAR .CORE .DATE .ERLOG	177777 000015 00000RG 002051RG 002054RG 002054RG 000442 000002 000010 000007 000016 000006 000000 000004 000014 000012 001466RG 001364RG 001364RG 104062 104070 104056 104005	004 002 002 002 002 002 002 002 002 002	
412 (413 414 ASSME ASSC ASSC ASSN ASSN ASSN ASSN ASSN ASSN	DL TABI MD 000 MD 000 Q 000 D 000 D 000 D 000 D 000 C 000 SG 000 SG 000 Q	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 0014 0004 2436RG 0014 0004 2420RG 0034 0004 20346RG 0032	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQEVN FQERNO FQEXT FQFLAG FQFUN FQDOB FQNODE FQNODE FQNAM1 FQNAM2 FQNAM1 FQNAM2 FQNENT FQPFLG FQPFLG FQPFN FQPROT FQSIZ FQSIZM FTLERR HLPCMD HLPMSG IBMHND JFBIG JFFDP JFLOCK JFNOPR	000020 000034 000030 000032 000004 000014 000024 000022 000022 000022 000022 000026 000026 000026 000026 000027 000016 000027 000016 000027 000016 0000576 RG 002067 RG 002067 RG 002067 RG 002067 RG 002067 RG 002000	.END FND FF FF FF FF FF FF FF FF FF F	RTS F.KBM F.NER F.REM F.SLA F.SLA F.SLA KBHND LTHND RGNAM RSCMD RSLOP TPHND TRHND BAD CC .CRAS .DET .EMT .FIS .FLAG .FPP .IOT .ISIZ .NEW	000400 004000 002000 00000 000020 000034 001756RG 001722RG 001630R 000012 000010 177754 177756 177776 177744 177756 177772 177742 177766 177776 177776 177776 1777750	002 002 002	UMPFQ USRLOG USRPPN USRPRT UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.CL UU.CL UU.CL UU.CHU UU.CL UU.CHU UU.CL UU.DAL UU.DAL UU.DAT UU.DET UU.DIE UU.DIE UU.DIE UU.DIE UU.DIR UU.DMP UU.ERR UU.FCB	000012 0007 40 0007 34 0007 34 0007 36 000014 1777 61 0000012 1777 47 000006 1777 65 000005 1777 50 0000023 000010 000024 000014 1777 62 000013 000007 1777 60 000017 000001 1777 45 000011 1777 70	UU.YLG UU.ZER VECT\$\$ VERMSG VERSON XRB XRBC XRBLK XRBLK XRBLK XRBLK XRLEN XRLOC XRTIME \$FRBCL \$FRBCL \$FRBCL \$FRBCL \$CCL .CLAIN .CLEAR .CORE .EXIT	177777 000015 00000RG 002051RG 002054RG 000442 000002 000010 000007 000016 000006 000000 000004 000014 000012 001466RG 001364RG 001570RG 001436RG 104062 104070 104056 1040052 104046	004 002 002 002 002 002 002 002 002	
412 (413 414 ASSYME ASSC ASSC ASSN ASSN ASSN ASSN ASSN ASSN	DODOO 42 DL TABI MD 00 Q 000 Q 000 MD 000 MD 000 MD 000 MD 000 C 000	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0530R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 004 0004 0034 0004 0034 0004 0032 0032 0032 0030 0032 0032 0032 0032 0032 0032 0032 0032 0032 00000 00000 0000 0000 0000 0000 0000 0000 0000 0000 00000 0000 0000 00000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 00000 0000 00000 00000 00000 00000 00000 00000 00000 0000 0000 00000 0	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQEVN FQERNO FQEXT FQFLAG FQFLAG FQVAM1 FQNAM2 FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPROT FQSIZ FQSIZM FTLERR HLPCMD HLPMSG IBMHND JFBIG JFFPP JFLOCK JFNOPR	000020 000034 000030 000032 000004 000014 000024 000022 000022 000022 000022 000020 000026 000026 000026 000027 000016 000005 001773RG 002067RG 002067RG 002067RG 00200	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER FF.NER FF.SLA FF.SLA FF.SLA KBHND CTHND RGNAM ROMPT RSCMD RSLOP TPHND TRHND BAD SCC .CRAS .DEXT .FIS .FLAG .FLAG .NEW .OFF	000400 004000 002000 040000 000020 000034 001756RG 001722RG 001630R 000012 000012 000012 000012 177754 177756 177770 177744 177756 1777742 177766 1777760 177732	002 002 002	UMPFQ USRLOG USRPPN USRPRT UUOFQ UU.ACT UU.ASS UU.ATT UU.BCK UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.DAL UU.DAL UU.DAL UU.DAT UU.DET UU.DIE UU.DIE UU.DIE UU.DIE UU.DIE UU.DIE UU.SC	000012 0007 40 0007 34 0007 34 0007 36 000400 000014 1777 61 000006 1777 65 000005 1777 50 000005 1777 50 0000023 000010 0000024 000014 1777 62 000013 000007 1777 60 000017 000001 1777 45	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLK XRBLK XRBLK XRLEN XRLOC XRTIME \$ERRPT \$FRBCL \$PRFRQ \$XRBCL .CCL .CLAIN .CLEAR .CORE .EXIT .FSS	177777 000015 00000RG 00262RG 002051RG 002054RG 000042 000012 000010 000007 000016 000006 000000 000004 000014 000014 00014 00012 001466RG 001364RG 001570RG 001436RG 104062 104052 104052 104046 104064	004 002 002 002 002 002 002 002 002 002	
412 (413 414 ASSWE ASSC ASSC ASSN ASSN ATRF(ASSN BADP BDCM BDCM BDCM BDCM BDCM BDCM BDCM BDCM	DODOOU42 DL TABI MD 000 Q 000 Q 000 Q 000 MD 000 Q 000 MD 000 MD 000 Q 000 MD 000 MD 000 MD 000 MD 000 C 000 Q 000	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0500R 1720RG 1322RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 004 0004 0034 0004 0034 0004 0034 0004 0032 0346RG 0032 0346RG 0030 0040 0032 0034 0004 0032 0034 0000 0004 00034 00000 00000 00000 00000 00000 00000 0000 0000 00000 00	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEV FQERNO FQEXT FQFLAG FQFLAG FQFDN FQNAM1 FQNAM2 FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPROT FQSIZ FQSIZM FTLERR HLPMSG JFBIG JFFPP JFLOCK JFNOPR JFPRIV JFSPRI	000020 000034 000032 000004 000014 000024 000024 000022 000022 000022 000022 000026 000026 000026 000026 000027 000016 00000576 RG 002067 RG 002067 RG 002067 RG 00200 001000 040000 010000 002000 000400	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	PF.KBM PF.KBM PF.NER PF.SLA PF.SLA FF.SLA KBHND CLTHND RGNAM ROMPT RSCMD RSLOP TPHND TRHND BAD CC CC CCAS DEXT FILAG FFP IOT ISIZ NEW OFF RUN	000400 004000 002000 040000 000020 000034 001756RG 001722RG 001614RG 001630R 000012 000012 000010 177754 177756 177770 177744 177752 177766 1777766 1777760 177732 177750 177750	002 002 002	UMPFQ USRLOG USRPPN USRPRT UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.DAL UU.DAT UU.DAT UU.DEA UU.DIE UU.DIE UU.DIR UU.DIR UU.ERR UU.FCB UU.HNG	000012 0007 40 0007 34 0007 34 0007 36 000400 000014 1777 61 000005 1777 65 000005 1777 50 000005 1777 50 0000023 000010 0000024 000014 1777 62 000013 000001 1777 760 000001 1777 760 000001 1777 760 000001 1777 760 000001 1777 760	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLK XRBLK XRBLK XRLEN XRCI XRCI XRLEN XRCI XRCI XRCI XRCI XRCI XRCI XRCI XRCI	177777 000015 00000RG 00262RG 002051RG 002054RG 000442 000002 000010 000007 000016 000006 000004 000014 000014 000014 000012 001466RG 001364RG 001570RG 001436RG 104062 104056 104056 104064 104054	004 002 002 002 002 002 002 002 002	
