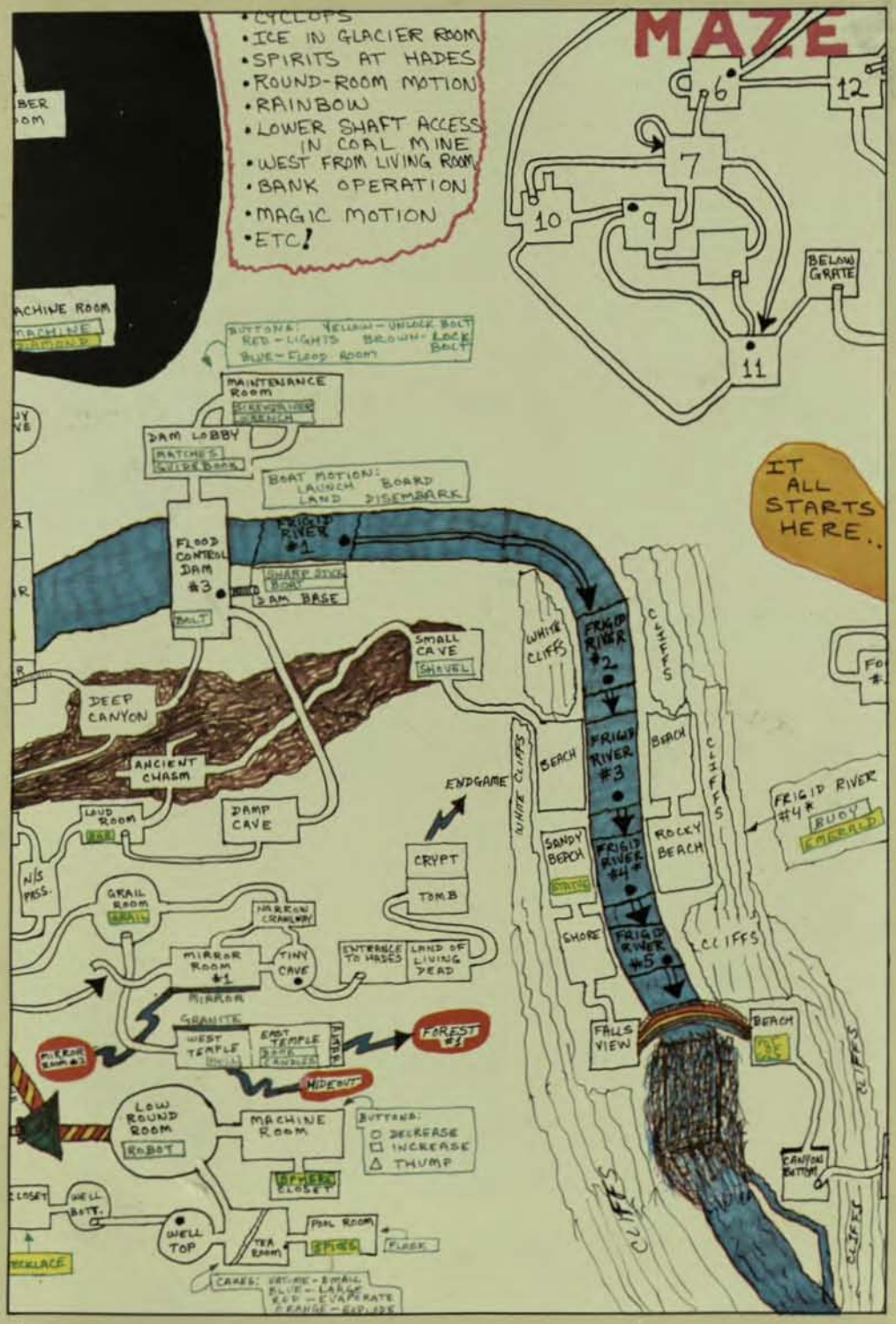
NOVEMBER • 1982

THE DEC* PROFESSIONAL

• VOLUME 1, NUMBER 3 •

THE MAGAZINE FOR DEC USERS



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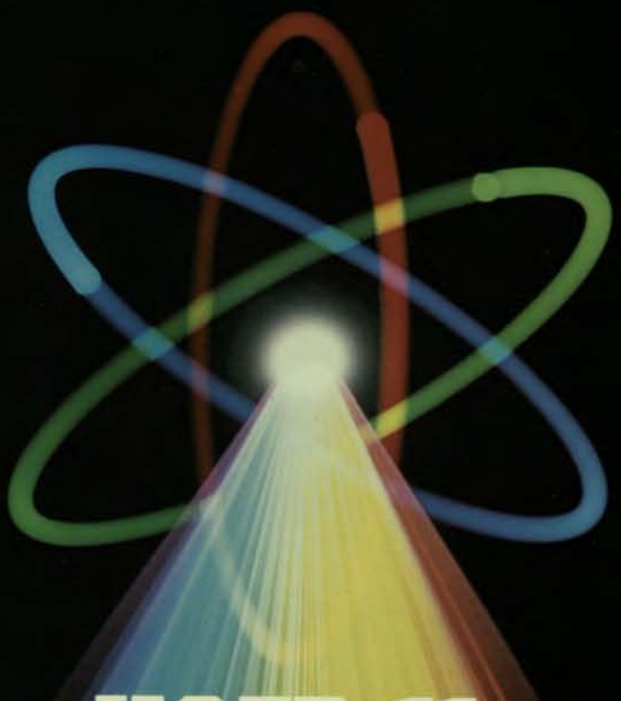

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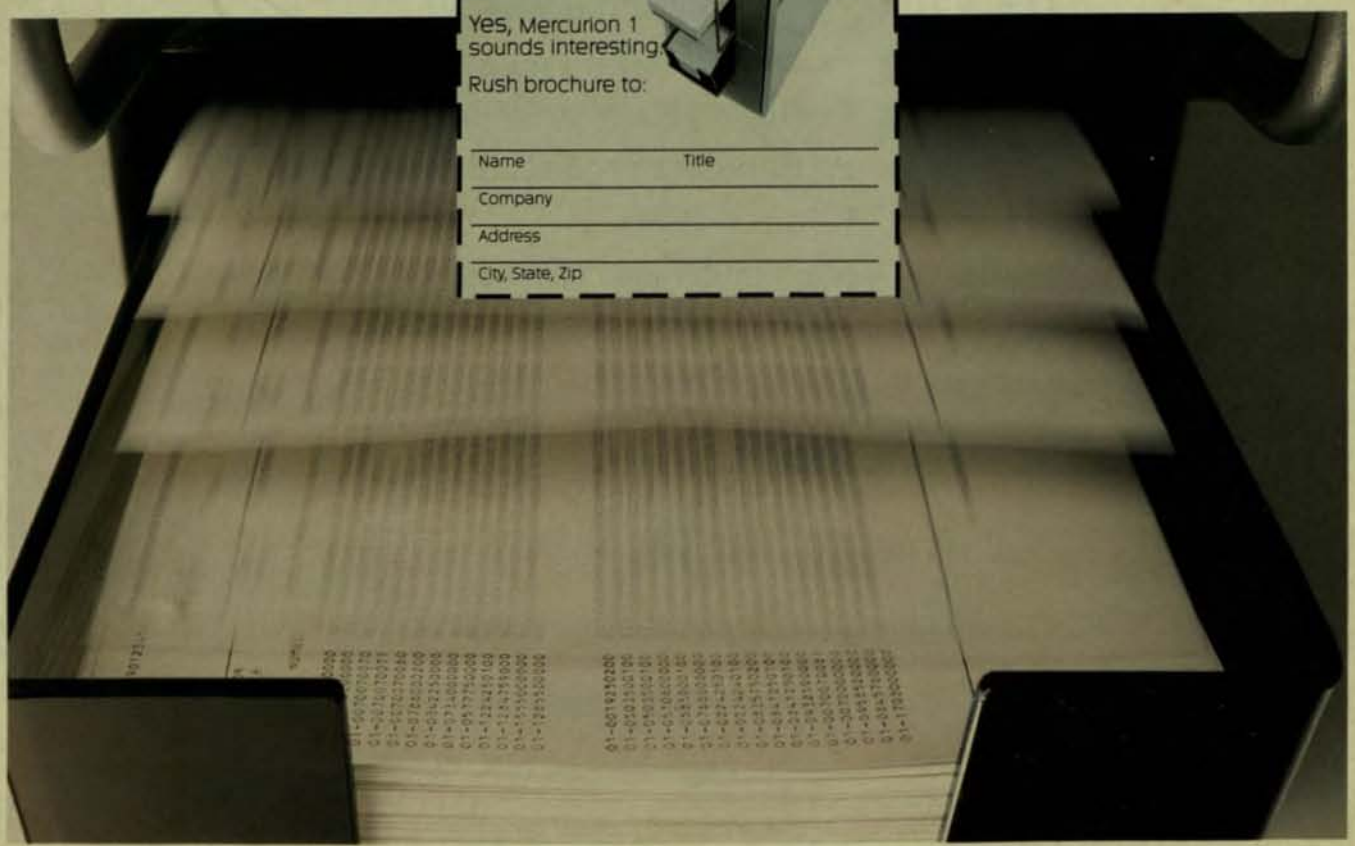

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FROM THE EDITORS

MICRO-11 — HEAVEN?

Dave Mallery

What are we coming to?? An 11/70 in my VT100 (VT1170?)? I doubt it . . . RSTS in my wrist watch? (RSTS Watch) Not yet.

I read almost everything published in the trade press and was amazed at the small reaction that the announcement has produced.

The announcement of the J-11 chip set with no board-level products was also significant. Did they just need an announcement, or does it signify a shift in policy?

I can name a half-dozen companies that could whack out an 11/34 cpu upgrade board based on the J-11 in 2 months from a cold start. Why give them such an edge? Just think of all those 11/34's out there swapping their brains out. Hmm . . . a one board cpu/MB that fits into the existing 11/34 backplane . . .

How does DSA (Digital, not Dave) figure into this picture? Will there be a UDA70 chip set that sits in the next socket to the right and whispers sweet nothings into the J-11?

With RSTS/E and 11/M licenses selling at $150 (OEM quantity 1000, run only), and the 11/70 rendered onto a board, where will DEC make any money? The computer is practically free. Will layered products be the profit center of the future, or do they expect to sell 200,000 systems a year?

Sometimes, it's great to be alive.

Carl B. Marbach

Hello! That hello is a pretty powerful hello; it is going to about 57,000 DEC professionals around the world. We estimate that there are more than 100,000 DEC users, but we have only "found" 57,000 of you. We are constantly finding and meeting more of you, something we work hard at; come see us at DECUS and DEXPO in December, we would be pleased to meet you. All told, you will find us very busy people that week. Besides the booth at DEXPO, I will be involved in no less than 4 DECUS sessions, some during dinner and others running into the wee hours of the night (morning??).

I have a two favors to ask all of you: first, we would like you to become authors. While all of what we get is not great, we usually are able to work with the authors to get good information across to our readers. Sometimes we are criticized for printing "commercial" material that looks like an article. We will print it if it has some value besides being an advertisement for the product in question. The "commercial" people seem to be the ones submitting articles, we would like to have some from the scientific and academic community as well as managerial material and good old bits and bytes (nibbles) from the hackers out there. Remember, our authors are paid an honorarium based on the article submitted, we prefer articles on magnetic tape or floppy disk in almost any DEC format including PIP, RNO, or many word processors. Don't forget that we are DEC users ourselves and you can dial our computer to "down-line load" your article (or we could call you and it's our nickel). Second, when you buy or inquire about a piece of equipment or some software you saw in THE DEC PROFESSIONAL, tell the advertiser you saw it here; it makes them happy and keeps them coming back.

Now for some questions and answers. Well, no answers, just questions. When will DEC begin shipping the personal computers in quantity? Who will sell these little computers? When will DEC begin shipping the MICRO-11 (a real PDP-11 in a MICRO case)? When will the MICRO J-11 chip find its way into the MICRO-11? Why is DEC announcing the personal computers at one DECUS and not even shipping them before the next? Why does my Computerland (a micro computer store) manager tell me how bad DEC has been to all its distributors in the past? And why doesn't this same manager know how terrific DEC's field service is? Have you figured out how to use the "module mail repair service" for your VT-100 type terminals? If not, do you know where the nearest "walk in" repair center is? Have you shared this magazine with a friend? Why do I have all the questions and no answers? The answers to these and other DEC related questions are coming in future issues of THE DEC PROFESSIONAL, which will be our pleasure to bring you soon.

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THE DEC* PROFESSIONAL
THE MAGAZINE FOR DEC USERS

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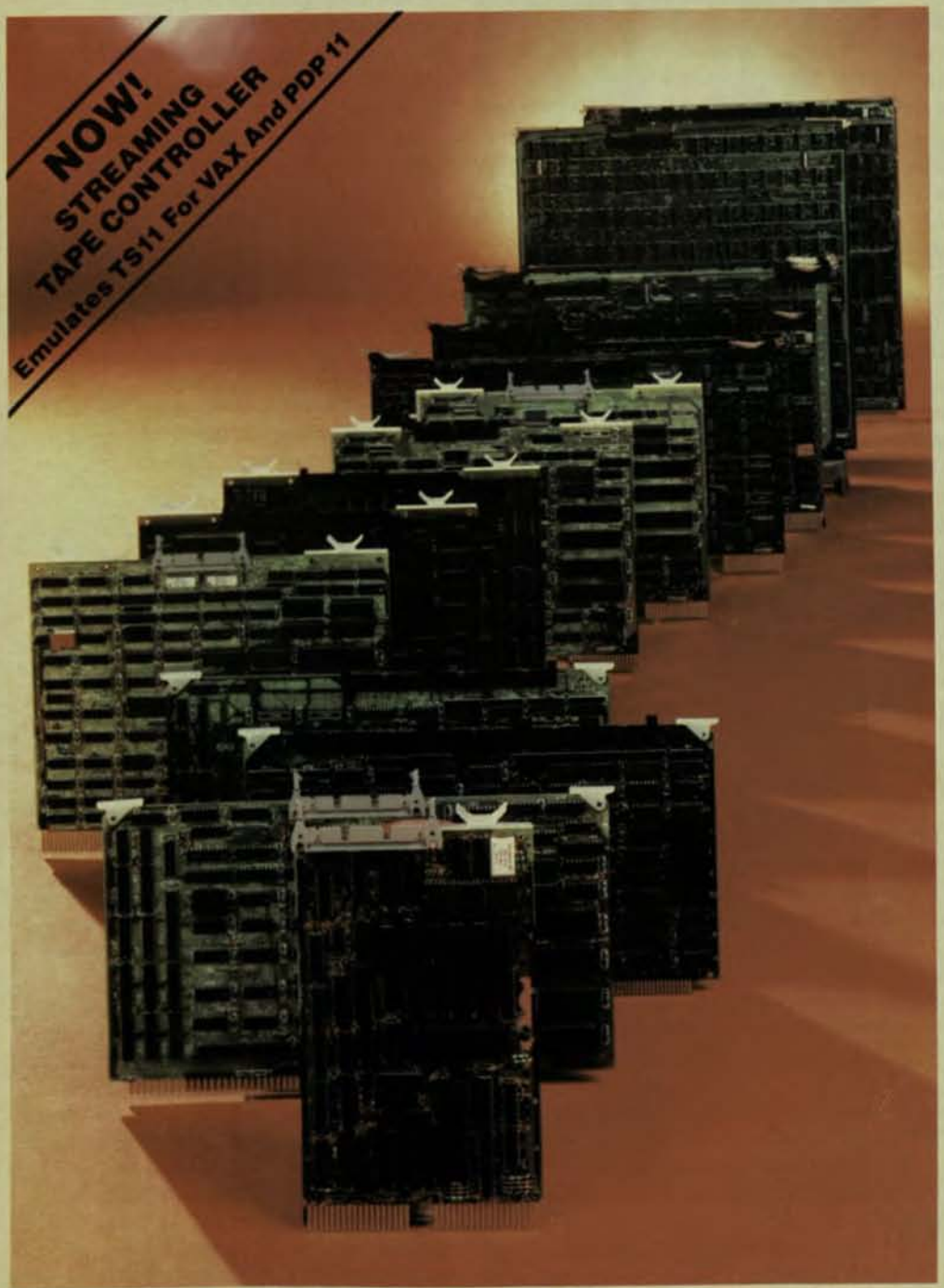

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Peripheral Processors provide efficient low-cost, software transparent alternatives to original disk and tape controllers offered with Unibus*, Q-bus, Data General's I/O bus**, and Multibus***-compatible systems.

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CIRCLE D27 ON READER CARD

LETTERS TO THE DEC PRO . . .

Send letters, comments, photos, etc. to: Letters to the DEC PRO, Box 362, Ambler, PA 19002.

I have been attempting to track down schematics and documentation on the TCO1 controller used for the TU55 single DECTAPE drives so that I can design an interface to use them with an LSI-11/23. Is anyone aware of a source for this information, or if such an interface has ever been built?

Yours truly,
Dale Amon, Pres.
DMA Systems Inc., Pittsburgh, PA

—

I first came in contact with *RSTS PROFESSIONAL* about a year and a half ago. After reading my first issue and re-reading it, I ordered all the back issues that I'd missed and found them extremely helpful. For instance it was nice to know that there were people out there that understood that when I said that I was having a problem with an overlay tree that I wasn't talking about an accident in my backyard.

Since reading those first issues I've watched "RSTS PRO" grow. It's nice to see that when the advertisers caught on to what they had in the publication and the ad space started to multiply that the articles didn't recede into the background. The quality, number and content of the articles has continued to be exceptional.

Now that you're launching out into the larger DEC world I'd like to wish you the best of luck with *THE DEC PROFESSIONAL* and hope that it will be as much of a success as is "RSTS PRO".

Sincerely, J. Scott Canfield
Bethany House Publishers Inc.
Minneapolis, MN

See page 18 of this issue for Scott's article "Dibol Data Entry Subroutine."

—

HELP DEC PRO: I have a CIDZ-11 board manufactured by Computer Interface Technology which is in need of repair. However, after numerous calls to various depot repair centers I find that no one has a print set or is willing to repair the board. If anyone has a print set or can repair the board please call me at (617) 964-4320 or send the information to me.

Gratefully Yours,
Peter A. Kapinos, Software Engineer
Computer Design and Applications
377 Elliot Street, Newton, MA 02164

Readers?!

—

I read with interest Sterling Crum's article, "Do They Still Use Calculators?" in your July 1982 issue of *The DEC Professional*. Mr. Crum prompted the question of the existence of other spreadsheet calculator packages for other DEC operating systems. In answer to Mr. Crum's question, I would like to point out that Computer Systems Corporation's CALC-11 product does, in fact, operate on all of the PDP-11 & VAX operating systems (i.e. RT-11 with TSX plus, RSX-11, RSTS/E & VMS).

Computer Systems Corporation has successfully accomplished this by evaluating the requirements of an electronic spreadsheet as well as reviewing the various constraints of the different operating systems. In doing so, Computer Systems' development team chose the 'C' language as the implementation vehicle. By choosing 'C', Computer Systems has been able to have essentially one version which results in less maintenance and total consistency between operating systems. It also allows for faster development time, which may account for some of the additional sophisticated features such as the TRUE THREE DIMENSIONAL feature which is available on CALC-11.

Mr. Crum left out one very important feature which we believe to be essential in a multi-processing environment. In comparison to a microprocessor, where a user will operate a spreadsheet and "walk away" with his/her floppy disk, a DEC system which has multiple users, requires a level of security beyond that of the standard project/programmer "log in" sequence. Computer Systems Corporation has again answered this requirement by providing a FILE ENCRYPTION feature of CALC-11. We believe this feature to be a REQUIREMENT for a spreadsheet calculator in a multiprocessing environment.

Last, but certainly not least, by using a single language as a development vehicle, the return on the initial investment may be recovered more readily, which is the reason CALC-11 is priced more attractively than most of the spreadsheet systems. The pricing even reflects the license for the 'C' library modules which are included with CALC-11.

Computer Systems Corporation will be happy to provide additional information on the CALC-11 product to the readers of The DEC Professional. Information is available at:

Computer Systems Corporation, 5540 Rock Hampton Court, Indianapolis, IN 46268, (317) 872-7200, Attn: David Tortora.

Sincerely,
David Tortora, President

—

A friend passed along to me Vol. 1, #1 (July 1982) "The DEC Professional." Your Journal is a VERY GOOD IDEA.

Significant articles like John Runyon's "DEC Personal Computer Series" need a wide variety of readers. DEC has dropped shoes previously, and the June announcement was a "Landmark," a "Bomb Shell," — like reading the front page of your favorite newspaper by the light of a thunderstorm. (It's obvious what's on the page, but there's no way for you to absorb all the detail, the first time around.)

As the users (both actual and potential) begin to understand the significance, in this case, of the DEC saying that DIGITAL changes the way the world thinks, the rain of independent shoes that follows could make nuclear fall-out look tame by comparison. I think this time we have a real "Rug Puller Out from Under-er."

The orderly world of computers is seeing its traditional idols shaken and tumbling. Time has shown that what many took to be established principles, has turned out to be personal/corporate doctrines and biases. (Conditions in the industry at times look like playing Fifty-Two Pick-up with ten decks of cards simultaneously — EXCITING, ISN'T IT.)

DEC's method of accomplishing things is interesting. It's like a matrix where DEC develops the skeleton, by running down all the columns to the elemental/primitive level of things, while the hardware world, the OEM's, and the users add muscle and flesh, filling in across the rows, and down the columns, then jumping in 3-D fashion to create a second, and third and fourth matrix etc. creating and filling in as they go.

How refreshing it is when you get down to the elemental/gut level of systems development, "cracking nuts with a computer" so to speak, and find that someone from DEC had either been there earlier, or that the thing has the logical hooks you need for your application. Then about the time you think you have the thing driven up against the wall, it turns out that the wall is a picket fence with most of the slats removed. So about DEC's approach I say, "Call it Mr. Clean."

It's obvious that DEC is here to stay, for a while at least, and for good reason, the systems they have produced are good ones, solid and dependable. Others have found it easy to build on the foundations

. . . continued on page 68

DILOG INTERFACES WINCHESTER/BACK-UP PDP-11*

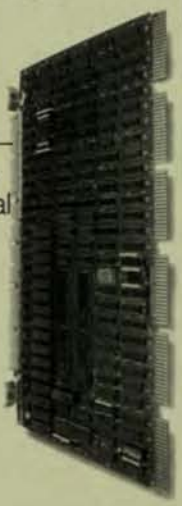
You can't find a better, high-performance line of low-cost, single board, disc and tape controllers for your PDP-11 data storage system. All Winchester disc and ½" tape controllers are based on uP architecture and automated design common to the thousands of DILOG controllers in use. So they consistently offer you best price/performance.

The vital time-saving and data base protecting features you want, including diagnostic test/self-test/error correction/etc., are all built into each intelligent controller. You'll also find RT-11, RSX-11, RSTS, IAS, MUMPS, DSM or VMS software compatibility, plus I/O compatibility with all popular drives.

WINCHESTER/SMD/CMD CONTROLLERS

These controllers mate with larger capacity hard disc drives employing RK, RM and RP emulations. The following is a partial listing of models:

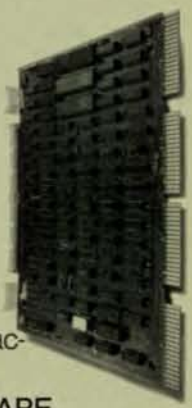
NEW—UNIVERSAL SMD INTERFACE COMPATIBLE—Model DU215—Interfaces UNIBUS to SMD I/O drives—switch selectable RK06/RK07—two 8" or 14" Winchester SMD/CMD drives to 300 MB capacity (mix or match without any component change)—56-bit ECC—88% utilization of unformatted storage capacity—exclusive universal formatting.



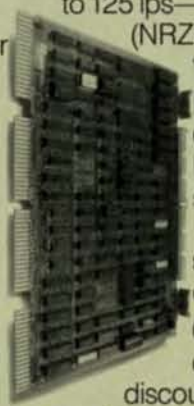
NEW—SMD INTERFACE COMPATIBLE—Model DU218—Full RM02/RM05/RP06 media compatibility—interfaces PDP-11/04 through 11/60 computers with up to four Winchester, or CDC9762/9766 equivalent disc drives employing industry standard SMD interface, as well as Memorex 677/RP06 type drives—includes three sector buffering, 32-bit ECC and dual port capability.

MAGNETIC TAPE CONTROLLERS

These ½" mag tape controllers/couplers handle standard start-stop and streaming drives with TM-11 or TS-11 emulations.



½" STREAMING/START-STOP COMPATIBLE—Model DU130—Handles up to eight 9-track, 800/1600 BPI industry standard drives at 12.5 ips to 125 ips—interfaces dual density (NRZI/PE) drives from all manufacturers. TM-11 emulation.



NEW—½" MAGNETIC TAPE COMPATIBLE—Model DU132—Emulates TS-11—interfaces up to four start-stop or streamer drives, including "Cache Streamer"—**12.5 ips to 125 ips speeds—exclusive 800/1600 BPI dual density—also interfaces GCR transports.

Contact your local DILOG sales office for complete details and O.E.M. quantity discount pricing/delivery of specific models providing Winchester/Backup for PDP-11.

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CIRCLE D19 ON READER CARD

RSTS/E PERFORMANCE MONITOR

By Michael Mayfield, Northwest Digital Software, Box 2-743, Newport, WA 99156

"Five minute response time."

"Our 11/70 dies at six users."

"An 11/34 can only support two word processing jobs."

Seem hard to believe. Well, it's true. These are real situations. In all cases system performance was improved by up to two orders of magnitude using standard system tuning techniques.

The five minute response time became two seconds. The 11/70 now supports 40 users. And the 11/34 supports 40 word processing terminals instead of two. It just goes to show what proper system tuning can do.

The first thing that is required to tune a system for optimal performance is to identify the resources that are being improperly or excessively used. Once identified, we can take steps to correct the situation.

There are only four basic resources used in a RSTS system: CPU, memory, disk, and FIP. Once we identify which resources are critical, the usage of these resources can be minimized by optimizing the offending programs or changing parameters within the monitor. By tuning only those programs or monitor functions that are causing the problems we can make dramatic improvements with a fairly minor effort.

The problem lies in identifying the offending programs or monitor functions. RSTS is pretty good at identifying problem areas in resource usage but it doesn't give you any information about who caused the problem. Up to now you had to know a lot about what was going on inside each of your programs, as well as how RSTS works inside, in order to indentify the offending program or function.

All this is changing now with the advent of a new product soon to be available from Michael Mayfield and Northwest Digital Software called RPM (RSTS Performance Monitor).

RPM greatly extends the information gathering capabilities of the RSTS monitor to include the information needed to analyze the system as a whole or on a per program and per file basis. RSTS just doesn't normally provide this information.

In addition to the increase in detail about programs and files, RPM provides information about resources that are common problem areas in system performance. Information about FIP usage includes average FIP queue depth and a histogram of FIP queue depth.

Disk information includes histograms of disk block usage and seek distance for each disk as well as as a breakdown of types of disk usage and cache utilization on a per disk basis.

Cache utilization is shown by various cache hit ratios, by minimum, maximum and average cache entry ages and by a breakdown of cache entry usages.

System tuning using RPM follows a logical progression from the identification of critical resources through identification of the individual programs and monitor functions responsible for degrading system performance.

Simply by typing "ANALYZE" you get a report custom tailored to your system telling you, in plain English, which resources are being used well and which are causing you problems.

Once the critical resources have been identified, the "LIST" command will identify the programs or files that caused the problem. For example, typing "LIST TOP 10 PROGRAMS BY PRG_FIP_USED" will list the top ten users of FIP during the sample period.

Individual programs can then be analyzed to determine what is causing the overhead. The "EXAMINE" command provides a detailed report of the actions of a particular job or program. It reports on CPU usage and scheduled overhead. It counts I/O requests and their associated overhead on a per channel basis. It even keeps track of each type of monitor request used and the disk overhead required to process it.

As you can imagine, being able to analyze a system at this range of levels really takes the guesswork out of tuning a system. Now anyone can get the most out of his system and keep it running at its best. All it takes is RPM.

The following is a brief overview of the commands available with RPM:

```
ANALYZE
    Analyze the overall system resource utilization and print a
    report that identifies problem areas and suggests methods for
    improving performance.  ANALYZE uses a command file which can
    be custom tailored for each particular installation.

STATUS [FOR] time [THROUGH time]
    This command displays a report similar to that created by the
    STATUS utility using a consolidation of all information
    selected during the specified time period.  With this
    command, the most important information about system
    performance is all displayed on a single screen in a familiar
    format.
```

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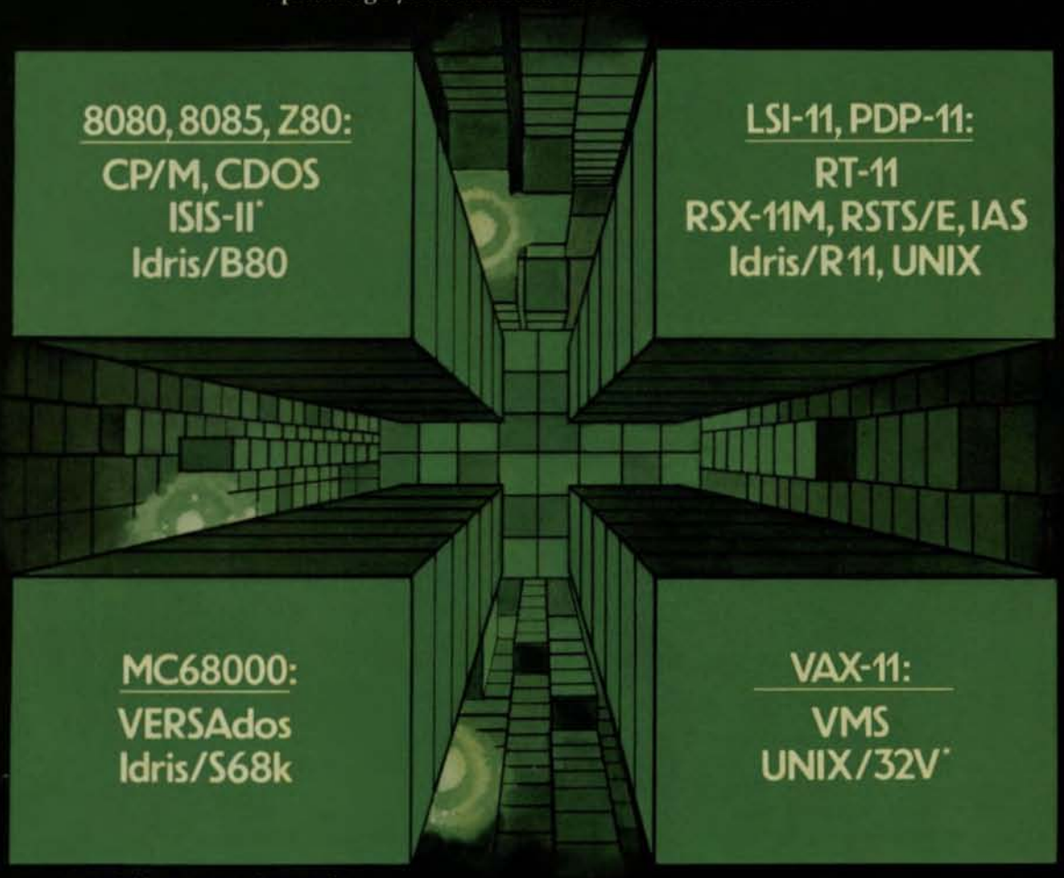

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CIRCLE D44 ON READER CARD

PLOT varlist [VS var | BY HOUR | BY DAY]
BARGRAPH var [VS var | BY HOUR | BY DAY]
HISTOGRAM varlist

Once the critical resources are identified, the PLOT, BARGRAPH and HISTOGRAM commands can be used to further analyze resource utilization and the ratios and relationship: between resource usages by plotting sample information in a line plot or bargraph or as a histogram of values.

LIST /DETAILED {TOP | BOTTOM} n {PROGRAMS | FILES} BY expression

This command is used to identify the program or files which have used the most or least of the resources in question.

EXAMINE [JOB] jobno EVERY secs [SECONDS] /PROGRAM:progname/ RESET

Once a particular program or group of programs is identified as the cause of the performance problem, the EXAMINE command is used to display detailed information about each specified program. The detailed information includes:

(1) Number of times scheduled.
(2) Number of 1/60 second ticks executing.
(3) For each channel: Number of I/O requests, Number of directory and system overhead I/O requests.
(4) For each monitor EMT code: Number of times requested, Number of disk I/O requests necessary to process the EMT.

INPUT infilelist
OUTPUT file /LA100/LA120/NOGRAPHICS
SCOPE /VT100/NOVT100/SCROLL:top,bottom/NOSCROLL

Specifies the sample files to use for input, the printer output device and an optional override of the printer for displaying on the screen.

SELECT /APPEND {ALL | IF condition}
SUBSELECT /APPEND {ALL | IF condition}
IF condition [THEN statements] [ELSE statements] [ALWAYS statements] ENDIF

Each sample is checked against the conditions specified for selection and then for subselection. Only those samples meeting both selection criteria will be used for reporting and analysis. IF statements can be used to control the execution of entire statements or blocks of statements.

AUDIT [FOR time [THROUGH time]]

This command displays all the selected sample information for the specified time period.

DISPLAY /EACH_SAMPLE {expression:size | text | COLUMN(n) | CR}
[,{expression:size | text | COLUMN(n) | CR}..]

This command is used to print information from selected samples. It is normally used in command files to print custom reports.

PRINT

This command temporarily suspends SCOPE mode and repeats the previous PLOT, BARGRAPH or HISTOGRAM command. It is useful for printing a useful graph once it is seen on the screen.

COMBINE outfile = infilelist

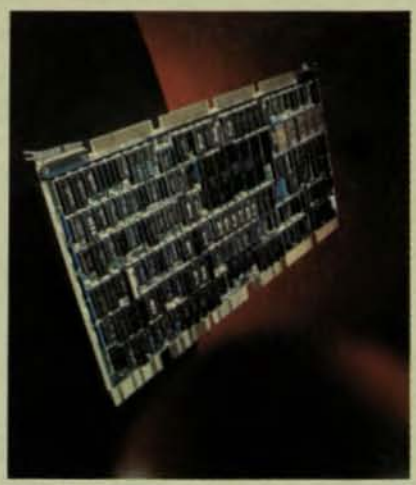
Combine several sample files into one larger file.

CONSOLIDATE [outfile]
UNCONSOLIDATE

Consolidates all the selected input data down to one sample for each hour of the day. This is useful for reducing the disk space requirements for data stored for use in monthly trend analysis.

ACCESS

Access the X.25 world. Today.



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CIRCLE D90 ON READER CARD

DEFINE varname = {expression | varlist | text} /MIN:{constant | AUTOMATIC | PREVIOUS} /MAX:{constant | AUTOMATIC | PREVIOUS} /DESC:text

Defines a new variable or expression using standard variables or previously defined variables.

HELP [topic]

Displays help on a specified topic or the HELP command.

@file

Take input from specified indirect command file.

The following is a brief overview of the data collected by RPM:

------ CPU Usage ------

USER_TIME
User CPU time.
IDLE_TIME
Unused CPU time.
CPU_PR2
CPU time at processor priority PR2 (currently unused).
MONITOR
CPU time at monitor level, excluding I/O processing.
SYS_UNCHARGED
CPU time at monitor level that is chargable to a user job.
SYS_CHARGED
CPU time at monitor level that is not chargable to a user job.
SLOW_IO
CPU time in interrupt driver for the terminal driver and other slow I/O devices.
FAST_IO
CPU time in interrupt driver for disk driver and other fast I/O devices.
CPU_6_7
CPU time in monitor at processor levels PR6 or PR7.
LOST_TIME
Amount of CPU capability lost due to insufficient memory.
CPU_STRETCH
Average number of additional ticks of CPU time required for a 1 second computation. Additional ticks are an indication of excessive interrupt servicing.
WALL_STRETCH
Average number of additional ticks of elapsed time required for a 1 second computation. Additonal ticks are an indication of excessive scheduling and CPU usage.

------ Memory Usage ------

AVG_MEM_USED
Average amount of memory (K-words) in use by the monitor, cache, user jobs, runtime systems or resident libraries.
AVG_MEM_FREE
Average amount of memory (K-words) not in use.
AVG_MEM_OUT
Average amount of memory (K-words) required for all swapped out jobs, runtime systems and libraries.

------ Disk Usage (for each disk unit) ------

[Dxn:]DISK_USAGE_0
[Dxn:]DISK_USAGE_10
[Dxn:]DISK_USAGE_20
[Dxn:]DISK_USAGE_30
[Dxn:]DISK_USAGE_40
[Dxn:]DISK_USAGE_50
[Dxn:]DISK_USAGE_60
[Dxn:]DISK_USAGE_70
[Dxn:]DISK_USAGE_80
[Dxn:]DISK_USAGE_90
Histogram of disk block usage for each disk. The variables correspond to the percentage of disk block accesses within each 10% segment of the disk block numbers.
[Dxn:]SEEK_DIST_1%
[Dxn:]SEEK_DIST_4%
[Dxn:]SEEK_DIST_16%
[Dxn:]SEEK_DIST_64%
[Dxn:]SEEK_DIST_100%
Histogram of seek distance for each disk. The variables correspond to the percentage of the total distance of the disk surface that the disk head seeked before performing an I/O operation.
[Dxn:]FREE_CLUSTERS
Average number of free clusters on disk.
[Dxn:]SWP_READ_ACC_HIT
[Dxn:]USR_READ_ACC_HIT
[Dxn:]SAT_READ_ACC_HIT
[Dxn:]OVR_READ_ACC_HIT
[Dxn:]DIR_READ_ACC_HIT
[Dxn:]MSC_READ_ACC_HIT
Number of read accesses that were found in cache for each type of disk access.
[Dxn:]SWP_READ_ACC_MISS
[Dxn:]USR_READ_ACC_MISS
[Dxn:]SAT_READ_ACC_MISS
[Dxn:]OVR_READ_ACC_MISS
[Dxn:]DIR_READ_ACC_MISS
[Dxn:]MSC_READ_ACC_MISS
Number of read accesses that were not found in cache for each type of disk access.
[Dxn:]SWP_READ_BLKS_HIT
[Dxn:]USR_READ_BLKS_HIT
[Dxn:]SAT_READ_BLKS_HIT
[Dxn:]OVR_READ_BLKS_HIT
[Dxn:]DIR_READ_BLKS_HIT
[Dxn:]MSC_READ_BLKS_HIT
Number of blocks read from cache for each type of disk access.
[Dxn:]SWP_READ_BLKS_MISS
[Dxn:]USR_READ_BLKS_MISS
[Dxn:]SAT_READ_BLKS_MISS
[Dxn:]OVR_READ_BLKS_MISS
[Dxn:]DIR_READ_BLKS_MISS
[Dxn:]MSC_READ_BLKS_MISS
Number of blocks read that were not found in cache for each type of disk access.
[Dxn:]SWP_WRITE_ACC
[Dxn:]USR_WRITE_ACC
[Dxn:]SAT_WRITE_ACC
[Dxn:]OVR_WRITE_ACC
[Dxn:]DIR_WRITE_ACC
[Dxn:]MSC_WRITE_ACC
Number of write accesses not found in cache for each type of disk access.
[Dxn:]SWP_WRITE_BLKS
[Dxn:]USR_WRITE_BLKS
[Dxn:]SAT_WRITE_BLKS
[Dxn:]OVR_WRITE_BLKS
[Dxn:]DIR_WRITE_BLKS
[Dxn:]MSC_WRITE_BLKS
Number of blocks written that were not found in cache for each type of disk access.

------ Cache Usage ------

CACHE_PR0
CACHE_PR1
CA{*CHE_PR2
CACHE_PR3
CACHE_PR4
CACHE_PR5
CPU time used for cache handling at each processor priority level.
CACHE_ATTEMPT
CACHE_HIT
Average number of single cluster reads each second and their associated cache hits.

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CACHE_DIR_ATTEMPT
CACHE_DIR_HIT
Average number of single cluster directory reads per second and their associated cache hits.
DATA_READ
DATA_HIT
Average number of clusters of data read per second and their associated cache hits.
WRITE_CHECK
WRITE_HIT
Average number of write accesses each second and their associated cache hits.
NOCACHE_READ
Average number of clusters that did not attempt to be read from cache (i.e., swapping I/O).
INSTALL_READ
Average number of clusters installed into cache per second.
MULTI_HIT
MULTI_MISS
Average number of multi-cluster reads found and not found in cache per second.
MULTI_PARTIAL
Average number of single cluster reads required for multi-cluster hits specified for MULTI_HIT per second.
CACHE_RESET
Number of times cache was reset.
CACHE_NODES
CACHE_NODES_SML
Total number of cache nodes used and the number contained in the small buffer region.
CACHE_NODES_FIP
CACHE_NODES_DATA
Number of cache nodes used for FIP and DATA caching.
AVG_CACHE_AGE
MIN_CACHE_AGE
MAX_CACHE_AGE
Average, minimum and maximum age of cache entries in seconds.

------ FIP Usage ------

FIP_IN_USE
Percentage of time that FIP was desired, whether it is currently running or waiting for something.
FIP_IDLE
Percentage of time that FIP was not actually running.
FIP_WAITING
Percentage of time that FIP in use but was waiting for something.
FIP_WAIT_OVR
FIP_WAIT_DIR
FIP_WAIT_SAT
FIP_WAIT_MSC
Percentage of time that FIP was waiting on overlay, directory, SAT or miscellaneous information.
FIPQ_DEPTH
Average depth of FIP queue.
FIPQ_0
FIPQ_1
FIPQ_2
FIPQ_3
FIPQ_4
FIPQ_5
FIPQ_6
FIPQ_7
FIPQ_8
FIPQ_9
Histogram of FIP queue depth. Higher numbered depths correspond to increased use and delays of FIP.

------ Terminal Driver Usage ------

KB_IN
KB_OUT
Average number of characters input and output per second by the terminal driver.

------ Small Buffer Usage ------

MIN_SML_BUF
AVG_SML_BUF
Minimum and average number of small buffers available.
MIN_CONTIG_SML_BUF
MAX_CONTIG_SML_BUF
Average minimum and maximum amount of contiguous small buffer space, in small buffers.

SML_BUF_10%
SML_BUF_20%
SML_BUF_25%
SML_BUF_30%
Histogram of critical small buffer levels. The variables correspond to the percentage of time the total number of small buffers available was within the specified percentage of the total small buffers on the system. System performance degrades rapidly if the number of available small buffers drops below 25% of the total.

------ Miscellaneous Variables ------

SAMPLE_NUMBER
Number of selected sample.
SAMPLE_MONTH
SAMPLE_DAY
SAMPLE_TIME
Month, day and time of day when sample started.
SAMPLE_TICKS
Number of 1/60 or 1/50 second ticks in sample.
OVRN_CNT
OVRN_DATE
OVRN_TIME
OVRN_SEC
Count of KW11-P programmable clock overruns and date and time of last overrun.