412 (413 414 ASSWE ASSCI ASSCI ASSN ASSN AUDHI BADCI BADP BDCMI BDCMI BDCMI BDCMI BDCMI BDCMI BDSMI BDSMI BDSMI BDSMI CALFI CCTRI CCTRI CORLI CORLI CORLI CRAF(CRFF(CRFF(CRFF(CVTL(DALF() CVTL(DDNF: DDNLI DDNLI	DL T ABI MD 000 MD 000 Q 000 GO 00 Q 000 Q 000 Q 000 Q 000 Q 000 Q 000 C 000 Q	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0530R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 20000 2436RG 0004 0004 0004 2420RG 0004 223346RG 00034 0004 20004	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQERNO FQEXT FQFLAG FQFUN FQJOB FQMODE FQNAM1 FQNAM2 FQNENT FQPROT FQPROT FQSIZ FQSIZM FTLERR HLPCMD HLPMSG JFFPP JFLOCK JFNOPR JFSYS	000020 000034 000032 000004 000014 000004 000024 000022 000022 000022 000022 000026 000026 000026 000026 000027 000016 000005 001773RG 002067RG 002067RG 002067RG 002042 020000 001000 010000 010000 002000	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS PF.KBM PF.NER FF.REM FF.SLA FF.SLA KBHND CTHND RGNAM ROMPT RSCMD RSCMD RSCMD TPHND TRHND .BAD .BPT C.CRAS .DEXT .FILAG .FPP .IOT .ISIZ .NEW .SIZE	000400 004000 010000 040000 000020 000034 001756RG 001722RG 001614RG 001630R 000012 000010 177754 177756 177774 177756 1777742 177742 177766 1777760 177750 177750 177752 177772 177774	002 002 002	UMPFQ USRLOG USRPPN USRPPT UUOFQ UU.ACT UU.ASS UU.ATR UU.ATT UU.BCK UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.CL UU.DAL UU.DAT UU.DAT UU.DEA UU.DET UU.DIE UU.DIE UU.ERR UU.FCB UU.FIL UU.HNG UU.JOB	000012 0007 40 0007 34 0007 34 0007 36 000400 000014 1777 61 000005 1777 65 000005 1777 50 000023 000024 000014 1777 62 000013 000007 1777 60 000001 1777 45 000001 1777 45 000001 1777 76 000001	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLK XRBLK XRLEN XRCI XRLEN XRLOC XRTIME \$FRBCL \$FRBCL \$FRBCL \$FRFRQ \$XRBCL .CCL .CHAIN .CLEAR .CORE .BATE .ERLOG .EXIT .FSS .LOGS .MESAG	177777 000015 00000RG 00262RG 002051RG 002054RG 00002 000010 000007 000016 000000 000004 000004 000004 000012 001466RG 001364RG 001570RG 001436RG 104062 104070 104056 104006 104052 104046 104064 104054 104064	004 002 002 002	
412 (413 414 ASSM ASSCI ASSN ASSN AUDHI BADCI BADP BDCM BDCM BDCM BDCM BDCM BDCM BDCM BDCM	DODO 42 DL TABI MD 000 Q 000 GO 000 Q 000 MD 000 Q 000 MD 000 Q 000 MD 000 Q 000 MD 000 Q 000 CO 000 Q 000	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0530R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 2436RG 004 0034 0004 0034 0004 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0400 1000	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEVN FQEXN FQFIL FQFLAG FQFUN FQNODE FQNMODE FQNMODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPFLG FQSIZ FQSIZM FTLERR HLPCMD HLPMSG IBMHND JFBIG JFFPP JFLOCK JFNOPR JFPRIV JFSYS KEY	000020 000034 000032 000004 000014 000004 000024 000022 000022 000022 000022 000020 000036 000026 000026 000027 000016 000027 000016 0000576 RG 002067 RG 002067 RG 000042 02000 001000 01000 002000 000400 000400 000400	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS F.KBM F.NER F.REM F.SLA KBHND F.SLA KBHND CTHND RSCMD RSCMD TPHND TRHND BAD BAD BAD CCAS .CRAS .FLAG .FPP .IOT .ISIZ .RUN .SIZE .STRT	000400 004000 010000 040000 000020 000020 000034 001756RG 001722RG 001614RG 001630R 000012 000010 177754 177756 177770 177744 177756 1777766 1777760 177732 177766 1777750 177752 177752 177774	002 002 002	UMPFQ USRLOG USRPPN USRSP UUOFQ UU.ACT UU.ASS UU.ATT UU.BCK UU.BYE UU.CCL UU.CHU UU.CLN UU.CLN UU.CLN UU.CLN UU.CLN UU.DAL UU.DAT UU.DAT UU.DEA UU.DEA UU.DIE UU.DIE UU.DIE UU.DIE UU.STL UU.FCB UU.FIL UU.JOB UU.JOB UU.SMC	000012 0007 40 0007 34 0007 34 0007 36 000400 000014 1777 61 000012 1777 47 000006 1777 65 000005 1777 50 000023 000023 000024 000014 1777 62 000013 000001 1777 60 000017 1777 60 000011 1777 45 000011 1777 76 000001 1777 76 000001	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBLK XRBLK XRLEN XRCI XRLEN XRCI XRLEN XRCI XRLEN XRLOC XRTIME \$FRBCL \$FRBCL \$FRBCL \$FRBCL \$CCL .CHAIN .CLEAR .CORE .DATE .ERLOG .EXIT .FSS .LOGS .NAME	177777 000015 00000RG 002051RG 002051RG 002054RG 00042 00002 000010 000007 000016 000006 000000 000004 0000012 001466RG 001570RG 001436RG 104062 104070 104056 104006 104054 104064 104054 104054	004 002 002 002	
412 (413 414 ASSCFI ASSFI ASSFI AUDHI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI BADCI CALFI CALFI CORCI COR	DL TABI MD 000 MD 000 Q 000 GO 00 Q 000 C 000 C 000 C 000 C 000 Q	0000034 000000' LE 1170RG 0024 1240R 0000 0032 1762RG 0530R 1720RG 1332RG 0530R 2027RG 1002 1744RG 4000 1324RG 0014 0000 2436RG 004 0034 0004 0034 0004 0034 0004 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0346RG 0032 0400 10	002 002 002 002 002 002 002 002 002 002	FQBUFL FQCLUS FQDEV FQDEV FQERNO FQEXT FQFLAG FQFUN FQVDB FQMODE FQNAM1 FQNAM2 FQNENT FQPFLG FQPPN FQPFLG FQPROT FQSIZ FQSIZ FQSIZ FQSIZ FLERR HLPCMD HLPMSG JFBIG JFFPP JFLOCK JFNOPR JFSYS KEY KMCHND	000020 000034 000032 000004 000014 000024 000024 000022 000022 000022 000022 000020 000026 000026 000026 000027 000016 000027 000016 0000576 RG 0000576 RG 0000576 RG 0000576 RG 0000576 RG 0000576 RG 0000576 RG 0000576 RG 0000576 RG 0000576 RG 000042 020000 001000 001000 001000 001000 002000 000400 000400 000400	.END FF FF FF FF FF FF FF FF FF FF FF FF FF	RTS F.KBM F.NER F.REM F.SLA KBHND F.SLA KBHND CTHND RGNAM ROMPT RSCMD TPHND TRHND BAD BAD BAD CCAS .CCAS .CCAS .FLS .FLS .FLS .FLS .FLS .SIZE .STRT .TRAP	000400 004000 010000 004000 000020 000020 000034 001756RG 001722RG 001614RG 001630R 000012 000010 177754 177756 177770 177744 177766 1777760 177732 177752 177752 177752 177774 177766 177776	002 002 002	UMPFQ USRLOG USRPPN USRPPN USRSP UUOFQ UU.ACT UU.ASS UU.ATT UU.BCK UU.BYE UU.CLL UU.CLN UU.CLN UU.CLN UU.CLN UU.CLN UU.CLN UU.DAL UU.DAT UU.DET UU.DIE UU.DIE UU.DIE UU.DIE UU.FCE UU.FIL UU.FIL UU.HNG UU.JOB UU.KMC UU.LIN	000012 0007 40 0007 34 0007 34 0007 36 000400 000014 1777 61 000005 1777 65 000005 1777 50 000023 000023 000024 000014 1777 62 000013 000002 1777 60 000011 1777 76 000011 1777 76 000011 1777 76 000011 1777 76 000011 1777 76 000011	UU.YLG UU.ZER VECT\$\$ VERCMD VERMSG VERSON XRB XRBC XRBLK XRBC XRBLK XRBSIZ XRCI XRLEN XRLOC XRTIME \$FRBCL \$FRBCL \$FRBCL \$FRFRQ \$XRBCL .CCL .CLAIN .CLEAR .CORE .DATE .ERLOG .XIT .FSS .LOGS .MAME .PEEK	177777 000015 00000RG 002051RG 002054RG 002054RG 00002 000010 000007 000016 000006 000000 000004 000014 000014 000012 001466RG 001570RG 001436RG 104062 104070 104056 104006 1040054 104064 104054 104064 104054 104064 104054	004 002 002 002	
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Texprint Emulator Gives Graphics Compatibility

Burlington, MA - Full compatibility with Plot-10 and Regis (vector-oriented computer graphics software languages) is now available on the Digital **Equipment Corporation VT-125** graphics display terminal with the Texprint 4014 Emulator. Graphics users can now have both Tektronix Plot-10 compatibility and DEC Regis compatibility in the same CRT unit, thereby simplifying system operation, and often eliminating the need for special graphic display terminals.

Texprint's 4014 Emulator module allows graphics programs previously completed using Plot-10 vector commands to display images directly on the bit-map oriented VT-125 terminal, eliminating the costly and time consuming step of reprograming for DECcompatible use. Because the 4014 Emulator preserves all the powerful features of VT-125 full color dot-addressable graphics and text, and also allows operation in the popular VT-100 mode, the Texprint-enhanced VT-125 display terminal is like having three different terminals in one.

Computer graphics users now no longer need to make a choice between Tektronix-compatibility (Plot-10) and DEC-compatibility (Regis) for their display terminal requirements, since the 4014 Emulator VT-125 combination fits both needs, at nominal cost, with no performance penalty. Hard-copy output is conveniently available for Tektronix graphics users with the VT-125/4014 Emulator and any Texprintenhanced LA-120 printer/plotter terminal, which may be connected directly to the VT-125 printer port for fast "screen dump" operation.

Installation of the plug-in 4014 Emulator module in a VT-125 display terminal takes only a few minutes, and no special tools or skills are required. Each Texprint kit includes complete operator instructions and a one-year warranty.