------ Program Usage ------

The following information is kept for each program in use on the system:

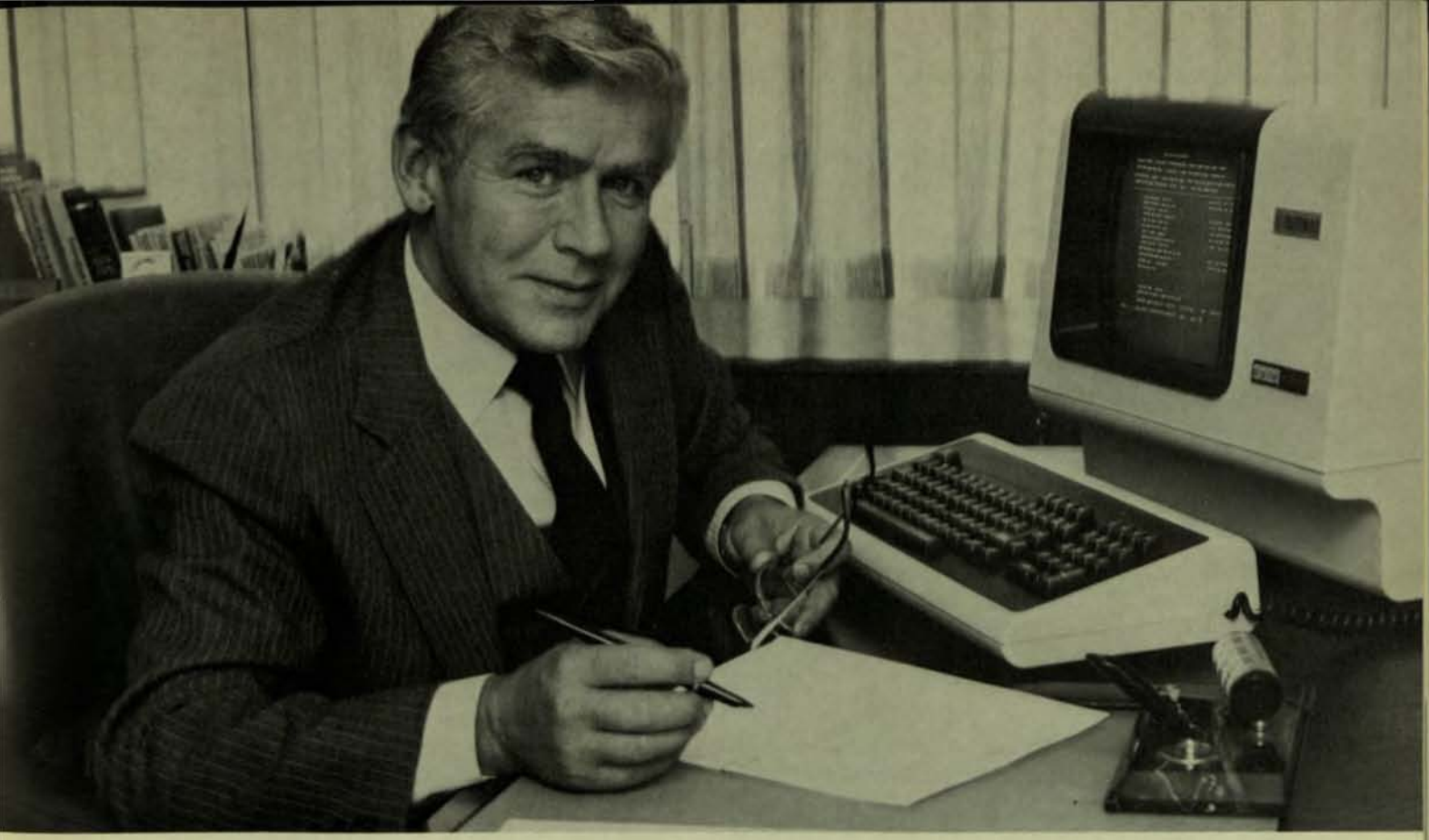
PRG_NAME
Program name.
PRG_CPU
Number of ticks this program was running.
PRG_FIP_USED
Percentage of time using FIP.
PRG_ACC
PRG_ACC_HIT
Number of disk accesses per second and their associated cache hits.
PRG_BLKS
Number of blocks accessed per second.
PRG_DIR_ACC
PRG_DIR_ACC_HIT
Number of directory accesses per second and their associated cache hits.
PRG_MEM_RESIDENT
Percentage of time resident in memory.
PRG_SWAP_IN
PRG_BAD_SWAP
Number of time this program swapped and the number of times the swap was forced by another job when this job was still runnable.
PRG_USER_CNT
Average number of users of this program.
PRG_RESPONSE_TIME
Average response time.
PRG_MEM_TOTAL
PRG_MEM_UNIQUE
Average total job size and job size unique to this job (excluding RTS and libraries).

------ File Usage ------

The following information is kept for each file in use on the system:

FILE_NAME
File name and account.
FILE_ACC
FILE_ACC_HIT
Data accesses per second and their associated cache hits.
FILE_BLKS
FILE_BLKS_HIT
Data blocks read or written and their associated cache hits.
FILE_DIR_ACC
FILE_DIR_ACC_HIT
Directory and other system overhead accesses per second and their associated cache hits.

. . . continued on page 16



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CIRCLE D13 ON READER CARD

A NOTE TO SOFTWARE MANUFACTURERS

By E.C. Dowse, Ottawa Canada

HELP - HELP! You software manufacturers have been so prodigious that there are hundreds of software products available on the market. As a result, our computer shop has purchased a few quite good systems. This has created a problem! You software manufacturers have designed your own human-computer interfaces but there is very little in common between your systems. Some of you use prompt commands, some of you use menus, some of you use a mix of both.

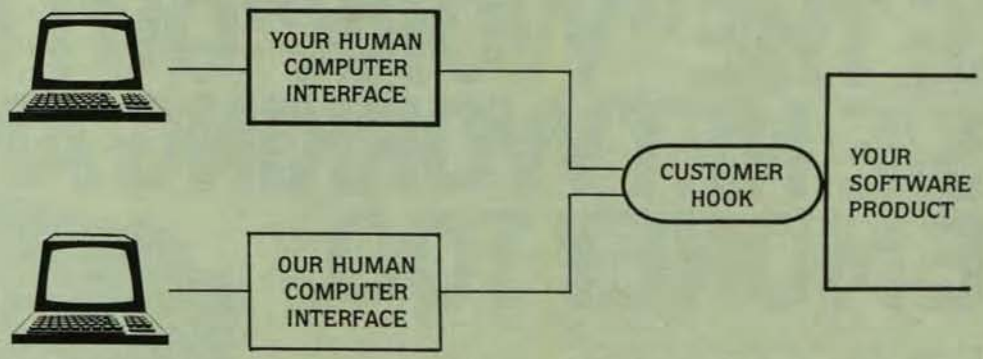
There is no commonality for even the simple 'end of activity' command. For example, I have seen the following commands used, all with the same meaning: STOP, ST, END, E, EXIT, EX, ctrl C, ctrl Z, HOME, BYE, GOODBYE, GB, ABORT, AB, FINISH, FINI, F and DONE. Clearly, the number of commands and methods used for just a few systems becomes very confusing. As a consequence, only our programmers can operate your software. Our user clients very quickly get bogged down and reject the systems.

As a solution, a standards committee could be struck with the task of recommending a standard. This solution would of course be a long time in preparation (you know how standards committees operate).

May I offer another solution to the problem. When you develop a package, develop two interfaces. One interface should be 'YOUR HUMAN-COMPUTER INTERFACE'. With this interface you can demonstrate the full power of your product and with any luck, sell many copies.

The second interface, a 'CUSTOMER HOOK', should be designed so that I, a not-too-unsophisticated-systems-manager, can build 'OUR HUMAN-COMPUTER INTERFACE' that will satisfy our users because it will follow the scheme with which they are familiar, know and love. 'OUR HUMAN-COMPUTER INTERFACE' will call/command your product to do its functions through the 'CUSTOMER HOOK'. Diagram I shows a very simplified schematic.

I am bringing this suggestion to your attention because I am sure that other sites have the same concern. In fact, even though we would prefer to purchase software, we have decided to build our own so that our users can comfortably use the systems that are available to them.



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CIRCLE D17 ON READER CARD

RSTS/E PERFORMANCE MONITOR

. . . continued from page 14

With all this information about your system's performance and the performance of every program you use, with the powerful capabilities of the report writer and with the documentation that comes with RPM on system tuning techniques, just about anyone can now tune a RSTS system and keep it in tune.

Even with RPM, some people may not feel comfortable tuning RSTS or they may want an expert to do it for them. Northwest Digital Software has the answer for this too.

A special version of RPM can be used to collect data at your site. This data is then analyzed each month by Michael Mayfield or one of Northwest Digital Software's other RSTS experts. An analysis of your system's performance, suggestions for improvements, and analysis of the effect of previous suggestions will be returned to you.

If you have ever wished you could get more out of your system, I am sure you will agree that, one way or another, RPM is just what you need.

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CIRCLE D46 ON READER CARD

PAGE 18 NOVEMBER 1982
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Example 2: Enter a 25 character line address. The line may be skipped.

```
TWO='M25N4532YU'
XCALL FIELD
GOTO(LAB1,LAB2,LAB3,LAB4,LAB5),BR
ADRES3=AFLD(1,25)
```

Here the parameters are set for mixed alpha numeric of up to 25 characters. The field need not be full, starts at line number 45 and column number 32, can be skipped, and the screen is to be formatted with underscores to show the operator when the limit of the field is being approached. The call is made. If the escape keys are used 5 labels are designated. Finally the data is stored in an area called adres3.

Example 3: enter a five digit account number.

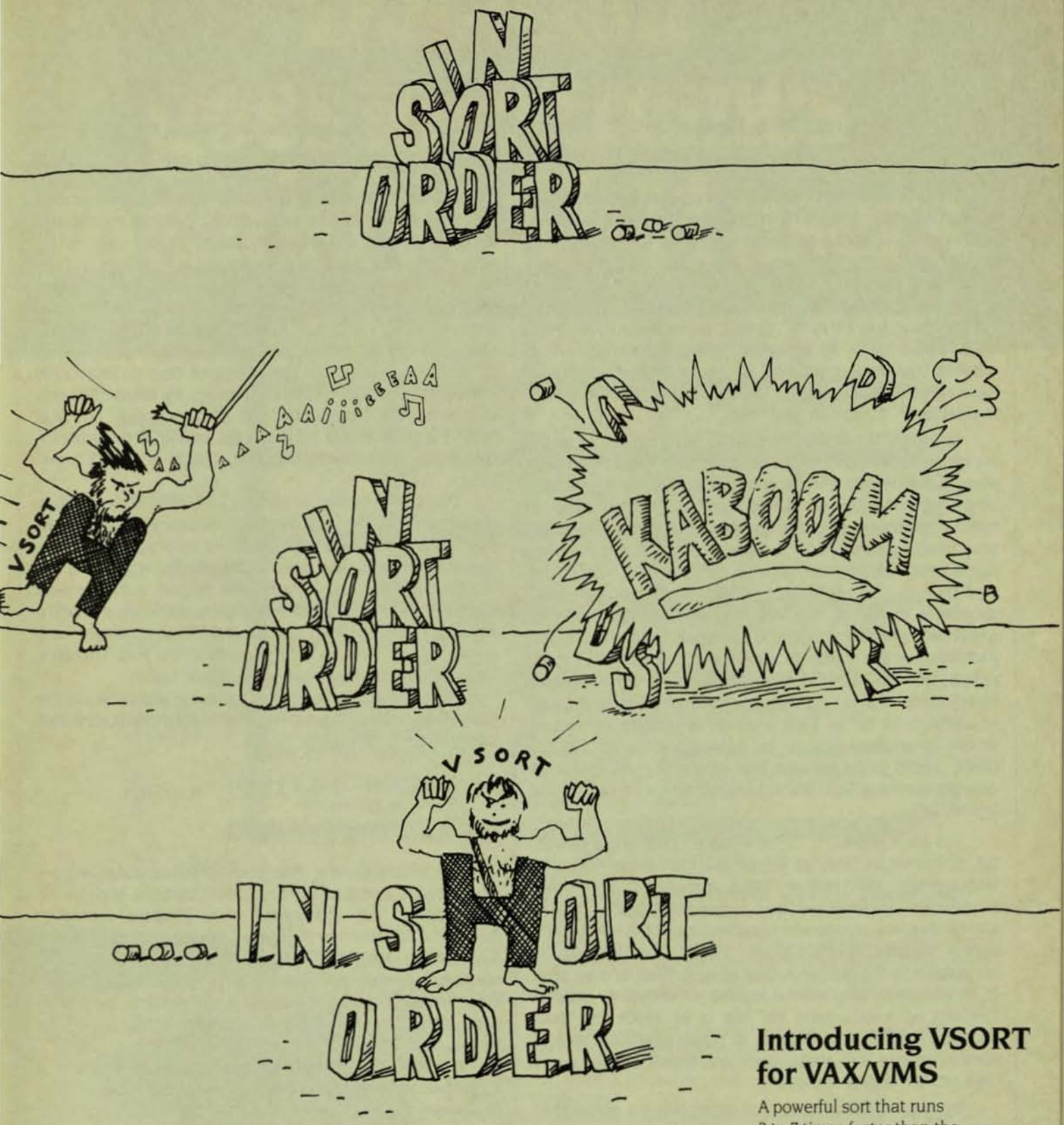
```
EACT,TWO='D05Y3845NU'
        XCALL FIELD
        GOTO(FIN,EACT,EACT,EACT,EACT),BR
        ACCTN=AFLD(1,5)
```

The data to be entered must be a decimal, no less than five characters, and appear on the screen at line 38 column 45. The field may not be skipped, and is underscored for convenience. The data is stored in acctn.

Specific application changes to this routine can readily be made; i.e., for use on 132 character screens, inclusion of the pf4 key, or the formatting of phone numbers.

This method of coding the data entry sections of our programs has made that otherwise tedious task just a matter of (pardon the pun) routine.

```
SUBROUTINE FIELD        ;GENERAL PURPOSE DATA ENTRY, CHECKING, AND FORMATTING
                        ;ROUTINE
START

RECORD
DSZ     ,D2

COMMON MISC2
DLN     ,D2
DCT     ,D2
DCN     ,D2
        ,A9
RCT     ,D3

COMMON TWO
T       ,A1     ;TYPE                   A,D,M
SZ      ,A2     ;SIZE                   1-30
F       ,A1     ;FULL?                  Y,N
LN      ,A2     ;LINE #                 32-54
CN      ,A2     ;COLUMN #               32-99 AND 00-11(FOR 100-111)
SK      ,A1     ;SKIP ALLOWED?          Y,N
FM      ,A1     ;FORMAT TYPE            Y(MONEY),N,D(DATE),U(UNDERSCORE)

COMMON MISC
ACHR    ,A1
DCHR    ,D3
BR      ,D1
DFLD    ,D9
AFLD    ,A30
CT      ,D3
FLAG    ,D1
SUB     ,D2
RSW     ,D2

PROC

AGN,    DSZ=SZ          ;SET PROGRAM COUNTERS AND SWITCHES TO 0
        DLN=LN
        DCN=CN
        FLAG=0
        CT=0
        BR=0
        DFLD=0
        AFLD=
        IF(DCN.LT.32.AND.FM.EQ.'D')DISPLAY(1,155,89,DLN,(DCN+100),'
&,155,89,DLN,(DCN+100))
        IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100),AFLD(1,DSZ),155,89,DLN,(DCN+100))
        IF(DCN.LT.32)GOTO SKIP
        IF(FM.EQ.'D'.AND.DCN.GT.31)DISPLAY(1,155,89,DLN,DCN,AFLD(1,8),155,89,DLN,DCN)
        DISPLAY(1,155,89,DLN,DCN,AFLD(1,DSZ),155,89,DLN,DCN)
SKIP,   IF(FM.EQ.'U')CT=(1-2)
        IF(FM.EQ.'U')CALL UND
AGN2,   ACCEPT(1,ACHR)
        XCALL DECML(ACHR,DCHR)
        IF(DCHR.EQ.008)GOTO AGN2        ;BACKSPACE ILLEGAL (USE DELETE KEY OR LEFT ARROW)
        IF(DCHR.EQ.13) GOTO EF          ;OPERATOR IS ATTEMPTING TO END ENTRY
        IF(DCHR.EQ.27) GOTO ESC         ;GO TEST WHICH ESC KEY USED
        IF(DCHR.EQ.127) GOTO DEL
        IF(DCHR.GT.57.OR.DCHR.LT.48) GOTO ER2   ;IF NOT A NUMBER
        IF(T.EQ.'A') GOTO ER3
G1,     INCR CT
        IF(CT.GT.DSZ) GOTO ER4
        AFLD(CT,CT)=ACHR
        GOTO AGN2
EX,     IF(FLAG.NE.1) GOTO FMT  ;IS IT A NEG # ?
        DFLD=(AFLD(1,CT))       ;FORMAT THE NEGITIVE #
         DFLD=(DFLD-(2*DFLD))
        AFLD(1,13)=DFLD,'Z,ZZZ,ZZZ.XX-'
        IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100),AFLD(1,13))
        IF(DCN.LT.32)RETURN
        DISPLAY(1,155,89,DLN,DCN,AFLD(1,13))
        RETURN
EF,     ACCEPT(1,ACHR)          ;CAPTURE THE LINE FEED
        IF(F.EQ.'Y'.AND.CT.NE.DSZ) GOTO ER5
        IF(SK.EQ.'N'.AND.CT.EQ.0) GOTO ER6
        GOTO EX
FMT,    IF(T.NE.'D')RETURN
        IF(CT.EQ.0) GOTO G2     ;TO PREVENT SUBSCRIPT ERROR ON SKIPPED FIELDS
        DFLD=(AFLD(1,CT))
G2,     IF(FM.EQ.'Y')AFLD(1,13)=DFLD,'Z,ZZZ,ZZZ.XX-'    ;FORMAT THE NUMBER AS MONEY
        IF(FM.EQ.'D')GOTO DATE
        IF(FM.EQ.'U'.OR.FM.EQ.'N')GOTO GG2
        IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100),AFLD(1,13))
        IF(DCN.LT.32)RETURN
        DISPLAY(1,155,89,DLN,DCN,AFLD(1,13))
        RETURN
GG2,    IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100),AFLD(1,DSZ))
        IF(DCN.LT.32)RETURN
        DISPLAY(1,155,89,DLN,DCN,AFLD(1,DSZ))
        RETURN
DATE,   IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100))    ;FORMAT 6 DIGITS ENTERED AS MM/DD/YY
                                                         ;MONTH/DAY/YEAR
        IF(DCN.LT.32)DISPLAY(1,AFLD(1,2),'/',AFLD(3,4),'/',AFLD(5,6))
        IF(DCN.LT.32)RETURN
        DISPLAY(1,155,89,DLN,DCN,AFLD(1,2),'/',AFLD(3,4),'/',AFLD(5,6))
        RETURN
ESC,    ACCEPT(1,ACHR)  ;GET THE CHARACTER FOLLOWING THE ESCAPE KEY
        DISPLAY(1,155,68,' ',155,68)
        XCALL DECML(ACHR,DCHR)
        IF(DCHR.EQ.68) GOTO OVER                ;LEFT ARROW
        IF(CT.NE.0) GOTO ER6                    ;NO OTHER ESC KEY ALLOWED AFTER 1ST CHARACTER
        IF(DCHR.EQ.80) BR=1                     ;BLUE KEY (PF1)
        IF(DCHR.EQ.81) BR=2                     ;RED KEY (PF2)
        IF(DCHR.EQ.65)BR=3                      ;UP ARROW
        IF(DCHR.EQ.66)BR=4                      ;DOWN ARROW
        IF(DCHR.EQ.67)BR=5                      ;RIGHT ARROW
        IF(BR.NE.0) RETURN
        IF(DCHR.EQ.82.AND.T.EQ.'M') GOTO ER6    ;CAN'T FORMAT A MIXED FIELD
        IF(DCHR.EQ.82.AND.T.EQ.'A') GOTO ER6            ;CAN'T FORMAT AN ALPHA FIELD
        IF(DCHR.EQ.82.AND.T.EQ.'D'.AND.FM.NE.'Y')GOTO ER6       ;CAN'T NEGATE
                                                                ;A NON FORMATTED FIELD
        IF(DCHR.EQ.82) FLAG=1   ;SET FLAG TO SHOW # IS TO BE NEGATIVE
        IF(DCHR.EQ.82) GOTO AGN2
        GOTO ER6
OVER,   AFLD=           ;RE-ENTRY OF WHOLE FIELD REQUESTED, RESET EVERYTHING
        CT=0
        IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100),AFLD(1,DSZ),155,89,DLN,(DCN+100))
        IF(DCN.LT.32)GOTO AGN2
        DISPLAY(1,155,89,DLN,DCN,AFLD(1,DSZ),155,89,DLN,DCN)
        IF(FM.EQ.'U')CT=(1-2)
        IF(FM.EQ.'U')CALL UND
        GOTO AGN2
DEL,    IF(CT.EQ.0) GOTO ER6    ;DELETE LAST CHARACTER ENTERED
        DISPLAY(1,155,68,' ',155,68)
        IF(FM.EQ.'U')DISPLAY(1,'_',155,68)
        AFLD(CT,CT)=' '
        CT=(CT-1)
        GOTO AGN2
UND,    CT=(CT+1)       ;UNDERSCORE IF REQUESTED
        IF(CT.EQ.DSZ)GOTO R
        IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100+CT),'_')
        IF(DCN.LT.32)GOTO UND
        DISPLAY(1,155,89,DLN,(DCN+CT),'_')
        GOTO UND
R,      IF(DCN.LT.32)DISPLAY(1,155,89,DLN,(DCN+100))
        IF(DCN.LT.32)CT=0
        IF(DCN.LT.32)RETURN
        DISPLAY(1,155,89,DLN,DCN)
        CT=0
        RETURN
ER2,    IF(T.NE.'D') GOTO G1
        DISPLAY(1,27,89,55,32,'DECIMAL ONLY')
        SLEEP 2
        DISPLAY(1,27,89,55,32,27,75)
        GOTO AGN
ER3,    DISPLAY(1,27,89,55,32,'ALPHA ONLY')
        SLEEP 2
        DISPLAY(1,27,89,55,32,27,75)
        GOTO AGN
ER4,    DISPLAY(1,27,89,55,32,'FIELD FULL')
        SLEEP 2
        DISPLAY(1,27,89,55,32,27,75)
        AFLD=
        IF(DCN.LT.32)GOTO ER84
        IF(FM.EQ.'D')DISPLAY(1,155,89,DLN,DCN,AFLD(1,8))
        IF(FM.EQ.'D')GOTO AGN
        DISPLAY(1,155,89,DLN,DCN,AFLD(1,(DSZ-1)))
        GOTO AGN
ER84,   IF(FM.EQ.'D')DISPLAY(1,155,89,DLN,(DCN+100),'       ')
        IF(FM.EQ.'D')GOTO AGN
        DISPLAY(1,155,89,DLN,(DCN+100),AFLD(1,(DSZ-1)))
        GOTO AGN
ER5,    DISPLAY(1,27,89,55,32,'FIELD NOT FULL')
        SLEEP 2
        DISPLAY(1,27,89,55,32,27,75)
        GOTO AGN
ER6,    DISPLAY(1,27,89,55,32,'ILLEGAL KEY')
        SLEEP 2
        DISPLAY(1,27,89,55,32,27,75)
        GOTO AGN
END
```



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"C" NOTES
A Guide to the "C" Programming Language

By C.T. Zahn, Paperback, 102 p. Yourdon Press, 1979. As Reviewed by John B. Runyon

This book conforms to its title as an excellent reference manual which, in concise form, effectively provides valuable notes to supplement a reference manual or to highlight important points of a tutorial text. It is a book that surely any "C" programmer from beginner to expert would find quite useful. The book is highly recommended to even the person with a casual interest in "C". Since it is less well known than the so called "bible" by Kernighan/Richie, I choose to review it before that book or the VAX "C" books, both of which will have reviews subsequently. Since all 3 are recommended, the world of "C" can be yours too.

The work is not even claimed to be of tutorial or training value. The reader is referred to another text for that purpose. Nevertheless, the experienced programmer in other languages may find this book more useful than either a tutorial or reference manual for reasons of conversion of his programming ability into "C", else a comparison of his own native programming language to "C". Since "C" serves the dual purpose of both an assembly (Macro) language substitute, as well as high level language replacement as its combined benefit and liability, this book and the language itself have wider appeal as a new language, the chief competitor to PASCAL more than ALGOL. For the VAX user searching for a new language, the book may also be uniquely useful in so far as VAX abounds in modern as well as unique languages such as in part: PASCAL, "C", PL/1, DIBOL, BLISS (is no joy even though it's the DEC standard development language) and apparently no one complains for lack of APL.

The book shows "C" to be a much richer, more powerful, primitive as well as higher level (in some respects) language than FORTRAN or COBOL. It shows "C" to be more suitable for universal use than either FORTRAN or COBOL but much more cryptic and less readable if the normal "C" style is followed. It would appear that "C", like APL, can be unreadable to the orginal author of a program and because of its allowance of primitive assembly-like coding, compile checking as a debugging aid has to be much less than PASCAL, FORTRAN or COBOL. "C" programs insist that it doesn't matter, but most managers realize how much it does matter in productivity.

By way of the program examples readers notice that there is a sort of undocumented standardization in the nmemonic contraction of functions and variable names that is less mathematical, typical of FORTRAN, somewhat more cryptic than typical of PASCAL, but well accepted in the "C" community. "C" seems like a relatively limited language in terms of verbs based on counting them (but that is misleading) but rich in operators (although certainly not as many as APL) and library functions. These library functions, including all I/O, are the "heritage" "C" programmers pirate as software tools and which are distributed in huge variety with many UNIX systems in source and object code, the tool kit or surgeon's operating instruments. The programs therefore are not superficially readable by laymen the way ones in DIBOL, PASCAL, FORTRAN or COBOL are. Unskilled managers can be bamboozled very much more easily with "C" and APL because of the less direct obvious relation to the objective. Obviously, such programs, by being more concise, take less typing time and storage space, but that benefit is by no means to negate the benefit of the other extreme; i.e., the self documenting aspects of COBOL's verbosity.

The book makes a routine use of Polish notation throughout so that explanations themselves can be accurately and concisely written almost as programs, just as Kernighan/Ritchie had done in their book, which this one salutes in obvious admiration. Each chapter ends in a summary in Polish notation, which taken together seem like the documentation of a language standard.Their reference value is considerable but only after you master the Polish notation for which these summaries may also be useful.

There are 7 chapters plus a Summary and Index: 0. The book opens with a Chapter 0 (since C subscripts start with 0 rather than 1) on syntax, thus:

> "What do you read, my Lord?
> Words, words, words."
> —Shakespeare, Hamlet

The chapter is a general description of the language. We are introduced to some of the unique "C" features such as the identification and codification of whitespace characters (nonprintable control or escape sequences), tokens, and variables called identifiers instead of tags or labels. Nothing seems to vary so much between languages as what the variables are called. Why at least, is it not possible for a standard name for something so common as a variable be agreed upon?

It is made evident that upper case only terminals are at a disadvantage for "C". Also, identifiers can have up to 8 characters rather than the 6 of other languages (VAX "C" accepts even more) and also, unlike some languages, some punctuation can be used in them.

In addition to data types, there are storage classes. There is an excellent description of 8 uses of integers where other texts have assumed it is so obvious as not to be worthy of explanation. The explanation is perfected by then discussing short and unsigned integers.

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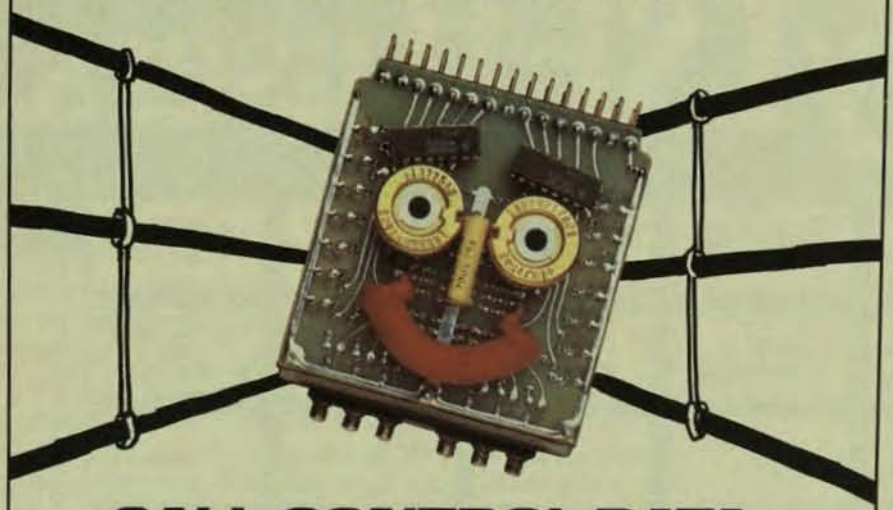

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The language handles literal decimals and octals as might be expected but also hexadecimal value in addition to direct representations of escape sequences so useful for terminal programming in all DEC's LA printing and VT video terminals.

One of the very highlights of "C" is the use of pointers. What the book says so eloquently will show the author's magnificent style, is educational, and could be applied in varying degrees to other languages.

"It is permissible to have pointers to any type of object in "C", including to other pointers, recursively ad nauseum. They arise naturally in many aspects of programming, but are most particularly useful in contexts in which the object itself should not or cannot be conveyed directly. It is much easier, for instance, to deliver to some function a copy of a pointer than to copy an entire array or data structure. And, it is not possible to represent some list structure unless pointers can be used to stand for sublists: Consider a circular list, for instance, in which each element is in its own sublist.

"It is also possible to abuse pointers, since they introduce a level of indirection that obscures readability, and since they provide a degree of programming freedom that is almost impossible to check thoroughly at compile-time or efficiently at run-time. "C" allows considerable latitude in the use of pointers, at the expense of even some checking that is easy to perform. Consequently, they should be used with particular care."

There is less of the typical "C" slang such as "guaranteed" and "promised" that you see so prevalent in other books as a normal way of writing.

"C" has structures and unions, described in this chapter, which will not be familiar to programmers in other languages, but the functions, in concept will seem familiar to FORTRAN and BASIC programmers. Like PASCAL, "C" is written in indented sections but they are delineated with different symbols.

"C" Notes reminds us that "C" can have recursive calls but (like in any language) "the programmer must carefully avoid infinite recursion."

1. The next chapter on External Declarations opens as cleverly from an author with great insight:

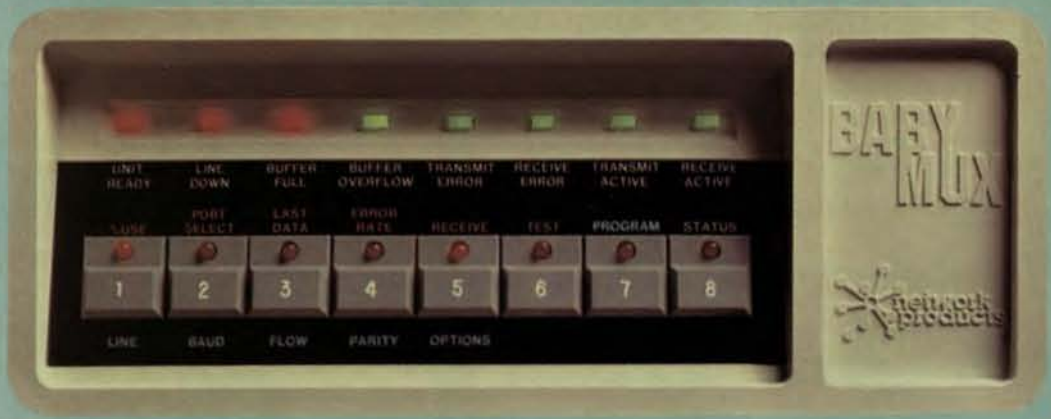
> "When I use a word," Humpty Dumpty said, in rather a scornful tone, "it means just what I mean it to mean — neither more nor less."
>
> — Lewis Carroll, Through the Looking-glass

COBOL programmers would say, oh, that's Data Division stuff of claiming a variable name, storage allocation, initialization, etc.

2. The following chapter is on Initializers but we start to get exposure to the If, While, Do, Break, Return, Continue, and Switch statements.

3. Expressions, again introduced by a Lewis Carroll quotation, get into assignments as well as computation with double operators, another peculiar looking aspect of a "C" program. Bitwise operators are introduced and the left and right shift common to assembly but not high level languages. Logical expressions are covered and pointer expressions are more interesting, to which the author comments, "If an integer is assigned to a pointer variable, however, no scaling is performed. This is a hole left intentionally in the language type-checking to facilitate systems programming . . . One of the more important uses of pointers in "C" is to efficiently walk through an array using the pointer augmentation assignments. The following will search an array . . ."

INFORMATION TRANSPORTATION



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Structure and union expressions follow, a superb Polish notation of 20 expression types.

4. Local Declarations starts with a clever quotation about finding things in stacks but has no surprises.

5. Parameters starts with the Basic Programmer lament of COBOL:

> "Merely corroborative detail, intended to give artistic verisimiltude to an otherwise bald and unconvincing narrative." — W.S. Gilbert, Mikado

"It is a common convention to use uppercase letters to name parameters and all lowercase letters to name variables," which highlights the use of a lowercase terminal for "C".

6. Program Library starts acknowledging the lack of "C" I/O statements, examples of the use of library functions. The chapter is extraordinarily weak due to the lack of any mention of stream files which are unique to "C", or much of anything about the rich collection of library functions that characterize "C".

7. The Machine Dependencies Chapter speaks of UNIX and RSX-11M on the PDP-11, the 11/40 and LSI-11, value ranges in a limited way. More could have been said.

8. Summary is less than exciting.

9. Index is better than is usually seen because of indentation, bolding, cross referencing, and classification of information under important subjects.

I enjoyed this book; I think most other people will also find that it makes "C" much more appealing and comprehensible than other books.

APPLICATION TUNING

By PETER BRYCE

About the Author:

Peter Bryce is the founder of System Support Team Incorporated, a company specializing in the tuning of both operating and application systems. He has fourteen years experience in the Data Processing industry, the last five of which have been devoted to RSTS/E and recently VAX/VMS.

Recent publications of the RSTS Professional have shown the depth of interest in system tuning and the development of programming standards; however, there is another area in which the most significant gains in system performance can be obtained without rewriting applications or becoming a RSTS internals expert applications tuning.

Fellow professionals, you are about to enter the most fascinating sphere of Data Processing . . . the world of Application Tuning. (gasp, faint!) The following scenarios are provided to demonstrate how Application Tuning can improve the effective utilization of system resources.

Scenario #1

You've just attended a course on standards, and return to the job refreshed and excited, but . . . six months after all programs are established with a standard line-number mask and a set of common private library routines, you begin to experience maximum memory and response time problems. If your mask looks like this:

```
10  !  PROGRAM DESCRIPTION ETC.
20  !  REVISION HISTORY
30  !  FILES USED
```

or something similar, this could be the cause of the problems. If all library routines also have this same mask, you are losing 13 bytes for each unnecessary line number in each library module and in the calling program. These newfangled things called 'text editors' eliminate the need for separate line numbers; besides, why waste a sometimes precious 13 bytes on a comment line anywhere in a program? At a user site, up to 1K has been saved by spending twenty minutes in a text editor on each library module.

The second half of this scenario is the wonderful set of library routines that you've set up; i.e., any code that is duplicated in three or more programs has been made a library module. Standard routines for screen painting, file I/O and error handling are in use.

For Example:

Library routine	OPEN	Opens data files, if error calls SCREEN to close screens, calls ERROR to display and log error then calls LOGOUT to clear itself off system.
	SCREEN	Displays a screen format file after opening the KB. If a fatal error occurs, closes the screen, CALL ERROR then CALL LOGOUT.

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ERROR Logs errors to the system console, and to a disk file. If the disk file does not exist it logs the error on the console and calls LOGOUT.

LOGOUT Closes data files correctly, chains to $LOGOUT. If $LOGOUT does not exist, calls ERROR.

I think you are beginning to see the pattern of recursive library calls emerging. Before you dismiss this simplified example, check the modules in your own library; you'd be surprised how many call each other.

You might say "But the task builder will only link one copy of each module in." Well that's true . . . in an actual case three library modules were explicitly called, totalling some 1.5K. These resulted in six modules consisting of 3K being linked in. BUT!!! another 7K was required to keep track of all the references, and to allow for passing parameters.

Specify MAP on your task builder and count the number of references to each library module, then add up the memory required for those references. The new Task Builder Reference Manual is much easier to understand these days and is even quite explanatory on memory maps.

Library routines are a very good idea, but like many other good ideas, it is possible to go overboard and get into an even worse problem than you had without them.

Scenario #2

You have only one CPU—development and production work must be done on the same machine.

The application is a complex, menu-driven beastie with a good standard set of library routines so you develop a library routine called CHAIN which looks for the next program on the current account before going to the production account with a logical.

Sound familiar? Here's where the problem occurs!

If the user has more than 60-100 files in his current account, disk accesses for directory lookup will occur between every single program chain.

On an actual site with 16 terminals running production on the same account containing some 362 work files and other junk left by programs failing to delete temporary files, directory accesses reached the astonishing peak of 190 per second! (Incidentally, until RSTS/E V7.1, the user was unable to get sufficient buffers to use STATUS, therefore the problem would have been put down to "swapping," "needs more memory," etc)

One possible solution is to establish two sets of logicals; one assigned to device and account for production task modules, the other assigned to device only for testing. In your CHAIN library routine, check the RSTS account number before chaining to the appropriate logical.

Scenario #3

Your application seems to run slowly when dealing with branch codes. Let's say there are 3 branches,

01 Head Office
15 New York
33 Boston

The design calls for a two digit branch code to allow for future growth and the numbers are assigned by a clerk somewhere in the boardroom.

The following example uses an RMS Indexed file of Parts, Keyed by Branch and Part Number:

```
! ROUTINE TO FIND ALL BRANCHES WITH A GIVEN PART
FOR I% = 1% TO 99%
FIND #1%, KEY EQ NUM1$(I%) + PART.NUM$
PRINT 'PART ';PART.NUM$;'IN STOCK AT BRANCH ';I%
NEXT I%
PRINT 'ALL BRANCHES SCANNED'
```

The point being that to check three branches, it was necessary to look 99 times, which caused RMS to perform some 200-300 disk accesses to reach the data level of the file and establish that there was no such record. (If core resident libraries were not used, or the file was in need of a reorganization, the situation could be much worse.)

At a user site, response time for Stock Inquiry was reduced from 3-5 minutes to 10 seconds as a result of using a small constants file to retain current valid branch codes, and modifying the programs to load that file into an array before doing the loop.

Naturally, other users on the system benefited from the reduced disk activity as well.

Scenario #4

The system seems to require more disk space on an exponential growth curve.

This is such a common problem that I'll just list some good things to do on a daily or weekly basis:

1) Every time a full backup is run, check every single account to find out: a) who it belongs to, and b) what each file is used for.

2) Programmers are notoriously bad at performing housecleaning. Explain to them what FIP directory overhead does to their response time when accounts become too full.

3) Call your user departments weekly to ensure that reports are deleted after printing.

4) Keep a record of work files that are not deleted at normal EOJ and get the programs fixed.

5) Don't keep the system files and patches on disk—you rarely need them and can read off tape just as easily.

6) Clean up after sys gen's—perform them in an empty account and see the files that are created both there and in [1,2] that you don't need.

7) Do you really know what each account is used for?

8) Persuade people that tape backups can be used to restore files and that after a backup there is no need to retain graveyard files on disk.

On a user site, over a two month period, disk usage was reduced to a point where 2 RM05 drives (average 25% free space) were needed as against 3 which had reached 90% of capacity.

Think of your computer as a car; look after it and it will run reliably, miss an oil change or tune-up and it becomes slow, unreliable and expensive to operate. ■

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RSTS/E INTERNALS MANUAL

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

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

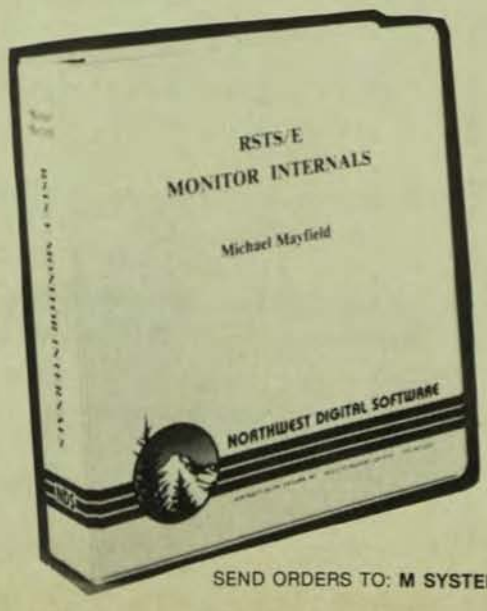
Information is available for all levels of users:

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

CONTENTS:

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

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



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

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

Appendix A provides six quick reference foldout charts:

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

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

Appendix C provides an example device driver.

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

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UNDERSTANDING STREAMING TAPE DRIVES

By Wef Fleischman
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It seems that everyone is offering a new streaming tape drive or controller these days. And yet, all that most people know about streaming drives is that they offer a low-cost alternative to conventional tape transports. But what does "streaming" actually mean and how do these new transports differ from conventional drives?

'How Streaming Transports Work'

In order to understand the streaming tape drive we must first know how traditional tape transports work. Conventional tape drives write or read every data record as a separate operation. The I/O operation begins with the tape stopped in a "dead zone" between records. This zone is known as the "inter-record gap." It contains no data, but serves instead to separate physical I/O records on the tape.

When a read or write request is issued, the tape very quickly accelerates to full speed, performs the data transfer, then suddenly stops (leaving another inter-record gap). When the next request is issued, the tape once again accelerates, performs the I/O, and stops. Hence the name "start/stop" drive.

Although improvements in the technology of these transports are being made constantly, the fundamental design of start/stop transports has not been changed in years. With the price of microprocessors in a tail-spin and the advent of the Winchester disk drive, high-density, low-cost mass storage computer systems have become a reality. This market pressure has forced tape manufacturers to invent the tape analogue of the Winchester disk.

As a result of this research, engineers determined that about 80% of the electromechanical components in a standard tape drive were dedicated to accelerating and decelerating the tape at rates fast enough to make data transfer practical.

It was this capability of positioning the tape almost instantaneously which resulted in the cost, size and reliability limitations of conventional transports.

Streaming tape drives circumvent these problems by eliminating the fast acceleration/deceleration of the tape. Streaming gets its name from the fact that the tape moves in a continuous, non-stop fashion, recording or retrieving data at a constant rate. Thus, streaming tape drives do not require vacuum columns, high-torque motors, or expensive capstan mechanisms.

When an I/O request is issued to a streaming drive, the drive slowly accelerates to transfer speed, then performs the read or write operation "on-the-fly" as the desired portion of tape moves past the heads. This acceleration can take as long as 3 seconds, during which time several feet of tape go by. When the next I/O transfer is requested, the streaming drive does not stop. Instead, it just continues reading or writing.

This means that the host system must be capable of continuously supplying data to (or accepting data from) the drive. If the data demands are not met, the drive must "reposition." Repositioning consists of stopping the tape, backing-up to the start of the previous tape record, and then backing-up several more feet so that the drive will have time to get up to speed by the time the desired tape position arrives. Repositioning is very time consuming. In fact, a 100 ips streaming drive will only achieve an effective tape speed of 3 ips when used in start/stop mode (See chart).

'The Bad News'

When streaming tape technology arrived in the minicomputer industry, many advantages were predicted for the small system user. Compared to start/stop transports, the streamers offered high performance at ridiculously low cost. Why then have the streamers failed to achieve widespread acceptance?

The major reason is that current hardware/software systems do not support transports in streaming mode. On-line capabilities have been limited to start/stop transport emulation, where performance is poor because of extensive tape repositioning. Repositioning is caused by standard software which has not been designed to satisfy the stringent data throughput requirements of data streaming. This means that the streaming tape user can actually use only 3 to 5 percent of his drive's performance.

'Software Solutions'

Some manufacturers have written stand alone software which is capable of dumping a disk (in image mode) to the tape at a rate fast enough to keep the tape streaming. There are several disadvantages to this approach:

1. Since the disk is transferred in dump mode, bad block handling is difficult. Usually this means that you must use error-free disks (which are expensive and may not stay error-free).
2. This type of transfer is not file-oriented. In order to recover a single file, the entire tape must be read onto disk. On single-disk systems, this is impractical. On multi-disk systems, it is a major inconvenience.
3. This type of interface does not provide compatibility with the other computer systems. The utility can not read distribution tapes or tapes written by other types of backup utilities. Aside from disk backup, compatibility is the major reason why people buy tape drives in the first place.
4. This type of utility only runs stand-alone (you have to shut down your system to use your tape drive). On single-user systems, this may be tolerable, but this approach is impractical for larger multi-user environments.