4014 Emulator kits for the VT-125 are available from Texprint at \$795; delivery is from stock.

> Western Resource Offers Fault-Tolerant Systems

Anaheim, CA — A new family of DEC-based Fault Tolerant Computer Systems was introduced by Western Resource Technology, Inc. at the recent Second National DEC-Compatible Exposition.

The new systems, built around DEC Q-Bus and UNIBUS based computers, provide a hardware solution to the problem of fault detection, tolerance and resolution. These systems support the standard DEC operating systems and will require little, if any, unusual programming efforts on the part of the user. People most interested in these products initially will be current DEC users that need to handle large numbers of devices or users, and can't suffer even minimum system down time. Technical systems developers, batch and process control groups, and commercial transaction processing/networking organizations are expected to be in this group.

"We looked around at the commercial systems providing high reliability or fault tolerance, and found nothing really profound," explained John Sutherland, WRT president. "Combining that finding with the fact that none of the suppliers were working with DEC technology, we decided to build DEC hardware based, fault responsive systems. In that way, we could easily beat the reaction speed and software sophistication problems, and appeal to the extensive DEC customer base already established.

"Every fault tolerant solution involves redundancy. When you have multiple systems, communications between them is the first problem to deal with. The next problem has to do with modularity. The system network must be able to communicate rapidly, unhook any detected faulty components, and keep the rest of the network running smoothly. Incidently, when you can do all of these things, you can also now overtly take down portions of a system for repair, preventive maintenance, or configuration change. This is a nice capability," he concluded.

The key to the WRT FTS Systems is the company's three new hardware subsystems; the Memory Duplication System (MDS), the Bus Isolation System (BIS), and the Power Control Subsystem (PCS).

"The MDS is the fastest DEC oriented memory-to-memory communications device I've ever seen. It moves a word or byte from one machine to another at literally bus speeds," he said. "The MDS, as with all of our current products, works on either the 18 or 22-bit Q-Bus, and the UNIBUS. The device's window can range from 2KB to 128KB in both directions. It also has eight interrupt lines in each direction, the last of which is a watch dog."

The Bus Isolation System solves the problem of modularizing a DEC bus. The inherent strength of a bus oriented computer system (the ability to attach most anything to it) is also its great weakness. If something goes wrong on the bus, it can take down the whole

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



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



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 autothrottle 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 timeconsuming 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 60day 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[™] 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.

"The z-Board[™] has four z-80a[®] microprocessors per board to execute programs at high speed. Faster than many dedicated micros. And it has 256K bytes of RAM, plus a bit slice state machine. That's the guts of four micros for less than you might pay for one.

"With *The Bridge*, I can run CP/M[®] based programs. I like that. And micro programs like Supercalc[®] are easy to use, and inexpensive. I like that, too.

"But the best thing about The Bridge is systems integration. Now everyone in the office uses the same system no more problems with disk formats, incompatible languages or programs. The Bridge provides each user with a virtual microcomputer with the advantages of a mini's high-speed printers, hard disks, and communications.

"The Bridge with a z-Board gives me the performance of four microcomputers — at a fraction of the cost."

The Bridge and z-Board are trademarks of Virtual Microsystems, Inc.

z-80a is a registered trademark of Zilog, Inc. CP/M is a registered trademark of Digital Research. Supercalc is a registered trademark of Sorcim, Inc.

2150 Shattuck, Berkeley, CA 94704

For information, call Jim Swanson (415) 841-9594.

virtual

"The Bridge and a z-Board the four best microcomputers I <u>never</u> bought."

the user in the restoration of lost or corrupt data. The system runs under RSTS/E, version 7.0, 7.1, or 7.2.

DATASAFE is capable of maintaining from 1 to 7 separate computer system tape libraries and is currently used by Apple Computer to keep track of PDP 11/70, VAX and IBM System 38 tapes at 3 different sites.

DATASAFE runs under the Basic Plus run-time system and keeps track of tape information utilizing a user-friendly interface. This menu-driven software product comes with full documentation and is easy to install.

The system maintains orderly, systematic, self-tracking of tape statistics contained within the library for reliable re-call and verification. This process is internal to the program, going unnoticed by the operator. Among more than 20 diverse features, the system provides the following functions:

1. Stores and retrieves information on any single tape or volume set.

2. Lists all tapes having any given label name.

3. Lists all tapes having any given date of creation or expiration.

4. Lists all tapes created within any 10-day time-span.

5. Generates several formatted reports on library storage data.

6. Keeps tape data segmented by programmer, operations, and system.

7. Organizes tapes by daily, weekly, monthly or yearly backup.

8. Reorders library for flagging tapes past their expiration date.

9. Enables reclamation of expired tape library data.

SOFPROTEX supplies DATASAFE complete with software to generate tape labels for rack storage. For more information write to: SOFPROTEX, P.O. Box 271, Belmont CA 94002 U.S.A.

Southern Systems Offers 140 CPS Matrix Printer

RSTSPROFESSIONALRSTSPROFESSIONA

Fort Lauderdale, FL — Southern Systems Inc., printer system specialist, has announced a new 140 CPS (character per second) matrix printer with a plotting format option.

The M-100 matrix printer offers output at 56 lpm when printing 132 characters per line, at 96 lpm when printing 72 characters per line and 145 lpm at 40 characters per line.

The new Southern Systems product, as with the company's other printer systems, is compatible with most mini computers on the market, including Digital Equipment. It shares 70 percent commonality with Southern Systems' 200 lpm dot matrix printer, the M-200.

Designed for near letter quality the M-200 offers options for graphics, bar codes, programmable character generator and block letters. With the block-letter option, characters may vary in height from .08 inches to 0.8 inches, well-suited for bold headlines or easily readable labels. The bar code option requires a minimum of data from the host CPU. Graphics options allow use of bar graphs, X-Y plots and special symbols and designs. The userprogrammable 128-character generator allows users to print with two languages or font styles; special characters are easily programmed.

The forms handled by the M-100 are continuous fanfold, edge perforated from three to 16 inches wide. Up to six copies (original plus five) can be produced.

Southern Systems is a fullservice printer system specialist offering end users a wide range of impact and non-impact devices that range upward to 5,280 lines per minute.

For more information write Southern Systems, 2841 Cypress Creek Road, Fort Lauderdale, FL 33309, or call (305) 979-1000; (800) 327-5602.

Software Ireland Enters U.S. Market; Gordon Bell To Head New Organization

New York, NY — Software Ireland Ltd., a three-year-old Belfast company that is part of the ICS Computing Group, plans to enter the U.S. market this year with a new commercial programming language that will extend the use of software developed for Digital Equipment Corp. (DEC) computers to thousands of microcomputer users.