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D289	D290	D291	D292	D293	D294	D295	D296	D297	D298	D299	D300	D301	D302	D303	D304	D305	D306
D307	D308	D309	D310	D311	D312	D313	D314	D315	D316	D317	D318	D319	D320	D321	D322	D323	D324
D325	D326	D327	D328	D329	D330	D331	D332	D333	D334	D335	D336	D337	D338	D339	D340	D341	D342

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then suddenly stops (leaving another inter-record gap). When the next request is issued, the tape once again accelerates, performs the I/O, and stops. Hence the name "start/stop" drive.

Although improvements in the technology of these transports are being made constantly, the fundamental design of start/stop transports has not been changed in years. With the price of microprocessors in a tail-spin and the advent of the Winchester disk drive, high-density, low-cost mass storage computer systems have become a reality. This market pressure has forced tape manufacturers to invent the tape analogue of the Winchester disk.

As a result of this research, engineers determined that about 80% of the electromechanical components in a standard tape drive were dedicated to accelerating and decelerating the tape at rates fast enough to make data transfer practical.

It was this capability of positioning the tape almost instantaneously which resulted in the cost, size and reliability limitations of conventional transports.

Streaming tape drives circumvent these problems by eliminating the fast acceleration/deceleration of the tape. Streaming gets its name from the fact that the tape moves in a continuous, non-stop fashion, recording or retrieving data at a constant rate. Thus, streaming tape drives do not require vacuum columns, high-torque motors, or expensive capstan mechanisms.

When an I/O request is issued to a streaming drive, the drive slowly accelerates to transfer speed, then performs the read or write operation "on-the-fly" as the desired portion of tape moves past the heads. This acceleration can take as long as 3 seconds, during which time several feet of tape go by. When the next I/O transfer is requested, the streaming drive does not stop. Instead, it just continues reading or writing.

achieve widespread acceptance?

The major reason is that current hardware/software systems do not support transports in streaming mode. On-line capabilities have been limited to start/stop transport emulation, where performance is poor because of extensive tape repositioning. Repositioning is caused by standard software which has not been designed to satisfy the stringent data throughput requirements of data streaming. This means that the streaming tape user can actually use only 3 to 5 percent of his drive's performance.

'Software Solutions'

Some manufacturers have written stand alone software which is capable of dumping a disk (in image mode) to the tape at a rate fast enough to keep the tape streaming. There are several disadvantages to this approach:

1. Since the disk is transferred in dump mode, bad block handling is difficult. Usually this means that you must use error-free disks (which are expensive and may not stay error-free).
2. This type of transfer is not file-oriented. In order to recover a single file, the entire tape must be read onto disk. On single-disk systems, this is impractical. On multi-disk systems, it is a major inconvenience.
3. This type of interface does not provide compatibility with the other computer systems. The utility can not read distribution tapes or tapes written by other types of backup utilities. Aside from disk backup, compatibility is the major reason why people buy tape drives in the first place.
4. This type of utility only runs stand-alone (you have to shut down your system to use your tape drive). On single-user systems, this may be tolerable, but this approach is impractical for larger multi-user environments.

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'Hardware Solutions'

Using a microprocessor-based controller, data can be buffered in the controller transparently to the system software. When the system transfers data to the controller, the controller immediately notifies the system that the I/O transfer was succesful. In reality, the data is buffered until the controller determines that it can keep the tape drive streaming.

If an error does occur during a transfer (due to a bad spot on the tape, for example) the controller can perform a re-try independent of the system software. The controller may also write an extended gap, or "skip" over the bad spot before re-trying the write. However, these errors can not be reported to the system software because the system may have transmitted several thousand bytes in the meantime and will not be able to recover. Instead, since all write operations must be terminated with at least one "write-file-mark" operation, error reporting is delayed until this operation is requested. Then, if the error was non-recoverable, the entire file is scratched.

There are several problems with this approach:

1. The controller must contain sufficient dedicated memory to store enough data to keep the tape streaming. This can be an expensive proposition.
2. The controller must intercept errors and report them to the system software in such a way that the buffers do not overflow. This can cause problems when the end of the tape is reached.

When the physical end-of-tape marker is reached, the system software must be notified. Then, the appropriate end-of-tape and volume identifier labels must be written. Unfortunately, the system software "thinks" that all of the data transferred to the controller was actually written. In fact, a portion may still be buffered in the controller's memory. This can cause the system software to believe that all of the data can fit on the tape when, in reality, a second volume is required. This causes further problems with backup utilities which typically maintain a directory of which tape volume contains which disk data.

'Possible Future Directions'

While there is no immediate solution to the problems associated with streaming tape drives, there are ways to approach the problem:

First, tape transports can be created which run at variable speeds. Some transports currently available can select a "high" and a "low" speed. If this concept could be expanded to include a wide range of speeds, the system software or the transport controller could dynamically select a speed which offers a good balance between throughput vs. repositioning based on current overall system conditions.

Secondly, system software can be written to handle streaming drives more effectively. The long-term solution is to use a more generalized approach to peripheral data transfer (similar to DEC's mass storage protocol). The short-term solution may be system software which "knows" about the operating modes of streaming transports and provides internal buffering and fast I/O turn-around. Streaming tape drives for several popular operating systems are currently under development at our company.

Another possibility is that streaming tape technology may disappear before it gets a solid foothold in the marketplace. Emerging removable Winchester cartridges provide low-cost, high performance secondary storage. Also, ¼ inch tape cartridges are rapidly gaining acceptance as backup media. While they both offer sufficient capacity, they unfortunately use recording formats which are far from standardized. This incompatibility between systems is a significant disadvantage.

'Conclusion'

We have seen that streaming hardware is a sound and viable technology. General acceptance however will require that hardware and software be coordinated. The streaming tape drive was not designed with the software issues in mind, and therefore has suffered from low effective performance and poor system software interface. The future of the technology is in doubt unless someone is willing to address the hardware and software problems jointly.

The eventual contribution of the streaming technology will be ultimately determined by the manufacturer's commitment to the end user. The real issue is whether competing technology will make streaming products obsolete before they ever become successful. In this world of rapidly developing alternative technologies, time is running out.

'About the Author'

Wef Fleischman is a Systems Analyst at Software Techniques where he is responsible for the development of advanced software systems. His current responsibilities include the development of technology for streaming tape systems.

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INTERFACING NON-DEC PERIPHERALS TO RSX-11M SYSTEMS: Part II: USING THE RSX TERMINAL DRIVER

By James A. McGlinchey, RA Enterprises, Post Office Box 1595, North Wales, PA 19454

"It's got an RS-232 port, so we can make it look like a terminal to RSX!"

These words, innocently spoken, often lead an RSX user down a dead-ended road. The RSX terminal driver is the object of our discussion this month, in particular the use of this facility to drive strange and wondrous things like PROM blowers, inter-processor links, and even motors and industrial robots!

The above quotation seems to be a recognition of a solution matching a problem. After all, the RSX terminal driver can handle a multitude of asynchronous lines and multiplexing devices, and it does have many features that can be used to handle RS-232 devices.

All RS-232's are not created equal

The killer here is the assumption that a device behaves like a terminal just because it burps RS-232. RS-232 defines how a single character will be transmitted across a pair of wires. It does not in any way dictate how those characters are to be assembled into messages, command lines, and other arrangements of characters which have meaning to human beings. Conforming to the RS-232 standard will ensure that the character transmitted will be the character received, and that's all.

What's a Terminal?

Terminals do a lot more with characters than you might expect. Lets look at what RSX expects in the way of terminal behavior:

1. The input arrives asynchronously at a low net data rate (don't confuse 'net data rate' with baud rate—more on this later). RSX expects the device at the end of the wires to be a terminal being pecked at by a human being.

2. The data arrives as single characters, each a member of the ASCII character set, which are assembled into finite-length messages, terminated by reception of a valid line terminator.

3. All characters are echoed by the terminal driver, except for certain control characters.

4. Output to the terminal is being printed or otherwise displayed for a human who is reading it. Output can be suspended or deleted, either in response to an operator request (control-O, for instance), or by the terminal driver as a result of some message-oriented condition (auto XOFF/XON, for instance).

5. Input can be solicited or unsolicited. Solicited input is dispatched to a requesting task; unsolicited input is dispatched to MCR (usually).

So a terminal is a surprisingly complicated device, more complicated than many of those other devices we want to drive via the terminal driver. This disparity often results in the RSX user turning off many terminal driver features in order to manipulate a foreign device.

Assuming that you haven't yet been discouraged and still want to use the terminal driver to drive your Whizbang Model 30, you're going to do a few more things than just plug it in.

'Just plugging it in' can be a problem in itself. You'll probably need a thing called a 'Null Modem', since Digital still thinks all asynchronous lines go out to modems. You can buy one of these beasts from DEC at an exorbitant cost, or you can just make one with a pair of connectors, some wire, and a soldering iron. The wiring diagram is in the peripherals handbook. DEC calls it an 'H312'.

You'll want to slave the terminal line (SET /SLAVE=TTn:) in order to prevent input data from being dispatched to MCR, and set its baud rate to the correct speed. Terminal option settings can be done either through the MCR SET command or through options available in the terminal driver at run time. I prefer the latter, just to keep all the terminal port adjustments in one place. You'll want to use one or more of the available options in the terminal driver. The following are likely candidates:

Read-Pass-All	(TF.RPA)
Read-No-Echo	(TF.RNE)
Write All	(TF.WAL)
Binary Prompt	(TF.BIN)

These and many more options are described in the Full Duplex Terminal Driver chapter of the RSX-11M/M-PLUS I/O Drivers Reference Manual.

Problem Areas

Problems usually occur with data being input from a non-terminal device. When problems occur, they manifest themselves as lost characters, system crashes, pool depletion, data overruns, framing errors, and locked-up terminal lines. None of these is good for your system; all are difficult to diagnose and repair. Most will be asynchronous in nature and not always reproducible, as they are timing-oriented problems which depend on external uncontrollable factors to bring them into existence.

If the data arrives at just the right time, all goes right—but sometimes it doesn't, and the difference in circumstances may not be obvious.

Still determined to use the terminal driver for your Whizbang Model 30? Here's a list of potential sources of such problems. Trudge on.

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1. High Net Data Rate

The 'Net Data Rate' is the number of characters per second being input from the terminal, averaged over a significant period of time such as 10 minutes. It is not dependent on the baud rate of the line, except as a physical limit. For instance, a typist averaging 30 characters per second will generate a net data rate of 300 baud, regardless of the actual line speed. An RSX system has a maximum practical net data rate. This figure must be determined heuristically for your system, but a good rule of thumb for 11/34-type systems is that RSX can sustain a maximum net data rate of 4800 baud, considering all input data lines. Exceed this threshold, and you're bound to have problems.

2. Binary Data

The terminal driver subfunctions which enable reading and writing of all eight bits in a character enable the handling of binary data transfers, if you're doing the data transfers entirely solicited. If, however, you've found the IO.ATA function which enables a task to attach the terminal for unsolicited input with AST notification upon arrival, be aware that this apparently handy facility can not be used for handling binary data, as it will not pass any character which is equivalent to a Control-O, Control-S, Control-Q, or Control-X ! The IO.ATA function is fine for character-oriented high-speed input, but is disastrous for handling binary data input. Bytes will go away, and you'll never know about it.

3. Message Streams

If a strobe message to your remote device results in a long stream of data being input, some difficulties are bound to arise. If, for example, a command is sent to a remote microprocessor system resulting in an upline dump of eigh one-K segments, a read must be posted for each segmen before it arrives. If the microprocessor just goes ahead an blasts all eight K up one after another, you'll have very littl time between the arrival of each segment to post a read fo the next segment, and chances are you'll miss a section of message now and then. When and how much you'll miss wil depend on the priority of the requesting task and how many other tasks are competing with it for the CPU. The termina driver goes out of its way to prevent you from posting more than one QIO, so it's not practical to queue up eight one-k reads. If you can tolerate it, post a read for all the data into one huge buffer. Otherwise, you're faced with either losing data or somehow throttling down the net data rate of the originating source. Sorry.

4. Protocol Dependence

The RSX terminal driver can be used to implement a Poor Man's Data Communications Protocol. The Read-after-Prompt facility gives an indivisible strobe-then-read function which can be used quite well for this purpose. Some protocol dependence can be handled through this mechanism, but there are gotchas here, too. Suppose you post a read-after-prompt to receive an amount of data which is of unpredictable length, the length being determined by an end-of-message character being received. You spy the 'Read with Special Terminator Table' driver function as a way of having RSX recognize your EOM character. GOTCHA!! You can't use TF.RTT with the Read-after-Prompt! There aren't any arguments left for the terminator table address in the QIO parameter list. So you fall back to doing a write of the prompt followed by the read-with-terminator-table, but now you have a timing window between the write finishing and the read being posted. So you lose data. Gotcha again. And the mind boggles at what you'd do to your pool if you posted a read for each single character that is to be read. Don't even think about doing it.

Several terminal driver features can do you dirt as well, such as the limited typeahead, the checkpointability of a task with terminal input pending, and the one-second granularity of timeouts. All of these are useful features for doing I/O to a real honest-to-god terminal, but cause difficulties for interfacing to foreign devices.

What to do about it

You might think that, with all of the potential problems, I would counsel you not to use the terminal driver. Wrong. Go ahead and try it. I hope I've presented criteria so you can judge which types of problems are amenable to such a solution, and which are not.

Some other hints which may help you prevent, or at least get out of, difficulty:

1. Debug any task using the Null Device first, so that you kill the bugs in your task that are not associated with terminal I/O.

2. Before you hang your real device on the end of that terminal line, use a Downright Stupid terminal as a target device, and simulate the operation of the real device by hand as far as you can. You'd be surprised how many problems are solvable once they become visible on a CRT screen.

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3. Speaking of CRT screens, if all else fails, hang a communications line analyzer on the line and see what actually flies down the wire.

4. Then again, it may be hardware.

And what if I can't use the terminal driver?

In my experience, there's about a fifty-fifty chance that you won't be able to use the terminal driver to solve your problem. Don't be dismayed—RSX never promised to drive anything but terminals through its terminal driver, remember? So don't waste a lot of time trying to bludgeon the terminal driver into submission. There's another solution: buy, steal, write, or otherwise acquire an RSX device driver which will treat your foreign device with the respect it deserves. It just so happens that one is available from the DECUS library which will do interprocessor links in a very flexible fashion. Some other special drivers are available commercially as well as through the library. Remember that to install a device driver for your device you must first wrest it away from RSX. This means a SYSGEN, and you must give up the entire controller, not just one port. So if you're using one port of your DZ11 for that foreign device, you're best advised to get a DL11 to drive it, and leave the DZ for terminals only.

Conclusions

My parting advice is to first look at the terminal driver as a potential mechanism for solving your interfacing problem. If you can use it, you're ahead of the game. I hope that by now you have a good feel for what kinds of problems you can and can not solve by this RSX facility.

A TYPESETTING SERVICE FOR PERSONAL COMPUTER USERS

By Norman Bringsjord, Intergraphics, Inc., Alexandria, VA

Commercial printers and typesetting companies provide their publishing customers with a variety of typesetting services. There are those who will accept magnetic tape, telecommunications, various types of OCR input as well as the traditional marked up typed copy. These service companies have more or less kept pace with technology and provided the large publishers with the kind of typesetting services that they need.

Today, however, there is a new breed of publishers who are using the latest in personal computing and word processing technology. The needs of this new group of typesetting users are not compatible with the kind of services offered by the average commercial typographer. Most commercial printers and typographers are oriented to a relatively small base of customers who use a high volume of services on a regular basis. The "Personal Publisher" as we will call him/her requires the service less frequently on an irregular basis and sometimes very small amounts at a time. Intergraphics has developed a special service for the Personal Publisher called, appropriately enough, Personal Publishing.

The service was designed around certain objectives that the personal publisher would be looking for in a typesetting service. They are: 1. Low cost and low minimum charge with credit card billing. 2. Complete control over the final output. 3. High quality output and variety of type styles and sizes.

For the personal publisher, the minimum charge for typesetting should be about $5.00 so that last minute corrections, small pieces of type, headlines, etc. could be obtained without having to pay the usual $15 to $50 minimum charge levied by commercial shops. For the typesetting output, $2.00 per thousand characters was found to be acceptable for the personal computer user. This amounts to anywhere from 50% to 90% less than that charged by commercial typographers. While $2.00 per thousand characters is 100% more than it costs to output copy on a Diablo or similar printer, most personal publishers felt that the typeset output was "worth" the cost. This difference in "worth" of typesetting is mostly due to the smaller number of printed copies produced by the personal publisher over which to spread the cost of producing the typeset original. A certain amount of the cost of the typesetting can be justified by the ability of typesetting to reduce the amount of pages required to print a document. There is also the intangible improvement in appearance that has some value.

To achieve the cost reductions it was necessary to automate the transfer of information from the customer to the production facility, as well as all production and billing functions. Most personal computers are equipped with asynchronous communications hardware and some kind of terminal emulator software with provision for sending data from a disk file. A timesharing-like system was built for receiving text files from the personal publisher using Intel single board computers and Shugart Winchester disk drives. To give the user complete control over the output, a comprehensive command language was developed as well as an instructional handbook written for the user who is unfamiliar with typesetting.

To provide further cost reductions and convenience for the personal publisher, a software package was developed to run on CP/M 80 systems that performs the hyphenation and justification functions that the commercial typographer normally does on his "front-end" system located in his shop. This software allows the user to see where the lines will break when typeset, check hyphenations, fit copy into a particular space, etc. Without this software, the user must guess as to how many lines the copy will run and whether the hyphenations will be correct since no computer algorithm can be 100% accurate. This software will run on most popular personal computers making additional hardware unnecessary.

The code set used in the Personal Publishing service is strict ASCII coding with the first 32 characters ignored by the system. With very few exceptions, all ASCII codes produce the expected output. Even the problem of using the same quotes character for open and closing quotes was corrected in the software. There are only two "reserved" characters in the whole code set and they are the open and close brace characters which are used as delimiters for the command code strings. Despite the fact that most of the photocomposition equipment made today still uses an ancient 6 level code or a non-standard variation of ASCII, Personal Publishing service uses only standard ASCII. This was done to obtain a "what-you-see-is-what-you-get" effect from the point of view of the personal computer user.

The command code strings inserted in the text allow the user to specify the precise spacing and format of the copy on the output. Unlimited mixing among 190 different typefaces is possible and control over vertical and horizontal spacing is specified as fine as 1/288 inch. There is a total of 130 different commands to control typeface, character size and line length; and also such things as drawing boxes, special symbols, accents, and tone reversal (white letters on black background). Such complete control allows the diligent user to create anything from simple book pages to a complicated advertisement.

For the ease of use by the personal publisher, efforts were made to make the commands easy to remember (self documenting) without penalizing the fast typist by adding too many keystrokes. Frequently used commands usually have a one letter mnemonic such as "f" for face, "p" for point size, etc. and less frequently use commands such as "bullet" can be spelled out to minimize the amount of looking up in the book that must be done when proofreading and correcting.

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A special command called "printout" is included. This command is given in the text file to indicate that the following copy should be typeset "as is" using the carriage return line feed code to end the line. Copy is typeset line-for-line in one of two typefaces. The first face is similar to a typeface called Century. The second is a replica of a dot matrix printer. This mode is useful in preparing documentation for computer systems since it eliminates the need to make photostats of actual computer printouts. Also when including complicated tables and charts in text, it is sometimes easier to enter printout mode to do the table and chart already formatted for the line printer.

```
  100 |
S  90 |                                  $$$
A     |                                  $$$
L  80 |                                  $$$
E     |                                  $$$
S  70 |                                  $$$
$  60 |                                  $$$
   50 |                                  $$$
   40 |                       $$$        $$$
      |            $$$        $$$        $$$
      |   $$$      $$$        $$$        $$$
      |   $$$      $$$        $$$        $$$        $$$*
      ------------------------------------------------------
        Monday   Tuesday   Wednesday   Thursday   Friday

                TOMMIE'S LEMONADE STAND SALES

*Left early to go fishing.
```

Example of PRINTOUT mode

Using the service is similar to using a timesharing system such as The Source with the exception that no login/logoff procedure is needed and the same toll free line is used for both 300 and 1200 baud. Every effort is made to make Personal Publishing service easy to use. This new typesetting service is just one of the many new and varied services available to the growing number of personal computer users.

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CIRCLE D47 ON READER CARD

MORE FROM THE EDITORS

In last month's issue of DEC Professional, we ran an article on the features of DBL. The article was intended to show the powerful use of structured language extensions through a program designed to check out fixed length I/O. We instead used a program designed for data input. Here, then, is the original program intended for the article. The following program will: create a test file of 512 character records using PUTS, performing GETS, GET, PUTS, and PUT checks on these records, then continuing this operation for records of 256, 132, 64 and 32 characters long. Also shown in this example is DBL's comprehensive use of error reporting.

```
                ; DFXDIO.DBL
;
; Check out the fixed length I/O functions GET, GETS, PUT and PUTS.
;
RECORD  REC512
                ,A32
        REC32   ,A32
        REC64   ,A64
        REC128  ,A128
        REC256  ,A256

RECORD CMP
                ,A512

RECORD
        I       ,D2
        J       ,D2
        K       ,D2
        L       ,D2
        A1      ,A1
        A2      ,A2
        DFXDIO  ,A6  ,'DFXDIO'
        RPB     ,5D2 ,01 ,02 ,04 ,08 ,16
        RECNM   ,D2
        STS     ,D1

PROC
        OPEN (15,I,'TT:')
        WRITES (15,' ')
        WRITES (15,'Performing Fixed Length I/O Checks')
        OPEN (1,O,DFXDIO)                       ;Create the test file and check
        XCALL FLAGS(100000)
        FOR A1 = '1', '2', '3', '4' DO
        BEGIN
          XCALL FILL(A1,CMP)
          PUTS (1,CMP)
        END
        CLOSE 1

        FOR L=1,0 DO                            ;Check out GETS and GET
          FOR I=1 STEP 1 UNTIL 5 DO
          BEGIN
            OPEN (1,I,DFXDIO)
            RECNM =
            FOR J=1 STEP 1 UNTIL 4 DO
            BEGIN
              A1 = J
              XCALL FILL(A1,CMP)
              FOR K=1 STEP 1 UNTIL RPB(I) DO
              BEGIN
                INCR RECNM
                CASE I OF
                BEGINCASE
                  BEGIN
                    IF L THEN GETS(1,REC512)
                      ELSE    GET(1,REC512,RECNM)
                    STS = REC512.NE.CMP
                  END
                  BEGIN
                    IF L THEN GETS(1,REC256)
                      ELSE    GET(1,REC256,RECNM)
                    STS = REC256.NE.CMP
                  END
                  BEGIN
                    IF L THEN GETS(1,REC128)
                      ELSE    GET(1,REC128,RECNM)
                    STS = REC128.NE.CMP
                  END

                  BEGIN
                    IF L THEN GETS(1,REC64)
                      ELSE    GET(1,REC64,RECNM)
                    STS = REC64.NE.CMP
                  END
                  BEGIN
                    IF L THEN GETS(1,REC32)
                      ELSE    GET(1,REC32,RECNM)
                    STS = REC32.NE.CMP
                  END
                ENDCASE
                IF STS THEN
                BEGIN
                  CALL BUZZ
                  IF L THEN DISPLAY(15,'GETS ')
                    ELSE DISPLAY (15,'GET ')
                  DISPLAY (15,'check failure: Record ')
                  A2 = RECNM
                  DISPLAY (15,A2,', field ')
                  CASE I OF
                  BEGINCASE
                    WRITES (15,'REC512')
                    WRITES (15,'REC256')
                    WRITES (15,'REC128')
                    WRITES (15,'REC64')
                    WRITES (15,'REC32')
                  ENDCASE
                  STOP
                END
              END
            END
            CLOSE 1
          END

        OPEN (1,U,DFXDIO)                       ;Check out PUT
        XCALL FILL('X',CMP)
        REC64 = CMP
        PUT (1,REC64,10)
        CLOSE 1
        OPEN (1,I,DFXDIO)
        GET (1,REC512,1)
        RECNM = 16
        FOR A1 = '2', 'X', '2' DO
        BEGIN
          XCALL FILL(A1,CMP)
          FOR I=1 STEP 1 UNTIL 2 DO
          BEGIN
            INCR RECNM
            GETS (1,REC32)
            IF REC32.NE.CMP THEN
            BEGIN
              CALL BUZZ
              DISPLAY (15,'Check failure while verifying PUT: Record ')
              A2 = RECNM
              DISPLAY (15,A2)
              WRITES (15,', field REC32')
              STOP
            END
          END
        END

        WRITES (15,' ')
        WRITES (15,'Everything seems to check out')
        XCALL FLAGS (1000000)
        STOP

BUZZ,   WRITES (15,' ')
        DISPLAY (15,7,'   ... ')
        RETURN
```

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CIRCLE D104 ON READER CARD

70KW of Address Space for RMS Under RSTS??

RMS Sleight of Hand

By Steve Roy, P.O. Box 284, Bloomfield, CT 06002

Having perfected some programming techniques tha many systems analysts consider akin to magic, I've decide to share them with the readers of the DEC PRO. Some tim ago I witnessed these clever tricks being used by a wise ol programmer. He went on to become a manager, and tha was the last I saw of anyone using them. I've spent the las three years refining the techniques and expanding them t other areas of systems programming.

Back in the days when RMS resident libraries were no available, programmers were forced to become experts i overlay tree design. I decided that there must be an easie way, and discovered that I could write programs that didn't overlay if I removed all references to RMS files (OPEN, CLOSE, GET, PUT, etc.) from my sources. That made it hard to read and write RMS format data, but it made my tasks very small.

Then, I wrote a database manager that had all of the RMS code in it, and made it service my applications programs through the RSTS interjob communications protocol (hereinafter IJC). "Yetch," said my customers, when I explained what I was going to do. But they changed their tunes when it increased the speed of their data access programs by a factor of sixty!! That's right, minutes became seconds, hours became minutes, and database management became the center of my research activity.

I've found that there are literally dozens of advantages to splitting RMS out of the task images. First, each program compiles and task-builds in one-tenth (or less) of the time. Typical task sizes have dropped by 60 to 90 percent. Most of the programs don't require any overlaying (that's less open files and FP use), and the ones that do have been broken into BIG overlay sections that don't cause too much disk activity (having RMS in the task greatly reduced the size of the user overlay space).

Then, there was the problem of the overworked RSTS File-Processor. When each job had to OPEN and CLOSE the files it used, the FP (of which there is only one) was kept very busy. That problem was multiplied if the job also CHAINed between programs, a "menu" and several file maintenance programs, for example. The CHAIN operations required FP time, as did each of the file maintenance programs when they OPENed files to perform their functions (enter, delete, update, inquire). The system performance degraded exponentially as the number of RMS jobs increased, even if they were all using the same files.

As if the file processor didn't have enough to do, it also performed "window turns" on the very large RMS files. A window-turn is a directory lookup performed by the FP on an open file, when a job is trying to access a block outside of

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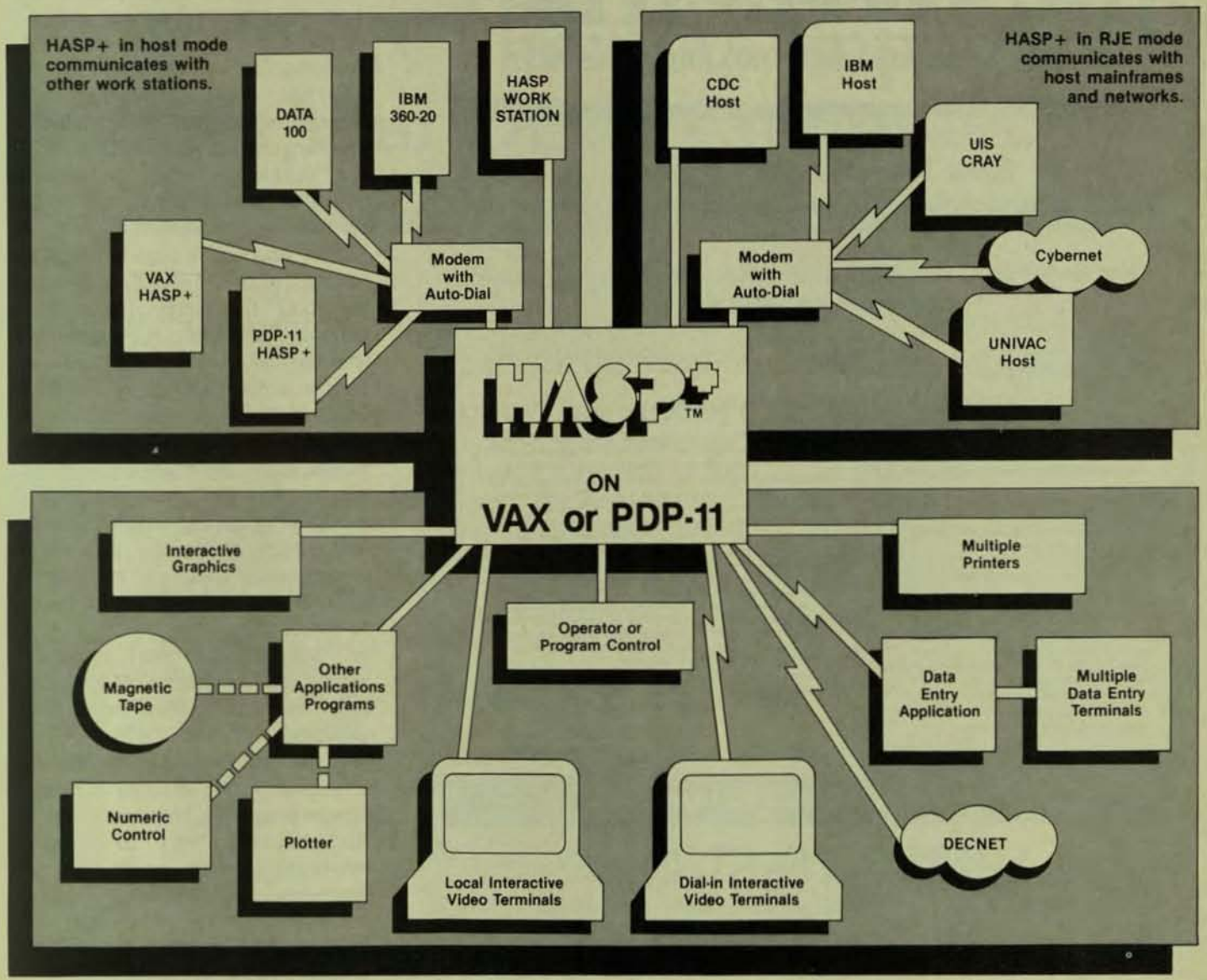

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the windows (cluster maps) previously provided by the FP (see RSTS-PRO Volume 3, Number 3, "Monitor Internals"). Window turning didn't take much time, but with five or six files over 30,000 blocks each, it couldn't be avoided.

What about bucket locking? I've always had problems programming around all of the possible real-time situations created by multiple users of a single file. The problem becomes more bizarre when the file is an RMS indexed file with two or more keys, because three users can lock each other permanently by fetching records via different keys and then changing the key of reference.

Suffice it to say that a single program directing "traffic" on the files allows for a much more efficient method of resolving conflicts. For example, a program performing inquiries shouldn't lock any records, and might use a sort-of "read regardless" command to get records that are locked by other jobs. Another advantage is RECORD locking rather than BUCKET locking, and a core-resident table of locked records can be maintained. Resolving conflicts should be automatic, and invisible to the application programmer. In addition, error trapping can be handled by the service program, making the application software simpler and easier to read and debug.

And finally, data and progra security are automatic. Data is ina cessable as soon as the service progra is shut down! Application programs a useless to programmers who steal yo software, since they have neither th service program, nor the access su routine(s) which communicates wit the service program. And, the servic program can log any or all file activit in a "journal" or "logfile" as it perform its other duties, making audit-tra software trivial.

By now you're thinking "BOTTLE NECK!!", or "What about my small buf fer pool?" Suprisingly, I've never ex perienced a bottleneck situation with this technique, even on 11/34's with twelve active RMS users. As far as small buffers, the messages are sent and received so quickly that there are seldom more than two requests waiting to be serviced, and boosting the service program's priority ensures that it is used much like the RSTS file processor, except that it relinquishes time to other jobs while waiting for disk I/O to complete.

Small sites will find that the above advantages will greatly reduce data access time, and that the smaller tasks will allow more jobs to fit into memory, reducing swapping. And for those of you with LOTS of memory, lock the service program in memory and add an RMS resident library to reduce its overlaying. I've also found that night processes, typically large programs running against large RMS files, finish much quicker when using a service program to reduce overlaying.

Now that you're convinced that RMS can be made to perform, all you have to do is write a service program, and design a set of messages that it can exchange with your applications programs. The easiest technique is to pass parameters in the 20-byte parameter string provided at the end of the IJC system call. Actually, only ten bytes are needed to pass operation-type, relationship (EQ,GT,GE), key-length, key number, record-length, etc., and less are needed to return error codes and RECOUNT. Keys under ten bytes can be passed in the remaining parameter space, but keys over ten bytes must be passed in the "data" area of the message.

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Record images should be passed directly into and out of MAPS or buffer areas, rather than treated like strings, because of the additional overhead required to do large string manipulation. Much of the service program can (should) be written in MACRO to decrease the time it spends servicing each user, thus increasing the time available to each user.

If you have programs that access a "control" record before accessing a data file, this technique can help there, too. Since there is no concern about the service program "competing" to get the control record, it can maintain it in memory, and only update it when it changes. In one such application, I use an RMS relative file to store linked-lists of transactions. The control record of that file (record 1) contains the root pointer to the list of free records. Since that record always changed during a transaction entry, it became the cause of major bottlenecks prior to converting to the service technique. Previously, the record had to be marked as "hands-off" while the linkage was performed. In the meantime, other jobs were consuming time attempting to get the control record, unsuccessfully. A sequence of six RMS record operations was required to perform the linkage. Now, the control record remains in memory, and is updated by the service program after each transaction is linked, a process requiring only four RMS operations.

Another side effect of having each job request database access through a service program is that no time is WASTED. Once a job has submitted its request, it waits in a "sleeping" state until its request is serviced. This effectively decreases the number of jobs competing for core residency and CPU time. The requests are serviced on a first-come first-served basis, so fairness is maintained, and a single job cannot "hog" a file.

There are many details to be considered when designing a database manager service program, but the cost is insignificant when compared to the additional effort required in the design of each application program, overlay restrictions, and speed degradation. As far as I can tell, the system performance degrades linearly as users are added when using a service program, whereas the degradation is exponential without one.

One last note: this technique doesn't lend itself to RMS sequential files, but works fine with indexed and relative accessing. I have several systems using one service program, and a heavily loaded 11/34 using two (totaling 42KW of space). Those of you who don't use a language that allows RMS file accessing might be happy to learn that the application software need not contain any RMS code, and therefore may be language independent. I've already written FORTRAN and BASIC PLUS (not +2) programs that access RMS files in this manner!

There are many areas that I haven't the time or space to cover, but I hope to be providing more insight into increasing program address space on PDP-11s in future articles. I've recently begun experimenting with virtual array (or large matrix) storage in one job and manipulation of the "virtual" data from another job. Move over VAX!! For those interested, I'll be providing more detail on this technique with regard to RMS at the DECUS symposium on December 9th. Now, if you'll excuse me, I have to put on my baggy robe and get back to the important business of dungeon exploring (see the map, also in this issue)!

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PART ONE

How To Select A Home Computer

By Joel Schwartz

My schooling is in the medical mode so I am used to a person presenting me with a set of seemingly unrelated facts (symptoms) and then synthesizing the information into a diagnosis and treatment plan. So naturally I expected the same thing to happen when I went shopping for a home computer. Boy was I wrong.

In the first store I went to, the salesman asked me what I was looking for in a computer. I told him I wanted one that had capabilities for word processing and game playing. He thought for a minute, just like I do before I give my recommendation, and then he said "You don't want to play games on a computer." I felt sort of embarrassed to admit to him that I really did, so I told him that the games were for my kids and the word processor was for me. He thought again and asked me what I did for a living. I told him I was a physician and I could see his eyes begin to glow. "You'll probably want to use this in your office some day so you'll want a system you can grow into." I'm not used to buying size thirty six pants when I really need a size thirty but I listened as he continued. "What you need is the new zxyell 100, a gramitz blue green moniter, a petuna-wheel letter quality printer, and a 10 megabyte hard disc. It's on sale now and for $9900.00 it's a real steal. But I must be honest with you — you can't play games on it — but for just another $300.00 you can buy the BIC-500 mini-micro-technicolor computer which plays only games. We have both in stock now and can have them ready for you in a day. Unfortunately we won't get the software for the BIC until Christmas but that will give you a full eight months to get used to your zxyell."

"Isn't there anything else a little cheaper?" I asked.

"There is," he replied "but I wouldn't consider selling you anything else. "Naturally I thanked him and went to another store. I again told the salesman my needs and after thinking he came up with the following suggestion. "You need the new portable newbourne-1. It only costs $999.00, but you can play games, do word processing, business, financial, graphics and keep recipes."

"Gee, that really sounds great. Can you show me how works?"

"Sure," said the salesman with confidence. For the ne twenty minutes he pushed buttons and keys and combi tions of keys and buttons and nothing happened. "We've or had this model for four months so I'm not that familiar wi how it works, but if you can wait another half hour o newbourne-1 expert will be back from lunch and he can sho you exactly how it works."

I broused through the latest issue of MICRO-MI WORLD until the expert returned. In it was an article on ho to buy the right word processing package for you and specifically gave you some questions to ask. When th newbourne-1 expert returned he began to show me the wor processing capabilities of the computer and with pride in m voice I asked "How do you compensate for the fact its only forty column screen?"

"Your eye can only see forty columns at a time anyway."

"Well then how do you format what you write?"

"Easy," replied the man. "To get a paragraph type control P, to indent use control J, to double space control DD, or is it control PP, and to set the width and length of the paper there is a six page table which is very easy to use once you get used to it."

"Isn't there an easier way?", I asked.

"Oh," he replied, "why didn't you say you wanted a real computer. What you wa . . ."

I didn't wait around to hear the rest. The next week, I don't know why, but I went back to the first computer store to see if maybe someone could begin to answer some questions about the type of computer I should get. I had already made up my mind to ask for another salesman but when I got there I found out it wasn't necessary. He had been fired. In fact three other salespeople had either left or had been fired. It was like going into the store for the first time and do you know what ... you guessed it ... the questions they asked me were different but the recommendations were still the same.

The above stories are all true. The names have been changed to protect me since I still occasionally use some of the stores just because of their proximity to my home. I am told by other friends that there really aren't any knowledgeable stores around. So what does one do to protect himself. Read — "I DON'T GET NO SUPPORT, PART TWO — HOW TO BUY SOFTWARE."

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CIRCLE D71 ON READER CARD

EDITORS vs. WORD PROCESSORS

Or, What You Don't Know Could Cost You a Large Sum of Money

By Peter Glickman, High Tech Marketing, Burbank, CA

This story began almost two years ago, when Glenn Barber, President of GABA Inc., in the midst of an immense development project, discovered that, for various technical reasons, the TECO editor he had used for years was unequal to the task of editing almost 10 megabytes of COBOL source code, some programs of which many were thousands of lines in length. The KED editor provided by DEC had the facility that was needed, but multiple KED users bogged down the 11/23 system utterly.

As luck would have it, Glenn's friend, Bob Denny—of worldwide fame as an RSX wizard— appeared on the scene with the kernel of a text editing system he had been nurturing for the past year. Together Bob, Glenn, and a few other "conspirators" whipped up a text editor with functions that didn't jam up the system when everyone used it at once. Furthermore, because the COBOL project required tons of documentation and the development people wanted to use the editor to write it, the "boys" squeezed in a few more features, carefully insuring that the thing did not grow any bigger than 9K. So impressed were those who used this editor, now christened FASTEXT, that Glenn decided to sell it, and I became his marketing manager. So far, so good.

Now at this time (and today), there was great interest in word processors. So we decided to capitalize on it. We promoted our editor as a text processor (a combination of TEXT editor and word PROCESSOR). In poured the replies! Ah, greedily I rubbed my hands together eagerly anticipating the vast number of sales. Months slipped by. Replies continued to pour in. But - Whoops—where were all those sales!!??!!

Being that by now we had spent well into the 5 figures for advertising and our only sales had come from a few people we already knew, I decided it was time for a little market research—better late than never. After talking to ten or perhaps twenty inquirers, who all gave the same responses, I realized there was a BIG difference between word processors and text editors and a vendor had better know that difference before he started to sell them. For myself, I learned enough to correct our marketing so that we now sell four times as many editors as before, and sell a good number of word processors also. Now, when someone calls me up and wants to know about editors or word processors, I know what questions to ask to find the perfect match for his needs.

The Difference Between Word Processors and Text Editors Or, The Right Questions to Ask to Win Friends and Influence People

I. WHAT TYPE OF DOCUMENTS ARE YOU GOING TO CREATE?

1. More than 50 pages long?	Indicates a word processor
2. Less than 10 pages long?	Indicates a text editor
3. Requires underlining?	Indicates a word processor
4. Requires bolding?	Indicates a word processor
5. Requires superscripting?	Indicates a word processor
6. Requires subscripting?	Indicates a word processor
7. Requires none of these?	Indicates a text editor
8. Source code for programs?	Indicates a text editor
9. Computer Data?	Indicates a text editor

II. WHO WILL BE USING THIS PRODUCT?

1. A programmer?	Indicates a text editor

A programmer is often highly concerned with text pattern—search and replace allowing him to generalize the task of writing or modifying a program or text file; or transplanting text from file to file. Programmers usually curse "user friendly" menus and desire an abbreviated way to command the editor. Also they generally do not like to be bothered by system prompts about type faces, character sets, margins, pagination, proportional spacing, etc. although a few are beginning to see the value of an automatic spelling corrector.

2. Non-Programmer?	Indicates a word processo

He will need to be prompted al along the way; that includes copying deleting, printing, or closing the file exiting the program, or killing the edit. The most common form of prompting is the use of menus. This does not mean that Word Processors are easier to use for simple functions. An editor may require only 10 key strokes to open a file, locate the twelfth line and delete the fourth word; the word processor may require 25 to do the same job. This is usually quite true of printing files. However, most word processors contain more functions and more complex functions (hopefully learned from the manual rather than a long distance phone call) than an editor.

More doesn't always mean better. For example, the automatic pagination function of the word processor, which breaks the text file every 54 lines with no further attention from the operator seems a definite advantage over an editor without this function. However in actual practice, the operator must visually check each page to insure there are no widow lines (lines with only one word, such as at the end of a paragraph), or other breaks which distort the meaning of the document.

The key point is that word processing is primarily concerned with text appearance and the placement of special characters in the text (usually non-printing) which control the output format of documents prepared with a word processing system. Word processors want to be reminded of details such as character sets, margins, pagination, headers and footers; otherwise the electronic typewriter would have done as well.

III. HOW MUCH MONEY DO YOU HAVE TO SPEND?

1. Less than $1000?	Indicates a text editor
2. More than $2000?	Indicates a word processor

I hesitated to put this question of price in, for two reasons: 1) most end users are interested in the right product and are not willing to buy the wrong one to save money; and 2) one can find single user word processors for RT-11 that sell for less than $1000. However, they are few and usually not the match of the ones selling for more.

Text editors, no matter how much better than their predecessors, suffer pricewise from the fact that there are many free or inexpensive ones available. Also, the idea of holding on to your comfortable old shoes applies here, and experienced programmers tend to hold on to their editors. Fancy editor manipulation is often a form of social one-ups-manship practiced in programmer environments. Newer programmers, however, are not nearly so set in their ways. Some of our TECO buffs used to belittle our new editor by day, and secretly use it at night; but now all of them have "seen the light."

Word processing operators are usually new to the computer system and require extensive and well documented training materials to become proficient with the vast array of facilities provided. This requires more money to be spent on documentation, user support and training. Furthermore, the word processing market is now so competitive, that everyone in the market is forced to upgrade his functionality and so must finance his ongoing development with higher prices. Lastly, a large number of word processing buyers purchased their computer systems solely to support word processing—and so feel that the price of a truly powerful word processor is justified. All of this leads us to our fourth question.

IV. WHAT TYPE OF COMPUTER ENVIRONMENT WILL THIS PRODUCT RUN IN.

People's concept of a "word processor" encompasses everything from TECO, through KED and RUNOFF, to full-fledged word processors such as CTOS. Lots of people call and ask for information on a word processor because they've been told they need one of these do-it-all systems, even though their environment is one where the machine is being used by engineers for real-time data acquisition or something else that requires an instant system response. In such a case, the real-time activity might well force the flying fingers of the office secretary to march along at a funeral dirge pace, much slower than the pace an editor would have permitted. Or perhaps the text being "massaged" must be transmitted to other systems, or devices, which would not be able to interpret the imbedded special characters used by a word processor.

There are many different word processors and text editors on the market and not all of these considerations hold for all of them, but I do hope that these things will help you to select the product most suitable to your needs.

Peter Glickman is the marketing manager for Glenn Barber & Associates, Inc. He is also currently the president of High Tech Marketing. Previously he had his own market research company for 5 years.

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CIRCLE D18 ON READER CARD

FILES-11 STRUCTURE

By Carl E. Frieberg
In House Systems, 165 Williams St., NY, NY 1003
Reprinted from Computers-R-Digital

In the last three years, the topic of FILES-11 struct has been greatly clarified for me, and I would like to some of this on to you. Fortunately, this topic is relevar RSX-11M, MPLUS, and pretty much to VAX/VMS. I will fine myself entirely to RSX in this discussion.

Before we can talk about FILES-11 structure, howe we should first understand the concept of a random ac device (which explicitly excludes magnetic tapes of the u variety). A random access device is one on which we store data into any physical block. To accomplish this, necessary to physically initialize the recording medium. initialization process is referred to as FORMATTING. So media, such as the RL01 and RL02 disks, are factory matted; other media require a special program to be ru order to format the device. This is often true if you are p chasing media from manufacturers other than Digital; a rule, DEC supplies formatted media. The main point to preciate is that a random access device gives a physical dress to each physical block so that the hardware itself able to reliably position itself and write data anywhere the medium. This includes floppy disks, DEC-TAPE I, DE TAPE II (TU58's); and all hard disks.

A second "hardware" fact of life is that in the manufa turing process, there are sometimes imperfections in t magnetic recording media which can cause certain blocks the disk to be unusable. Sometimes the manufactur already knows this when the disk is shipped out, in whi case that information should be located on the last track the medium (if manufacturer "bad block" information supported on that device type). However, whatever inform tion may accompany a disk when new, bad blocks may cro up during the life of the media, making the data on tha block(s) useless. The ultimate bad block situation is whe there has been a head crash, rendering the entire dis useless.

Conclusions: (1) You will need to know something abou how to deal with bad blocks, which is explained later on; an (2) you ought to be making sufficiently frequent backups o your media so that a disk head crash will not wipe you out. do not know of any installation anywhere which is makin too many backups. At this point, I strongly recommend the use of the RSX BRU utility, providing that all published patches through February, 1982, have been applied. If for no other reason, this is now the standard distribution mech anism for the DECUS RSX SIG tapes! Assuming that you have a properly formatted medium, with the last track writ ten with factory bad utility. The right way to do this is (on a hard copy terminal, not a scope):

```
SET /NOPUB=DA2:     ; make the device a private device

ALL DA2:            ; allocate it so no one else can have
                      it
```

```
                    ; make sure your new medium is on
                    ;
INS $BAD            ; BAD should never normally be
                      installed (MPLUS: you must MOU
                      DA2:/FOR at this point)
BAD DA2:/LI         ; notice that BAD starts right out
                      destroying
                    ; (writing on) your disk; no confir-
                      mation
                    ; the /LI option causes bad blocks
                      to be listed
```

The medium now is ready to use, and we will be able to prevent the system from utilizing any of the blocks which BAD marked as error-prone. YOU SHOULD ALWAYS DO THIS BEFORE USING A DISK. NOTE HOWEVER — THIS DESTROYS EVERY BIT OF DATA THAT WAS ON THE DISK. CAREFUL.

Now finally we can discuss the nature of a FILES-11 device. The first block on the device (BLOCK 0) is always reserved for the bootstrap code. ALL DEC PDP-11 computers expect to find some sort of executable code in this block; the hardware bootstrap operation simply reads this block into memory, then executes that code. No matter what the geometry of the physical device (e.g. cylinder/track/sector arrangement or whatever) the FILES-11 and related drivers look at a random access device as containing a sequence of LOGICAL BLOCKS, beginning with BLOCK 0 and running up to the highest numbered block (which, on an RM05 is somewhere around 500,000). Unless you write drivers, you don't need to know anything about the geometry. Now the FILES-11 structure imposes a well-defined organization upon this sequence of numbered blocks. This organization is accomplished when you:

(1) run the DSC program
(2) run the BRU program with the /INI option; or
(3) use the MCR INITIALIZE volume command.

There are five files which are always created in this process:
INDEXF.SYS; BADBLK.SYS; BITMAP.SYS; CORIMG.SYS; and 000000.DIR. Understanding these five files enables you to completely understand FILES-11.

INDEXF.SYS

The index file INDEXF.SYS contains some of the most critical information on the volume. A file, incidentally, is a series of logical blocks, starting with a special block called the "header." The first data block in the file is given a VIRTUAL BLOCK NUMBER of 1; and subsequent blocks are numbered incrementally. For INDEXF.SYS, VBN 1 is the BOOT BLOCK! VBN 2 is another valuable block, the HOME BLOCK. The HOME BLOCK contains some very important information, which is clearly spelled out in appendix E-3 of the IAS/RSX I/O Operations Reference Manual (this appendix is mandatory reading — right now). Following the home block

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CIRCLE D4 ON READER CARD

is the INDEX FILE BIT MAP, which controls the assignmen of FILE HEADER BLOCKS: a 1 bit indicates that it is in use There is 1 bit for each HEADER BLOCK in INDEXF.SYS; thu there is one INDEX FILE BIT MAP BLOCK FOR EACH 4096 FILE HEADER BLOCKS. Immediately following the INDEX FILE BIT MAP are the FILE HEADER BLOCKS themselves.

Here we get to the first of several performance issues. It is very important that the FILE HEADER BLOCKS and their associated INDEX FILE BIT MAP all be contiguous. (CONTIGUOUS in a FILES-11 context means that the data blocks in a file are sequentially numbered in LOGICAL BLOCK order; it does not mean that for geometry they are contiguous, necessarily.) The reason: the index file is constantly being accessed by the file system; if the INDEX FILE is contiguous (excepting the BOOT and HOME blocks, which have predefined physical locations on the disk) then only 1 disk read is ever necessary to access any component. Normally, the INDEX FILE as supplied by DEC on their distribution media is substantially smaller than the maximum number of files which can be created on the device. If you put more files out on the disk than the quantity initially allocated, the index file can get badly fragmented. Ultimately, this could mean that every time you need to access the index file, you could need two disk accesses — one of them just to find out where the part of the index file that you need is located. This process is known as "windowing." Contiguous files up to 65,000 blocks can be mapped in a single window by the file system, saving unnecessary disk accesses. If you have a disk-limited system, and most of us do, then you should always be trying for contiguous allocation of your files.

When a volume is initialized, there are five pre-defined file header blocks associated with the five files mentioned earlier (same as MPLUS; ten on VAX/VMS). Each of these is given a unique identification, known as the FILE ID. These are:

INDEXF.SYS (1,1)
BITMAP.SYS (2,2)
BADBLK.SYS (3,3)
000000.DIR (4,4)
CORIMG.SYS (5,5)
If you don't believe me, just type in:
PIP [0,0]*.SYS/FU
(if you find RSX11, see if you can guess what that is . . .).

In general, a FILE ID is assigned by giving the first number as the serial number of the header; and the second number is normally a sequence number (except for those 5 files above), beginning with 1 the first time a file is created, and incremented each time a file header is re-cycled (e.g., a deleted file returns the header to the pool of available headers by having a bit cleared in the INDEX FILE BIT MAP when it then gets used again this sequence number is incremented. Should you try to access this new header thinking it still contained the old file and data, you would get a file ID sequence check error. As you will see, the directory keeps the complete FILE ID). At this point, you should be wondering what information is kept in the file header block. GOOD! Read Appendix F of the I/O operations manual.

Now in this sketchy manner, you should have an idea of how FILE HEADER BLOCKS are allocated and de-allocated. If

you have read Appendix E and F, then you are overwhelmed with information. Do not get discouraged, it will all make sense eventually. The FILE HEADER contains: The FILE ID; the owner UIC; the protection code; the name of the file; the creation and revision date and time; and the file data block windows (or retrieval pointers, as they are also known). In the file header, a retrieval pointer consists of a 3-byte (24-bit) LOGICAL BLOCK NUMBER which points to the PHYSICAL block of data which is the first one in a contiguous series which this window, or retrieval pointer, maps; and one byte which is a count of the number of CONTIGUOUS blocks in this window (+1); thus 255. (377 octal) is the maximum number of blocks which can be shown in a window (so 256. is the maximum number which are mapped in that case).

To look at your favorite file, use the DMP utility /HD switch: DMP TI: = [123,123]JUNK.TMP/HD/BL:0 (/BL:0 suppresses dumping of the data blocks) and look at appendix F.

At this point, there are still three missing links: how to keep track of of the DATA blocks in a file; how to keep track of bad blocks on a device; and how to find files and organize the files on a disk, say by UIC (directories).

BITMAP.SYS

This file contains 1 bit for every physical block on the device. The bit is set if that block is in use in a file; it is cleared (to 0) when the block is available for use. Thus each block in the BITMAP file keeps track of 4096 blocks on the device. Thus the process of deleting a file not only involves marking the header as available (clearing the appropriate bit in the INDEX FILE BIT MAP); but also in freeing up all of the blocks which were owned by that file — the retrieval pointers in the header are used to deallocate all the blocks "owned" by that file, clearing the appropriate bits in the BITMAP. Conversely, creating a file involves:

(1) Getting a file header and marking it in use in the INDEX FILE BIT MAP and inserting user-related information into the header incrementing the sequence number in the FILE ID;

(2) Allocating retrieval pointers for the desired number of blocks in the file, and setting the appropriate bits in the BITMAP file; and

(3) Depending on how the file is created, it may be made known by means of placing an entry in a directory (see MFD below).

Extending a file simply involves more of step (2) above. From a performance point of view, it is always desirable to pre-allocate a contiguous group of blocks for a file; it takes processor time to extend a file; and it hurts access performance to have a "fragmented" file with lots of windows. Remember, as of version 3.2 of RSX, the file system (F11ACP) is capable of mapping over 65,000 contiguous blocks in a single window (NOT on disk; in the ACP storage).

What's that? ACP storage. Another topic! What is an ACP? That is another topic: Briefly, the MOUnt utility makes known a specific device as having a FILES-11 structure, and associates a "process" (an ACP) with that device. An ACP may relate to more than one device, but you are well advised, if you have more than the minimum core system, to

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CIRCLE D39 ON READER CARD

PAGE 58 NOVEMBE
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CIRCLE D108 ON READER CARD

MONITORING PERFORMANCE

Inasmuch as I began to write a series on TUNING, what can be done to monitor disk performance? Unfortunately, DEC provides nothing outside of their SPM-11 to help you with this. Intuition helps. If your disk makes noise, such as the RP06, you can often tell when it is heavily loaded. If there is an access light, as on the Systems Industries 9400 controller, you get a feel for the load. It is theoretically possible to measure I/O packets and queue lengths, but this places additional loading on the system. Here are some guidelines: Run BRU or DSC with the/VE option, and use the OUTPUT disk as your NEW DISK. Both BRU and DSC try very hard to make their output disks have contiguous allocations of blocks. Make sure you allocate the maximum number of files you think you will ever need when you initialize the disk (see the /INF option in INI and /HEADERS option in BRU). DEC defaults are annoyingly small on software distribution, such as using RP04 defaults for RP06; RL01 defaults for RL02; and RK06 defaults for RK07. Fortunately, the BRU utility lets you set things right easily — use the /HEADERS and /MAX and /POSITION:MIDDLE options. Note that the INDEXF file should ALWAYS be positioned at or near the middle of the disk, UNLESS you are going to put one very large file on the disk, in which case put it at the beginning. The INDEXF file itself will always start off being contiguous; the reason to pre-allocate it is so that it will never have to extend.

Now, as of the Fall of '80 and later, there are a lot of very useful programs on the RSX/IAS DECUS SIG tape. To mention a few:

[300,70]LUT and FCB—LUT tells you all the open files, including interesting retrieval pointer information for a specified task; FCBS tells you all the open files for a given volume.

[300,100]MVI tells you who has a volume mounted CVL that has been around for a while and lets you diddle some otherwise hard to modify disk parameters. BEWARE.

Somewhere there is a FRAG utility, I believe, which will tell you about disk fragmentation. (ANOTHER TOPIC!). When RSX first came into existence, an RK05 was a BIG disk with its 2.5 Megabytes of storage. Thus disk space was at a premium. Unlike RT, which always allocates contiguous files, and has a SQUEEZE command, RSX never makes a file contiguous unless you demand it. RSX file ACP's are the worlds best garbage collectors. I have honestly seen, on a 300 megabyte drive, files which have one single block in each window. In fact, the early version of BRU created files like this (@|[|/] % + -!@). The garbage collection is ingenious if you want to squeeze every last block out of a disk before you exhaust the space on it; an admirable goal, say for RSX V2.0. Here we are, ready to welcome in V4.0 7 years later—will the ACP design still garbage collect on RM05 disk drives??? Any bets? So, you the user have to work around DEC's frozen-in design for small disks, if you want good performance from your fast, big disks. CONTIGUOUS FILES. Frequent back-ups and swapping of packs. (Be careful to archive tape files for a long time when you do this, as files will

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CIRCLE D41 ON READER CARD

"I'M AKMED, THE GURU. YOU WANT MAHARESH, THE GURU, TWO PEAKS OVER. HE'S THE ONE THAT'S COMPUTERIZED."

"IT SAYS PAC-MAN ATE ALL IT'S DATA!"

disappear if you are careless.) Install extra controllers if you have too much of a load on one controller. Use overlap seek drivers (either upgrade to M-PLUS or get one from CYTROL). Minimize unnecessary disk accesses, due to excessive swapping (checkpointing) and memory resident overlaps help cut down disk hits, as do resident libraries (RMSRES and FCSRES are mandatory on big-memory systems). FIND OUT ABOUT VIRTUAL DISK DRIVERS. (Go to the DECUS symposia . . . You don't expect me to tell you everything, do you?) And call on expert help if you are lost in the woods, or if you have a disaster on your hands. There are some disaster tools on the recent DECUS tapes, too. And cheer for more reliable and much cheaper disks from DEC. Extra RL02's now go for $3,300! (The drive; even DEC media is not that expensive.) Finally, read DECUS symposia hand-outs and the RSX Multi-TASKER TO SEE WHAT YOUR COLLEAGUES HAVE DONE TO IMPROVE DISK AND ACP performance, particularly the MULTI-USER ACP. Good luck.

NOTE: Reference "Multi-Tasker," Vol. 15, No. 9, April, 1982, page 42.

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CIRCLE D20 ON READER CARD

EDT EXTENDED WITH AN INITIALIZER FILE
Part 1

By David Spencer, Infinity Software Corporation

This is the first half of a two part series of articles on version two of EDT. EDT is a strong step forward for Digital. It is written in the efficient and structured language BLISS, and therefore can be cross-compiled and run on many DEC operating systems. To my current knowledge this list includes RSX, IAS, RSTS, and VMS. I'm sure it will eventually appear on every DEC operating system, if it hasn't already.

The advantage of having one editor that crosses many operating systems should be obvious. With the DEC languages becoming more and more compatible and with a common set of system commands (DCL), EDT rounds out a package that enables easy migration from one operating system/machine to another.

In this installment I will first try to give a little EDT history. Then I will describe an EDT initializer file that greatly increases the power of EDT by allowing access to line and nokeypad mode commands.

The second article deals with describing the EDT help file format and how to modify it, and with editing hints and kinks.

I would like to take the opportunity here to thank Steven L. Edwards and his partners at Software Techniques for their very useful research that led to our co-development of the initializer file.

1.0 A little EDT history

Version one of EDT was a line oriented editor written in an assembly language for the PDP-11 family. I assume that the purpose of that EDT was to provide a simplistic editor with support for RMS attributed files. The operating systems it ran on were IAS, RSTS, and RSX. It had a very, very simple screen editing "change" mode that would allow displaying the file on the screen and using the arrow keys to move around, but had no real keypad editing functionality.

Sometime later an RT11 screen editor appeared. It was called KED, for Keypad EDitor. KED was entirely a screen editor and was very fast. Soon it made its way to other operating systems and began to chip away at the loyal VTEDIT users. (VTEDIT is a TECO based screen editor. It is fairly slow but quite powerful. I have good reason to believe that KED actually has the TECO screen window handler inside it in some form.)

By this time VAX was starting to build up speed. EDT, KED, and VTEDIT would all run on VAX, but in compatibility mode. To get out of the VAX the real power it had, one of these editors had to be converted to native mode. As it has turned out, we received a mix of all three.

2.0 Version two of EDT

The new, totally rewritten version of EDT does a 99% complete job of emulating the old EDT. In fact, the new EDT, as far as line oriented editors go, is even better than the first version. The keypad layout and a number of context commands (SET WIDTH, etc.) from KED were copied and expanded. The extendability of VTEDIT was incorporated by allowing users to define their own editing keys.

EDT version two runs in any of three modes: Line, Keypad, and Nokeypad. In line mode, EDT runs just like the old EDT line oriented editor. In keypad mode the current buffer is displayed on the screen and the editing is done immediately with single key commands like KED. Nokeypad mode is a little strange; the screen is used like keypad mode, but short text commands must be entered to get editing accomplished. Sort of like the other two modes combined. This mode is very useful though, in that those short commands can be used in the definition of new editing keys.

3.0 EDT initializer

When EDT is started, it looks for a file on the current user's account called "EDTINI.EDT". This is called an initializer file because it can be used to initialize or tailor EDT to suit the user's tastes.

The initializer file can contain commands to define the editing environment, such as line, keypad, or nokeypad mode, create macros, and define editing keys. Other attributes such as terminal type and width can also be set at this time. Any of these items can be changed later on, but it gives each individual the chance to create, in effect, his own personal editor.

4.0 My favorite initializer

The following information deals with an EDT initializer that I prefer for several reasons. First is that it allows access to line and nokeypad commands that were previously unavailable in keypad mode. It also does not interfere with those editing keys already assigned by DEC. This allows those familiar with the initializer to always be able to fall back on stock EDT in a pinch without being lost in any way. Last it assumes that the user is on a video screen and will be using EDT as a screen editor. This mode is by far more productive than any line mode editor.

Figure 1 is a list of the stock VT100 editing keys. (For a more complete explanation of the standard keys, please refer to the EDT manual.) They do a good job, and I haven't the kind of space (or attention span) to redescribe their use.

5.0 Additional keys defined

Here is a detailed list of the additional EDT key definitions. Nearly all of these commands accept an iteration count.

In those commands which ask for input (like buffer name), the input must be terminated with the keypad ENTER key. If for some reason you wish to abort the command asking for input, type "CONT U" and EDT will terminate the command without any action taking place.

(Note: Use of the word "GOLD" is used to mean striking the GOLD or PF1 key, and "CONT x" is used to signify control character "x". I use this terminology because it matches that used in the EDT manual.)

GOLD ARROW-UP

Move the editing window upward 22 lines. The vertical orientation of the cursor will be maintained from the line it left.

GOLD ARROW-DOWN

Move the editing window downward 22 lines. Once again, the vertical orientation of the cursor will be maintained from the line previous to the GOLD ARROW-DOWN.

CONT B

Move backward a word. Identical to striking the keypad "5" key followed by the keypad "1" key. "CONT B" works to move the cursor backward regardless of the motion flags.

CONT F

Move forward a word. This key is identical to striking the keypad "4" key and then the keypad "1" key. "CONT F" always moves forward.

CONT P

Move to next paragraph. Using this key moves the cursor to the next paragraph. (The default definition for a paragraph delimiter is two consecutive carriage returns.)

CONT G

Paste contents of named buffer. Typing CONT G will ask for the buffer name on the twenty-third line on the screen. Enter the buffer name, and that buffer's contents will be inserted at the current position.

CONT X

Cut region to named buffer. Select a region of text and type CONT X. Enter the buffer name. The selected region will be removed from the current editing buffer and placed into the buffer name entered.

GOLD CONT B

This command moves the cursor to the beginning of the previous sentence. This is very useful for editing text files, and even programs if your sentence delimiters are set right.

GOLD CONT D

Toggle word delimiter sets. This allows the use of two completely different word delimiter sets. In this initializer is one word delimiter set for programming, and one for word processing.

GOLD CONT F

This works like GOLD CONT B but in a forward direction to the end of the next sentence.

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GOLD CONT G

Replace region with named buffer. This command works very much like the keypad "GOLD 9" command. Select a region of text, and type "GOLD CONT G". Enter the buffer name. The selected region will be replaced with the contents of the entered buffer.

GOLD CONT H

Transpose previous two characters. By striking the GOLD key and backspace, the previous two characters will be transposed. This is helpful for typists who frequently type "teh" instead of "the."

GOLD CONT I

Move cursor eight characters. I find this command useful as an "in between" from single character moves and moving big lumps at a time. This command works in either direction, and makes a line scan a lot easier.

GOLD CONT T

Make current line top line of screen. This command uses the nokeypad command TOP. What this command does is make the current line the top line on the screen. This is useful when you are interested in what's coming, rather than what has preceded.

GOLD CONT W

Toggle 80/132 screen width. A very useful command to switch the screen between 80 and 132 column mode. (Just for VT100's though.)

GOLD CONT X

Copy region to named buffer. Select a region and type GOLD CONT X. EDT will accept a buffer name. The selected region will then be copied to the buffer name entered.

GOLD CONT Z

Complete edit and leave EDT to the monitor. It is the equivalent of invoking the EDT "EXIT" command.

GOLD DELETE

Clear an entered buffer name. Type GOLD and the delete key and EDT asks for a buffer name. Enter a buffer name and it is cleared of all text so it may be used again for whatever. It even works on PASTE and MAIN!

GOLD .

Insert special file marker. This keystroke inserts the "~ ~ / \ ~ ~" special position marker. The mark can be found later with the "GOLD /" command. This command is useful when you leave EDT, and come back later and want to find your place.

GOLD /

Locate position file marker. This command locates and deletes the special position marker from the text buffer. Leaves the cursor in the position formerly occupied by the marker.

GOLD B

Switch to a named buffer. Enter the buffer name to switch into followed by the ENTER key. The screen will then refresh and you'll be editing your buffer.

GOLD C

Change case, but retain first letter. This command will advance a character, and change case on the remainder of the word. Very useful for changing totally uppercase words to capitalized lowercase, or capitalized words to all uppercase.

GOLD F

Fill a paragraph. Entering this command will cause EDT to set the mark, move to next paragraph, and fill the selected region.

GOLD I

Read file into buffer. Enter the file to open followed by ENTER, and the buffer to copy the file into. EDT will leave you in the buffer selected after the read is completed. VERY useful in extracting needed text from other files. Why write something twice?

GOLD L

Return to last position. This executes the EDT "FIND LAST" command. It is most useful in bouncing between two buffers without entering the buffer names with the "GOLD B" command. EDT does, however, seem to lose what the other buffer name was when a cut or paste is performed.

GOLD M

Switch to buffer MAIN. Identical to entering "GOLD B" and "MAIN" as the buffer to switch to. Returns to the spot where the cursor was when "MAIN" was left.

GOLD O

Output named buffer to a file. EDT will ask for the output filename, and then the buffer name to write to that file. EDT is smart enough to rename any existing file by that name given to ".BAK" before writing out the file. You will be left in the buffer name selected after the output is complete.

GOLD Q

Abort edit. This command aborts the current edit, saves the journal file, and leaves EDT. This is the equivalent of invoking the EDT "QUIT/SAVE" command.

GOLD S

Show all named buffers. Same as the line-mode command "SHOW BUFFER". This command helps when you've forgotten what buffers were in use.

6.0 Stock command modified

There is only one modification to the stock DEC key assignments. The HELP key (PF2) is disabled. Most users learn the keypad very rapidly and don't need to see the keypad diagram. And accidentally striking the HELP key becomes annoying. Of course, those who would still like to see the HELP screen can still get help by striking the GOLD key and then PF2.

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Sunnyvale, CA 94086, U.S.A.
Telephone: (408) 749 1089
Telex: 172943

CIRCLE D110 ON READER CARD

VT100 Keypad:

Gold	Help	Findnext Find	Del L Und L
Page	Section	Append	Del W
Command	Fill	Replace	Und W
Advance	Backup	Cut	Del C
Bottom	Top	Paste	Und C
Word	Eol	Char	Enter
Chngcase	Del Eol	Specins	
Line		Select	Subs
Open Line		Reset	

VT100 Keyboard:

DELETE	Delete previous character
CONT A, GOLD A	Compute tab level
CONT D, GOLD D	Decrease tab level
CONT E, GOLD E	Increase tab level
CONT H	Go to start of line
CONT J	Delete to start of word
CONT K	Define key
CONT R	Refresh screen
CONT T, GOLD T	Adjust tabs
CONT U, GOLD U	Delete to start of line
CONT W, GOLD W	Refresh screen
CONT Z, GOLD Z	Return to line mode

FIGURE 1. Standard EDT Keystroke Assignments

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PDP-11 RSX, RSTS/E, RT-11, TSX-Plus.

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TSX-Plus is a trademark of S&H Computer Systems.

CIRCLE D111 ON READER CARD


```
!       Standard Initializer File       V01.3   25-Jun-82
!+
!       Word Delimiter Macros
!-
DEF M DELIMITERS_PROGRAMMING
F=DELIMITERS_PROGRAMMING
I
DEF K GOLD CONT D AS "EXT DELIMITERS_WORD_PROCESSING."
^Z
C; ISE EN WO '^Z 9ASC 10ASC 11ASC 12ASC 13ASC 27ASC I ()[],-+*/=:'^Z EX
^Z
!
DEF M DELIMITERS_WORD_PROCESSING
F=DELIMITERS_WORD_PROCESSING
I
DEF K GOLD CONT D AS "EXT DELIMITERS_PROGRAMMING."
^Z
C; ISE EN WO '^Z 9ASC 10ASC 11ASC 12ASC 13ASC 27ASC I ,'^Z EX
^Z
!+
!       Screen Width Macros
!-
DEF M WIDTH_132
I=WIDTH_132
DEF K GOLD CONT W AS "EXT WIDTH_80."
SE SC 132
SE WR 131
^Z
!
DEF M WIDTH_80
I=WIDTH_80
DEF K GOLD CONT W AS "EXT WIDTH_132."
SE SC 80
SE WR 79
^Z
!+
!       Key Definitions
!-
DEF K 10      AS "."
DEF K CONT B AS "-W."
DEF K CONT F AS "+W."
DEF K CONT G AS "PASTE=?'Put buffer: '."
DEF K CONT P AS "PAR."
DEF K CONT X AS "CUTSR=?'Cut buffer: '."
!
DEF K GOLD DEL     AS "EXT CL ?'Clear what buffer: '."
DEF K GOLD 12      AS "(-22V)."
DEF K GOLD 13      AS "(+22V)."
DEF K GOLD CONT B AS "BSEN."
DEF K GOLD CONT D AS "EXT DELIMITERS_WORD_PROCESSING."
DEF K GOLD CONT G AS "CUTSR=DELETE PASTE=?'Replace with buffer: '."
DEF K GOLD CONT F AS "ESEN."
DEF K GOLD CONT H AS "(-C D-C +C UNDC)."
DEF K GOLD CONT I AS "(8C)."
DEF K GOLD CONT T AS "TOP."
DEF K GOLD CONT W AS "EXT WIDTH_132."
DEF K GOLD CONT X AS "EXT CO SELECT TO=?'Copy to buffer: ' ; F L."
DEF K GOLD CONT Z AS "EXT EX."
!
DEF K GOLD . AS "I~~/\~~^Z -6C."
DEF K GOLD / AS "S$~~/\~~$$."
DEF K GOLD B AS "EXT F=?'Buffer: '.."
DEF K GOLD C AS "(C SEL W CHGCSR)."
DEF K GOLD F AS "(SEL PAR FILLSR)."
DEF K GOLD I AS "EXT INC ?'Input file: ' =?' Buffer: '."
DEF K GOLD L AS "EXT F L."
DEF K GOLD M AS "EXT F=MAIN.."
DEF K GOLD O AS "EXT WR ?'Output file: ' =?' Buffer: '."
DEF K GOLD Q AS "EXT QUIT/SAVE."
DEF K GOLD S AS "EXT SH BU."
!+
!       Set Terminal Characteristics
!-
SE WR 79
SE TR
SE K
SE M-C
DELIMITERS_PROGRAMMING
!+
!       Set Buffer to MAIN, and Start
!-
F=MAIN
```

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- **Increased Capacity –** One Intersil DH-11 replaces nine DEC card slots
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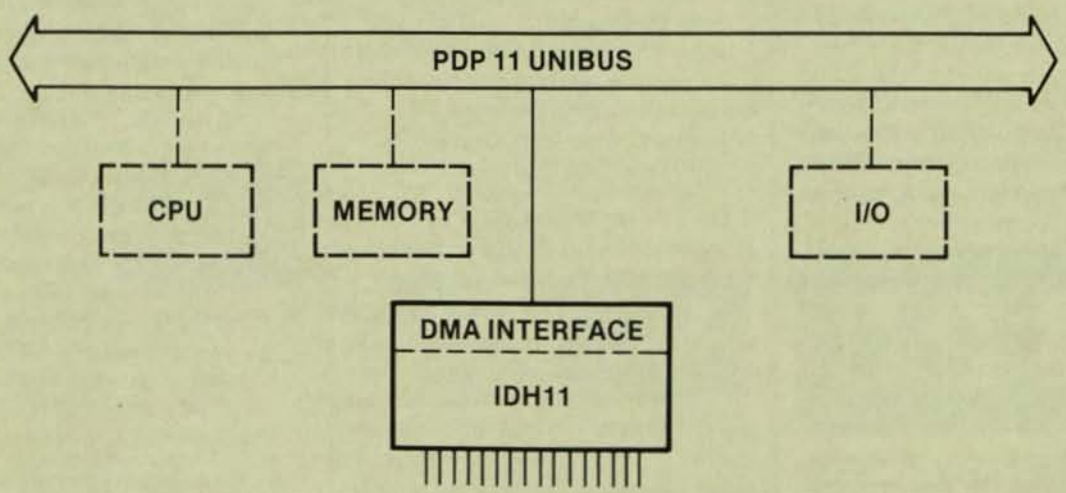

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CIRCLE D112 ON READER CARD

PAGE 68
NOVEMBER 1982
DECPROFESSIONALDECPROFESSIONALDECPROFESSIONALD

DEC USERS

Test your word processing I.Q.

And discover how the advanced features of LEX-11 can increase your w-p capabilities.

THE CHALLENGE:

Almost any word processing software package will have such features as menus, editing, spelling error detection, list processing, cut and paste, automatic word wrap and automatic pagination. . .

. . .But can you tell the difference between run-of-the-mill software and a system that is really special?

EEC SYSTEMS offers you this challenge! Test your word processing I.Q.

THE QUESTIONS:

1 EDITING

Which kind of editing operation is quickest to execute and easiest on the eyes of the word processing user?

a) Full screen editing allowing for easy cursor movement around the screen?

b) Moving the cursor around by doing a line count?

c) Editing on the bottom line of text only?

2 DOCUMENT LAYOUT

Whatever document format you choose. . .you want to see what the finished article will look like. Should you. . .

a) View it on the screen as it would come out of the printer?

b) Run it through a pre-processor to see what it looks like and then if you like it, print it?

3 KEYSTROKES

Using a well designed w-p system, how many keystrokes should it take to execute the most often used w-p functions?

a) One easy stroke with no codes?

b) Two or more with complex w-p codes?

c) Three or more?

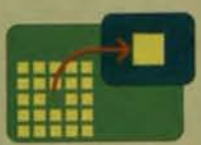
4 FLEXIBILITY

As the business manager of your company, you would like to find w-p software that you can tailor to your company's specific needs. Should you. . .

a) Look for w-p software that allows you to change and add menus, and change function keys?

b) Write your own custom software?

5 RETRIEVAL

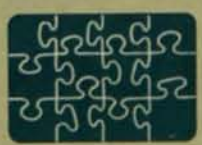


If you want to retrieve information quickly from a large database, which w-p software should you choose?

a) One that can access a particular record by going to it directly?

b) One that searches through all the records on the database sequentially until it finds the right one?

6 COMPATABILITY



As a manager of MIS, you want a w-p system that can be integrated with any other DEC compatable application software. Should you choose w-p software with. . .

a) ASCII formated files?

b) Software which requires non-printing characters in it's file system?

7 MATH

Your company has a number of financial applications and is looking for a w-p package with math capabilities. Should you choose. . .

a) On screen calculating allowing for editing, storing and recall of equations, calculations integrated with your word processing applications?

b) Software where the math capabilities are tied to the list processing module?

c) A separate math package?

THE ANSWERS:

If you answered "a" to all of the questions above, go to the top of the class. Chances are that you already use LEX-11 or are about to buy it. You know that LEX-11 is the ONLY word processing software that combines these advanced features. . .and more. . . in one software package.

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LEX-11 is available under the following operating systems: RT-11, TSX-Plus, RSX-11M, RSTS/E, IAS, UNIX (both PDP-11 and VAX), IDRIS, VMS. . . and it works in exactly the same way, with the same features for all operating systems, with your existing peripheral equipment.

CIRCLE D22 ON READER CARD

I do take exception to some of your answers in the Dear Dr. DEC column.

With regard to your answer to "Bussed Out," you stated that DEC makes a bus repeater as well as other vendors such as Able computer, with a reference to their advertisement.

While it is true that DEC makes a bus repeater, it is only for Unibus computers, not for Q-bus computers. This also applies to Able's. You might have pointed out that a truly functional Q-bus repeater must be capable of handling all lines of the LSI-11/23 processor including 22-bit addressing. To my knowledge, only the MLSI-DB11 Bus Repeater manufactured by MDB Systems has this capability.

Your answers to "Connect's" questions were not completely valid either.

MDB Systems makes a DL11 equivalent which provides EIA RS-232 and 20 MA current loop capability, as well as RS-422 circuitry on a single board, in addition to MODEM control. This single board designated the MDL-11, provides all of the capabilities of DEC's DL11 A,B,C,D and E modules. Our MDL-11W also provides RS-232, 20 MA current loop and RS-422 capability on a single module, as well as a line frequency clock.

MDB's 8 channel multiplexors for PDP-11 Unibus and LSI-11 Q-bus computers do allow the user a choice of EIA RS-232 and 20 MA current loop circuitry or EIA RS-232 and RS-422 circuitry on a per line basis. Consequently, Mix/Match capability does exist for these products. MDB's advertisement on page nine points out some of these capabilities.

With tongue-in-cheek, I might point out that your prescriptions for solutions are oriented toward the brand names, i.e. DEC, whereas the generic products made by other vendors will also suffice at a lower cost.

Since most doctors keep current on the latest state of the art in medicines by use of pharmaceutical detail men, I have enclosed literature on all of MDB's DEC compatible products for your research information. I am sure that other vendors would be pleased to do the same.

Sincerely yours,
Stan Margulis, Marketing Manager
MDB Systems, Inc., Orange, Calif.

The Doctor is on leave this issue, however, he has noted your suggestions.

—

I scanned your opening issue at a business associate's office yesterday and was very impressed with both the format and the editorial content. Unfortunately he would not let me remove the issue from his premises.

Please include me in your subscription list and, if possible, send me the July issue. If future issues measure up to your first, your success will be assured.

Sincerely,
Richard E. Behner, President
Digiwise Systems, Gardner, Kansas

—

I enjoyed the first edition of *The DEC Professional* very much. Enclosed please find (see below) an enhanced version of the Dibol Subroutine printed in that issue (July 1982).

Keep up the good work.

The Unknown Programmer

—

When I saw the dungeon map in your December 1981 issue, I couldn't resist pullng out my old map and putting on my baggy robe to take another journey into the dungeon. It was thrilling, especially since I use some "Magic" commands that few Dungeon-Masters have even discovered (like turn-off-thief). Well, I'm not prepared to share all of the secrets with the general public, but this map may give some clues to the adventurous ones that haven't gotten to the endgame, yet. The Endgame isn't shown because anyone who gets to it is more than capable of figuring it out. Further hints are available on a correspondence basis and only to seasoned adventurers (no armchair wizards, please). Have fun! Steve Roy, Diversified Consulting Co., Bloomingfield, CT 06002-0284 (203) 688-2821.

Steve's map appears on pages 88-89.

```
THE SUBROUTINE BELOW IS USED FOR NUMBER CONVERSION TO WORD FORMAT FOR CHECK
PRINTING. THE CALLING PROGRAM SHOULD USE :

                XCALL CHECK (INAMT,OUTAMT,LNGTH)

WHERE INAMT IS THE NUMBER CHECK AMOUNT INTO THE SUBROUTINE, OUTAMT IS THE
WORD FORMAT PASSED BACK, AND LNGTH IS THE LENGTH OF THE LINE PASSED BACK.
THE LENGTH IS ADDED FOR MULTIPLE LINE PRINTOUT OF THE WORDS IF THEY
EXCEED 55 CHARACTERS.
THE CALLING PROGRAM SHOULD DEFINE THE VARIABLES AS FOLLOWS:

                INAMT   ,D8
                OUTAMT  ,A100
                LNGTH   ,D3
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------


SUBROUTINE CHECK
        INAMT   ,D
        OUTAMT  ,A
        LNGTH   ,D
RECORD CENTS
                ,A4,'AND '
        CANT    ,A2
                ,A12,'/100 DOLLARS'
RECORD TABLE1
                ,A7,'1ONE   '
                ,A7,'1TWO   '
                ,A7,'5THREE '
                ,A7,'4FOUR  '
                ,A7,'4FIVE  '
                ,A7,'3SIX   '
                ,A7,'5SEVEN '
                ,A7,'5EIGHT '
                ,A7,'4NINE  '
RECORD,X
        ENTRY1  ,9A7
RECORD TABLE2
                ,A11,'3TEN        '
                ,A11,'6ELEVEN     '
                ,A11,'6TWELVE     '
                ,A11,'8THIRTEEN   '
                ,A11,'8FOURTEEN   '
                ,A11,'7FIFTEEN    '
                ,A11,'7SIXTEEN    '
                ,A11,'9SEVENTEEN  '
                ,A11,'8EIGHTEEN   '
                ,A11,'8NINETEEN   '
RECORD,X
        ENTRY2  ,10A11
RECORD TABLE3
                ,A9,'6TWENTY  '
                ,A9,'6THIRTY  '
                ,A9,'5FORTY   '
                ,A9,'5FIFTY   '
                ,A9,'5SIXTY   '
                ,A9,'7SEVENTY '
                ,A9,'6EIGHTY  '
                ,A9,'6NINETY  '
RECORD,X
        ENTRY3  ,8A9
RECORD AMT
                ,A8
RECORD,X
        NAMT    ,8A1
RECORD PLINE
                ,A100
RECORD
        CHAR    ,A1
        I       ,D2
        LEN     ,D3
        LENGTH  ,D1
        N       ,D2
        NAME    ,A11
        NSUB    ,D1
        TAMT    ,D8
PROC
BEGIN,
        AMT=INAMT
        LNGTH =
        I=1
        NSUB = 0
        PLINE =

LOOP,
        INCR NSUB
        IF(NSUB.EQ.7) GOTO DONE
        IF(NAMT(NSUB).EQ.' '.OR.NAMT(NSUB).EQ.'0') GOTO CONT
        IF(NSUB.NE.2.AND.NSUB.NE.5) GOTO ONES
        IF(NAMT(NSUB).EQ.'1') GOTO TEENS
        N=NAMT(NSUB)
        N=N-1
        NAME=ENTRY3(N)
        LENGTH=NAME(1,1)
        PLINE(I,I+LENGTH)=NAME(2,1+LENGTH)
        I=I+LENGTH+1
        GOTO CONT
TEENS,
        NSUB=NSUB+1
        N=NAMT(NSUB)
        N=N+1
        NAME=ENTRY2(N)
        LENGTH=NAME(1,1)
        PLINE(I,I+LENGTH)=NAME(2,1+LENGTH)
        I=I+LENGTH+1
        GOTO CONT
ONES,
        N=NAMT(NSUB)
        NAME=ENTRY1(N)
        LENGTH=NAME(1,1)
        PLINE(I,I+LENGTH)=NAME(2,1+LENGTH)
        I=I+LENGTH+1
CONT,
        IF(NSUB.EQ.3.AND.I.GT.1) CALL THOU
        IF(NSUB.EQ.1.OR.NSUB.EQ.4) CALL HUND
        GOTO LOOP
THOU,
        PLINE(I,I+8)='THOUSAND '
        I=I+9
        RETURN
HUND,
        IF(NAMT(NSUB).EQ.'0') RETURN
        IF(I.EQ.1) RETURN
        PLINE(I,I+7)='HUNDRED '
        I=I+8
        RETURN
DONE,
        CANT=AMT(7,8)
        IF(CANT.EQ.'00') CANT='NO'
        PLINE(I,I+18)=CENTS
        IF(I.EQ.1) PLINE(I,I+18)=CENTS(5,18)
        OUTAMT=PLINE
        LEN=I+18
        IF(LEN.LE.55) RETURN
        LNGTH=56
DONE1,
        LNGTH=LNGTH-1
        IF(LNGTH.EQ.1) RETURN
        IF(OUTAMT(LNGTH,LNGTH).NE.' ') GOTO DONE1
        RETURN
END
```

What gives your VAX or PDP 11 TOTAL NETWORKING, MORE THROUGHPUT AND BETTER PERFORMANCE?

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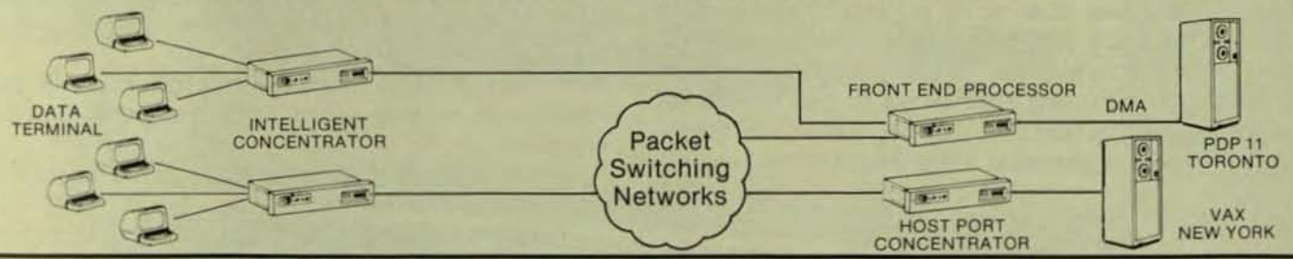

Our family of LSI-X.25 products are designed to give you everything needed to join the Networking revolution. You will increase the efficiency of your operation while improving your speed, accuracy, flexibility and control.

Front End Processor
Provides VAX or PDP-11 DMA communications multiplexing for up to 127 terminals without any application software changes.