The Belfast firm has established a U.S. sales organization, Software Ireland Representatives, Inc., with headquarters in New York City. R. Gordon Bell, managing director of Software Ireland, has relocated to the United States and will serve as president of the new organization. He will'personally supervise the building of a sales network throughout the country.

Bell said that Software Ireland's SIBOL language compiler was developed over the past year specifically to provide a link between the popular DIBOL language developed by DEC for use on its PDP-11 and VAX ranges of computers and the growing number of 16-bit and 32-bit microcomputers using the UNIX operating system developed at Bell Laboratories.

The system already has been launched into the European market, Bell said.

"The success we've had with SIBOL in Europe convinced us we were ready to make our move into the highly competitive U.S. market, where the potential growth of business applications software on UNIX-based microcomputers is phenomenal," he stated.

"We have identified almost 40 hardware manufacturers who

offer machines using UNIX, which means that a great many end users already exist who can benefit from the superb DIBOL software programs now being marketed exclusively to DEC users."

Bell said he is moving rapidly to establish a sales network to market the SIBOL system to computer manufacturers, OEMs, distributors, software suppliers, and possibly even direct end users.

SIBOL had its formal introduction to the U.S. computer industry at the November, 1982, COMDEX trade show. The system consists of a compiler, a run-time interpreter, a symbolic debugger, and a library of eternal utility subroutines.

Bell said the company will offer non-exclusive licenses for the compilers and run-time systems to manufacturers and distributors. He estimated that prices will be on the order of \$2,000 for the compiler and \$500 for run-time licenses.

Software Ireland is a whollyowned subsidiary of National Westminster Bank, one of the world's 10 largest banks, and is part of its ICS Computer Group, the largest computer services company in Ireland. Formed in 1979, Software Ireland now has more than 30 employees at offices in Belfast and Dublin.

For further information contact: R. Gordon Bell, Software Ireland Representatives, Inc., 100 Wall Street, New York, NY 10005; (212) 509- 0363.

> Emulex Adds Capability To CS 11/21 Multiplexers

Santa Ana, CA — Emulex Corporation has added two products to its line of communications equipment, William Dollar product manager, Communication, recently announced.

The two products, called the CS11/F and CS21/F, add DMF-

32 capability to Emulex's CS11 Series and CS21 Series of communications multiplexers.

Both models are fully software transparent and operate in the VAX-11 environment with VMS 3.0 and above. Also, they are fully software transparent to the stand-alone and on-line versions of DMF-32 diagnostics, meaning that these products are at the disposal of all VAX users, including the 11/730, 750, and 780 CPU's.

"The major advantage of the DMF-32 emulation," said Dollar, "is the significant performance improvement gained through the new, highly optimized terminal handling software in VMS. These Emulex products permit the user to realize this same performance—plus gain the many added advantages offered

The smoothest path between RSTS/E and VAX / VMS just got smoother: there's a major new release of



ROSS/V has always provided:

- the fastest way to bring up RSTS/E applications on the VAX.
- the only way to do RSTS/E development on the VAX.
- an extensive subset of RSTS/E monitor calls and standard RSTS/E features, like CCLs, DOS-formatted magtape, and RSTS/E-style file update mode.

Now, in Version 3, ROSS/V supports:

- the "hidden" RSX run-time system (with 32 KW job size).
- resident libraries.
- job spawning and detached jobs.
- spooling to VMS print and batch queues.
- mailbox send/receive for communication with VAX-11 BASIC and other native mode applications.

How ROSS/V works:

ROSS/V is written in VAX-11 MACRO, and RSTS/E monitor calls are performed in VAX native mode. The rest of your PDP-11 code (in applications, run-time systems, TKB, etc.) is executed directly in the PDP-11 microcode that's present in every VAX. ROSS/V runs under VMS, not in place of it. Thus, some users may be working under the RSTS/E subsystem provided by ROSS/V while others are concurrently using any of the other VAX/VMS capabilities.

Call or write for the new ROSS/V technical summary, which describes all of ROSS/V's features.

Evans Griffiths & Hart, Inc.

55 Waltham Street Lexington, MA 02173 (617) 861-0670 OnLine Data Processing, Inc. N. 637 Hamilton Spokane, WA 99202 (509) 484-3400

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by the CS11 and CS21 hardware, all at considerably lower cost.

"One major advantage of these Emulex products over the DMF-32," continued Dollar, "is in the area of modem control: The DMF-32 offers eight asynchronous lines, one synchronous line, and one parallel I/O port. But, only two of the eight asynchronous lines have modem control needed for remote telecommunications. The other six lines are for local use only. The CS11/F and CS21/F respond to the real need of users, most of whom simply need to concentrate many asynchronous lines into their VAX CPU. Therefore, these products are ideal to implement new systems and also as add-ons to a system already equipped with a DMF-32. Both models incorporate modem control on all lines. Thus, any or all lines (in any combination) may be used for any mix of local or remote lines.

RSTSPROFESSIONALRSTSPROFESSIONA

"Another big advantage of the Emulex products," added Dollar, "is their efficient, compact

packaging. The CS11/F, for example, handles as many as 48 asynchronous lines on a single board — the equivalent of six DMF-32 boards. All lines have full modem control and may be used in either full- or half-duplex modes. A fully configured CS11/F system consists of a single host-mounted hex-sized controller board and three external distribution panels of 16 ports each, making it ideal for applications involving large numbers of local or remote terminals and/or where power



The F model brings DMF-32 capability to Emulex's popular CS11 Series of communications multiplexers.

and backplane space are at a premium."

The CS21/F offers a maximum capacity of 16 aschyronous lines on a single hex-sized board the equivalent of two DMF-32 boards. All lines have modem control and are used in the fullduplex mode only. A fully configured CS21/F system consists of a single host-mounted controller board and a passive 16-line distribution panel. The CS21/F is ideal for applications involving a smaller number of local or remote terminals and where backplane space and power requirements are not critical.

"Pricing is exactly the same in both the CS11 and CS21 Series as for our current DH11 emulations," said Dollar. There is no premium paid for the higher performance. For example, a 16line CS11/F lists for \$4500, and a 16-line CS21/F lists for \$3500. Attractive discounts are available to OEM and volume users on a mix-and-match basis with all other Emulex products. Plus, existing CS11 and CS21 owners can convert their configurations to the DMF-32 version by PROM changes for \$350."