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Cluster controller for up to 32 asychronous terminals on a private line or an X.25 Network supporting either direct hardwired connection or dial-up modem PAD service. Additional software provides formatted screen mode for prompting and checking information from data entry clerks. The templates are stored in the concentrator and accessed as needed for greater accuracy and reduced CPU processing time.

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File transfer between VMS, RSTS/E, RSX-11M and RT-11 systems eliminating magnetic tape or costly hardware solutions. Portal can be used with Cableshare's full X.25 networking products to provide file transfer over both public and private packet switched networks.

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CIRCLE D33 ON READER CARD

PAGE 72 NOVEMBER 1982
DECPROFESSIONALDECPROFESSIONALDECPROFESSIONALD

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CIRCLE D23 ON READER CARD

PAGE 74 NOVEMBER 1982
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Your time is money

Every second you spend programming costs you money. Our **DEC-compatible software** gets you faster answers and more productivity with lower programming costs.

Take EasyEntry, our forms management and data entry system for the PDP-11 and VAX. You design and implement forms on-screen — in hours instead of days.

But you don't sacrifice versatility for speed. EasyEntry is powerful enough to handle complex tasks like transaction processing and data retrieval. It can be used as your complete data processing system.

And we have three more software solutions to save you time and money: AIS-PL/I, a multi-purpose language for the PDP-11 and VAX; BURCOM-11, our exclusive Burroughs-DEC communications link and WP Saturn, a powerful word and list processor for the PDP-11 and VAX.

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CIRCLE D78 ON READER CARD

PAGE 76 NOVEMBER 198
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DEC

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12117 Riverwood Drive, Burnsville, Minnesota 55337

CIRCLE D74 ON READER CARD

```
4       EXTEND
6       !!>CH-FILENAME------ACCESS-------MNEMONIC
            1-OUTPUT.FIL    I/O           OUTPUT FILE FROM LIB
            2-INPUT.LIB     I/O           INPUT LIB FILE
            3-WL:           LSET          DIR BUFFER
            4-U                           <UNUSED>
            5-U                           <UNUSED>
            6-U                           <UNUSED>
            7-U                           <UNUSED>
            8-U                           <UNUSED>
            9-U                           <UNUSED>
           10-U                           <UNUSED>
           11-U                           <UNUSED>
           12-COMMAND KB:
12      DIM AMB(2%),CDS(2%),DIR.BLK$(2%),DIR.DAT$(2%),DIR.ENT$(2%,31%),
            DIR.FDS$(30%),DMB(2%),EOS(2%),EPPN$(2%),FB(2%),
            F.DAT$(2%),FDS(2%),FLAGS(2%),FLN$(10%),FOS$(30%),
            LAST.DIR.BLK$(30%),LBF$(2%),LIB$(2%),MMB(2%),MAB$(2%),
            NOS(2%),NOB$(2%),RTN.FOS$(30%),SEL$(10%)

                                  !!>DIM ALL INCORE ARRAYS

25      PB$="SLIB"
        \ ON ERROR GOTO 32000
        \ NB=""
        \ LB=CHR$(13%)+CHR$(10%)
        \ KB%=12%
                                  !!>PROGRAM NAME
                                  !  TRAP ERRORS
                                  !  NB=NULL STRING
                                  !  LB=<CR><LF>
                                  !  KB%=KEYBOARD CHANNEL

30      OPEN "KB:" AS FILE KB%
        \ X$=0$
                                  !!>OPEN KEYBOARD FOR INPUT

80        NULL$=FNR$(FNR$(' '))
        \ WILD$=FNR$(FNR$('*.*'))

              !!>SET UP FILE NAME SCAN CONSTANTS

500       OPEN 'WL:' AS FILE 3%,RECORDSIZE 1024%
        \ FIELD #3%,512% AS DIR.DAT$(1%),512% AS DIR.DAT$(2%)
        \ FIELD #3%,2% AS NOB$(1%),2% AS MAB$(1%),2% AS AMB(1%),2% AS DMB(1%),
                    4% AS LBF$(1%),500% AS DUMMY$,
                  2% AS NOB$(2%),2% AS MAB$(2%),2% AS AMB(2%),2% AS DMB(1%),
                    4% AS LBF$(2%),500% AS DUMMY$
        \ FIELD #3%,12% AS DUMMY$,16%*(E%-1%) AS DUMMY$,16% AS DIR.ENT$(1%,E%)
                              FOR E%=1% TO 31%
        \ FIELD #3%,524% AS DUMMY$,16%*(E%-1%) AS DUMMY$,16% AS DIR.ENT$(2%,E%)
                              FOR E%=1% TO 31%

                                  !!>FIELD NULL DEVICE

510       LSET DIR.DAT$(1%)=STRING$(512%,0%)
        \ LSET LBF$(1%)=FNR$('PLIB')
        \ EMPTY$=DIR.DAT$(1%)+NB

                      !!>CREATE INITIALIZED DIR DATA STRING

520       C.1%=1%
        \ C.2%=2%

                                  !!>CHANNEL NUMBERS

530       DIR.FMT$="##### ##### \       \ \       \ \       \

                                  !!>DIR PRINT FORMAT

540       CPPN$=PPN$

                                  !!>SAVE CURRENT PPN

999                                                 !
                                                    !!>BEGIN MAINLINE PROCESSING
                                                    !
1000      LIB$(1%),LIB$(2%)=0$
        \ IN.FLAGS(1%),IN.FLAGS(2%),LIB%=0%
        \ DIR.BLK$(1%),DIR.BLK$(2%)=0$
        \ LAST.DIR.BLK$(1%),LAST.DIR.BLK$(2%)=0$
        \ FLAGS(C.1%),FLAGS(C.2%),E%=0%
        \ USER$,USER1$,OPS$,OPJ$,IN$,IN$=NB
        \ LP.SPOOL$,DIR,HEAD$=-1%

                  !!>INIT VAR. BETWEEN COMMANDS

1010      E%=FNO%('SLIB$')
        \ GOTO 9050 IF E%
        \ OPS=FND$(IO$,"=")
        \ IN$=T2$ IF T1%
        \ IN$=OPS IF IN$=NB
        \ OPS=NB  IF IN$=OPS
        \ OPS=FND$(OPS,"/")
        \ OPJ$=T2$ IF T1%
        \ IN$=FND$(IN$,"/")
        \ IN$=T2$ IF T1%
        \ IN$=IN.SAV$ IF IN$=NB
        \ E%=3% IF FNF%$(IN$) IF IN$<>NB
        \ GOTO 1500$ IF E%
        \ E%=2% IF FNF%$(OPS) IF OPS<>NB
        \ GOTO 1500$ IF E%
        \ E%=13% IF IN$=NB
        \ GOTO 1500% IF E%

                  !!>GET COMMAND LINE
                  !  SEPARATE INPUT AND OUTPUT FILE SPECS.
                  !  REMOVE AND SWITCHES FROM THE NAMES

1020      IF LEN(IN$) THEN      I$=IN$
        \                       GOSUB 5000$
        \                       GOTO 1500$ IF E%
        \                       FLAGS(C.1%)=FLAGS
        \                       IN.FLAGS(C.1%)=IN.FLAGS

                  !!>LOOK AT INPUT SWITCHES IF ANY
                  !  AS LONG AS THEY ARE GOOD CONTINUE

1030      IF LEN(OPS) THEN      I$=OPS
        \                       GOSUB 5000$
        \                       GOTO 1500$ IF E%
        \                       FLAGS(C.2%)=FLAGS
        \                       IN.FLAGS(C.2%)=IN.FLAGS

                  !!>LOOK AT OUTPUT SWITCHES IF ANY
                  !  AS LONG AS THEY ARE GOOD CONTINUE
```

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CIRCLE D116 ON READER CARD


```
1040      ES=-125
          \ IF FLAGS(C,1%)=0% THEN
                IF FLAGS(C,2%)=0% OR FLAGS(C,2%)=1024% 
                      THEN 2000% ELSE
                           GOTO 1500%

                !>>>ADDING TO A LIB TAKES ONLY A '/SL' OR
                ! NOTHING ON THE OUTPUT FILE BUT NO SWITCHES
                ! ON THE INPUT FILE.

1050      IF (FLAGS(C,1%) AND 128%)=0% THEN 1060 ELSE
                IF (FLAGS(C,1%) AND NOT(704%)) THEN 1500%
          ELSE  IF (FLAGS(C,2%) AND NOT(1024%)) THEN 1500%
          ELSE  GOTO 2000%

                !>>>EXTRACTING FROM A LIB REQUIRES A '/EX'
                ! THE ONLY OTHER SWITCHES ALLOWED WITH THE
                ! '/EX' ARE '/MS:' AND '/NF'. THE OUTPUT
                ! SIDE CAN ONLY HAVE A '/SL' SWITCH.

1060      IF FLAGS(C,2%)=0% THEN
                IF FLAGS(C,1%)=66% THEN 2000%
          ELSE  IF FLAGS(C,1%)=320% THEN      2000%
          ELSE  IF FLAGS(C,1%)=65% THEN 2000%
          ELSE  IF FLAGS(C,1%)=8%  THEN 2000%
          ELSE  IF FLAGS(C,1%)=16% THEN 2000%
          ELSE  IF FLAGS(C,1%)=32% THEN 2000%
          ELSE  IF FLAGS(C,1%)=72% THEN 2000%
          ELSE  IF FLAGS(C,1%)=80% THEN 2000%
          ELSE  IF FLAGS(C,1%)=96% THEN 2000%
          ELSE  IF FLAGS(C,1%)=4%  THEN 1080%
          ELSE  GOTO 1500%

                !>>>THE OTHER COMBO'S ARE '/DR/MS:'
                !                        '/ER/MS:'
                !                        '/FF:I/MS:'
                !                        '/DI' '/BR' '/FD'
                !                        '/DI/MS:' '/BR/MS:' '/FD/MS:'
                !       AND SPECIAL CASE '/CF'

1070      GOTO 1500%

                !>>>IF YOU GET THIS FAR THEN SWITCHES ARE INCORRECT

1080      ES=0%
          \ ES=-16% IF OFS<>NS
          \ GOTO 1500% IF ES
          \ OPEN FNDEV$(FNS(INS)+'TEM'+NUM1$(FNJ%)+'.SLB'
          \ FS(C,1%)=INS
          \ FS(C,2%)=OFS
          \ GOSUB 5300%
          \ GOTO 1500% IF ES
          \ ES=-20% IF LIBS(C,1%)=-1% AND LIB%=0%
          \ GOTO 1500% IF ES
          \ LIBS(C,2%)=LIBS(C,1%)
          \ GOSUB 5100%
          \ GOTO 1500% IF ES
          \ USER$=WILD$
          \ PRINT #KB%,'Compressing ';FS(C,1%)
          \ GOSUB 10000%
          \ GOTO 1500% IF ES
          \ CLOSE C,1%,C,2%
                !>>>PREPARE FOR LIB COMPRESS
                ! SAVE FILE NAMES
                ! THEN OPEN INPUT AND OUTPUT 'LIB'S
                ! SET UP TO MATCH ON WILD CARD AND THEN PROCESS
                ! CLOSE FILES WHEN COMPLETE AND NO ERROR

1090      KILL FS(C,1%)
          \ NAME FS(C,2%) AS FS(C,1%)
          \ GOTO 1000%

                !>>>CLEAN UP AFTER 'LIB' COMPRESS.

1500      GOSUB 16005
          \ ES=0%
          \ CLOSE C,1%,C,2%
          \ GOTO 1000%

                !>>>PRINT ERROR MESSAGE AND GO BACK TO PROMPT

1600      GOTO 1620 IF ES>=0%
          \ RESTORE
          \ I$=NS
          \ READ I%,I%,I$ UNTIL I$='***'
          \ READ ERN%,ERT$ UNTIL (ERN%=ABS(ES) OR ERT$='***')
          \ IF ES=-ERN% THEN PRINT #KB%,ERT$;
          \                  PRINT #KB%,FNFPN$(EPPN$); IF ES=-21%
          \                  PRINT #KB%
          \                  RETURN

                !>>>SEARCH FOR ERROR NUMBER , IF YOU FIND
                ! IT PRINT ERROR TEXT AND GO BACK T'
                ! COMMAND LINE PROMPT.

1610      PRINT #KB%,'?Program Bug, Error ';ES
          \ PRINT #KB%,'? Submit SPR to system manager'
          \ RETURN

                !>>>TELL WHAT ERROR CAUSED THE PROBLEM
                ! AND TELL THEM WHAT TO DO ABOUT IT.

1620      PRINT #KB%,FNE$(ES)
          \ RETURN

                !>>>SYSTEM ERROR ...

2000      ES=0%
          \ FS(C,1%)=INS
          \ FS(C,2%)=OFS
          \ IF (FLAGS(C,1%)=0% AND FLAGS(C,2%)=0%) OR
               (FLAGS(C,2%) AND 1024%) OR
                    ((FLAGS(C,1%) AND 128%) AND OFS<>NS) THEN
                         GOSUB 5100%
                         GOTO 1500% IF ES
                         GOTO 2020

                !>>>SET UP FILE NAMES THEN CHECK TO SEE
                ! IF OUTPUT FILE SHOULD BE A 'LIB' IF
                ! IT SHOULD BE THEN TRY TO OPEN IT AS
                ! A 'LIB'. QUIT IF NOT A 'LIB'

2010      GOSUB 5200% IF OFS<>NS
          \ GOSUB 5210% IF OFS=NS
          \                   GOTO 1500% IF ES

                !>>>IF NO OUTPUT FILE THEN QUIT OTHERWISE
                ! OPEN THE FILE , QUIT IF ANY ERROR

2020      IF FLAGS(C,1%) THEN   GOSUB 5300%
                                GOTO 1500% IF ES

                !>>>IF INPUT IS A 'LIB' THEN OPEN IT AS SUCH
                ! THEN IF NOT A 'LIB' OR SOME OTHER ERROR
                ! THEN QUIT.
```

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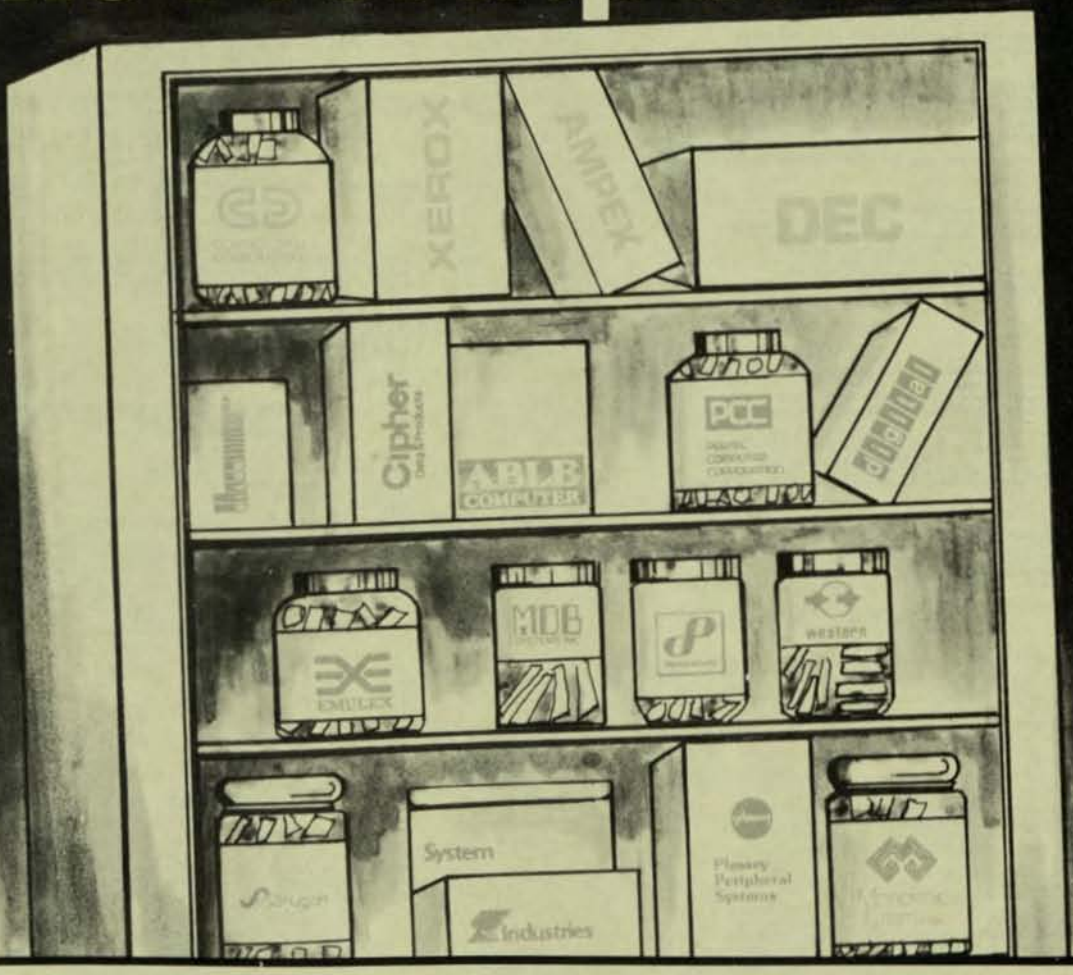

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CIRCLE D11 ON READER CARD

```
2030    IF FLAG$(C.1%) THEN GOSUB 10000$
        \ GOTO 1500$ IF E%
        \ CLOSE C.1%,C.2%
        \ GOTO 1000$

                !>>DO PROCESSING IF INPUT FILE IS A 'LIB'


2040    E%=FNFSS$(IN$)
        \ DIR.FSS$(E%)=FSS$(E%) FOR E%=0% TO 30%
        \ DIR.FSS$(1%)=6%
        \ DIR.FSS$(2%)=17%
        \ DIR.FSS$(3%),DIR.FSS$(4%)=0%
        \ DIR.FSS$(E%)=0% FOR E%=13% TO 22%
        \ DIR.FSS$(E%)=0% FOR E%=27% TO 30%
        \ DIR.MATCH$,SELECT$=0%
        \ GOSUB 3000$ IF (IN.FLAG$(C.1%) AND 4096%)

                !>>SET UP DIRECTORY LOOKUP ROUTINE


2050    E%=FNDIR.FSS$(DIR.MATCH$)
        \ IF E% THEN E%=-4% IF SELECT$=0%
        \               GOSUB 1600$ IF E%<>%
        \               E%=0%
        \               CLOSE C.1%,C.2%
        \               GOTO 1000$

                !>>LOOKUP MATCH NUMBER DIR.MATCH$


2060    SELECT$+=1%
        \ USER1$=DIR.NAME$
        \ GOTO 2070 IF FNTORM$(USER1$) IF (IN.FLAG$(C.1%) AND 2048%)
        \ F$(C.1%)=DEV$+FFN$+DIR.NAME$
        \ GOSUB 5350$
        \ F.BLK$=1%
        \ GOSUB 15300$  IF E%=0%
        \ IF E% THEN PRINT #KB%,'?Error while adding ';USER1$;' ';
        \               GOSUB 1600$
        \               E%=0%
        \               GOTO 2070$

                !>>IF ANY ERROR TELL THE USER AND THEN CONTINUE


2065    IF E%=0% THEN
                IF (IN.FLAG$(C.1%) AND 4096%) THEN
                        KILL F$(C.1%)
        \               DIR.MATCH$=DIR.MATCH$-1%

                !>>IF NO ERROR AND THE KILL INPUT FILE
                !  FLAG IS SET THEN WIPE OUT INPUT FILE.


2070    CLOSE C.1%
        \ DIR.MATCH$=DIR.MATCH$+1%
        \ GOTO 2050

                !>>PASS NAME TO ADD TO 'LIB' ROUTINE
                !  PRINT ERROR MESSAGE IF ANY
                !  ZERO ERROR FLAG AND INCREMENT MATCH
                !  COUNT. THEN LOOK FOR NEXT ONE.


3000            PRINT #KB%,'** Warning , this program will kill any input'
        \       PRINT #KB%,'**                  file that is loaded into a library'
        \       PRINT #KB%,'**                  with no error.'
        \       PRINT #KB%,'*****************************************************'
        \       RETURN

                !>>PRINT WARNING MESSAGE


4900    E%=FNI%("TYPE <CR> TO EXIT .. ")
        \STOP IF IO$="STOP"             !>>ABORT TO HERE ON ABNORMAL EXIT
4950    GOTO 32760

                                        !>>EXIT POINT


5000    FLAG$,IN.FLAG$=0%


DATA LOST
                !>>CLEAR SWITCH FLAGS

5010    SW$=FND$(Z$,'/')
        \ Z$=T2$
        \ RESTORE

                !>>LOOK FOR END OF SWITCH THEN SAVE ALL THATS LEFT
                !  RESET TO FIRST DATA STATEMENT.

5020    READ VL$,OP$,SW$
        \ GOTO 5030 IF SW$=LEFT(SW$,2%)
        \ GOTO 5020 IF SW$<>"**"
        \ E%=-5%
        \ RETURN

                !>>SCAN THRU SWITCHES IF FOUND THEN
                !  BRANCH OUT , OTHERWISE IF NONE LEFT
                !  THEN RETURN ERROR.

5030    FLAG$=FLAG$ OR VL$ IF VL$<2048%
        \ IN.FLAG$=IN.FLAG$ OR VL$ IF VL$>=2048%
        \ GOSUB 5040 IF OP$
        \ GOTO 5010$ IF Z$<>N$
        \ RETURN

                !>>SET BIT AND GO BAC

DATA LOST
E FOR MORE IF ANY

5040    IF VL$=1% THEN LP.SPOOL$=FNV$(RIGHT(SW$,4%))
        \               RETURN IF E%=0%
        \               E%=-19%
        \               RETURN

                !>>GET PRINTER TO SPOOL TO


5050    IF VL$=128% THEN DEVACT$=RIGHT(SW$,4%)
        \               DEVACT$=FNDEV$(DEVACT$+'FOO.BAT')
        \               DEVACT$='DI:'+FNFFN$(CFFN$) IF DEVACT$=''
        \               RETURN

                !>>GET EXTRACT DEVICE AND FFN


5060    IF VL$=64% THEN USER$=RIGHT(SW$,4%)
        \               USER$=FNR5$(FND$(USER$))
        \               E%=-14% IF USER$=NULL$ OR USER$=N$
        \               RETURN

                !>>GET MEMBER SELECTION


5065    IF VL$=0%       THEN USER$=FNV$(RIGHT(SW$,4%))
        \               E%=-28% IF E%
        \               RETURN IF E%
        \               E%=-29% IF USER$<>CFFN$
        \               LIB$=-1% IF E%=0%
        \               RETURN

                !>>CHECK FOR LIBRARIAN


5070    RETURN

                !>>NOT A SWITCH WE NOW WHAT TO DO ..


5100    F$(C.2%)=FNSLB$(F$(C.2%))
        \ RETURN IF E%
        \ OPEN F$(C.2%) FOR OUTPUT AS FILE C.2%,MODE 128%
        \ PRINT #KB%,'Creating ';F$(C.2%)
        \ C%=C.2%
        \ GOSUB 5400$
        \ NEW.BLK%=1%
        \ GOSUB 23080$
        \ RETURN IF E%
        \ GOSUB 23000$
        \ RETURN

                !>>OPEN 'LIB' , IF ONE DOES NOT ALREADY EXIST THEN
                !  CREATE ONE. FIELD THE BUFFER AND INITIALIZE THE
                !  DIRECTORY STRUCTURE.


5110    OPEN F$(C.2%) FOR INPUT AS FILE C.2%
        \ E%=-17% IF (STATUS AND 1024%)
        \ RETURN IF E%
        \ C%=C.2%
        \ GOSUB 5400$
        \ DIR.BLK$(C%)=1%
        \ GOSUB 23000$
        \ RETURN

                !>>OPEN 'LIB' CHECK FOR WRITE ACCESS , THEN
                !  FIELD BUFFER AND READ FIRST DIR BLOCK.


5200    OPEN F$(C.2%) FOR OUTPUT AS FILE C.2%,MODE 128%
        \ RETURN

                !>>OPEN OUTPUT FILE , BUT DON'T WIPE OUT
                !  ANY FILE OF THE SAME NAME.


5210    OPEN 'KB:FOO.DAT' FOR OUTPUT AS FILE C.2%
        \ RETURN

                !>>OPEN KEYBOARD IF NO CHANNEL 2 FILE


5300    F$(C.1%)=FNSLB$(F$(C.1%))
        \ RETURN IF E%
        \ OPEN F$(C.1%) FOR INPUT AS FILE C.1%
        \ IN.DAY$=F$(C.1%)
        \ E%=-17% IF (STATUS AND 1024%)
        \ RETURN IF E%
        \ C%=C.1%
        \ GOSUB 5400
        \ DIR.BLK$(C%)=1%
        \ GOSUB 23000$
        \ RETURN

                !>>OPEN INPUT 'LIB' , CHECK FOR WRITE
                !  ACCESS TO FILE , FIELD BUFFER , THEN
                !  READ FIRST DIR BLOCK.


5350    OPEN F$(C.1%) FOR INPUT AS FILE C.1%
        \ E%=-11% IF (STATUS AND 1024%)
        \ RETURN        IF E%
        \ C%=C.1%
        \ GOSUB 5400$
        \ RETURN

                !>>ADD OPEN SUBROUTINE


5400    FIELD #C%,512% AS F.DATA$(C%)
        \ RETURN

                !>>FIELD BUFFER FOR INPUT AND OUTPUT
                !  FILES , IF THEY ARE 'LIB'S


10000   C%=1%
        \ DIR.BLK$(C%)=1%
        \ GOSUB 23000$
        \ RETURN IF E%
        \ USER$=WILD$ IF USER$=N$
        \ MATCH$=0%
        \ WILD$=INSTR(1%,USER$,'?')

                !>>LOOK AT FIRST DIR BLOCK
                !  QUIT IF FILE NOT A 'SLIB'


10010    FOR DE2% =1% TO CVT$%(AMB(C.1%))
        \ DE%=DE2%
        \ GOSUB 23080
        \ RETURN IF E%
        \ GOTO 10020 IF RDB(C.1%)+-1% UNLESS (FLAG$(C.1%) AND 32%)
        \ IF FNMATCH%(USER$,MNB(C.1%),(IN.FLAG$(C.1%) AND 2048%)) THEN  MATCH%=-1%
        \               GOSUB 10500$
        \               RETURN IF WILD$=0%
        \               IF E% THEN PRINT #KB%,'?Member ';MNB(C.1%);' ';
        \                                       GOSUB 1600$
        \                                       E%=0%

                !>>LOOK AT EACH ENTRY IN THE DIRECTORY
                !  IF THE ENTRY MATCHES THE SELECTION
                !  CRITERIA THEN PROCESS THE MEMBER.
                !  THEN IF USER SELECTION WAS NOT A WILD
                !  CARD ONE THEN QUIT SEARCH


10020   C%=C.1%
        \ NEXT DE2%
        \ GOSUB 23100$
        \ GOTO 10010 IF E%=0%
        \ IF E%=-27% THEN E%=0%
        \               IF (FLAG$(C.1%) AND 56%) THEN GOSUB 11100$ ELSE
        \                 E%=-7% IF MATCH%=0%
        \                 RETURN

                !>>LOOK AT NEXT MEMBER IN DIRECTORY
                !  IF NO MORE DIRECTORY ENTRIES LEFT
                !  THEN RETURN.


10030   RETURN

                !>>GO BACK WITHOUT ZEROING ERROR IF
                !  NOT END OF DIRECTORY STRUCTURE.


10500   IF (FLAG$(C.1%) AND 256%) THEN
                RETURN IF EFFN$(C.1%)=0%
        \       E%=-25% IF EFFN$(C.1%)<>CFFN$ IF LIB$=0%
        \       RETURN IF E%
        \       KFFN$(C.1%),KD$(C.1%)=0%
        \       GOSUB 23060
        \       RETURN IF E%
        \       GOSUB 23070$
        \       RETURN

                !>>IF ERASING EXTRACT FLAGS THEN CHECK
                !  TO SEE IF FILE IS CHECKED OUT, IF SO
                !  THEN CHECK TO SEE IF 'WE' CHECKED IT
                !  OUT OR 'WE' ARE THE LIBRARIAN. IF SO
                !  THEN CLEAR FLAGS AND WRITE BACK.
```

```
10510     IF (FLAG$(C.1%) AND 2%) THEN GOSUB 16000%
          \                 RETURN IF E%
          \                 PRINT #KB%,'Deleting ';MN$(C.1%);' from ';FI$(C.1%)
          \                 RETURN

                            !>>>IF DELETING FILES THEN IF FILE NOT CHECKED
                            !  OUT THEN SET SPECIAL EXTRACT DATE AND INCREMENT
                            !  NUMBER OF DELETED MEMBERS THIS DIR BLOCK.


10520     IF (FLAG$(C.1%) AND 128%) THEN
                  EPPN%=EPPN%(C.1%)
          \       E%=-235 IF (EPPN%(C.1%)<>0%) AND ((FLAG$(C.1%) AND 512%)=0%)
          \       RETURN IF E%
          \            GOSUB 15000%
          \            RETURN IF E%
          \                 C%=C.1%
          \                 DE%=DE2%
          \                 IF (FLAG$(C.1%) AND 512%) THEN RETURN
                      ELSE        EPPN%(C.1%)=CPPN%
          \                 ED$(C.1%)=FND$
          \                 GOSUB 23060%
          \                 RETURN IF E%
          \                 GOSUB 23020%
          \                 RETURN

                            !>>>IF EXTRACTING THEN IF NOT CHECKED OUT OR NOT
                            !  FLAGGING EXTRACTIONS THEN TAKE OUT OF THE LIB
                            !  THEN IF EXTRACTING THEN SET EXTRACT PPN AND
                            !  DATE. WRITE BACK UPDATED DIR BLOCK.


10530     IF (FLAG$(C.1%) AND 4%) THEN
                            GOSUB 15000%
          \                           C%=C.1%
          \                           RETURN

                            !>>>IF COMPRESSING THEN MOVE DATA OVER
                            !  AND THEN RETURN FOR MORE.


10540     IF (FLAG$(C.1%) AND 56%)<>0% THEN      10600
               ELSE                 GOSUB 11000%
          \                 PRINT #C.2%,MN$(C.1%);
          \                 PRINT #C.2%,'*';          IF ED$(C.1%)<-1%
          \                 PRINT #C.2%,' ';          IF ED$(C.1%)<>-1%
          \                 IF (FLAG$(C.1%) AND 16%) THEN GOSUB 11090
          \                                           PRINT #C.2%,' ',
          \                                           RETURN

                      !>>>IF DOING DIRECTORIES THEN DO THIS CODE.
                      !  PRINT FILE NAME AND FLAG IF FILE IS DELETED
                      !  THEN IF DOING BRIEF DIR THEN ADD TO TOTAL AND
                      !  RETURN.


10550                 PRINT #C.2%,USING DIR.FMT$,FB$(C.1%),WD$(C.1%),
                            DAT$(CD$(C.1%)),PWPPN$(EPPN%(C.1%)),
                            FWED$(ED$(C.1%))
          \           GOSUB 11090
          \           RETURN

                      !>>>PRINT REST OF DIR LINE COUNT BLOCKS AND
                      !  THEN RETURN


10600     RETURN

                      !>>NO MORE SWITCHES SET


11000     IF DIR.HEAD$ THEN     PRINT #C.2%,'Directory of ';FI$(C.1%);
                                      ' on ';DATE$(0%)
          \                   PRINT #C.2%,'File is a ';
          \                   PRINT #C.2%,'SLB '; IF LIB$(C.1%)<>-1%
          \                   PRINT #C.2%,'PLB '; IF LIB$(C.1%)<3%
          \                   PRINT #C.2%,'library.'
          \                   DIR.HEAD$=0$
          \         IF (FLAG$(C.1%) AND 40%) THEN
                                PRINT #C.2%,'Name   Ext  Start   Size  ';
                                  'Date       Ext PPN    Ext Date'


                      !>>>PRINT HEADER OF DIR


11010           RETURN

                      !>>>PRINT HEADER FIRST TIME


11090     TOT.MEM%=TOT.MEM%+1%
          \ TOT.BLK%=TOT.BLK%+NB$(C.1%)
          \ RETURN

                      !>>ADD UP FOR TOTAL


11100     PRINT #C.2%
          \ PRINT #C.2%,USING 'Total of ##### block(s) in ##### member(s) ',
                      TOT.BLK%,TOT.MEM%;
          \           TOT.MEM%,TOT.BLK%=0%
          \         PRINT #C.2%
          \         CLOSE C.2%
          \           RETURN


                      !>>>PRINT TOTAL


15000     GOTO 15300 IF LIB$(C.2%)
          \ OUT$=DEVACT$+MN$(C.1%)
          \ OPEN OUT$ FOR OUTPUT AS FILE C.2%,MODE 128%
          \ PRINT #KB%,'Creating ';MN$(C.1%);' in ';DEVACT$;' from ';FI$(C.1%)
          \ B.BLK%=0%
          \ FOR BLK%=FB%(C.1%) TO FB%(C.1%)+(NB%(C.1%)-1%)
          \       E%=FNDISK.READ%(BLK%,C.1%)
          \       RETURN IF E%
          \       B.BLK%=B.BLK%+1%
          \       E%=FNDISK.WRITE%(B.BLK%,C.2%+SWAP%(C.1%))
          \       RETURN IF E%
          \ NEXT BLK%
          \ CLOSE C.2%
          \ RETURN

                      !>>>OUTPUT FILE , BUT NOT IF IT ALREADY EXISTS


15300     C%=2%
          \ USER1$=MN$(C.1
DATA LOOT
%) IF LIB$(C.1%)
          \ GOTO 15330 IF (FLAG$(C.1%) AND 4%) OR
                          (IN.FLAG$(C.2%) AND 8192%)
          \ DIR.BLK%(C%)=1%
          \ GOSUB 23000%
          \ RETURN IF E%

                !>>ACCESS OUTPUT LIB FILE
                !  START AT FIRST DIR BLOCK AND READ IT
                !  QUIT IF ERROR
                !  IF DOING A COMPRESS SKIP ADD CHECK
                !  SET SEARCH NAME UP


15310     FOR DE1%=1% TO CVT%%(AM$(C.2%))
          \ DE%=DE1%
          \ GOSUB 23040%
          \ RETURN IF E%
          \ GOTO 15320 IF ED$(C.2%)<>-1%
          \ IF FNMATCH%(USER1$,MN$(C.2%),0%) THEN
                      E%=-245 IF EPPN%(C.2%)<>0%
          \           RETURN IF E%
          \           EPPN%(C.2%)=0%   IF LIB% OR
                                  ((EPPN%(C.2%)=CPPN%) AND  (LIB$(C.2%)<-2%))
          \            GOSUB 16000%
          \           RETURN IF E%
          \     PRINT #KB%,'Replacing ';USER1$;' in ';FI$(C.2%)
          \     A.MEM%=A.MEM%+1%
          \           GOTO 15340

                !>>LOOP THRU DIR BLOCK , READ ENTRY
                !  IF DELETED SKIP OTHERWISE CHECK FOR
                !  MATCH.


15320     NEXT DE1%
          \ GOSUB 23100%
          \ GOTO 15310 IF E%=0%
          \ RETURN IF E%<>-27%

                !>>NEXT DIR ENTRY , THEN NEXT DIR BLOCK
                !  IF NO MORE BLOCKS THEN FALL THRU


15330       E%=0%
          \ PRINT #KB%,'Adding ';USER1$;' to ';FI$(C.2%)
          \ IF LAST.DIR.BLK$(C.2%)       THEN
                  DIR.BLK$(C.2%)=LAST.DIR.BLK$(C.2%)
          \       GOSUB 23000%
          \ RETURN IF E%

                !>>REMEMBER LAST DIR BLOCK AND THEN READ IT


15340     GOTO 15350 IF CVT%%(AM$(C.2%))<31%
          \ GOSUB 23100
          \ GOTO 15340 IF E%=0%
          \ RETURN IF E%<>-27%
          \ E%=0%
          \ NEW.BLK%=CVT%$(NAB$(C.2%))
          \ LSET NAB$(C.2%)=CVT%$(0%)
          \ LSET NUB$(C.2%)=CVT%$(NEW.BLK%)
          \ DIR.BLK%(C.2%)=LAST.DIR.BLK%(C.2%)
          \ GOSUB 23020
          \ RETURN IF E%
          \ GOSUB 23080
          \ RETURN IF E%

                !>>SPACE AVAILABLE ??? , IF NOT
                !  READ NEXT DIR BLOCK AND CHECK
                !  IF NO MORE DIR BLOCKS THEN SET
                !  UP LINKAGE AND THEN ADD A NEW ONE.


15350     DE%=CVT%%(AM$(C.2%))+1%
          \ LSET AM$(C.2%)=CVT%$(DE%)
          \ GOSUB 23040%
          \ MN$(C.2%)=USER1$
          \ B.BLK%,FB%(C.2%)=CVT%%(NAB$(C.2%))
          \ CD$(C.2%)=FND$
          \ EPPN%(C.2%),ED$(C.2%)=0%

                !>>INCREMENT ACTIVE MEMBERS
                !  UPDATE DIR
                !  READ DIR ENTRY SET NAME
                !                       FIRST BLOCK
                !                       CREATION DATE
                !       AND CLEAR       EXTRACT PPN AND DATE


15360     IF LIB$(C.1%) THEN
                  F.SIZE%=NB%(C.1%)
          \       F.BLK%=FB%(C.1%)
          \       CD$(C.2%)=CD$(C.1%)
          \       IF (FLAG$(C.1%) AND 4%) THEN
                  EPPN%(C.2%)=EPPN%(C.1%)
          \       ED$(C.2%)=ED$(C.1%)

                !>>WHEN READING FROM A LIBRARY TAKE FROM THE
                !  'FROM' DIRECTORY.


15370     FOR BLK%=F.BLK% TO F.BLK%+(F.SIZE%-1%)
          \       E%=FNDISK.READ%(BLK%,C.1%)
          \       RETURN IF E%
          \       E%=FNDISK.WRITE%(B.BLK%,SWAP%(C.1%)+C.2%)
          \       B.BLK%=B.BLK%+1%
          \ NEXT BLK%
          \ NB%(C.2%)=F.SIZE%
          \ GOSUB 23060
          \ RETURN IF E%
          \ LSET NAB$(C.2%)=CVT%$(B.BLK%)
          \ GOSUB 23020%
          \ RETURN

                !>>LOOP FOR NUMBER OF BLOCKS TO MOVE
                !  WHEN COMPLETE UPDATE NEXT AVAILABLE
                !  BLOCK POINTER AND REWRITE THE DIR.


16000     IF EPPN%(C%)<0% THEN
                            E%=-185          IF (LIB$(C%)=-1% AND LIB%=0%)
          \                 RETURN IF E%
          \                 ED$(C%)=-1%
          \                 EPPN%(C%)=CPPN%
          \                 GOSUB 23060
          \                 LSET DM$(C%)=CVT%$(CVT%%(DM$(C%))+1%)
          \                 GOSUB 23020
          \ RETURN

                            !>>DELETE FILE FROM DIR AND REWRITE
                            !  DIR BLOCK.


16010       E%=-235
          \ EPPN%=EPPN%(C%)
          \ RETURN

                !>>FILE EXTRACTED DELETE NOT PERMITTED'


200001

          FUNCTIONS

201001

          FUNCTION TO CONVERT STRING STORED IN RAD50 TO ASCII

20110     DEF FNR$&(F$)
          \ X.ZZ$=""
          \ X.ZZ$=X.ZZ$+RAD$(SWAP$(CVT%$(MID(F$,2%,2%)))) FOR 2%=1% STEP 2%
            UNTIL 2%>LEN(F$)
          \ X.ZZ$=LEFT(X.ZZ$,6%)+"."+RIGHT(X.ZZ$,7%) IF LEN(X.ZZ$)>6%
          \ FNR$=X.ZZ$
          \ FNEND

202001

          FUNCTION TO CONVERT ASCII STRING TO RAD50

20210     DEF FNR%(D$)=MID(SYS(CHR$(6%)+CHR$(-10%)+D$),7%,6%)

20300     !>>

                FUNCTION TO CHECK TO SEE IF A FILE NAME MATCHES
                THE SELECTION CRITERIA.

          !>>
```

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CIRCLE D61 ON READER CARD


```
24810     DEF* FNDISK.READ$(B$,C$)
          \ GET #C$,RECORD B$
          \ ES=0$
          \ GOTO 24830

                    !>>>READ BLOCK B$ ON CHANNEL C$
                    !  CLEAR ERROR FLAG AND THEN EXIT

24820     ES=ERR

                    !>>>SET ERROR FLAG ON ERROR

24830     FNDISK.READ$=B$
          \ FNEND

                    !>>>RETURN ERROR FLAG

24840     DEF* FNDISK.WRITE$(B$,C$)
          \ PUT#C$,RECORD B$
          \ ES=0$
          \ GOTO 24860

                    !>>>PUT RECORD B$ ON CHANNEL C$
                    !  CLEAR ERROR FLAG

24850     ES=ERR

                    !>>>SET ERROR FLAG

24860     FNDISK.WRITE$=E$
          \ FNEND

                    !>>>RETURN ERROR FLAG

24870     DEF* FNDEVFPN$(F$)
          \ I.F$=F$
          \ ES=FNFSS%(F$)
          \ GOTO 24890 IF ES
          \ IF ((FLAG2% AND 28672%)=28672% AND (FLAG1%<0%)) THEN 24880%
                    ELSE     IF (FLAG2% AND 512%) OR (FLAG2% AND 256%) THEN 24880%
                    ELSE     I.F$=CHR$(FSS%(23%))+CHR$(FSS%(24%))
                                  IF (FLAG2% AND 8192%)
          \                 I.F$=I.F$+NUM1$(FSS%(25%)) IF FSS%(25%)>255% AND
                                                           (FLAG2% AND 8192%)
          \                 I.F$=I.F$+":" IF (FLAG2% AND 8192%)
          \                 I.F$=I.F$+"["+NUM1$(FSS%(6%))+","+NUM1$(FSS%(5%))+"]"
                                  IF (FLAG1% AND 1024%) OR
                                     (FLAG2% AND 16384%)
          \                 FNDEVFPN$=I.F$
          \                 GOTO 24890

                    !>>>DO FILE NAME SCAN , ABORT ANY ERROR , THEN
                    !  CHECK FOR UNTRANSLATABLE LOGICALS AND WILD
                    !  CARD FPN'S (WHICH ARE BOTH ERRORS).
                    !  FULL OUT FPN AND DEVICE IF ONE WAS SPECIFIED.

24880     ES=-1%
          \ FNDEVFPN$=N$

                    !>>>FLAG BAD FILE NAME
                    !  CLEAR DEVICE FPN RETURN STRING

24890     FNEND

                    !>>>RETURN TO CALLER

24900     DEF* FNFSS%(F$)
          \ CHANGE SYS(CHR$(6%)+CHR$(-10%)+F$) TO FSS%
          \ ES,FSS%=0%
          \ FLAG1%=FSS%(27%)+SWAP%(FSS%(28%))
          \ FLAG2%=FSS%(29%)+SWAP%(FSS%(30%))
          \ GOTO 24920%

                    !>>>DO FILE NAME SCREEN SCAN , CLEAR ERROR
                    !  FLAG THEN QUIT.

24910     ES,FSS%=ERR

                    !>>>RETURN ERROR FLAG

24920     FNEND

25000     DEF* FNDIR.FSS%(I%)
          \ FNDIR.FSS%,ES=0%
          \ DIR.FSS%(I%)=I%
          \ DIR.FSS%(4%)=SWAP%(I%)
          \ CHANGE DIR.FSS% TO DIR.FSS$
          \ CHANGE SYS(DIR.FSS$) TO RTN.FSS%
          \ GOSUB 25100%
          \ GOTO 25020%

                    !>>>CLEAR ERROR FLAG , SET UP MATCH NUMBER
                    !  CONVERT TO STRING AND DO SYS CALL TO GET
                    !  NAME. PULL NAME OUT OF ARRAY AND GO TO
                    !  END OF FUNCTION.

25010     FNDIR.FSS%,ES=ERR

                    !>>>SET ERROR FLAG ON ERROR RETURN

25020     FNEND

                    !>>>END OF FUNCTION

25030     DEF* FNSLB$(F$)
          \ ES=-10%
          \ IF INSTR(1%,F$,":SLB") THEN 25070 ELSE
            IF INSTR(1%,F$,".")    THEN 25080 ELSE
            F$=F$+".SLB"
          \                 GOTO 25070

                    !>>>CHECK FOR ".SLB" , IF SO THEN OK
                    !  OTHERWISE IF A "." THEN ERROR
                    !  OTHERWISE ADD ".SLB" TO FILE NAME

25070     ES=FNFSS%(F$)

                    !>>>DO FILE NAME SCAN OF NEW FILE NAME

25080     FNSLB$=F$
          \ FNEND
```

. . . continued on page 93

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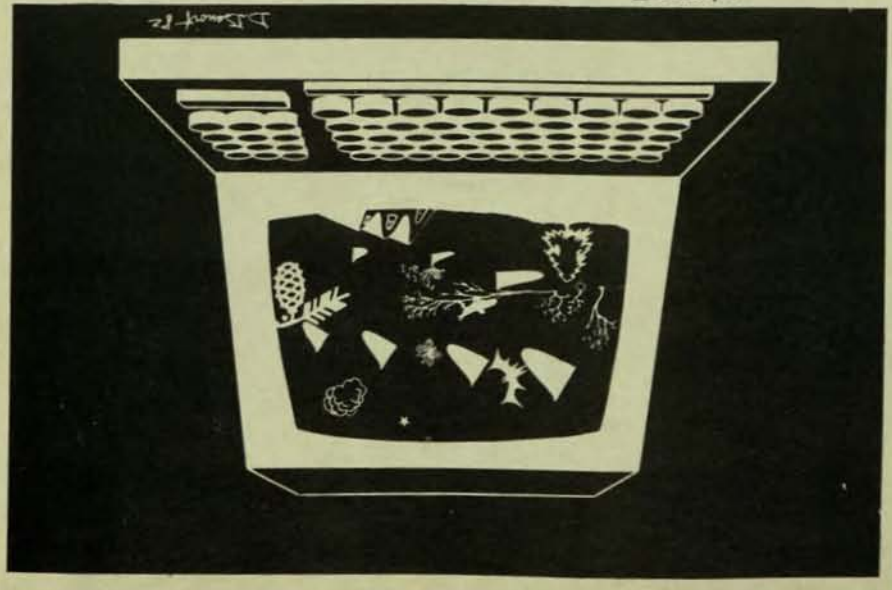

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to be used only with a direct wire to wire connection over very short (less than 1 mile) distances, and whose performance in speed attained will vary with the distance. Short haul modems are built to operate over very short (up to 10 mile) telephone circuits, their speeds run from 19,600 baud on the shortest route to 2400 baud on the longer runs. Medium distance modems will work at a specified baud rate up to about 60 miles, and the regular modems are not limited by distance except in extreme circumstances where long delays due to the distances may be experienced.