The CS11/F has been available in quantity since Jan. 1, 1983; the CS21/F since Jan. 15, 1983.

Like all Emulex products, the CS11/F and CS21/F are constructed of pre-tested and preaged parts and are tested at least twice at a complete subsystem level. Each unit is environmentally cycled from 40 to 125 degrees F for 96 hours prior to shipment to minimize infant mortality failures. The products are backed by Emulex's standard one year warranty and by the Company's extensive service network.

For further information, please write or telephone Phillip Begich, director of national sales, Emulex Corporation, 2001 East Deere Avenue, Santa Ana, CA 92705; (800) 854-7112, or in California (714) 557-7580.

GEJAC Announces ARSAP for RSTS

Riverdale, MD — The ARSAP Resource Management and Chargeback System, has been updated to run on PDP-11 computers using RSTS versions 7.0, 7.1 and DEC's recently released 7.2 operating system.

ARSAP is a comprehensive computer resource management system which provides users, system managers, corporate and financial staff with reliable reports for making informed, accurate decisions about the data center operation.

ARSAP is now available on all the most widely used DEC operating systems: RSTS, RSX-11M-PLUS and VAX/VMS. Managers of multiple operating system shops can get compatible reporting of resource utilization, making it easy to compare productivity on all in-house DEC systems. This compatibility has not been available before now.

The most significant features of **ARSAP** are:

1. Project Accounting — Users can be prompted for a project-id and password upon logon and the terminal session can be allocated to his project as well as his logon account, so it is easy to monitor projects and users.

2. Terminal Accounting — System utilization reports can be generated for each terminal, showing the activity on each terminal, when the terminal is used and the amount and type of resources consumed. The reports are presented in graphic as well as numeric format.

3. System Utilization — Utilization reports can be generated by shift and for any user-selected date range. Reports include information on CPU usage, disk space, number of logons, connect time, device time, printed lines, and other major resources.

4. Invoicing — Invoices can be generated by user or by project.

Rates can be by time of day and can be set by individual user, project, or system default basis.

ARSAP is used to control day to day operations, to monitor system utilization and growth, to plan the resources needed for current and future workloads, to justify needed hardware and software upgrades, and to prioritize and schedule computer processing demands.

ARSAP also can produce itemized invoices automatically for allocating costs of computer resources to internal departments, projects, users, contracts and grants. It is used for departmental budgeting, to control project costs, or to bill timesharing customers. ARSAP's equitable billing system enables bidding competitively on contracts and satisfies government and commercial job costing requirements.

Multiple copy discounts are available. ARSAP is delivered within two weeks on mag tape, comes with a 30-day acceptance period and a full one year warranty, including maintenance and enhancements services, and complete documentation.

Contact: GEJAC, Inc., P.O. Box 188, Riverdale, MD 20737, 301-864-3700.

PRODUCT UPDATES

Emulex Reduces Prices On Many Unibus Products

Santa Ana, CA — Emulex Corporation has reduced prices on selected members of its family of Unibus disk and tape controllers, Roger S. Evans, director of product management, recently announced.

The price reductions cover Emulex's SC21/V disk controller and TC11/N and TC11/P tape controllers.



Computer Age Systems

Tara Hotel Kensington, London W8

March 7 -9, 1983

- DEC BASIC VERSION 2 Al Cini — Computer Methods Corp.
- The Good BASIC Guide to RSTS/E Peter Dick — Silver Programs
- BETTER BASIC
 Presented by a group of the U.K.'s
 leading independent system suppliers.

Contact: Computer Age Systems P.O. Box 14, Wallingford, Oxon, OX10 8NN

FROM TRANSNET PURCHASE PLAN • 12-24 MONTH FULL OWNERSHIP PLAN • 36 MONTH LEASE PLAN DESCRI 12 MOS \$105 190 220 200 280 162 115 215 \$ 58 LA34 DECwriter IV Forms Ctrl. \$1.095 \$ 40 72 83 75 106 61 43 119 63 72 86 LA34 DECwriter IV Forms C LA100 Letter Printer R0... LA120 DECwriter III KSR .. LA120 DECwriter III R0... LA12A Portable DECwriter VT100 CRT DECscope ... VT101 CRT DECscope ... VT101 CRT DECscope ... 1,995 2,295 2,095 2,950 1,695 1,195 106 122 112 155 90 67 185 93 106 128 * DEC 315 167 190 230 VT125 CRT Graphics VT131 CRT DECscope 3,295 1.745 VT132 CRT DECscope VT18XAC Personal Computer Option 995 2,395 1745 Portable Terminal 1765 Bubble Memory Terminal 1940 CRT 1785 Portable KSR, 120 CPS. 1787 Portable KSR, 120 CPS. 1787 Portable KSR, 120 CPS. 1810 R0 Printer 153 249 173 173 211 1.595 85 138 96 96 117 90 117 58 93 65 65 80 61 80 2,595 1,795 1,795 2,195 TEXAS INSTRUMENTS 1,695 2,195 162 211 TI820 KSR Printer ADM3A CRT Terminal ADM5 CRT Terminal ADM32 CRT Terminal 595 645 1,165 57 62 112 34 36 65 22 24 42 LEAR SIEGLER 1,525 2,675 3,095 82 143 165 55 97 112 CIT-101 CRT 147 CIT-161 Color CRT CIT-161 Color CRT CIT-427 Color Graphic CRT C-ITOH 257 297 650 850 1,075 62 82 103 36 46 57 24 31 39 910 CRT Terminal TELEVIDEO 925 CRT Terminal 950 CRT Terminal 2,695 259 307 144 171 98 115 NEC SPINWRITER Letter Quality, 7715 R0 . Letter Quality, 7725 KSR GENERAL ELECTRIC 2030 KSR Printer 30 CPS 2120 KSR Printer 120 CPS 1,195 115 211 67 117 43 80 745 71 86 42 27 MX-80 F/T Printer . MX-100 Printer ... EPSON 895 TIMEPLEX E0400 4 Channel Stat Mux . E0800 8 Channel Stat Mux . 1,525 147 197 82 110 55 74 *DEC is the trademark of Digital Equipment Corporation FULL OWNERSHIP AFTER 12 OR 24 MONTHS • 10% PURCHASE OPTION AFTER 36 MONTHS MICROCOMPUTERS APPLE . COMMODORE . HP87 . DEC ACCESSORIES AND PERIPHERAL EQUIPMENT ACOUSTIC COUPLERS . MODEMS . THERMAL PAPER . RIBBONS . INTERFACE MODULES . FLOPPY DISK UNITS **TRANSNET** CORPORATION 1945 ROUTE 22 • UNION, N.J. 07083 • (201) 688-7800 800-526-4965 OUTSIDE N.J 10-985-5485 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 mixand-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.



SEND ORDERS TO: M SYSTEMS, INC., BOX 361, FORT WASHINGTON, PA 19034-0361

most common types of commercial data processing programs.

SOLUTIONS DECk includes preprocessors to aid in producing report, inquiry, master and transaction programs. These individual, low cost tools should provide at least a 100% productivity improvement in even casual use.

Taking advantage of

the similarities between programs of the same type, SOLUTIONS DECk will produce greater than 90% of the code required. The programmer is provided with the opportunity to include his own code for the necessary unique solution to the particular task.

SOLUTIONS DECk supports the use of Digital's Basic+2 and RMS-11 if desired. (Basic+2, RMS-11, DEC and RSTS are trademarks of Digital Equipment Corp.)

Introductory prices are all less than \$800.

For more information write: P.O. Box 684, Postal Station A, Fredericton NB E3B 5B4, Canada; or call 506-455-1008.

Digital To Distribute Virtual's 'The Bridge'

Berkeley, CA — Digital Equipment Corporation has become a distributor for Virtual Microsystems, a Berkeley based software developer. Virtual Microsystems has created a software product called **The Bridge**, which provides a virtual CP/M environment on DEC minicomputers. **Bridge** users can directly run CP/M applications on their DEC minicomputers; programs which are often very user-friendly and which are usually quite inexpensive.

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DEC will also market Virtual's PhoneLink communications package, under the name "Bridge Communications." PhoneLine allows minicomputer users to transfer binary and text files between CP/M microcomputers and their minicomputers. A user of **The Bridge** runs the program like any other task. Once invoked, **The Bridge** causes the terminal to act as though it were connected directly to a **CP/M** microcomputer. The only difference is that the system substitutes "virtual floppies" for the diskettes used by microcomputers, a virtual floppy being a file on the user's hard disk.

The virtual nature of **The Bridge** system is quite useful.



Southern System's new 140 cps (characters per second) matrix printer with a Plotting Format Option.

Instead of dedicating additional microcomputer hardware to new users, any existing terminal tied to the DEC minicomputer can function as a microcomputer. Moreover, CP/M files can be shared like any other minicomputer file, and are backed-up automatically with the rest of the minicomputer system.

In reality, The Bridge is an alternate approach to microcomputer networking. Instead of building a microcomputer network, with all the attendent problems of communications and incompatibility, Bridge users merely add CP/M capability to the existing DEC network. The CP/M operating environment and the thousands of CP/Mapplication programs become one of the many functions available within the DEC environment.

The Bridge system can be supplemented by adding a hardware accelerator available directly from Virtual Microsystems. The accelerator, known as the **z-Board**, features four z80a microprocessors, 256Kbytes of RAM, and a bit slice state machine. Once installed, the z-Board works with The Bridge to execute CP/M programs at the full speed of a dedicated microcomputer. The integrated Bridge/z-Board system allows DEC users to get full microcomputer functionality within their existing networks at a fraction of the cost of adding microcomputers.

DEC is currently marketing the RSX and VMX versions of **The Bridge** for the full line of PDP/11 and VAX minicomputers. **Bridge Communications** will be available shortly.

> First DR11-W Module For LSI-11's From MDB

Orange, CA — After recently introducing a Direct Memory Access Module (DMA) for PDP- 11 processors, MDB Systems, Inc. has now developed the only Q-Bus DR11-W for LSI-11 based systems.

Designated MLSI-DR11-W, it is compatible with DEC's operating software for the Unibus DR11-W with several added features. The MDB quad size module has a switch selectable 22-bit addressing mode, and Bus Address Extension (BAE) register per DEC format, that allows direct memory transfer throughout the 4 mega byte range, and MDB's exclusive DMA throttle feature so system designers can maximize their CPU capability.

In addition, it offers the exclusive design features of four level or single level interrupt arbitration (also switch selectable and is compatible with 16, 18, and 22-bit processors.

Like MDB's Unibus module, the Q-Bus MLSI-DR11-W is a high speed digital input/output device designed for use with high speed graphics, digital data acquisition, any application where parallel information needs to be processed quickly, or as an interprocessor link between a Unibus and Q-Bus system.

Other exclusive features of the Q-Bus DR11-W include self-test from on-board diagnostics which are micro sequencer driven, and ease of set-up and cabling. Edge mounted LED's indicate error conditions and proper performance.

The MLSI-DR11-W is available in 30 days ARO and is priced at \$995 in single quantities.

For additional information contact the company at 1995 N. Batavia Street, Orange CA 92665; 714/998-6900.

> Digital Info. Systems Now Has DBL/VMS in Native Mode; Announces Combo Package with S&H

Sacramento, CA — Data Business Language (DBL) is now available in a VMS native mode version, according to Digital Information Systems Corporation.

DBL has been marketed since 1978; and with the addition of DBL/VMS, this DIBOL-11 source code compatible language and compiler is now available for RT-11, TSX/TSX-Plus (time sharing extensions to RT-11), RSTS, RSX-11M/M-Plus, VAX/VMS compatibility mode, and VAX/VMS native mode.

DBL/VMS features include:

1. The DBL/VMS compiler is written in VAX/VMS native mode and is a true compiler.

2. Output of the DBL/VMS compiler is in-line native code.

3. Multi-user programs can access shared XCALL libraries.

4. Entire applications can be "bound" into a single executable module (i.e., an Accounts Payable application).

5. Little or no modification is required to run existing CTS-300 DIBOL code under DBL/VMS native mode.

6. DBL/VMS uses the RMS file structure. Those files are then accessible to Datatrieve, FMS, and all other VMS supported languages.

7. DBL programs can access and be accessed by other languages.

List price is \$5,300.00 and quantity discounts are available to OEM's.

In a related development, Digital Information Systems Corporation and S&H Computer Systems Inc. of Nashville, TN, are jointly offering a combination package that includes DBL, TSX-Plus, and RTSORT.