To order your very own leased line to be used with one of these modems you should order a 4 wire, 3002 leased line terminating in a Bell 829 and terminal block. The 3002 is the Bell type of circuit and it needs no additional conditioning beyond its specifications. The 829 is a protective device as well as a remote operated loopback device that allows Bell to test the line without physically coming out to the site. The terminal block is where we will hook up the two transmit leads from the modem and the two receive leads to the modem. This type of circuit is normally "loaded," that is, it has equalizing coils in it to keep the response of the line even over its long travels; if you are using one of the short haul modems, it may require an "unloaded" circuit. If it does, specify so in your original order and remind the installer that this circuit should have no coils in it. Remember, when you order this circuit you may be talking to someone who knows nothing about leased lines, my long experience is to order the numbers above and remind the installer as mentioned.

Most leased line modems will display some basic important information on their front panels which will help you hook it up properly and isolate problems when they occur. At least the modems will display carrier detect (CD, pin 8 on the RS232), send data (pin 2) and receive data (pin 3). When you connect a modem to the line, you should "see" the carrier on the line, if in fact there is another similar modem at the other end and the line is intact. Once you have a carrier, it is time to send data. But what data? A useful gadget is a "BERT," a bit error tester. This device can send known data to another similar device and have the remote BERT tell how many errors are occurring in transmission. Of course this requires two BERTs and two people. It can also be done with one BERT and one person if we can "loop back" the remote modem, that is, cause the remote modem to "turn the data around" and send it back to us. This way we can test both transmission and receive pairs at once. At one end the BERT will send known data to the remote end where it will be turned around and sent back to the BERT to tell us if it got here O.K. If it didn't, the BERT will count it as an error and keep sending; most lines have some small acceptable error rate, about 1 error in about 100,000,000 bits or so.

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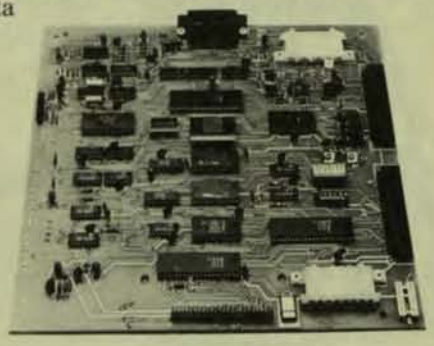

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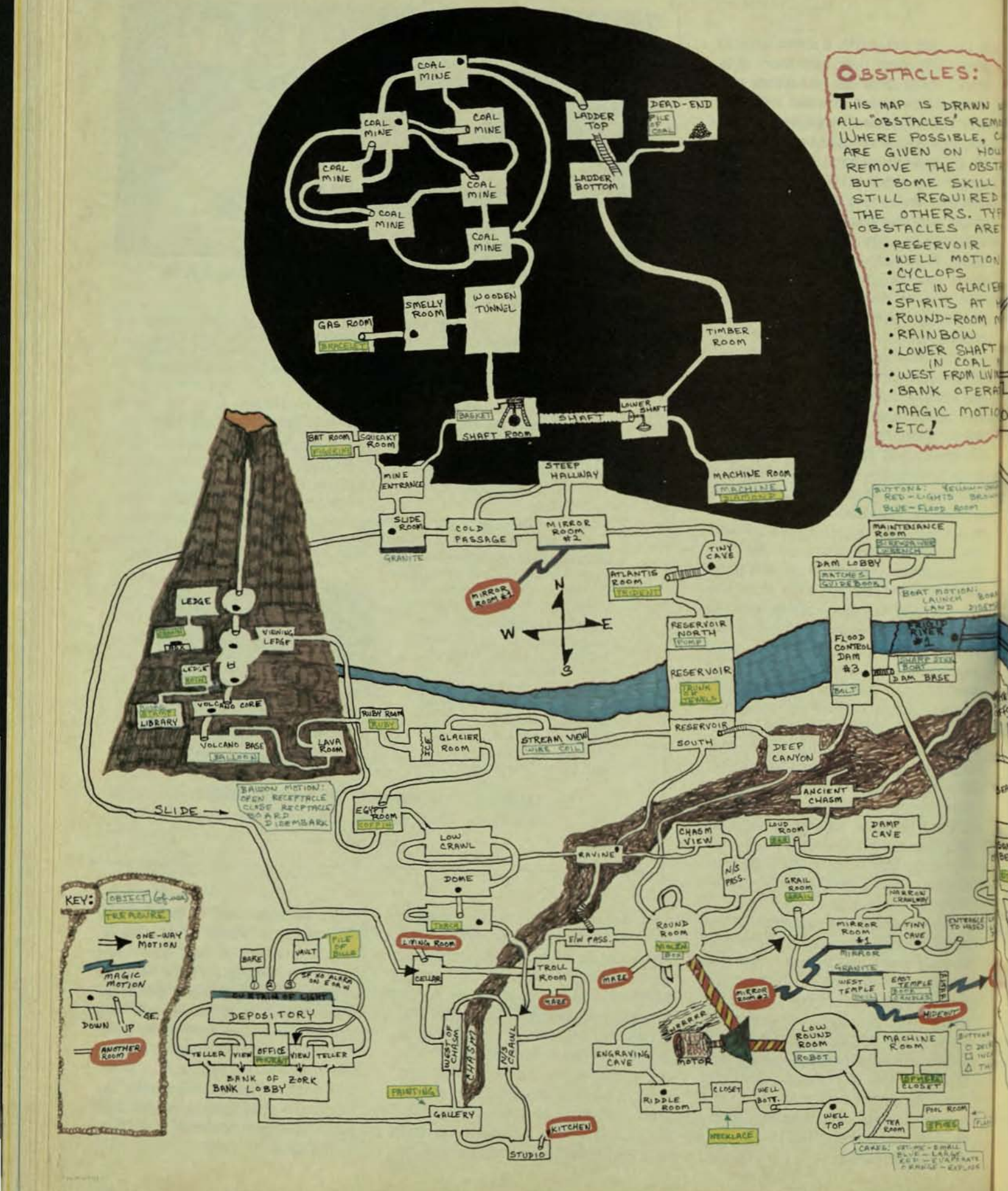
OBSTACLES:
THIS MAP IS DRAWN
ALL "OBSTACLES" REM
WHERE POSSIBLE, C
ARE GIVEN ON HOW
REMOVE THE OBST
BUT SOME SKILL
STILL REQUIRED
THE OTHERS. TYP
OBSTACLES ARE
• RESERVOIR
• WELL MOTION
• CYCLOPS
• ICE IN GLACIE
• SPIRITS AT
• ROUND-ROOM
• RAINBOW
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• BANK OPERA
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COAL MINE
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TIMBER ROOM
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BAT ROOM
SQUEAKY ROOM
MINE ENTRANCE
STEEP HALLWAY
MACHINE ROOM
MACHINE
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GRAIL
NARROW CRAWLWAY
ROUND ROOM
MIRROR ROOM #1
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DOWN
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GE.
ANOTHER ROOM
BARE
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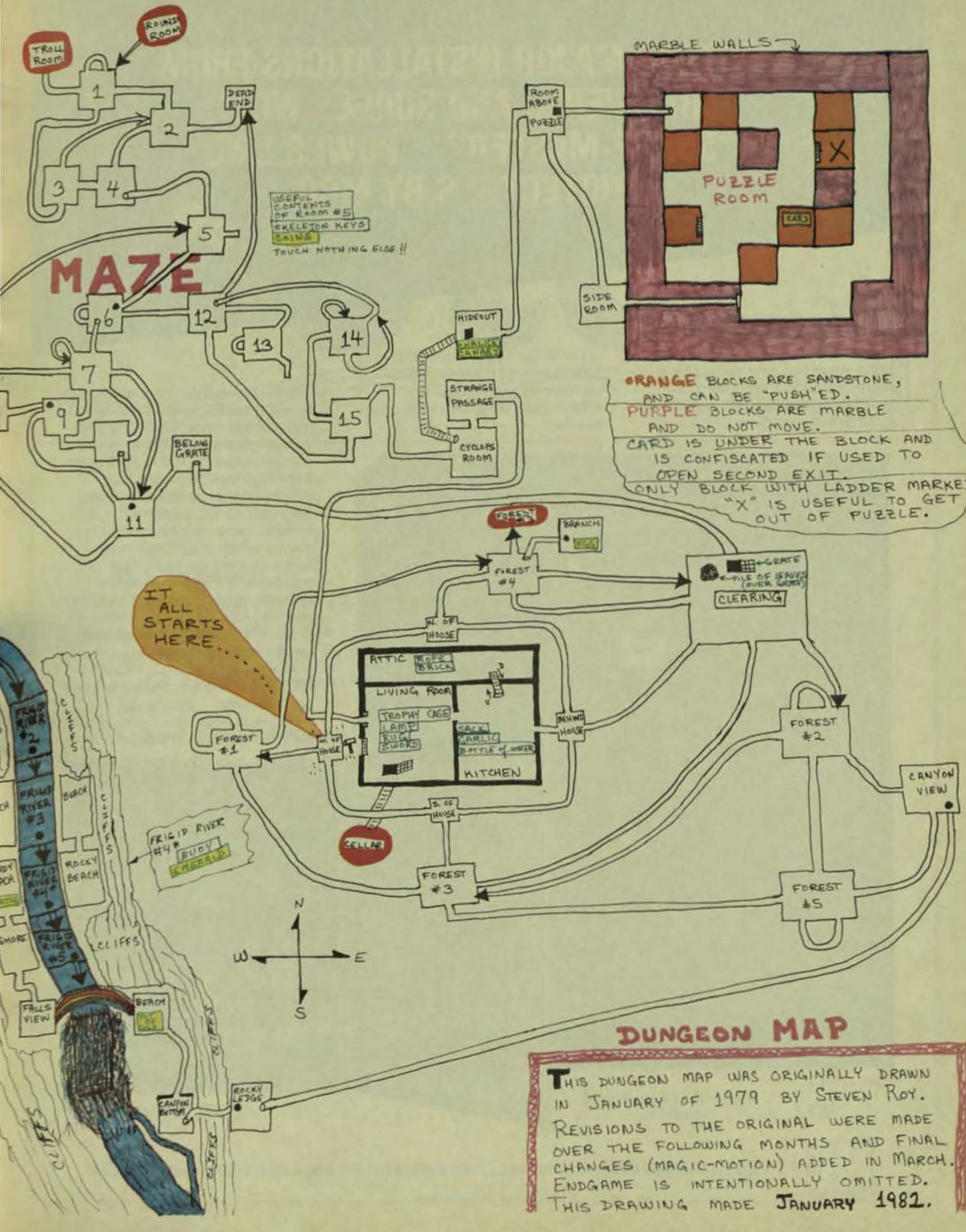

DUNGEON MAP

THIS DUNGEON MAP WAS ORIGINALLY DRAWN IN JANUARY OF 1979 BY STEVEN ROY. REVISIONS TO THE ORIGINAL WERE MADE OVER THE FOLLOWING MONTHS AND FINAL CHANGES (MAGIC-MOTION) ADDED IN MARCH. ENDGAME IS INTENTIONALLY OMITTED. THIS DRAWING MADE JANUARY 1982.

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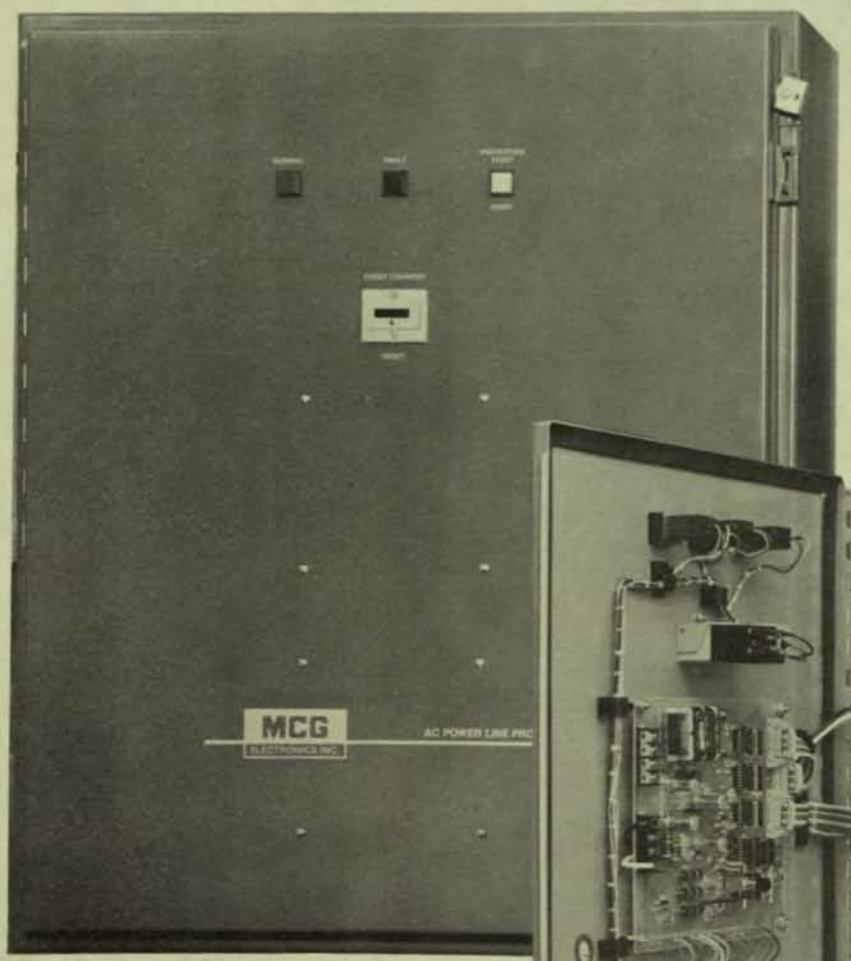

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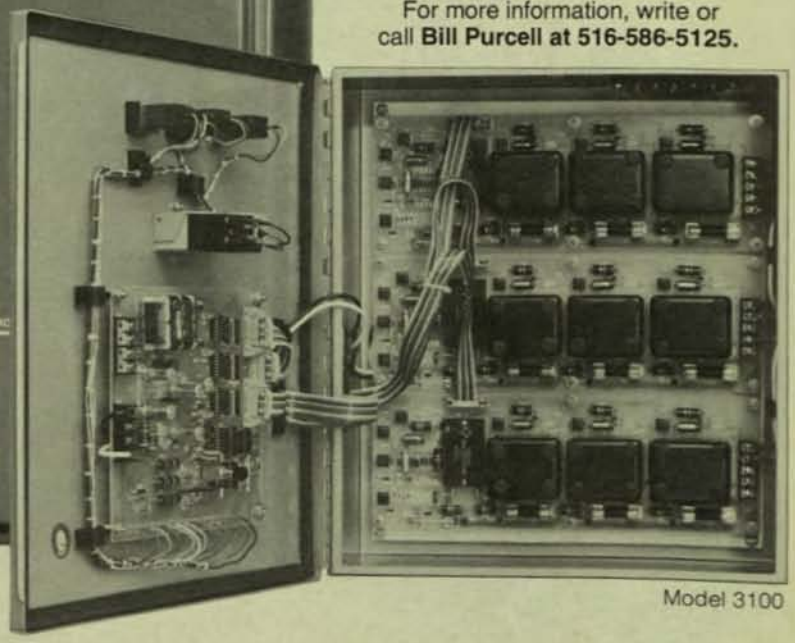

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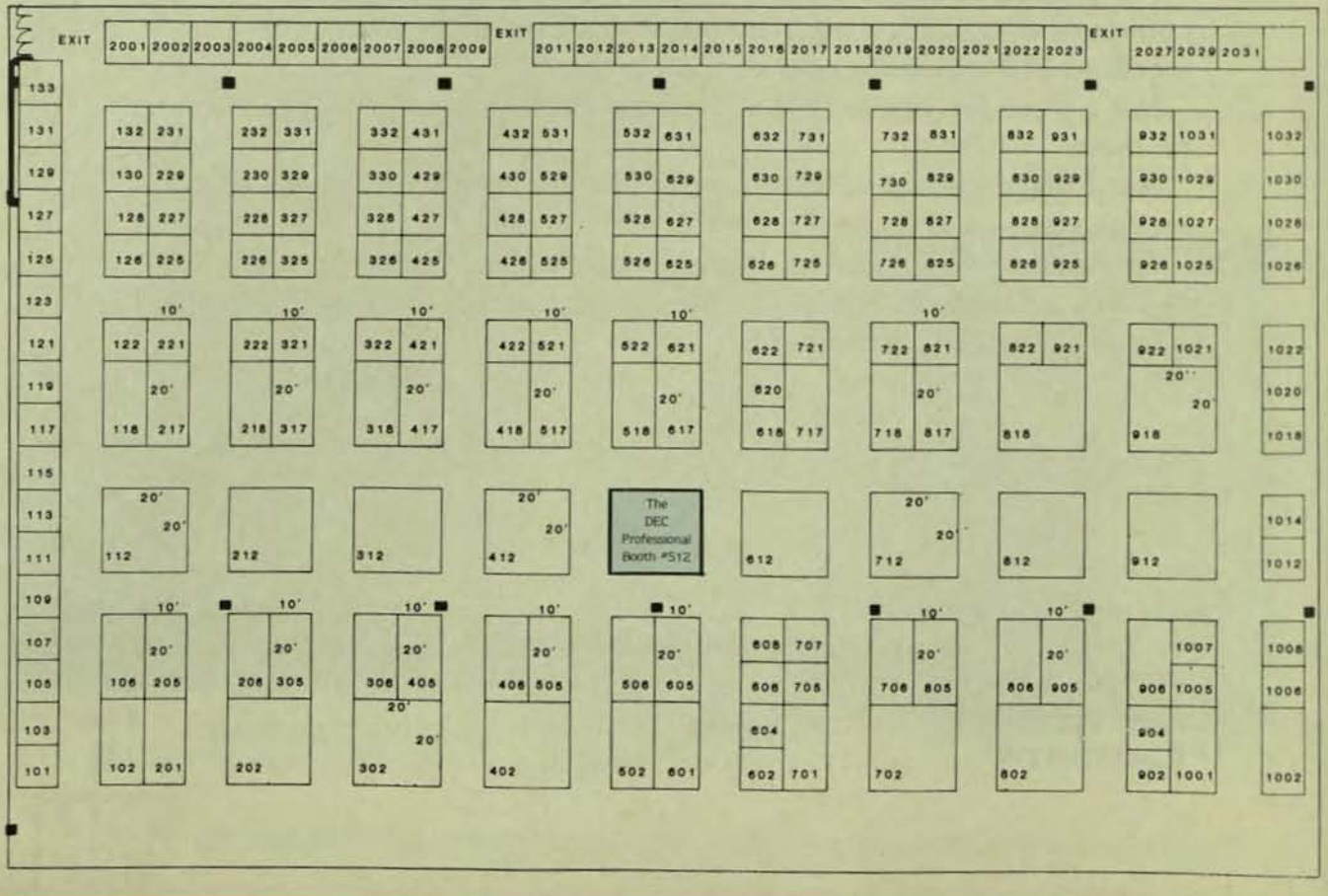
NEW PRODUCT INFORMATION

Send Notes, Meetings, News Releases, New Product Information, etc, to: **PROFESSIONAL etc**, P.O. Box 362, Ambler, PA 19002-0362.

Last May, we were treated to the first DEXPO, the DEC compatible show in Atlanta. Some of us (myself included) were skeptical that Larry Hollander (president of Expoconsul) could really pull it off. Why it was downright shameful! Opposite DECUS, using their name and place for pulling people into town and then having this show right next door. Some thought it couldn't be done; after all, aren't hospitality suites not allowed under DECUS rules? Well it happened. There were even advertisements for it on the closed circuit TV in the DECUS hotel. Not a whimper from DECUS, and rumors abounded that DEC itself would soon be exhibiting here (alas they didn't). It was a success; for Larry Hollander and for the exhibitors. The exhibitors got to see many qualified sales prospects and the prospects got to see lots of DEC compatible hardware and software. So DEXPO is with us again, bigger and therefore better for everyone. While we have not included information on everyone who will be there, this is as complete a group as we had up to press time. It ought to be enough to induce any person to go and look over the DEXPO this December in Calfornia. See you there!



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Creation Of A Source Librarian

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                        !!!END OF FUNCTION

25100     DEV$,FPN$=NS
          \ FPN$=$["+NUM1$(RTN.FSS$(6$))+",'+NUM1$(RTN.FSS$(5$))+"]"
                        IF RTN.FSS$(6$)
          \ DEV$=CHR$(RTN.FSS$(23$))+CHR$(RTN.FSS$(24$))
                              IF RTN.FSS$(23$)
          \ DEV$=DEV$+NUM1$(RTN.FSS$(25$)) IF RTN.FSS$(26$)+255$
          \ DEV$=DEV$+":" IF (RTN.FSS$(23$)<>0$)
          \ DIR.NAME$=NAD$(RTN.FSS$(7$))+SWAP$(RTN.FSS$(8$)))+
                      NAD$(RTN.FSS$(9$))+SWAP$(RTN.FSS$(10$)))+".'+
                      NAD$(RTN.FSS$(11$))+SWAP$(RTN.FSS$(12$)))
          \ F.SIZE$=RTN.FSS$(13$)+SWAP$(RTN.FSS$(14$))
          \ RETURN

                        !!!PULL NAME OUT OF DIR SCAN ARRAY


30000     !!! CCL ENTRY
31000     !!! DATA STATEMENTS
31010!

          DATA STATEMENTS FOR INPUT SWITCHES

31020     DATA     1,       1,       "FB"
31030     DATA     2,       0,       "DB"
31040     DATA     4,       0,       "CP"
31050     DATA     8,       0,       "DI"
31060     DATA    16,       0,       "BB"
31070     DATA    32,       0,       "FD"
31080     DATA    64,       0,       "MB"
31090     DATA   128,       1,       "EX"
31100     DATA   256,       0,       "EB"
31110     DATA   512,       0,       "NF"
31120     DATA  1024,       0,       "SL"
31130     DATA     0,       1,       "LB"
31140     DATA  2048,       0,       "IB"
31145     DATA  4096,       0,       "DF"
31146     DATA  8192,       0,       "FL"
31150     DATA     0,       0,       "**
31160!

          DATA STATEMENTS FOR ERROR CODES

31170     DATA     1,       "Invalid file name"
31180     DATA     2,       "Invalid output file name"
31190     DATA     3,       "Invalid input file name"
31200     DATA     4,       "Can't find input file"
31210     DATA     5,       "Invalid output switch"
31220     DATA     6,       "Invalid input switch"
31230     DATA     7,       "Can't find input member"
31240     DATA     8,       "File is not a SLIB or PLIB"
31250     DATA     9,       "Invalid device or FPN specification"
31260     DATA    10,       "Extention of libraries must be '.SLB'"
31270     DATA    11,       "Write access not granted to input file"
31280     DATA    12,       "Invalid switch combinations"
31290     DATA    13,       "No input file specified"
31300     DATA    14,       "No members specified"
31310     DATA    15,       "No output file specified"
31320     DATA    16,       "Output file not allowed with '/CP'"
31330     DATA    17,       "Write access not available to Library"
31340     DATA    18,       "Delete not allowed in SLIB"
31350     DATA    19,       "Invalid printer number"
31360     DATA    20,       "Compress not permitted"
31370     DATA    21,       "Output file already exists"
31380     DATA    23,       "File extracted from Library by "
31390     DATA    24,       "File not extracted cannot be replaced"
31400     DATA    25,       "Erase not allowed to member"
31410     DATA    26,       "Invalid Directory access, submitt SPR"
31420     DATA    27,       "End of library encountered"
31430     DATA    28,       "Invalid Librarian ID code"
31440     DATA     0,       "***"
32000     !!! ERROR TRAPS
32020       IF ERL=24810$ THEN RESUME 24820$

                        !!!FNDISK,READS ERROR

32030       IF ERL=24840$ THEN RESUME 24850$

                        !!!FNDISK,WRITE$ ERROR

32040       IF ERL=24900$ THEN RESUME 24910$

                        !!!FSS ERROR

32050     IF ERL=5100$ AND ERR=16$ THEN
                        RESUME 5110$ IF (FLAG$(C,1$) AND 4$)=0$
          \             KILL F$(C,2$)
          \             RESUME 5100$

                        !!!OUTPUT LIB ALREADY EXISTS

32060     IF ERL=5200$ AND ERR=16$ THEN E$=-21$
          \             RESUME 5070$

                        !!!OUTPUT FILE ALREADY EXISTS

32065       IF ERL=5300$ AND ERR=5$ THEN E$=-9$
          \         RESUME 5070$

                        !!!INPUT LIB NOT THERE

32070     IF ERL=15000$ AND ERR=16$ THEN E$=-21$
          \         RESUME 5070$

                        !!!EXTRACT OUTPUT ALREADY IS THERE

32080     IF ERL=24900$ THEN RESUME 24910$

                  !!!BAD FILE NAME TO FSS DIRECTIVE.

32090       IF ERL=25000$ THEN RESUME 25010$

                        !!!DIR SCAN ERROR

32100       IF ERL=5350$ THEN E$=ERR
          \             RESUME 5070$

                        !!!OPEN INPUT FILE ERROR


32600     !!! STANDARD ERROR TRAPS
32610     IF ERL = 24030 AND ERR = 11$
          THEN E$ = -1$                                   ! "Z HANDLER
          \RESUME 24040
32650     IF ERL = 24060 THEN FNV$ = 0$                   ! FNV$ ERROR HANDLER
          \E$ = -1$
          \RESUME 24070
32700     PRINT L$;"FORGROUND ERROR DETECTED IN "; FN$
          \ ON ERROR GO TO 0                              ! ERROR2 END HERE
32760     CLOSE #X FOR X = 1% TO 12%                      ! EXIT THIS HERE
                                                          ! CLOSE EVERYTHING
32767     END                             !!!TJAFF
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ednesday, December 8 *(continued)*

me	Topic/Sponsor	Room
30 p.m.	ORACLE®: The High Performance Relational Database Management System that Offers Effective Productivity Tools to the End User *Relational Software Incorporated*	C
00 p.m.	Interactive 3D Color Graphics for Design, Engineering and Manufacturing Applications *Olamic Systems Corporation*	A
00 p.m.	Software Tools and Communications Packages for VAX and PDP-11 *Evans Griffiths & Hart, Inc.*	B
00 p.m.	Bubble-Memory – How to Use It in LSI-11 Systems *Bubbl-Tec*	C
30 p.m.	Networking and Program Development Tools *Glenn A. Barber & Associates, Inc.*	A
30 p.m.	"Intelligent Data Base Machines" – A Performance Enhancement *Britton-Lee Inc.*	B
30 p.m.	Task Master™ – An Operations Environment *Dawn Computer Corporation*	C
00 p.m.	QSORT: A High Speed Sort for RSTS-E/CTS-500 Operating Systems *Advanced Computer Systems, Inc.*	A
00 p.m.	Focus on Software Enhancements: Data Analysis for VAX; Conversion of RT11 to 20 User System *S & H Computer Systems, Inc.*	B
00 p.m.	DDCMP Protocol Analysis Using Interview Family Data Analyzers *Atlantic Research*	C
30 p.m.	Sales Lead Generation to the DEC End User Community *Computer Intelligence*	A
30 p.m.	A Software Development Facility Using an Enhanced System III Operating System *Cambridge Digital Division of Compumart Corp.*	C
30 p.m.	Guardian Data – Mass Storage Subsystem *Guardian Data (Group III Electronics, Inc.)*	C
00 p.m.	Bus Driver™ – Communications Multiplexor for Local and Remote Terminals *Micom Systems, Inc.*	B
00 p.m.	How to Develop a Fail Safe Database With Your VAX *System Industries*	C
30 p.m.	Distributive Financial Planning Utilizing The Mini Computer As Well As The Micro Computer *Ross Systems*	A
30 p.m.	How To Do Graphics Faster Economy in a 66 Line Word Processing Terminal *Micro-Term Inc.*	B
00 p.m.	Low Price, Board-Level Array Processors for Q-bus *Sky Computers c/o Beckrep*	A
00 p.m.	Vision Series, Soft Intelligent CRT's with VT 100 Emulation, Plus R232 Cable System *Northern Technologies*	B
00 p.m.	Obtaining Current Information on a Fast-Track Industry *Data Sources*	A
00 p.m.	A Selection of Data Base Management Systems for DECsystem-10, -20 and VAX Computers *Software House*	A
00 p.m.	Co-Processing With RT-11 and CP/M *Basic Information Systems, Inc.*	A
00 p.m.	A Technical Presentation on DBL/VAX Native Mode *Digital Information Systems Corporation*	B
00 p.m.	Terminal Front-end and Switching System *Xyplex, Inc.*	A
00 p.m.	"NET488", A File Transfer Package for DEC Computer Networks *National Instruments*	B

ursday, December 9

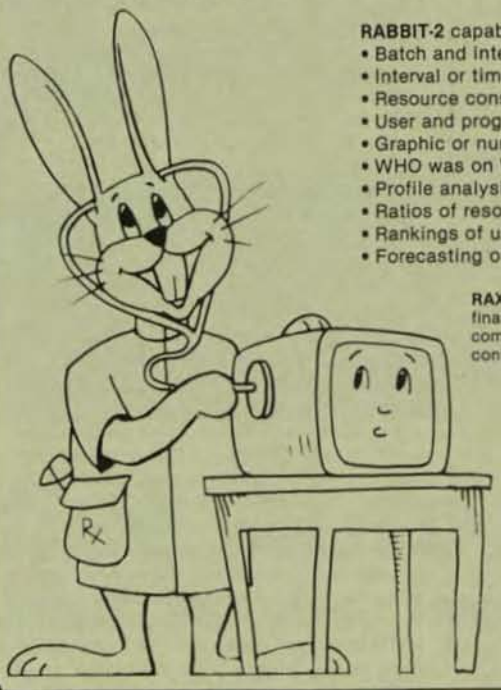
e	Topic/Sponsor	Room
30 a.m.	Reducing Your Datacom Costs *ComDesign, Inc.*	A
30 a.m.	Relational Database Systems *Henco Software*	B
00 a.m.	Achieving Controller & Graphics Compatibility with High Performance & Low Cost *Advanced Electronics Design*	A
00 a.m.	How to Use Software to Upgrade an 11/23 While Retaining 18 Bit Peripherals *EEC Systems Inc.*	B
30 a.m.	AIDE – Software Productivity System for Business Applications Development *OASYS, Inc.*	A
30 a.m.	Offshore Software Services *Hinditron Computer Systems & Consultants Private Limited*	B

SYSTEM PERFORMANCE ANALYSIS FOR VAX AND RSTS/E USERS

If your system is suffering from slow response, clogged I/O, reduced throughput, then put **RAXCO's RABBIT-2** on your case. **RABBIT-2** locates the trouble spots in your operating system and identifies the source of the problems.

RABBIT-2 will chart your system performance, on an hour by hour, user by user, or program by program basis. **RABBIT-2** will quickly sketch a profile of your average system day, your average user demands, and your average program resource requirements.

RABBIT-2 provides the tools you need to investigate system throughput in terms of CPU, I/O, memory, connect, KCTs, etc. — over any time period you specify. You can play "What if?" by simulating the removal of the offending program or user and displaying the results of the change.



RABBIT-2 capabilities include:
- Batch and interactive analysis
- Interval or time displays
- Resource consumption diagrams
- User and program investigation
- Graphic or numeric output
- WHO was on WHEN
- Profile analysis of users and programs
- Ratios of resources utilized
- Rankings of users and programs
- Forecasting of future resource consumption

RAXCO markets a complete line of operational support, financial planning and data management systems for DEC computing equipment. For a free catalog of these systems contact.

RAXCO INC.

Suite 200
6520 Powers Ferry Rd.
Atlanta, GA 30339
(404) 955-2553

CIRCLE D87 ON READER CARD

12:00 noon	DMG/NET – Networking for RSTS/E – Tomorrow's Needs Today *Digital Management Group Ltd.*	A
12:00 noon	Graphics Hard Copy from the DEC VT100 Series *Tektronix*	B
12:30 p.m.	Use of DMA Throttle in MDB DR11-W DMA Interfaces *MDB Systems, Inc.*	A
12:30 p.m.	Financial Accounting for Business & Education *The FASBE Group*	B
1:00 p.m.	P-STAT®: A Conversational Data Management, Data Display, & Statistical Analysis Program *P-STAT, Inc.*	A
1:00 p.m.	Upgrading Existing 18-bit Systems to the 4Mbyte World by Single-Board Add-in *Able Computer*	B
1:30 p.m.	OMNIBASE – The VAX High Performance Database Solution *Signal Technology, Inc.*	A
1:30 p.m.	A Crash Course in Retro-Graphics™ *Digital Engineering, Inc.*	B
2:00 p.m.	Qbus Minicomputer Systems Featuring Fast Efficient Interface to Winchester Disks *Webster Electronics Inc.*	A
2:00 p.m.	Interconnect Notes: VAX and PDP-11 to IBM, CDC, and More *Datanex Inc.*	B
2:30 p.m.	Aviv Tape & Disk Controllers and Subsystems – Their Origin and Future *Aviv Corp.*	A
2:30 p.m.	A Progressive Approach to Interactive Data Analysis *Minitab Project*	B
3:00 p.m.	High-speed A/D & D/A Systems with Specific Interfaces for DEC Computers *Preston Scientific c/o Beckrep*	A
3:00 p.m.	Computer Aided Application Generation *Clyde Digital Systems*	B

NEW SOFTWARE PRODUCT FROM RAXCO

Atlanta, GA — RAXCO Inc., announces the exhibit of two new software products for Digital Computers, December 7-9 at the Anaheim Convention Center.

RABBIT-4 SYSTEM INTRUSTION PREVENTION software (SIP) will be displayed for the first time within the U.S.A. Rabbit-4 SIP is a maximum security software system designed to prevent unauthorized intrusions into PDP-11 RSTS Systems. Upon gaining authorized system entry, the user activities may be monitored and logged. Menu execution and system commands are controlled under the user keyboard profile directory.

RABBIT-5 HIGH SPEED BACKUP (HSB) software for VAX/VMS computer systems will also be demonstrated for the first time anywhere. Introduced in April of 1982, RABBIT-5 HSB offers the only known com-

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Total Office Automation

for DEC VMS, RSTS/E, RSX-11M, 11M+, TSX+, RT11

CT*OS Word Processing

- Full editing capability — global search/replace, cut/paste, headers, footers, auto numbering, boiler-plate libraries, document assembly, auto bold, underline, uppercase. Movement by word, paragraph, sentence, page, etc. Status line indicates page, line, column position in addition to the mode, document number, and account.
- Simultaneous print and edit — variety of serial letter quality and draft printers. Full-page CRT compatibility.
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- Adaptable to your own application with user-defined keys and list processing.

Exectronic Mail™

- 60,000+ users — 30kb for first user, each additional user 10kb, one-keystroke instructions.
- Management communications system — directory of users, log of communications, acknowledge, and nudge capability, and more. Transfer any file on the system.
- Create and read your message with a full-featured word processor.

Electronic Spreadsheet

- Budgets and cash flow projections — create with the spreadsheet package, edit in CT*OS, and send with Exectronic Mail™ to the head office. Or print to the printer or to a disk file for inclusion in other reports. Or send to the typesetter.

Spelling Correction
(more than a dictionary)

- Global correction directly on the word processing document, while user dictionary is updated with special terminology — 80,000 word dictionary.

East Coast	Midwest	Pacific
Dennis A. Wills Compu-Tome, Inc. (213) 796-9371	Paul Harris Gina Harris Mountain W. Software (213) 796-9374	Diane Sullivan Ted Dresser Discom (805) 499-6256 (213) 796-9375

COMPU-TOME, INC.
234 East Colorado Boulevard
Pasadena, CA 91101

CIRCLE D122 ON READER CARD

SYSTEM INDUSTRIES NEW TAPE SYSTEM PERMITS SHARED DATA BACK-UP CAPABILITIES FOR MULTIPLE DEC CPUs

Milpitas, CA — System Industries, the world's leading independent supplier of large-capacity storage systems for users of Digital Equipment Corporation (DEC) and Data General minicomputers, today introduced a new multiple-access tape system (MATS) for DEC processors, a new high-capacity, high-performance Winchester disk drive option for users of Digital Equipment Corporation's (DEC) VAX series of minicomputers.

MATS is based upon a 125 inch-per-second, triple-density (800, 1600 and 6250 bits-per-inch) tape drive which permits at least two DEC processors to share a common tape system.

With its multiple bits-per-inch capability, the new system permits users to maintain old tape libraries — recorded at 800 bpi — without having to keep an outdated machine in operation. Moreover, by interfacing the processors with the tape system through a single controller, a fault-tolerant configuration may be established.

The 9751 Winchester Disk Drive, which is just 10.4" high, provides VAX users with up to 414 Mbytes of reliable on-line storage — with very fast access time. Average seek time is 18 milliseconds and track-to-track seek time is a mere 5 milliseconds. And the high data throughput rate of 1.86 Mbytes-per-second further enhances the unit's performance.

Up to four 9751s can be mounted into an SI Series 6000 cabinet, yielding over 1.5 Gbytes of formatted storage.

SATURN-CALC NOW AVAILABLE

Minneapolis, MN — SATURN-CALC, an electronic worksheet for DEC PDP-11, VAX, and LSI-11 users, is now available from Saturn Systems, Inc.

SATURN-CALC offers a wide assortment of mathematical operations, including sums, averages, "what if" statements, and algebraic functions. Its self-explanatory prompts and on-screen help text make it easy and enjoyable to use.

SATURN-CALC is written in assembly language to provide rapid recalculation while using a minimum of memory space. Its ASCII file structure makes it compatible with Saturn's word processor to provide editing and reformatting of reports.

SATURN-CALC's graphics display capabilities and external file interface will be demonstrated at DEXPO West, December 7-9.

SATURN-CALC runs on RSX-11, RT-11, RSTS, VMS, and TSX-Plus operating systems.

For additional information contact Ed Neis, Saturn Systems, Inc., 6875 Washington Ave. S., Minneapolis, MN 55435. 612-944-2452 or 800-328-6145.

MICRO-TERM, INC., DEXPO/WEST 82, **BOOTH #332**

St. Louis, MO — Micro-Term will display its revolutionary word processing terminal, the ERGO 4000. Priced at only $1,695.00, this terminal will display 66 lines by 80 characters on a 15 inch screen. Features include video attributes, down-loadable function keys, set-up mode, alternative character generator, and printer port. The ERGO 4000 is housed in an ergonomic cabinet with tiltable display and integrated palm rest keyboard.

Also on display will be raster graphics boards for Micro-Term terminals. These add-on boards feature 768 by 240 pixal resolution, Plot Ten compatibility, and up to four pages of memory.

In addition, Micro-Term will showcase its entire line of MIME, ACT, and ERGO terminals, which feature emulations of DEC, Hazeltine, Lear Siegler, and other terminal manufacturers.

Micro-Term, Inc. 1314 Hanley Industrial Court, St. Louis, Missouri 63144, (314) 968-8151.

STREAMSAVE INTRO AT DEXPO WEST '82

Long Beach, CA — StreamSave, a streaming tape backup/restore utility program for DEC PDP-11's and LSI-11's, will be introduced by Software Supply at DEXPO WEST '82 December 7-9. StreamSave is standalone, operating system-independent software which provides ultra-fast transfer of data to support streaming tape operation. The program automatically performs multiple-disk-unit, multiple-tape-reel backups and restores, handles recoverable I/O errors, and provides an optional verification pass on each tape reel.

StreamSave views a disk as a collection of cylinders , tracks, and sectors without regard to any file structure. The user may completely specify the locations and extents of disk data to be saved. Data may be restored to disk units other than those from which it was saved, and/or only a subset of saved units may be restored. Versions of StreamSave are available for RM02/03/05, RP02, RP06, RL01/02, or RK06/07 compatible disks, and TM11 or TS11 compatible tape interfaces.

StreamSave provides a system console dialogue which guides the user through the save or restore process. Defaults, changeable by patching at installation time, are provided to make the program easy to use and to minimize the possibility of errors by unsophisticated operators. Once the program has been configured to the user's installation, a routine disk backup operation requires the operator merely to press RETURN at each prompt to select the default response (except for a line of tape identification, typically the date and time). For non-routine use when the default responses may not be appropriate, a "Help" function is available at each prompt to explain the options available to the operator.

For additional information contact: Steve Brecher, Software Supply, (213) 434-3723.

TEKTRONIX HARD COPY UNIT OPTION CREATES COMPATIBILITY WITH DEC VT100 TERMINALS

Beaverton, OR — Tektronix, Inc. announces an option to the 4612 Video Hard Copy Unit creating plug-to-plug compatibility with the DEC VT100 Series terminals. DEC VT100 users, found primarily in the engineering, data analysis, and business environments, now have a source for high quality, low cost, quick computer graphics hard copies. This option will be exhibited for the first time at DEXPO WEST '82.

The standard 4612 is optimized for use with terminals offering a horizontal resolution of 640 pixels such as the Tektronix 4025A Computer Display Terminal. The DEC compatible option to the 4612 provides images with the correct aspect ratio from the DEC VT100 family of terminals and other terminals with a horizontal resolution at or near 768 pixels.

There is no charge for the option when factory installed. A field kit is available for $40.00.

The 4612 Video Hard Copy Unit uses electrostatic technology to provide high quality, high contrast black and white copies from up to four raster scan video displays at the push of a button. Hard copies are produced in 28 seconds regardless of image density.

The dielectric paper has excellent archival qualities and has the look and feel of plain bond permitting pencil notations on the copy. These characteristics make the 4612 output ideal for working or archival copies. The copy unit produces 8½ × 11" copies and uses easy-to-load dry toner and rolls of paper providing 540 hard copies each.

The 4612 option broadens and enhances the Tektronix line of hard copy devices to include DEC VT100 terminal users. In addition to the 4612 for raster scan video signal copies, the 4611 Hard Copy Unit for storage tube copies is especially suitable in environments where cost and quality are important considerations.

For applications requiring photographic quality or true continuous gray shades, Tektronix offers the 4631 and 4632 Hard Copy Units. The 4631 produces hard copies from storage tube displays, and the 4632 copies raster scan video sources. Both products utilize fiber optic technology to produce the highest quality copies for dense and complex graphic displays. For imaging and patterning applications, the Tektronix 4634 Imaging Hard Copy Unit provides high resolution copy with multiple shades of gray.

Tektronix, Inc., headquartered in Beaverton, Oregon, has 24,000 employees worldwide and is a leading manufacturer of computer graphics products, cathode ray oscilloscopes and professional television instruments. Tektronix designs, manufactures and markets a wide range of electronic products throughout the world to both end-users and Original Equipment Manufacturers (OEM). Tektronix maintains a worldwide network of sales and service centers to satisfy customer needs.

For further information on the 4612 Hard Copy Unit option, write on company letterhead to the Marketing Communications Department, Mailing Station 63-635, Tektronix, Inc., P.O. Box 500, Beaverton, Oregon, 97077.

FIRST U.S. EXHIBITION OF MICRO DEVELOPMENT SOFTWARE

Secaucus, NJ — Intelligent Industrial Systems is exhibiting the microMAGIC software development package for the first time in the United States at DEXPO/WEST 82 on December 7-9.

Based on DEC PDP-11's under the RSX-11M operating system or VAX under VMS, microMAGIC provides users with a sophisticated programming tool for producing real time embedded systems on attached 16-bit micro single board computers. MicroMAGIC packages support the DEC Falcon (SBC 11/21) and LSI series, Motorola 6809 and 68000, and Intel 8086 computers.

As one of the first software vendors to

Cobar, Inc. now offers 15-inch DEC VT100/132 emulation in its Model 3132 priced at $1,595 with OEM discounts available.

provide a package on the new DEC personal computer range, Intelligent Industrial Systems will demonstrate the microMAGIC software on the Professional 350 at the show.

Intelligent Industrial Systems will exhibit at **Booth 822.**

PENNINGTON TO SHOW ENHANCED VAX CONVERSION PACKAGE

Pennington, NJ — Pennington Systems Incorporated announces Release 2 of CONPAX, the package which converts PDP-11 assembly language to VAX-11 native mode. The enhanced CONPAX will debut December 7-9 at DEXPO West '82 **(Booth 722)** in Anaheim. CONPAX Release 2 adds capabilities for handling system calls, floating point arithmetic, and other conversion problems.

Additional facilities for handling system call parameters and subparameters make conversion of operating system calls easier. Various types of floating point usage are accommodated. Handling of mixed operand integer arithmetic (by converting either to macros or to in-line code) helps migration to the 32-bit environment. Some new features take advantage of the more powerful VAX architecture, by helping (for example) to convert position-dependent PDP—11 code to position-independent VAX-11 form. Other convenience features include optional conversion of numeric constants to decimal or hexadecimal.

CONPAX is driven by conversion directives, which are user-controlled. Release 2's ability to save compiled sets of directives improves the speed and efficiency of the conversion process.

CONPAX Release 2 is upward compatible with Release 1, which was introduced in early 1981. It runs on both PDP-11 and VAX-11 computers and produces VAX-11 assembler source code in far less time and with fewer errors than manual conversion. Conversion to native mode provides the full power of the VAX-11 hardware and software, in contrast to the substantially slower execution speed and limited capabilities of "compatibility mode". In the conversion process, CONPAX uses addressing modes and other information from the PDP-11 assembler code to produce the VAX-11 conversion for each line, including multi-line alternatives when appropriate. Simple editing procedures and a post-processor allow the user to select the desired conversion and eliminate unwanted alternatives.

CONPAX is available under permanent license or as a service from Pennington. A permanent single-user license costs $5,000 for one CPU; additional CPUs can be licensed at substantial discounts. A service bureau license is also available. Current users with maintenance contracts will automatically receive the new release. Consulting and conversion assistance are available from Pennington on a *per diem* basis.

CONPAX is a member of Pennington's family of software products for the DEC PDP-11 and VAX-11 computers; others include the SPEEDSORT/11 sort utility, the VIDIO/11 (VIDeo I/O) video terminal support package, and the SCRNIO/11 (SCReeN I/O) screen form package. Further information can be obtained from Pennington Systems Inc. / 65 South Main Street, Building C / Pennington, NJ 08534 / (609) 737-2727 / Cable: PSIUSA / Telex: 136 479 (Attn: 357).

THE XYPLEX™ SYSTEM TO BE SHOWN AT DEXPO **(BOOTH 826)**

Harvard, MA — The new integrated terminal switch and front-end system from Xyplex, Inc. will have its first showing at DEXPO West 82 in December in **booth 826**. The XYPLEX System provides a user with easy access to any of the computer resources while removing the overhead of handling terminals from the host computers.

The XYPLEX System moves all the functions of the DEC* supplied VMS* and RSX* terminal drivers into small intelligent cluster controllers. Each cluster controller handles up to 8 asynchronous terminals via standard RS-232 connectors. The cluster controllers communicate with the host computer using a host interface unit. Each host interface unit supports up to 64 simultaneous connections to the computer and it performs direct memory access operations for BOTH read AND write functions. All the cluster controllers and host interface units are connected with a single multiaccess coaxial cable. As a result, cabling problems within a building and in the computer room are eliminated.

Access to word processing systems, personal computers, etc as well as non RSX or VMS multiuser systems is provided by attaching them to cluster controller ports.

The System not only provides a user access to the various computers within a company but results in huge performance improvements on these computers. Thus, more users can run simultaneously on a given computer and achieve improved response time.

The XYPLEX System is a complete hardware/software package. No user programming is required.

For more information, see Bob Rosenbaum in **booth 826** at DEXPO West 82, write to him at Xyplex, Inc., Oak Hill Road, Harvard, MA 01451 or call (617) 456-8399.

*Trademark Digital Equipment Corporation

DILOG REDUCES CONTROLLER PRICES 5 TO 28 PERCENT

Garden Grove, CA — Distributed Logic Corporation has reduced prices on twelve of its plug- and software-compatible disk-drive and tape-transport controllers for Digital Equipment Corporation PDP-11 and LSI-I Series computers by 5 to 28 percent.

"Continued economics of scale associated with volume production along with increased manufacturing efficiencies makes the new lower prices feasible," says Glenn Salley, Dilog President. "We have shipped in excess of 7000 systems to date.

"In addition, Dilog's microcomputer-based architecture, in which firmware is used to tailor the controller to a specific Digital Equipment Corporation tape and disk emulation, permits lower prices after product-development costs are amortized."

Designed for use with one-half inch tape transports, the model DX120 controller and DX130 coupler are reduced to $1,895 each and $1,550 each, a 17 percent and 8 percent cut, respectively.

The model DQ320 one-quarter-inch cartridge tape transport controllers and DQ330 cartridge coupler are now priced at $1,695 each. This represents a 15 percent and a five percent reduction.

Prices for three Storage-Module-Device interface-compatible controllers for 8- or 14-inch Winchester disk drives have been lowered. The DQ202A controller for LSI-11s

now is available for $2,450 each; down 12 percent. The DU202A controller for PDP-11s is $1,995 each — a 28 percent reduction. The DX215 is $2,395 each, 19 percent below previous prices.

Five other controllers also have been reduced eight percent. The DQ409, which mates the Shugart SA850 floppy disk to LSI-11s, now sells for $1,095 each.

Controllers for Shugart SA1000 eight-inch Winchester disk drives, the DQ431/434 are priced at $1,895 each. The DQ601/604 controllers which control Seagate five-and-one quarter-inch Winchester disk drives have been reduced to $1,895 each.

All controllers are contained on a single "Quad-sized" circuit board and occupy only one slot in the computer or an expansion chassis.

Distributed Logic Corporation, 12800 Garden Grove Blvd., Garden Grove, Calif. 92643; (714) 534-8950; Telex: 681399.

PRODUCT ANNOUNCEMENT

BIS MODEL 1000A PRINTER/PLOTTER DEC USERS CAN NOW PRINT AND PLOT!

Inglewood, CA — Basic Information Systems now offers a printer/plotter package based on a high performance 200 cps serial dot matrix line printer with a 72 dots per inch graphics print capability. The package also includes CCSI-PLOT, a FORTRAN-callable, CALCOMP-compatible plot library.

The printer/plotter is supported under the following DEC-based operating systems.

RT-11, Version 4.0
RT-11, Version 3B
TSX, Version V10A
TSX-PLUS, Version 2.1
RSX-11M
VAX/VMS

Pricing: $3,500 including printer/plotter, expanded buffer option (3.5K), printer stand, software, documentation and license.

No charge for floppy media; other media priced at cost to BIS.

Delivery is 15 days ARO.

CALCOMP is a trademark of California Computer Products.

RT-11 is a trademark of Digital Equipment Corporation.

TSX & TSX-PLUS are trademarks of S&H Computing.

CCSI-PLOT is a trademark of Cerritos Computer Services, Inc.

OLAMIC SYSTEMS INTRODUCES DEMAND-92 HOST LANGUAGE INTERFACE

Chicago, IL — Olamic Systems Corporation will introduce the DEMAND-92 Host Language Interface at the Second National DEC-Compatible Exposition in December.

DEMAND-92 is a user-friendly, general purpose video data-base management system, which allows the manager or office workers to create multi-file "video forms" for such applications as purchase orders, personnel records, and insurance. After defining the form, the user can interactively insert, change, and delete, or review information, DEMAND-92 also provides for computation, verification of data items, and a full range of logical control features, such as table lookups.

Now the DEMAND-92 Host Language Interface will allow the use of external programs written in COBOL, FORTRAN, or MACRO. Giving the application programmers full access to the powerful screen handling capabilities available to users of DEMAND-92.

DISC ANNOUNCES NEW PRODUCT AT DEXPO WEST 82

Sacramento, CA — DISC (Digital Information Systems Corporation) has announced a new product to be formally introduced to the DEC marketplace at DEXPO WEST 82.

DBL/VAX, a VAX native mode version of DISC's successful DBL product, will establish DBL over all the major DEC commercial operating environments and enhance the product range to now include availability of this DIBOL-11 source code compatible language and compiler 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.

This new product, like all other DBL products will maintain source code compatibility with DIBOL-11 as used under a DBL/VAX environment after recompilation and relinking of the source code, with little or no source code modifications required.

Features of this new product include:

- The DBL/VAX compiler is written in VAX/VMS Native mode, and is a true compiler.
- Output of the DBL/VAX compiler is in-line native code.
- Mutli-user programs will be able to access shared XCALL libraries.
- Entire applications may be BOUND into a single executable module (i.e., an Accounts Payable application).
- Little or no modification will be required to run existing DIBOL-11 code under DBL/VAX native mode.
- DBL/VAX will use the RMS file structure. Those files are then accessible to Datatrieve, FMS, and all other VMS supported languages.
- DBL programs can access and be accessed by other languages.

Quantity list price is $5300.00. Quantity discounts are available to OEM's.

COMMERCIAL GRAPHICS FOR VAX'S

Burlington, MA — Interactive Systems, Inc. has announced the release of a new business graphics package for non-data processing users of Digital Equipment Corporation VAX computers. D-PICT/B will be exhibited for the first time at DEXPO West 82 in **Booth 602.**

It utilizes an interactive menu approach to allow the user to produce bar charts, pie charts, and line charts in as few as two instructions. Once a chart definition has been created, it can be recalled later for use with new data. Output from accounting and financial planning packages can be easily adapted to D-PICT/B. According to the vendor, D-PICT/B can be used with a wide variety of color and black-and-white graphics terminals.

D-PICT/B is priced at $8000, for an introductory period, from Interactive Systems, Inc., 131 Middlesex Turnpike, Burlington, MA 01803.

As Part of Major Simplification-of-Use Enhancements ...

ITI EXPANDS ITS RDM APPLICATION DEVELOPMENT SOFTWARE TO SUPPORT DEC'S NEW PROFESSIONAL 350 PERSONAL COMPUTER

Portland, OR — Now, users of DEC's new Professional 350 personal computer (as well as PDP-11's) will have complete, highly advanced application program development capabilities available through the use of ITI's RDM software. A major advantage is full application development capability without the need to drop into a program coding level.

This will enable an extremely wide range of users whose major strength is an understanding of application problems, rather than programming, to develop application programs for their own use, or to cost effectively engage in custom work or the production of bookshelf application packages.

The complete, enhanced software package is now available and will be exhibited for the first time at DEXPO WEST 82, December 7-9, at the Anaheim (CA) Convention Center.

RDM operates on DEC PDP-11 computers as well as the new DEC Professional 350. The package for the DEC PDP-11 includes User RDM ($995, U.S.), Reporter Writer II ($750, U.S.), and Process Generator ($750, U.S.). The price for these three products for the single-user DEC Professional 350 is under $1000. All are available for immediate delivery on a CPU license basis.

ROSS SYSTEMS WILL DEMONSTRATE MAPS/PRO AT THE SECOND NATIONAL DEC-COMPATIBLE EXPOSITION

Palo Alto, CA — Ross Systems will demonstrate MAPS/Pro, the new financial software for the DEC Professional 350, at DEXPO/WEST '82 in December. MAPS is Ross Systems' financial modeling package designed for an array of applications for the financial executives. Financial forecasting, budgeting, strategic business planning, personnel planning, tax analysis, and consolidations are just a few of the areas in which MAPS has been repeatedly successful. A full color graphics package is included with MAPS creating a perfect tool for faster, more accurate financial decision making. Used on Digital Equipment's PDP-11 and VAX-11 computers, MAPS is a language for decision support of non-programming executives.

The version of MAPS for the new DEC Professional 350, called MAPS/Pro, contains all of the commands and capabilities of MAPS. MAPS/Pro also shares features and benefits of its forebear such as interactive "friendliness," flexible reporting, integrated graphics, prompts, HELP messages, and a library of financial functions.

INTAC is Ross Systems' database management system, and is a powerful tool for organizing and reporting strategic data. Data entry, data validation, updating, reporting and inquiry are all available in easy-to-use Business English. INTAC applications include financial information databases, headcount planning, accounting systems, asset/liability management, and much more.

GTSC INTRODUCED SERIAL I/O SYSTEM BOARD

Chelmsford, MA — Grant Technology Systems Corporation (GTSC), has introduced a Serial I/O System Board which is compatible with DEC's LSI-11/2, and LSI-11/23 series of microcomputers.

The Mode 304, Serial I/O Board, is a direct

replacement and offers the user an alternative source to the DEC Serial I/O unit, Model DLV11-J.

The main features of the Model 304 are:

- Low Cost - 20% plus lower in cost in quantities of 1 through 9 than the DLV11-J.
- Direct Replacement for DEC DLV11-J Serial I/O Board.
- Totally Compatible with DEC Software.
- All Standard DEC Features.
- Four Level Interrupt Structure - Ideal for Multi-user Environments.

The model 304 is a four channel serial I/O port for interfacing DEC's Q-bus to asynchronous serial data channels. It is packaged on the standard 8.9" × 5.2" DEC style width board and is electrically and mechanically compatible with DEC's LSI-11, 11/2, and 11/23 Microcomputer Series.

Each channel consists of a UART which receives and converts serial start, data, parity and stop bits to parallel data into serial form and automatically adds start, parity, and stop bits.

Each channel's data length can be configured for 7 or 8 bits. Parity is jumper selectable, odd or even, and parity checking and generation can be inhibited. Stop bits are jumper selectable one or two.

The 304 can be used in a wide range of interface applications including printers, terminals, peripherals and remote data acquisition systems. Each channel can operate at one of nine jumper selectable data rates, from 150 to 38.4K baud, which are generated by an on-board clock. The user may also provide an external clock of up to 4 MHz allowing for data communications of 250K baud.

The line characteristics of each channel can be jumper configured to operate in accordance with EIA standards RS-232C, RS-422, or RS-423. Twenty milliamp current loop operation is possible when used in conjunction with the DEC DLV11-KA.

A unique feature of the 304 is the capability to support the LSI-11/23 four level interrupt structure. Channel 4 may also be configured as the system console, independent of the other three channels. Special pins are provided on each I/O connection which can be used to constantly assert the data terminal ready lines of the peripheral, and each channel can also be configured to provide a pulse output to control a paper tape reader.

For further information contact: Mr. Steven Bakalis, Product Line Manager.

EVEREST ELECTRONIC EQUIPMENT OFFERING LINE OF DEC COMPATIBLE CABINETS

Anaheim, CA — Everest Electronic Equipment is now offering a line of D.E.C. compatible cabinets with total interchangability for models H-9602, H-9642, H-9646, H-960 and H-967. Additionally available are Power Controller units, CPU Expansion Hardware and Kits for mounting various peripheral units. Standard D.E.C. color combinations or finished in custom colors if desired. Shipped from stock with considerable cost savings. Contact Everest Electronic Equipment, 2100 E. Orangewood Ave., Anaheim, CA. 92806. Phone (714) 634-2200 (See us at **Booth #318** at DEXPO/WEST 82).

NEW ENHANCEMENTS TO IBMS TO BE INTRODUCED AT DEXPO WEST '82

Nashua, NH — The FASBE Group is pleased to announce new enhancements to IBMS, its fully intregrated online financial information system designed for use on all Digital Equipment Corporation's VAX, DEC-20, DEC-10 computers.

IBMS is composed of seven integrated COBOL subsystems: General Ledger, Accounts Payable, Purchasing, Inventory Control, Budgeting, Accounts Receivable, and Security. IBMS was exhibited for the first time at DEXPO EAST '82 and has been gaining wide acceptance in both the commercial and educational marketplaces.

Among the new features in the area of Encumbrance Accounting are budget tolerance, summary purchase orders, and alternative access methods to General Ledger account numbers.

Expanded report writers feature several new variables regarding parent-subordinate account relationships, all easily accessible by the user.

The functions of electronic spreadsheets and business graphics are also now available for FASBE clients.

IBMS will be exhibited in **booth 107** at DEXPO WEST '82, Anaheim Convention Center, December 7-9, 1982, and is available from The FASBE Group, 92 Main Street, Suite 108, Nashua, NH 03060, Tel. (603) 883-3212.

BATTELLE TO INTRODUCE NEW SYSTEM AT DEXPO WEST '82

Columbus, OH — Battelle's Columbus Laboratories new Database Management System, BASIS-DM, will be introduced to the DEXPO West '82 attendees in December, 1982 at the Anaheim Convention Center. Members of the BASIS Program Office will be located in **booth number 625** to answer any questions about their BASIS-DM and BASIS software products.

The BASIS-DM software system is a dictionary driven DBMS. Designed to be a complete DBMS, BASIS-DM allows hierarchical, network, and relational data model definition. This system provides both high level user-friendly interfaces for end-users, and powerful host language interfaces for programmers. In addition, multiple simultaneous database access and manipulation is supported by the BASIS-DM software. On-line update and comprehensive recovery capabilities, as well as many other features are also contained in the BASIS-DM system.

BASIS-DM handles both numeric and textual data. Because it handles long textual data particularly well, the BASIS-DM software has a wide range of application areas in comparison to other DBMS systems. These applications include litigation support, inventory control, accounts receivable, library automation, personnel/payroll, project management, electronic filing, and research applications, to name a few.

For further information, please contact: Steven H. Clark, BASIS Program Office, Battelle's Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201.

NEW COMMUNICATIONS CONTROLLER MEETS REQUIREMENTS LONG SOUGHT BY VAX/VMS USERS

Irvine, CA — ABLE Computer announces the ABLE VMZ/32, a 16-line communications microcontroller with modem control and programmable DMA which meets the performance requirements sought by VAX/VMS users for the past year and a half. The ABLE VMZ/32 contains two 8-line multiplexers programmed to emulate the asynchronous line functions of two Digital DMF32 controllers. By combining the best features of a DH11 and DZ11, the VMZ/32 exceeds the performance and efficiency of either.

The ABLE VMZ/32 gives VAX-11/730, VAX-11/750 and VAX-11/780 system users their first chance to optimize the DMA capability of asynchronous communications on VMS software, according to Ray Ball, Director of Marketing. He said, "Our new controller is compatible with version 3 of the VAX/VMS operating system. It is fully transparent. No foreign software is required to use this valuable enhancement product. Our first customer put sixteen 19.2K baud users on-line and found an 85% idle time factor on his VAX-11/780. He really appreciated that improvement."

System overhead is reduced considerably by the use of DMA and SILO buffers which permit runtime selection of the optimal-data-transfer method by system software. During output operations, software can either select the SILO mode (32 characters per line) for handling short output requests or the DMA mode for long output requests. For input operations, a 48-character input SILO is available for each group of eight lines.

Performance is improved further by a software-transparent output throttle which allows an external device to control and optimize its own data rate. Other features include interrupt-driven modem control which eliminates the software overhead for program scan required by a DZ and on-board micro-diagnostics which automatically check the functions of the controller at every power-on and report exceptions in an LED display.

Physically, the ABLE VMZ/32 consists of a single hex-width board, distribution panel, and interconnecting cables. It installs into any hex-width SPC slot of a standard DEC DD11 backplane, or equivalent, in half the space and half the bus loading of either the DEC DZ11-E or two DMF/32's. An optional 16-line adaptor permits selection of EIA or current loop operation on a line-by-line basis.

The ABLE VMZ/32 is fully supported with documentation, application engineering, rapid board replacement and repair. Current users of the ABLE VX/DZ can buy field upgrade kits for a nominal fee of $750 and convert their existing ABLE products into the ABLE VMZ/32. Price for a single unit is $4250 U.S., and delivery is currently 30 days ARO.

DH-CLASS PERFORMANCE NOW AVAILABLE ON -11/23 SYSTEMS

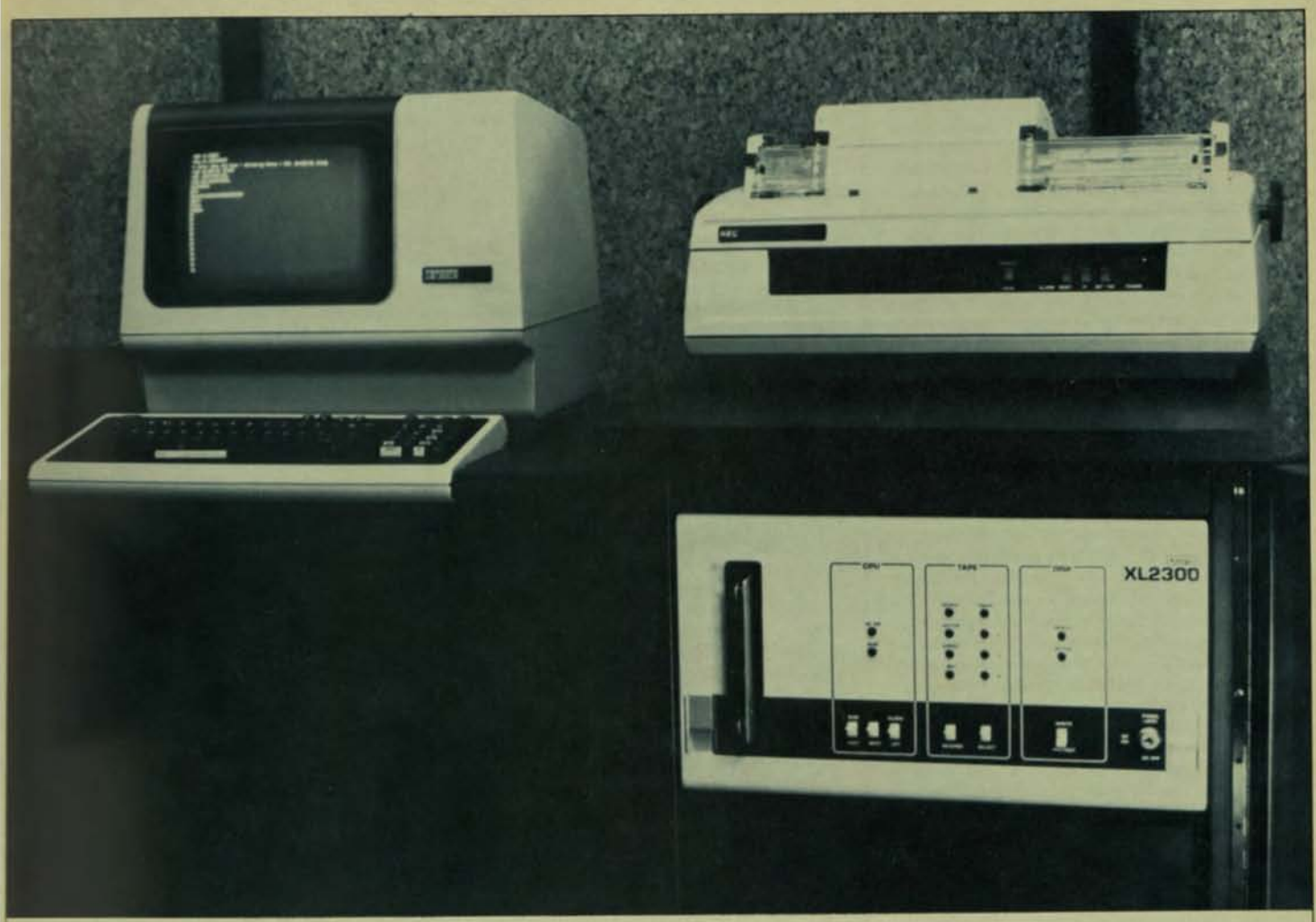
ABLE Computer announces ABLE Q/DH$_{tm}$, a microprogrammed asynchronous controller which makes DH-class performance possible on the PDP-11/23 and LSI-11/23 Q-Bus systems. ABLE Q/DH$_{tm}$ is the first DMA communications multiplexer ever made for -11/23 based systems. It connects any standard Q-Bus to as many as 16 asynchronous communications lines with DMA output capabilities.

The DMA capability provides significant system throughout improvements over interrupt-driven devices, according to Ray Ball. "The DMA output means that the

PICTORIAL PREVIEW OF DEXPO WEST 82

THE FD4 TWO-MEGABYTE FLOPPY DISK SYSTEM FROM SYNEMED, INC.
(Booth 606 at DEXPO/WEST 82)

One of the Webster Electronics Inc. Spectrum-Eleven Minicomputers to be demonstrated at DEXPO WEST 82. This model is a Spectrum-Eleven Model SS23GC, which features a 256 kilobyte memory and an eight inch fixed Winchester disk, plus removable floppy — storage totalling 30 Megabytes.



"XL" 2300 — SOFTWARE SAVER SYSTEMS (XYLOGICS, BOOTH 212)

Webster Electronics Inc. President, David Webster displays three of the input/output processor boards that he designed to run alongside the LSI-11 CPU in his DEC-compatible Spectrum-Eleven minicomputers. These Webster I/O boards take away many housekeeping tasks from the LSI-11 and enable the Spectrum machines to transfer disk data at a rate in excess of one Megabyte per second.

The Spectrum range will be demonstrated at DEXPO/WEST 82, Booth 805.

processor does not need to process an interrupt for each character, but for a whole block of characters at one time. By using word output transfers, our new multiplexer really does allow optimum Q-Bus utilization."

ABLE Q/DHtm is fully software transparent to DEC established drivers for the DH11 and DM11, making modem control standard on all lines—available for use when needed. The new controller also provides interface and signals conforming to EIA RS-423 and is available with an EIA panel or with a line adaptor/panel offering both EIA and 20ma current loop channels.

A large input silo improves the input handling capacity, thereby reducing the probability of data overrun for block mode terminals and computer-to-computer interconnects. Other features include on-board pencil switches for address and vector selection and comprehensive self-test diagnostics with LED display. Diagnostic loopback connectors are built into optional distribution panels.

Physically, ABLE Q/DHtm consists of a quad-width board for the first eight-line group, an optional expander board for the second eight-line group, and an optional distribution panel and cables. With the Q/DH, ABLE lets the user put sixteen lines in two quad-width slots compared to the conventional installation of four dual-width cards plus four sets of cables. Hardware is provided for future applications using 22-bit DMA addressing.

Delivery begins in October and will then be 30 days ARO. Domestic list price is $1850 for the basic eight-line multiplexer. At approximately $100 per line, this gives the user DH-class DMA performance at DLV11-J prices.

ABLE is the world's largest independent supplier of enhancement interfaces for the VAX, PDP-11, System 20 and LSI-11 series of computers. The company manufactures an extensive line of communications, memory and general-purpose products, all of which are hardware compatible with and software transparent to the host machine. They are supported and serviced worldwide with offices and plants located throughout the United States and Canada, as well as England, Germany and Puerto Rico. ABLE also manufacturers the MAGNUMtm series of computer systems.

PASCAL-2 TO SHOW AT DEXPO WEST

Portland, OR — Oregon Software will be showing its Pascal-2/MC68000 system development packages for the first time at DEXPO West Dec. 7-9 at Anaheim, Calif.

The products consist of the optimizing Pascal-2 compiler, producing code that can be linked and executed on the MC68000, plus utilities and a source-level debugger. One package resides on the VERSAdos operating system, the other on the RSX operating system of the Digital PDP -11 series.

Both OEM products offer an option that allows concurrent programming in Pascal, including true priority scheduling and the ability to write device drivers in Pascal. The concurrent package enables user programs to run without an operating system, making it a key tool in the development of embedded systems on the MC68000.

COMPLETE DATA ANALYSIS SYSTEM FOR VAX ANNOUNCED

Nashville, TN — S&H Computer Systems, Inc. has introduced INDASTM (Integrated Data Analysis System), the first complete data analysis system for Digital Equipment Corporation VAX/VMS systems.

What Is INDAS

INDASTM is a complete data analysis system for Digital Equipment Corporation VAX/VMS systems. In one integrated system INDASTM provides (1) databases facilities (including the ability to sort, merge, update and join databases); (2) a complete programming language; (3) a matrix manipulation language; (4) powerful statistical analysis procedures including the General Linear Model.

Although a number of products are available for the VAX that provide programming languages or database access or statistical analysis, INDASTM provides all of these features in a single integrated system. Using INDASTM, the data analyst performs the complete analysis from the raw data to the final printed results within the INDASTM system.

The database, programming language and plotting and charting facilities make INDASTM a flexible system well suited to a broad range of applications in science and business.

INDASTM Database

INDASTM features relational database capabilities. The MERGE statement implements the relational join operator, linking data from several data sets by a common key. The UP-DATE statement applies transaction records to a master file. The IF, KEEP and DROP statements implement subsetting by records and variables. Taken together, these statements allow users to maintain and extract data with a minimum of programming.

INDASTM Programming Language

INDASTM provides a complete programming language that includes structured programming facilities, subprograms, numeric and character data types, matrices, as well as statements for selecting, merging, dating and joining data sets. Because the language compiler is part of the INDASTM system, it is not necessary to compile and link programs separately.

A powerful set of intrinsic functions is part of the programming language. In addition to the usual mathematical and transcendental functions, INDASTM provides functions to perform operations such as computing probability functions, character string manipulation, and state name and zip code conversion.

Operations on character strings include the ability to extract or alter substrings, determination of the length of a string, concatenation of two or more strings, location of one string within another and removal of selected characters. INDASTM also provides character-string matrices.

INDASTM Matrix Manipulation Language

In addition to a conventional programming language, INDASTM provides a complete matrix manipulation language. This facility is similar in power to APL but does not require a special terminal. The matrix manipulation language allows matrix variables, constants and functions. The allocation of memory space for matrices is completely dynamic and automatic. Arithmetic expressions involving matrices can be written as simply and directly as those involving scalars.

For example, if X is a matrix variable, the following statement computes the inverse of the matrix resulting from the product of the transpose of X with X:

Y = INV (X'* X)

Matrix operators available in the language include: addition, subtraction, matrix multiplication, scalar multiplication, transpose, horizontal concatenation, vertical concatenation, comparison and summation over selected rows and columns. Generalized subscripts allow access to single matrix elements or sections of the matrix. Intrinsic matrix functions include: inverse, generalized inverse (Moore-Penrose), determinant, singular value decomposition, solution of linear equations, sweep operator, transcendental functions and probability funtions.

INDASTM General Linear Model

The General Linear Model procedure analyzes data within the framework of an arbitrary linear statistical model. This procedure is exceptionally comprehensive, encompassing in a unified setting:

- Analysis of Variance (ANOVA)
- Regression
- Analysis of Covariance (COANOVA)
- Multivariate Analysis of Variance (MANOVA)

The syntax is simple yet powerful, paralleling the notation used to describe linear models. A particular strength of the General Linear Model is its ability to accept unbalanced data, which allows analysis of the type of data frequently encountered in applications but which cannot be analyzed with traditional methods.

INDASTM Statistical Procedures

INDASTM has a comprehensive set of procedures for statistical analysis. This includes descriptive and univariate statistical analysis; analysis of variance for balanced and unbalanced designs; non-parametric analysis of variance; t-tests; probit analysis; linear models for catagorical data; multiple, stepwise and non-linear regression; autoregression; correlation (Pearson, Spearman and Kendall); canonical correlation; discriminant analysis; cluster analysis; and factor analysis. Graphics facilities include procedures for generating curve and contour plots, bar charts, pie charts, star charts and block charts.

INDASTM is Extensible

INDASTM users can write procedures to be incorporated into the INDASTM system and called just as the standard INDASTM procedures. This allows a flexible and convenient way to develop specialized analyses. All of the database and programming features of INDASTM can provide the input to a user-written procedure.

INDASTM Is Another Quality Product From S&H

S&H Computer Systems, Inc. has been developing high quality system software for Digital Equipment Corporation computers since 1976. In addition to INDASTM, S&H has developed the popular TSX-PlusTM operating system, the high-performance COBOL-PlusTM compiler and the versatile RTSORTTM disk sort program. S&H products are in use at

over 3,000 sites in more than 25 countries. S&H plans to deliver the first INDAS™ systems early in 1983.

Please address domestic sales inquiries to Gary Manookian, and all other inquiries to Richard Dohrmann, Vice President, at S&H Computer Systems, Inc. 1027 17th Avenue S., Nashville, Tennessee 37212 (615) 327-3670, Telex 786577 S&H NAS.

SOFTOOL® CHANGE AND CONFIGURATION CONTROL (CCC™)

Goleta, CA — SOFTOOL CORPORATION IS PLEASED TO ANNOUNCE THE RELEASE OF ITS CHANGE AND CONFIGURATION CONTROL (CCC™) ENVIRONMENT, A NEW PRODUCT TO BE EXHIBITED FOR THE FIRST TIME AT DEXPO™/WEST 82.

For a long time, software managers and programmers alike have been waiting for a software tool that would allow them to automatically keep track of all software and documentation changes and versions. CCC™ fulfills this need in a most impressive manner. CCC™ can reconstruct software and documents upon demand!

CCC™ is a comprehensive system for the management of software changes and configuration control. It is an interactive tool with an easy-to-use interface. It supports, in addition to automatic program reconstruction, impact of change reports, access control, archiving, compression, encryption, automatic backup and recovery, as well as other powerful features. It includes an editor, and provides interactive tutorials that facilitate training. CCC™ can handle programs written in any programming language.

CCC™ is part of SOFTOOL®, which is an integrated set of tools for software management, development, and maintenance.

CCC™ is available, off-the-shelf, for the DEC VAX computer.

A permanent license for CCC™, including one year maintenance, costs $30,000. Various lease plans are also available.

SOFTOOL® products can be seen at **Booth 230** at the Dexpo™/West 82 Convention.

ZIA ANNOUNCES EXHIBITION AT DEXPO 82

Morris Plains, NJ — Zia Corporation, a vendor of DEC compatible utility software, announced today that the following products will be exhibited in **booth 604** at DEXPO 82 in Anaheim on Dec. 7th-9th.

Zia Back/Rest . . . a full incremental backup and restore utility for users of RT-11, TSX and TSX Plus. Operates on all supported random access devices and handles multi-volume backups automatically.

Zia RIFLE . . . designed to facilitate the transfer of files between two PDP-11 computers, hard wired or through dial-up lines, using the RT-11 operating system. Files transferred may be of any type, including source, data, object, or binary.

Zia Virtual Terminal . . . Permits RT-11, TSX or TSX Plus users to establish a connection between their local computers and nearly any remote time-sharing system. The user then may interact with the remote computer using his local terminal or transmit files in either direction. A simple control language offers many options including transmission speed control and automatic call placement and termination.

For further information please contact Glenn Burnett at (201) 328-7177.

HINDITRON

Bombay, IN — HINDITRON OFFSHORE SOFTWARE SERVICES is the first time exhibition of a service that offers cost effective options to the software industry that will help you get more from your computer for less.

HINDITRON's software development centre in Bombay, India, is geared to meet your specific requirements, using a wide range of computer and microprocessor systems.

HINDITRON offers software services for developing Application Software, System Software, Process Control Software and Software Conversions on turnkey and contract basis.

A multidisciplinary team of over a hundred software professionals has provided such services satisfactorily to DEC and DEC OEMs in the Asian, African and Middle-East regions.

Now for the first time these services are offered to the U.S. Software industry.

For more information on HINDITRON OFFSHORE SOFTWARE SERVICES contact Harish Mehta, Director HINDITRON COMPUTER SYSTEMS & CONSULTANTS PRIVATE LIMITED, Eros Bldg., 5th Floor, 42, M.K. Road, Bombay 400 020, India, Tel. No. 22 09 20.

RSTS/E NETWORKING SOFTWARE TO BE DEMONSTRATED AT DEXPO/WEST '82

Toronto, Canada — Digital Management Group Ltd. will demonstrate DMG/NET — networking software for RSTS/E users — at DEXPO/WEST.

DMG, a DEC-oriented software and consulting company, developed DMG/NET as an effective and economical solution to today's complex networking problems. DMG/NET provides a networking growth path as the user's needs grow, since network carriers from direct cable links through leased lines and auto-dial units to X.25 networks are supported in any combination. Thus a network that starts out as a simple 2 system link can grow to a multi system, multi-carrier network as and when required.

" DMG/NET evolved out of a project for a client," says John Dightam, President of DMB. "Their need was for a communication network that would provide low cost interactive access from any of their head office terminals to a wide variety of DEC and non—DEC computers throughout Canada and the United States. They also needed low cost file transfer capability between their seven RSTS/E sites across Canada. We were asked to provide all this, with the mandatory specification that no modifications be made to either the standard RSTS/E system or their PDP-11 hardware, as supported by DEC."

DMG/NET provides reliable, trouble-free networking and takes advantage of the cost savings offered by X.25 networks, especially over long distances. DMG/NET interfaces with Tymnet, Telenet and overseas X.25 networks. Some users have found that they have cut their communication costs by as much as 90%.

DMG/NET provides two-way file transfer and interactive dialogue capabilities between a local RSTS/E host and other RSTS/E systems. Interactive communication with IBM and other non RSTS/E systems is also possible, and file data can be transferred from non-RSTS to RSTS by use of the "log" option contained in DMG/NET. All this is accomplished using short, English language commands, which can be easily understood by non-computer personnel.

The "alternate path" capability of DMG/NET allows all available alternatives for network connection to be explored, including all outgoing ports, remote access numbers and different carriers, if these facilities are available on the computer. If a connection cannot be completed because all lines are in use, or because of a fault in the network or communications unit, DMG/NET will describe the situation in an easily understood message displayed on the user's screen. When a network problem does occur, DMG/NFT diagnostic routines help pinpoint the problem quickly. Comprehensive usage statistics recorded by the system facilitate management of day-to-day traffic on the network.

Through table-driven software, DMG/NET provides total interface and network flexibility. For example, as new micro-computers become available and are interfaced with the RSTS/E host, DMG/NET can handle the dialogue requirement between the two central processors.

DMG/NET is available on either a perpetual license or a rental basis — both with comprehensive support plans. "We are really committed to support," says DMG President Dightam, "and we have designed DMG/NET so that it lends itself to remote diagnosis. For example, from our Toronto office, we can reconfigure, diagnose faults, and load new versions into customer computers anywhere in the world — just as if they were in the next office."

DMG/NET will be exhibited by DMG in **Booth No. 125**, at DEXPO/WEST '82.

For more information on DMG/NET, contact Ken Allsopp, Digital Management Group Ltd., 4800 Yonge Street, Willowdale, Ontario Canada M2N 6G5, Tel: (416) 225-7788.

RSTS/E, PDP-11 and DEC are registered trademarks of Digital Equipment Corporation. DMG/NET is a registered trademark of Digital Management Group Ltd.

CAMBEX AT DEXPO IN DECEMBER

Waltham, MA — Cambex Corporation will be announcing new memory products for the DEC VAX-11/780* and VAX-11/750* series of processors at "The Second National DEC-Compatible Exposition December 7-9, 1982."

Cambex has been a supplier of OEM memories for over a decade and will exhibit its Unibus and Q-Bus compatible memories along with the new VAX products. Additionally, there will be an add-on version of their semiconductor RK05* emulator disk.

All of the products have gained wide acceptance in varied applications areas and across the PDP-11* and LSI-11* families. Many users have boasted of significant increases in performance, since the products are utilizing 64K dynamic RAMS and the highest quality components and manufacturing facilities available.

The Cambex Booth is #232. Any inquiries can be made to Mini/Micro Marketing Department, (617) 890-6000.
*Registered Trademarks of Digital Equipment Corporation

COMPUTER SYSTEMS CORPORATION ANNOUNCES VERSION 1.1 OF CALC-11

Indianapolis, IN — CALC-11, Version 1.1. of the electronic spreadsheet system, is now available for the PDP-11 and VAX computers. Computer Systems Corporation will be demonstrating CALC-11 at DEXPO/WEST 82.

The CALC-11 product is one in a series of products from the Software Products Division of Computer Systems Corp. CALC-11 has been designed to operate on all of the popular PDP-11 operating systems (RT-11, RT-11 with TSX plus, RSX-11 RSTS/E) as well as the VMS operating system for the VAX computer. CALC-11 will be available for the Unix operating system in the near future.

CALC-11 incorporates some exciting features not generally available on previous spreadsheet systems. In addition to providing many of the standard features, CALC-11 allows for data access to non CALC-11 files, file encryption, three dimensional spreadsheet (paging), multiple nested function capability, very flexible spreadsheet adjustment and various data formatting options.

Distribution and media is supplied with each purchase of CALC-11. The user manual incorporates both the tutorial section and the user reference section. The first time user of CALC-11s need only follow the tutorials in order to become proficient with this utility. The installation section of CALC-11 is very easy and requires less than a page of instruction.

CALC-11 licenses are priced according to which particular operating system is required. CALC-11 pricing starts at $2000. Educational and volume discounts are available. For additional information, contact: Computer Systems Corp., 5540 Rock Hampton Ct., Indianapolis, IN 46268, Att: David Tortora, Phone (317) 872-7200, Telex 27-6243.

MSC 3812
NEW! 1 MEGABYTE MEMORY FOR VAX 11/730 AND VAX 11/750

Englewood, CO — Monolithic Systems Corporation has introduced a one-megabyte memory board for Digital Equipment Corporation's VAX 11/750 and the new VAX 11/730. The MSC 3812 is compatible with standard DEC diagnostics and is designed to work with both VAX EDAC systems, providing users with a quality second-source alternative.