DBL is a structured superset of DEC's DIBOL and is source code compatible with DIBOL. DBL is currently available for RT-11, TSX-Plus, RSTS, RSX-11M, and VAX/VMS.

Price per package ranges from \$1420.00 for a quantity of 5 down to \$1154.00 for 100 or more.

For more information, please contact Digital Information

Systems Corporation, 3336 Bradshaw Road, Suite 340, Sacramento, CA 95827, or call (916) 363-7385.

Auto-Dial Support For DMG/NET Package

Ontario, Canada — Digital Management Group Ltd. has announced that DMG/NET (their networking software for DEC PDP-11, RSTS/E systems) now interfaces with Racal-Vadic and Ven-Tel auto-dial units.

DMG president John Dightam points out that for some networking needs, auto-dial can be cost-effective. "DMG/NET is well established for X.25," he said, "but there are many data communications situations where auto-dial is a better choice. The often substantial cost savings of packet switching frequently don't apply to links in a 'local calling' area, and in some countries X.25 networks are very limited, expensive or unreliable."

In a typical DMG/NET configuration, an auto-dial modem is connected to one of a DEC computer's terminal ports. The software is configured for all required destinations, and the user can then access any destination by typing a short, meaningful abbreviation at the terminal. DMG/NET establishes the connection to the remote computer and if the main number is busy will automatically seek alternates.

Auto-dial and many other network "gateways" can all be included on the same DEC host. "This is the key to DMG/NET's ease of use," explained Dightam. "It's the 'Executive Work Station' concept, with a whole world of computing power brought to a single desk-top terminal. When a manager types NET NY, it's the New York computer he wants to talk to ... quickly and without concern for how the connection is made. An auto-dialer can also back-up the normal X.25 link, and keep the user happy even on days when the packets aren't travelling as they should!"

The Racal-Vadic and Ven-Tel auto-dial units support both 1200 and 300 baud, and DMG/NET automatically selects the speed appropriate to the destination. Both units have been tested by DMG, a fact which the company stresses as important.

John Dightam said "We designed DMG/NET to interface with almost any network unit or computer type that uses ASCII code, but there are some traps for the unwary. Nearly every 'black box' has its own quirks, and can sometimes require a special cable or chip. After all, autodialers were really designed to work with terminals, and allowing them to handle outbound calls from a DEC computer is a bit 'different'. We've had a lot of help from Ven-Tel and Racal-Vadic and their distributors, and now feel confident in recommending these units."

DEC, PDP-11 and RSTS/E are registered trademarks of Digital Equipment Corporation.

For suitable auto-dial model numbers, and further information on DMG/NET, contact Ken Allsopp, Digital Management Group Ltd., 4800 Yonge Street, Willowdale, Ontario, Canada M2N 6G5. Telephone (416) 225-7788.

> IB Graph Available To Digital Users

Placentia, CA — IB Graph, a menu-driven graphics software package which provides users of DEC PDP-11 and VAX systems with business graphics capability, is now available from Data Processing Design (DPD), Inc. The new package allows non-technical users to create bar, line and pie charts on a variety of graphics output devices.

"Not only can a relatively unsophisticated user create a variety of business graphics with IB Graph software, he or she can do it using existing data, or data entered on IB Graph's own complete data editor," said Eric Moothart, DPD's software marketing director.

IB Graph allows users to enter data for building graphs interactively on-line from a terminal, with the computer constantly monitoring and verifying operator command. Users can also process data in other formats, such as data processing files like RMS data management service, or list processing documents created through WORD-11 or DECWORD.

"IB Graph stores the definitions of charts and lets the user recall and modify these definitions to create exactly the chart needed," Moothart explained. "Charts that once took as long as two weeks to develop can now be produced in a few hours."

Using IB Graph users can enter and modify data and chart specifications on Digital VT100 (with advanced video option — AVO,) VT102 and VT125 terminals. The VT100/AVO command terminal will display only bar charts, while the VT125 will display bar, line and pie charts. When an appropriate color monitor is attached to the VT125, users can display their charts on the monitor in four colors.

IB Graph is implemented using Macro-11 and VAX BASIC for VAX/VMS and can be used on any valid VAX/VMS configuration — version 2.3 or later — with a working set size of 200 pages and at least 2000 free blocks of disk space.

As a multi-user interactive business graphics system, IB Graph operates in a timesharing environment under the RSTS/E, CTS-500 and VAX/VMS operating systems.

IB Graph is menu-oriented and includes a complete set of help screens to assist the user. The package consists of several



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C33	Cartridge disk controller	RK05	
Т03	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	R P06	
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	R M02	
S33/B	80 MB/300 MB SMD controller	RK07	
S33/C	200 MB/300 MB SMD controller	R P06	
S33/D	96 MB CMD controller	R K 06	
Products printed in red are LSI-11 Bus compatible. Products printed in black are UNIBUS® compatible for PDP-11 and/or VAX minicomputers.			

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modules:

1. Main Menu module displays a list of available commands and also displays on request an index listing the names and reference numbers for data groups and chart definitions

2. Data Group Editor module allows the user to enter and edit data. This includes numeric data and label information for charts. With the editor, users can move, condense and manipulate data in various ways

3. Chart Specification Editor module provides complete control over the details of a chart, including type, colors, labels, etc. The user can select from more than 100 specific specifications to control the details of a chart

4. Plot module uses a data set and a chart specification to produce an actual chart on a device specified by the user

5. Utility module allows the user and manager to define devices that will be used to produce charts and assign names and characteristics to these devices

6. Data Transition module converts data processing files of various types (RMS, block I/O, ASCII, and others) and WORD-11 list processing files into IB Graph data groups so they may be easily edited and plotted.

The price of IB Graph for users operating under VAX/VMS is \$9500 for the PDP-11/780, \$8500 for PDP-11/750 and \$7500 for PDP-11/730. Secondary licenses cost \$5500, \$5500 and \$4500 respectively.

Price of the IB Graph for users operating under RSTS/E is \$7500 for the PDP-11/44 and \$5500 for all others. Secondary licenses are \$4500, \$4000 and \$3500 respectively.

Deliveries will be made 30 days ARO. IB Graph is distributed on magnetic tape compatible with nine-track 800 or 1600 bpi drives.

For more information, call DPD at (714) 993-4160.



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