Featuring socketed memory elements, two spare refreshed RAMs, and a memory disable switch; the MSC 3812 is an easily-maintained memory module. A one-year warranty on parts and labor is standard. Single unit pricing begins under $2600.00, with educational, GSA and quantity discounts available. Delivery is currently 30 days ARO.

The new MSC 3812 is designed to work with the new VAX controller that supports up to one megabyte per slot. Other versions of the product will be available for VAX 11/750 systems that have not been converted to the new controller.

MSC 4806
NEW! 256KB FULL PARITY MEMORY FOR LSI-11/23

Monolithic Systems Corporation has announced a new dual-high, 256Kb, parity memory board for the LSI-11/23 CPU. The new MSC 4806, which includes a CSR, is a full equivalent of DEC's MSV11-L.

Totally supported by DEC diagnostics, the MSC 4806 allows the user to select starting addresses in 4Kb increments throughout the full four megabyte address range. Single voltage 64K RAMs require only a 5VDC source, and a battery back-up version is also available. High reliability, adherence to DEC specifications, and socketed elements provide the OEM with an excellent alternative which is easily field maintainable. Addressing and capacity are set on-board via jumper blocks (rather than switches) for increased reliability.

A one-year parts and labor warranty is standard. Delivery is two weeks ARO for small quantity orders. Single unit pricing for the MSC 4806 is $979 for the 256Kb version and $761 for 128Kb.

Further information is available from Monolithic Systems Corp., 84 Inverness Circle East, Englewood, Colorado 80112, (303) 770-7400, Telex: 45-4498.

MINITAB: INTERACTIVE DATA ANALYSIS SOFTWARE

University Park, PA — Minitab data analysis software will introduce its new 1982 release at DEXPO 82. The Minitab exhibit, **Booth 101**, will feature on-line trials of Minitab's newest product — the VAX (VMS) conversion, which installs in minutes.

Minitab is an interactive, general purpose data analysis system featuring unusual ease of implementation maintenance and installation. It provides comprehensive cross-tabulation, curve-fitting, plotting and data manipulation features, and performs a wide range of statistical procedures. Its applications are equally broad, including forecasting trends, providing decision support, cross-tabulating survey results, predicting demands and any other task involving data organization and analysis.

Beginners can write and run programs with less than one hour of instruction. Originally designed in 1972 for college freshmen, the system has grown in sophistication and gained a wide following among managers, scientists, engineers and statisticians. But Minitab has retained its simplicity of operation with features like a command-driven language using readily understood terms such as PLOT, AVERAGE and TABLE.

Minitab is the only package that offers both overall ease of use and sophisticated data anlaysis for the full range of DEC machines. Besides the new VAX (VMS) conversion, Minitab offers similar load-and-go modules for PDP models 11/03 and up and LSI-11 based micros. Installation is also routine on VAX-11 models running under UNIX and DEC 10's and 20's.

A direct access, on-line HELP facility provides clear documentation. Other documentation plus two free newsletters are available. For further information contact: Minilab Project, 215 Pond Laboratory, University Park, PA 16802, Tele. (814) 865-1595.

NYPLAN 3.0 — An Important New Release of the Nyplan Financial Modeling System to be Exhibited for the FIRST TIME AT DEXPO WEST 1982

Kirkland, WA — Sophisticated business graphics which can be output to a wide variety of plotting devices, a matrix window with split screen, logic window with editor, visible calculation, help command, and goal seeking capabilities are a few of the exciting new features potential users will be able to try out at the 2nd National DEC Compatible Exposition. The NYPLAN system is presently available on RT-11, TSX+, RSX, IAS, RSTS, VAX/VMS, and TOPS 10/20 operating systems. Information available from NYPLAN INC., 135 Lake Street, So. Kirkland, WA 98033, 206-822-6074.

MARC TO EXHIBIT SPELLING CHECKER FOR MUSE WORD PROCESSING AT DEXPO WEST 82

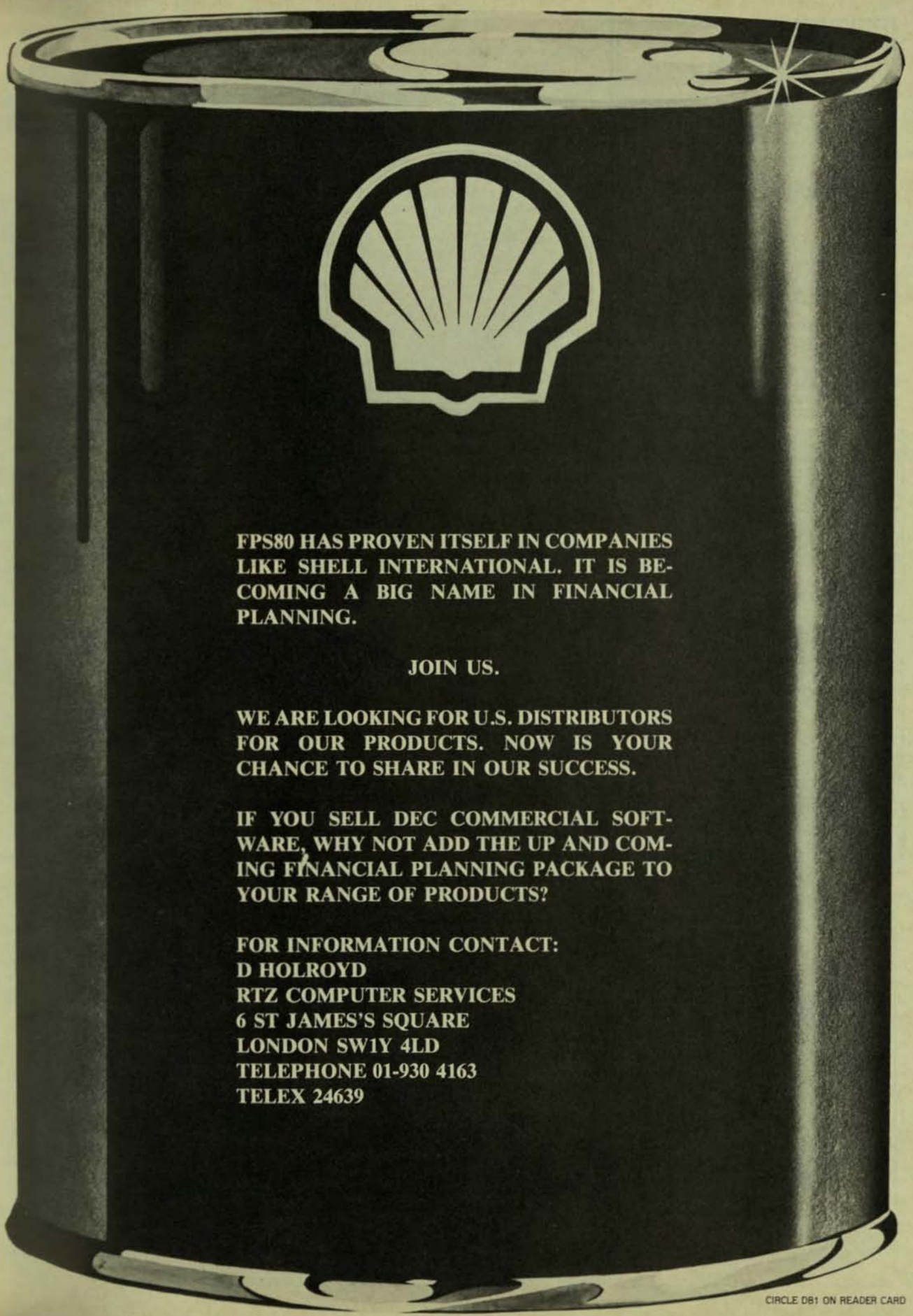
Palo Alto, CA — A very versatile interactive spelling checker capability has just been integrated with the MUSE Word Processing software package. This new capability plus several new features constitutes the new MUSE Version 4.0 which will be shown for the first time at DEXPO WEST 82 by MARC Software International, Inc. The MUSE software package provides full function word processing on the complete DEC line of computers as well as the PRIME, HARRIS, and GOULD SEL computers.

The new spelling check provides capabilities unmatched by any other word processing package. Documents are checked against four different dictionaries: the most common word dictionary (9300 words), a temporary user dictionary, a site specific dictionary, and the MARC main dictionary (41,000 words). During the first check of the document, a temporary document dictionary is created so that subsequent spelling checks will be completed even faster than the first check. After the spelling check, MUSE interactively presents the document with the errors identified and with the most likely correct spellings. The user dictionary can easily be updated during this session.

Other features in MUSE Version 4.0 include improvements to allow interactive pagination, high speed cursor movement, bold face typing, column move and erase, multiple line headers and footers, and cursor controlled document selection and document deletion. All of these features are directed at increasing productivity by improving ease-of-use and by providing more powerful capabilities.

Virtually ANY CRT can be used as the user work station with MUSE to provide full screen, function key editing. Letter quality printing is provided on any of the popular letter quality printers. Scientific typing is supported for technical application areas. MUSE displays 13 levels of superscripts and subscripts, making the most complicated formulas easy to type.

MUSE Version 4.0 and the Spelling Checker will be available for delivery in 30 days. The MUSE price ranges from $12,500 for a fully paid-up license and unlimited usage to $2,500 for a single user version on the smaller DEC PDP-11 computers. The Spelling Checker is included in all MUSE



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Version 4.0 shipments at no additional charge. For more information visit MARC at DEXPO WEST 82 or contact MARC Software International, Inc., 260 Sheridan Avenue, Suite 200, Palo Alto, CA 94306, (415) 326-1971.

CREATIVE CONCEPTS FOCUSES ON DEC-COMPATIBLE INDUSTRY

Lombard, IL — Along with the tremendous growth of the DEC-compatible industry comes the "DEC-compatible Ad Agency."

CREATIVE CONCEPTS, an agency serving the information processing field, has announced it will specialize in handling marketing and advertising for vendors of DEC-compatible products.

According to company president Robert A. Cycon, "The ever-increasing number of marketing channels available to DEC-compatible vendors requires specialized knowledge and expertise to effectively reach potential buyers. Our experience and involvement in the DEC-compatible industry can be an asset to both established firms and new firms."

CREATIVE CONCEPTS currently serves clients who market DEC-compatible hardware, software, supplies and services. In addition, Cycon serves as on-site Press Officer for the DEXPO Trade Show.

CREATIVE CONCEPTS offers a full range of services, including marketing plans, advertising, sales promotion, public relations and trade shows. For further information, contact: CREATIVE CONCEPTS, 418 North Edgewood, Lombard, IL 60148, (312) 495-0242.

NIS WILL SHOW ACCENT R, VUE, PASCAL-PLUS and PRES on DECEMBER 7-9 at DEXPO WEST 82

Cupertino, CA — National Information Systems will be showing ACCENT R and VUE and introducing PASCAL-PLUS and PRES at the Second national DEC-Compatible Exhibition, Anaheim Convention Center.

ACCENT R is a high productivity development tool that allows computerized information management applications to be developed in a fraction of the normal time. ACCENT R's combination of a relational DBMS with a non-procedural query language and a 4th generation high-level structured programming language makes immediate and direct access to information a reality for strategic planning, decision support, and information management on DECsystem-10 and -20 computers.

VUE is an interactive project management system that provides a convenient tool to plan and manage complex projects. VUE performs critical path analysis for projects with up to 3,000 activities. VUE performs very well in environments where multi on- and/or off-site users need program access. The menu-driven user interface allows easy data entry, modification, and report selection. VUE runs on DEC system-10/20, HP3000, VAX, PDP-11, and Perkin Elmer. Reporting is done on CRT's, printers, or optional graphics plotters.

PASCAL-PLUS is a production oriented compiler for DEC-10 and DEC-20 users, developed for the serious PASCAL implementor. PASCAL-PLUS extends standard features, removes many of the arbitrary restrictions appearing in standard PASCAL versions, and utilizes an advanced optimization design. New features, normally occurring in languages such as ADA, FORTRAN, and ALGOL, have been added to increase programming power and flexibility. The PASCAL-PLUS compiler produces code that is 30-40 percent more compact than most standard compiler versions, with a corresponding increase in processing speed.

PRES is an interactive personnel resource management system. PRES provides record keeping and record tracking for all employees, including such features as job history, benefits administration, compensation, and salary history. Special government requirements, such as affirmative action reports, are met, as are regular corporate needs. PRES offers a powerful reporting function. This menu-driven system allows easy data entry, modification, and report selection.

Dave Bray (PRES), Joe Rizzo (VUE), and John Enyedy (ACCENT R, PASCAL-PLUS) will be representing National Information Systems at **Booth #432**, waiting to demonstrate the power of these products.

National Information Systems, Inc., is headquartered at 20370 Town Center Lane, Cupertino, Calif. 95014.

CP/M COS310 CTS300 CTS500
TSX TSXPLUS DIBOL DBL

APPLICATIONS

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WORKSHOPS, MEETINGS, SEMINARS, & NOTES

ESSENTIAL RESOURCES

New York, NY — Training Computer Professionals on Digital Equipment Corporation software is the primary aim of Essential Resources, formed in May 1982. The emphasis is tailored on-site courses for the DEC customer base.

A comprehensive set of subjects is offered including most DEC Operating Systems, Programming Languages and Layered Software.

In detail, courses are offered in: RSX-11M; RSX-11M Plus; IAS; RSTS/E; VMS; UNIX; MACRO-11; MACRO-32; COBOL; FORTRAN; BASIC; "C";, DATATRIEVE; CD; FMS and DECNET.

Detailed on-site surveys are conducted with the client and course outlines are prepared using a proprietary "needs analysis" package.

The technical level of Essential Resources instructors is considerable and includes both training in and completion of software projects involving RSX-11M; RSX-11M Plus; IAS and VMS. Eric Atkins and Martin Davis, the principals have a background in MACRO-11 and RSX-11M training and Marty Davis, the president, was Unit Manager of the DEC training facility in New York City.

Pricing is very competitive, usually running at about 60% of DEC Educational Services.

TERC EXPANDS ITS WORKSHOP SERIES

Cambridge, MA — Technical Education Research Centers, Inc. (TERC) is expanding its workshop series, Microcomputers in Education to 14 sites throughout the country this year. The fall/winter series will be held in the following locations:

1. Westport, CT — October 19-21
2. Cambridge, MA — November 8-10
3. St. Louis, MO — December 7-9
4. Boulder, CO — December 13-15
5. Tallahassee, FL — January 18-20
6. Washington, D.C. — February 7-9
7. New York — February 17-19

Workshops are designed for professional development for educators at all levels, elementary through college. Each workshop will emphasize hands-on experience with a variety of microcomputers. Extensive workshop reference materials will be given to participants. Special evening symposia will be held that address topics on current issues in microcomputer applications in education. Hotel accommodations will be available for participants who need them.

Workshop topics include:

1. BASIC and Graphics I
2. BASIC and Graphics II
3. LOGO I
4. LOGO II
5. PASCAL I
6. PASCAL II
7. Overview of Educational Applications of Microcomputers
8. Administrative Uses of Microcomputers
9. Microcomputers in Mathematics Instruction
10. Microcomputers in Science Instruction
11. Microcomputers as Laboratory Instruments
12. Microcomputers and the Education of Special Needs Students
13. Machine Language

For further information on these and pcoming workshops in other locations, rite: TERC, 8 Eliot St., Cambridge, MA 02138 contact, Ms. Sharon Woodruff, Conference oordinator).

PRODUCT UPDATES

EC SYSTEMS ANNOUNCES COMPLETE IEMORY PACKAGE EXPANSION UNIT

udbury, MA — EEC Systems, Inc. announces complete packaged memory expansion unit r RSX-11M based 11/23 Q-bus systems. nce installed in a host system, it allows emory expansion of up to 4 megabytes of OS memory. Supplied with the hardware is C's software product, CATCH-23 which ables all DMA controllers in the host stem to function with the 22 bit expansion emory. The basic unit contains a single lf-megabyte of parity MOS memory. dditional memory is available in half egabyte increments which are user stallable.

Once installed the memory expansion unit completely transparent to system users; ly the reduced need for checkpointing will noticed. The CATCH-23 software correctly apts the RSX environment and DMA ntrollers for 22-bit memory and enables e same RSX system to be used with the iginal 18 bit processor. The only difference ich will be noticed by users of the new nfiguration is the marked reduction in the ount of task checkpointing taking place. A spokesman for EEC anticipates a high mand for the expansion unit explaining t it saves DEC users several thousand llars over the alternative of upgrading by rchasing a new 11/23 plus processor and ntroller and other 22 bit peripheral rdware devices.

The basic unit with a half megabyte of mory is $5,000 which includes a credit for the existing processor backplane. The price excluding an exchange of an existing backplane and processor box is $6,500. Additional memory is available for $1,500 per half megabyte.

For more details contact: Mr. Eric Dickman, President, EEC Ssytems, Inc., Mill Brook Park, 327/E Boston Post Road, Sudbury, Massachusetts 01776.

NEW DEVICES FROM INMAC PROTECT COMPUTERS FROM POWER SURGES WHILE FILTERING OUT RF NOISE

Santa Clara, CA — Security devices that protect computers against voltage spikes that can cause memory glitches, unstable CRT displays, or system malfunction are now available through Inmac. Called Noise-Filtering Surge Protectors, the new devices also filter out radio-frequency line noise.

According to Ron Becht, Marketing Manager from Inmac, the nation's largest independent supplier of computer cables, accessories and supplies, the cost of the devices can be minimal compared to preventable data loss of a single, let alone propagating, CPU failure from voltage spikes. (Depending upon quantity, prices vary from $96 to $149 each.) Transient voltage spikes can be generated by a transformer or simply flickering flourescent lights.

The surge protector #6676 is 120 V 60-Hz device with two power outlets. It weighs one-half pound, and measures 4" × 3" × 1½". The device maintains a maximum continuous load of 15 amps, and can absorb transient pulses as high as 4000 amperes. It is the only available direct-plugable surge protector with RF noise-filtering capability.

The Surge Protector #6676 is 120 V 60-Hz continuous load of 10 amps and 4000 transient pulse absorption) provides up to eight power outlets to filter noise and protect from surges. Power to all outlets is controlled by one switch, and an indicator light tells when power is on. A six-foot cord enables the user to locate the device near the equipment to be protected. The Surge Protector weighs three pounds and measures 6½" × 5½ × 2¼". It is the only low-cost multiple-outlet surge protector with RF noise filter.

Also available through the Inmac catalog are models which provide surge protection only. All protectors can be used with standard three-pronged ground plugs.

Inmac offers 24-hour shipment in response to phone and mail orders from regional sales and distribution centers throughout the United States. The company also maintains distribution facilities in Europe.

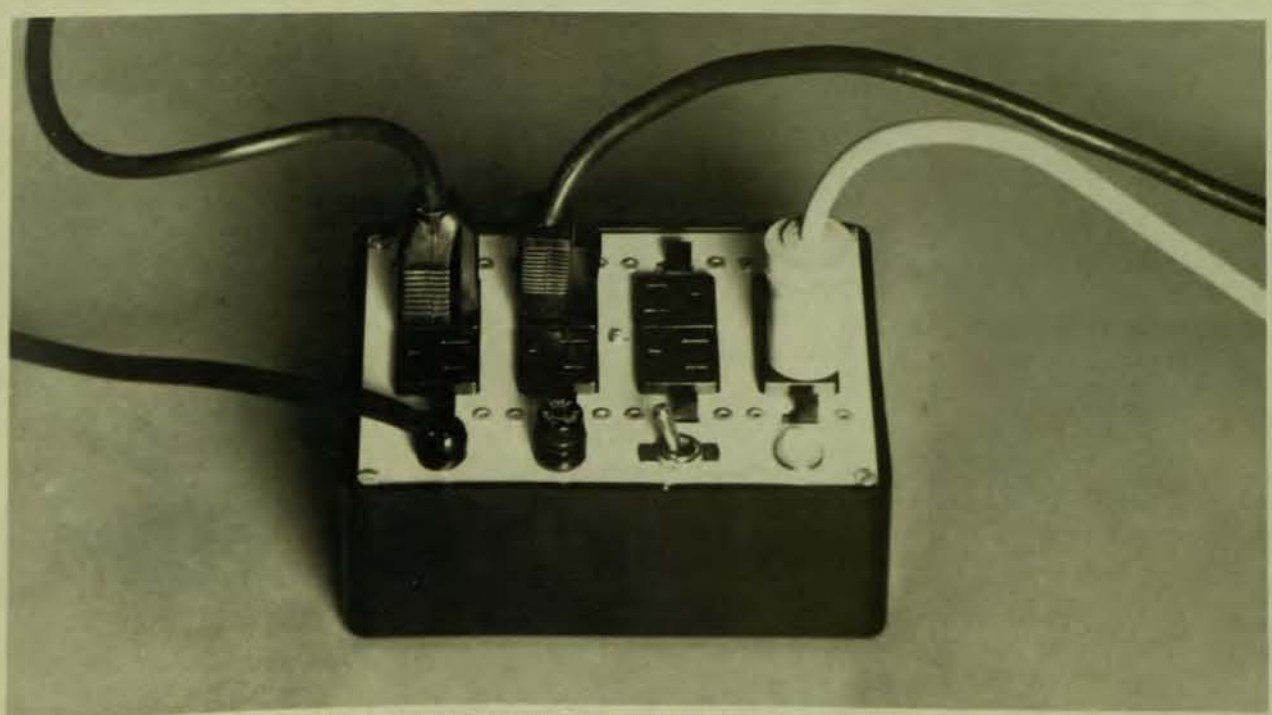
For a free subscription to Inmac's 100-page, four-color catalog, which lists over 2,000 mini-microcomputer accessories, contact: INMAC, Department 74, 2465 Augustine Drive, Santa Clara, CA 95051, 408/727-1970.

ABLE COMPLETES CANADIAN DISTRIBUTOR NETWORK

Irvine, CA — ABLE Computer now has completed the appointment of a network of five distributors serving Canadian needs coast to coast, announced Robert T. Jones, Director of International Marketing. "This network of firms specializing in computer systems makes experienced sales, installation and service facilities promptly available throughout Canada," Jones said.

Distributors are located in Vancouver, Calgary, Regina, Mississauga (Toronto), and Dollard des Ormeaux (Montreal). They are supported by ABLE's own office and service facilities in Mississauga.

ABLE Computer is a leader in the enhancement market, designing, manufacturing and distributing a broad line of UNIBUS-compatible data communications, memory and general purpose enhancement products for users of Digital Equipment



Voltage Surge Protectors from INMAC (eight-device outlet, left and two-device outlet, right) can prevent data or program loss from occurences such as lightning or static from a nearby elevator. The low cost protectors also filter out RF noise.

Corporation computers. In addition to the support service center in Canada, the Company maintains centers in England and Germany, and has offices and plants in the United States and Puerto Rico. Corporate headquarters are in Irvine, California.

EPS CONSOLIDATES U.S. OPERATIONS INTO NEW HEADQUARTERS

Windham, NH — EPS, Inc. has now completed the consolidation of all marketing, sales, research, product development and executive management for U.S. operations into a new headquarters building at Windham, New Hampshire. "With gross U.S. revenues in excess of $5 million in 1981 and continuing brisk sales of the company's decision support software, FCS-EPS, it was determined that expanded product benefit to our users could be managed best from a single location," said Robert J. Earle, EPS President.

The company has sales offices in Atlanta, Boston, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Phoenix, San Diego, San Francisco, Seattle and Tampa. In addition, area training centers are located in Boston, Chicago, Houston, New York, and San Jose. Each sales office continues to offer the services of applications development consultants to streamline installation and implementation of the FCS-EPS system.

FCS-EPS is now running on over 50 combinations of hardware and operating systems including IBM machines from System/34 through 30xx and 4300, Prime, DEC and DEC/VAX, HP-3000, Honeywell, Burroughs, SEL, Univac, Data General, Harris, Onyx, Wang and UNIX-based micro compters.

EPS, Inc. is a privately held U.S. Corporation.

VAX SOFTWARE UNBUNDLED FOR RELATIONAL DATABASE PROCESSOR

Goleta, CA — Signal Technology, Inc., the developers of OMNIBASE, a high-performance relational DBMS for VAX/VMS systems has announced unbundled pricing for the database software components. OMNIBASE software operates on all VAX systems including the VAX-11/730 and all VMS operating systems of version 2.5 or greater (including the new VMS version 3.0).

The primary OMNIBASE software is the VAX personality package which contains three major components: 1) the Frontender, a set of front-end tools which support session logging, user buffer editing with arbitrary choice of VAX editor, an on-line help facility, and user command definition facility, 2) the Reporter, an interactive report writer facility which allows for very general formatting of outputs without compilation or execution, and 3) the Parser, a major section of software which translates the user queries into elementary sets of backend processor commands. The Parser also formats the final output to the user.

An OMNIBASE utilities package contains easy-to-use DATABASE Administrator tools for backup and recovery, authorizing users of OMNIBASE for extracting useful system status information. In addition, resource accounting tools are provided which interface with the Signal Technology, Inc. Process Accounting and Chargeback System (PACS).

Two embedded query language pre-processors are also separately priced. The FORTRAN and COBOL Embedded Query Language pre-processors allow the user to embed interactive query language code into the host language for easy-to-maintain code with easy database access.

These software packages interfaced to the OMNIBASE Processor by way of an IEEE-488 protocol. The OMNIBASE Processor consists of the Britton Lee, Inc. IDM-500 or IDM-200 relational database machine. The processor can be purchased from Signal Technology, Inc. as part of a complete OMNIBASE system or it can be purchased directly from the manufacturer, Britton Lee, Inc. of Los Gatos, California. Signal Technology, Inc. is located at 5951 Encina Road, Goleta, CA 93117.

VALUABLE SUBSCRIPTIONS TO INFORMATION UTILITIES, SHOPPING SERVICES, OFFERED WITH PURCHASE OF SCANSET TERMINALS

Cupertino, CA — Valuable subscriptions to the Dow Jones Information Services, THE SOURCE℠ information utility, and Comp-U-Star home shopping service are now included with the purchase of Scanset™ personal information terminals from Tymshare, Inc. Low-cost, easy-to-use Scansets are designed to allow the user quick, simple access to data bases or other computer-stored information, at the press of a key or two.

Scanset purchasers are entitled to a Dow Jones password at no charge, plus one hour free usage of Dow Jones Information Services. Free Usage is in non-prime time, and must be used within 45 days. Subscribers can access news from The Wall Street Journal, Barron's and the Dow Jones News Service; current quotes on stocks, bonds, treasury issues, and mutual funds; weekly economic updates; weather and sports reports; and other information.

Scanset buyers also may subscribe to THE SOURCE basic services without payment of the usual registration fee. A credit of $20.75 applied toward the subscriber's account is included, and must be used within the first two months. Through THE SOURCE, users can access almost 800 information and communications services, including the UPI News Service and other business and financial news; communicate via electronic mail; look at airline schedules and make flight, hotel, or car reservations; conduct information searches; and much more.

A six-month free trial membership to Comp-U-Star shop-at-home service also is available to Scanset purchasers. Included is a half-hour of free usage. Comp-U-Star members may access information on 30,000 brand name products, then order at substantial discounts and have products shipped directly to their homes.

The Scanset Model 410, featuring automatic computer log-in, sells for $495. The Model 415, with built-in modem, automatic dialer, and automatic computer log-in, is priced at $649. Scansets take only about one square foot of space, and fit inconspicuously on a desk top. They feature user programmable function keys, a 9-inch diagonal screen with 24 lines of text, 40 or 80 character line lengths, and limited graphics capability.

Tymshare is a major international computer information management and telecommunications company, providing a broad range of business services throughout the United States and in Canada, Western Europe and Japan through affiliated operations. Tymnet, Inc., a subsidiary of Tymshare, operates TYMNET, the world's largest public packet data communications network.

DIGITAL ASSOCIATES ANNOUNCES THE INDUSTRY'S FIRST ONE-YEAR EXTENDED PARTS WARRANTY FOR LINE PRINTERS

Stamford, CT — Digital Associates Corporation (The Printer Store) recently announced the first one-year parts warranty program among independent line printer suppliers. The new plan is an exclusive option with any of the company's 27 models of Band, ChainTrain, Belt, Drum and Matrix printers. According to Thomas Loucas, President of Digital Associates, "This kind of warranty is ideal for users such as systems houses, large end-users and universities, who have the resources to perform their own maintenance and therefore don't require a service contract. It extends coverage from the industry standard of 90 days to 365 days—one full year."

Digital Associates is America's oldest and largest independent supplier of line printer systems for minicomputers. The company offers the largest selection of line printers for both local and remote applications available anywhere; guaranteed plug-compatibility with a broad range of minicomputers, discounts of 30% to 50% off the minicomputer vendors' list printer prices; professional installation by factory-trained technicians; nationwide service; and complete product support via a full line of ribbons, spare parts and printer accessories.

For more information on the new, one-year extended parts warranty from Digital Associates, call Art Schimel, Vice President/Sales at (203) 327-9210.

MIND NETWORK DESIGN TOOL GETS CANADIAN AND CALIFORNIA TARIFFS

Great Neck, NY — The tariff options available for MIND, the network design and analysis software tool, have been expanded to include private line rates for Canada and for intrastate California, according to ConTel Information Systems, the network design firm which licenses the package.

The MIND system is currently in use by more than 800 network analysts to simulate network performance under various line-loading conditions and to design line layouts which satisfy operating requirements at the lowest cost. It may be accessed through a time-share vendor or installed on the user's own computer. Users report savings of up to 30% in line costs after utilizing MIND to optimize network designs.

DSC-200

Santa Barbara, CA — The DSC-200 is a complete Audio Data Conversion peripheral subsystem to VAX and PDP-11 computers engaged in the critical analysis and reproduction of audio signals. Applications include speech/voice R&D, computer music, seismic, sonar and other activities requiring 'in or near audio bandwidth' signal processing capabilities.

Three features distinguish the DSC-200 from all of its nearest competitors: (1) complete functionality, (2) modularity, and

IATIONWIDE DATA DIALOG (215) 364-2800

LOCK-11

©NDD

70 James Way, Southampton, PA 18966

REAL RSTS SECURITY

•LOCK-11

- Access control with 'hardened' security file and editor.
- Unlock specific [p,pn] or [p,*] for specific user or keyboard.
- Unlocks can cover specific day & time ranges.
- Comprehensive alarms from independent sources.
- Auto log in available, with or without password.
- Auto keyboard disable on probe.
- All user-assignable logicals, default KBM, etc, automatic.
- Person-oriented user-id or (mix/match) KB: based security specifications.

• SAFE-11

- A MENU run-time environment [KBM]
- Total containment of non-privileged users.
- Multi-level MENU access control;
  entire applications, selected menus or
  parts of menus can be locked by: a) system manager
  b) supervisor.

REAL RSTS CONTROL

• LCKDPY TSK (VT5DPY in MACRO) The ultimate MACRO SYSTAT.

- The system manager's observation platform
  - Issue 'UTILTY' commands without exiting display.
  - Hi-light activity of selected keyboards.
  - Alarms certain critical conditions.
  - Negligible load.

•DYNPRI TSK (Macro-of course)

- LOCK-11's observation platform.
  - Online-tunable dynamic priority changer.
  - Biases response in favor of KB-state users.
  - Auto hibernate detect and alarm.
  - Can kill HB-s in selected [p,pn] or [p,*]
  - Can print audit trail of arrivals and departures.
  - Negligible system load.

CIRCLE D49 ON READER CARD

(3) level of performance. The DSC-200 is a completely 'turnkey', hardware and software system package. From remote, level adjustable microphone and speaker input and output; through the high performace, filtered and buffered A/D and D/A converters in rack mountable chassis with isolated power supplies; through the high throughput (up to 500KByte) DMA Controller, the complete hardware spectrum, including all interfaces, power and cabling, is covered. Similarly, a full array of software products is available to support all hardware operations and testing. Running under VMS, RSX-11, UNIX or RT-11, comprehensive, menu selectable, diagnostic, operational and application program development tools are provided, including an extensive callable FORTRAN Library, and such high level programs as 'Record' and 'Playback'. This complete and fully integrated hardware and software audio data conversion package ensures a smooth and rapid installation, and trouble free operation thereafter; thereby greatly reducing the delays, risks and cost overruns otherwise to be anticipated when using less complete product alternatives.

The modular organization of the DSC-200 provides a number of important user benefits. Up to 16 analog input or output channels can be accommodated on a single DSC-200 system. In addition to the obvious economies of multi-user configurations, such functions as multi-channel stereo record and playback and full-duplex operation (simultaneous record and playback) are readily performed. By appropriate initial (and subsequent) selection of system components, a high degree of user-configurability is provided, thus accommodating a variety of initial user needs and permitting system expansion.

Last, but certainly not the least of the DSC-200's most notable attributes is its exceptionally high performance. From microphone input, through the computer, to speaker output, a Dynamic Range and Signal to Noise Ratio in excess of 90 dB (16 bit resolution) is consistently maintained. Digital and analog circuit buffering and full optical ground isolation greatly reduce crosstalk (-75 dB) and Total Harmonic Distortion (THD 0.1% maximum). Up to 4 user-selectable, anti-aliasing and signal reconstruction filters per channel, and a programmable variable sample rate (up to 50 KHz) are provided. Fully buffered DMA operation permits continuous uninterrupted recording and playback.

That the DSC-200 meets or exceeds all of the aforementioned specifications attests to its design superiority, and indeed, is why it has become the de facto standard of audio data conversion excellence. The DSC-200 is in current use by such leaders in the fields of computer speech and music processing as Texas Instruments, National Semiconductor, Bell Labs, ITT and MIT, to name only a few. Starting price for a fully functional system is approximately $16,500. Delivery is available within 60 days, ARO.

CONVERSION SOFTWARE LETS TRS-80 II USERS ACCESS DEC & CP/M

Mountain View, CA — Thousands of Model II users will be delighted to learn that they can now exchange data files and source programs with CP/M or DEC RT-11 systems using one of the two new versions of REFORMATTER conversion software from MicroTech Exports, Inc.

TRSDOS to CP/M reads and writes single density CP/M diskettes. And TRSDOS to DEC reads and writes single density RT-11 diskettes.

Each version runs on a single-drive Model II and provides Model II users full facilities for file reorganization and directory maintenance on the target diskette. In addition to bidirectional transfer of files between the two operating systems, REFORMATTER conversion software provides complete file statistics for the target diskette, permits the user to delete or rename files, alter user numbers, display or print accessed files, and convert TRSDOS diskettes to the target diskette.

These introductions expand to three the company's offerings of conversion software for Model II users. The third program, TRSDOS to IBM, is available exclusively from Tandy Corporation through Radio Shack Stores.

Says company spokesman Oscar Rosenbloom "Now TRS-80 Model II users have a choice — they may access the extensive databases and software source libraries available through CP/M or DEC."

MicroTech Exports also offers CP/M and DEC RT-11 users versions of its conversion software. For CP/M users it offers CP/M to IBM and CP/M to DEC RT-11 versions. For DEC RT-11 users it offers DEC RT-11 to CP/M.

REFORMATTER conversion software is available directly from MicroTech Exports, and selected distributors such as Lifeboat Associates, Radio Shack, Software Distributors, and Westico.

For more information, contact Oscar Rosenbloom, MicroTech Exports, Inc., 467 Hamilton Avenue, Palo Alto, California. Telephone (415) 324-9114.

INGRES RELATIONAL DBMS ADDS UNIX SUPPORT AND JOURNALING

Berkeley, CA — Relational Technology, Inc. (RTI) announces the release of a VAX/UNIX* version of its INGRES relational database management system, as well as enhancements to its VAX/VMS* version to support journaling, audit trials and the use of its forms management system from high level programming languages.

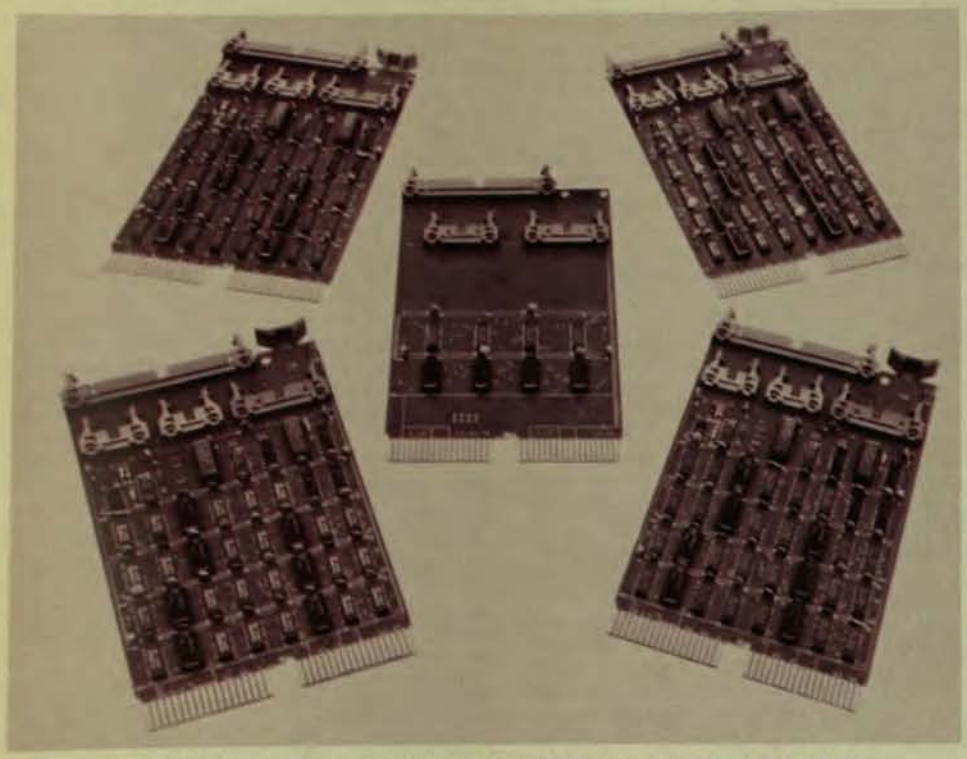
INGRES Version 1.1 for VAX/UNIX includes RTI's Report Writer and Forms Management System, including QBF (a Query and update by Forms subsystem), VIFRED (a Visual Forms Editor) , all associated documentation and support. Availability is immediate, and license pricing is $35,000 less applicable discounts.

INGRES Version 1.4 for VAX/VMS includes a journaling facility to save updated records to a second disk automatically and support full database recovery after "hard" disk crashes. Journaling may be enabled for an individual relation or an entire database. Audit trials allow inspection and selected removal of updates made to an INGRES database.

INGRES Version 1.4 also supports high level calls to its forms management system from procedural programming languages. This approach lets application developers manage terminal interaction with users by defining a "form" using VIFRED, storing it in an INGRES database, then retrieving it for execution from within an application program. During execution, the form can display data from the program or database, collect data for database queries or data entry, and specify program control flow with command menus. Initial forms support is available for the FORTRAN and C languages; support for COBOL, PASCAL and BASIC will be available in subsequent releases.

INGRES Version 1.4 for VAX/VMS has been distributed without charge to all current RTI INGRES users.

*VAX and VMS are trademarks of Digital Equipment Corporation. UNIX is a trademark of Bell Laboratories.



MLSI-DB11-SA, Bus Repeater/Switch for LSI-11/23 Computers from MDB SYSTEMS, INC.

LARGE SYSTEM PERFORMANCE CAPABILITY NOW BROUGHT TO LSI-11/23 SYSTEMS

Orange, CA — A family of combinations of a Bus Repeater/Bus Switch is now available from MDB Systems Inc., the world's largest independent manufacturer of computer interface modules. The Bus Switch, MLSI-DB11-SA in its minimal configuration, allows the sharing of peripherals and memories between two independent CPUs.

The Bus Switch, a completely electronic device, connects and disconnects bus segments to the main CPU bus. Applications of the switch can be Resource Sharing, Multi-Processing, and Redundant Systems for situations requiring a high degree of reliability.

By switching whole sections of the CPU bus complete with all attached peripherals and memory between processors, the most powerful implementation of multi-processing systems is realized. Shared memory, front end processing, redundant systems, shared peripherals are all possible through the use of this bus switch. Powerful, flexible and cost effective systems can be easily implemented.

The level of system design power, previously available only in the mini-computer class or larger, is now possible for DEC's LSI-11 line. Many peripherals cost more than the CPU, and these expensive peripherals can now be shared between several processors.

The MLSI-DB11-SA is $2995 in single quantity. Delivery is 30 days ARO.

DIGITAL EQUIPMENT TO MARKET INTERNATIONALLY RAXCO RABBIT SOFTWARE

Atlanta, GA — RAXCO Inc. announces an international marketing agreement with Digital Equipment. Under the terms of the agreement, Digital Equipment Australia Pty Limited will market and support RAXCO's "Digital tested" RABBIT Software on an exclusive basis throughout Australia and New Zealand. Negotiations to provide similar services throughout Europe are expected to be concluded shortly. RAXCO will continue to directly provide RABBIT Software throughout North America.

In the July 1982 issue of "Digital News" Digital is quoted as follows: "Digital is pleased to announce a new program designed to make it easier for customers to obtain some of the Software written by third parties in Australia, New Zealand and Overseas."

"This worldwide program was established in response to the many requests made by customers to Digital, especially in countries such as Australia and New Zealand. Customers had expressed a concern at DECUS Meetings and in their Survey responses to Software Services, that it was expensive and time consuming to obtain Software Applications Packages written by Software Houses and by major customers in Europe and the U.S.A. It was not easy for them to evaluate packages remotely or to negotiate an agreement for their purchase. They were also concerned about local support for these packages.

"In addition, many customers have developed software which they believe to be of a high enough quality to be marketed. They asked Digital to use its extensive marketing capabilities to make these Application Packages available to Digital's customer base worldwide.

"The Digital Application Software Library has been set up by Digital to provide customers with access to packages developed locally and overseas by software houses and by customers."

RABBIT Software is available for DEC computers running VMS, RSTS/E and soon-to-be-announced RSX-11m plus.

RABBIT-1 Software provides system resource accounting, auditing and billing reports.

RABBIT-2 Software provides graphic system performance analysis through an interactive command language.

RABBIT-3 Software is a job accounting and monitor program for RSTS/E systems.

RABBIT-4 Software is a computer security system for users and data files under RSTS/E.

RABBIT-5 Software is a high speed file backup and restore system for VMS.

Over 500 RABBIT Systems have been installed worldwide in the past two years, including England, Ireland, Germany, France, Australia, South Africa, Mexico, Canada and the U.S.A.

For more information contact: RAXCO Inc., Suite 200, 6520 Powers Ferry Road, Atlanta, Georgia 30339 U.S.A., Telephone (404) 955-2553, TWX 810 766-2256, Telex 54-2659.

NEW PRODUCTS

DATATREND RELEASES SPREADSHEET

Salt Lake City, UT — DATATREND has announced the release of an electronic spreadsheet, DataCalc, for operation on DEC and alternative DataSystems. DataCalc is written in DIBOL, Digital's Business Oriented Language, to enable it to operate on CTS-300 and DBL/TSX-Plus based Business Computers.

DataCalc's capabilities are similar to those of VisiCalc, the highly successful software product developed by Dan Bricklin and Robert Frankston of Software Arts. VisiCalc has experienced phenomenal success in the personal computer marketplace, and is in fact largely responsible for the emerging concept of Personal Business Computers. VisiCalc has bridged the traditional gap between unfriendly computers and non-technical users.

For people who work extensively with numbers, the electronic spreadsheet is the most significant product to be developed since electronic calculators. Its impact on the computer industry and the business community is likely to be as great as word processing has been. Electronic spreadsheets are important tools for accountants, managers, financial analysts, executives, engineers, in fact, anyone who uses a pencil, paper and calculator.

DataCalc can be used to create forecasts and budgets, projected income statements and balance sheets, depreciation and amortization schedules, consolidations, cost charts, and numerous other spreadsheet applications. Changes can be made easily and the re-calculated results viewed almost instantly, allowing decision makers to determine consequences BEFORE the action. What used to take hours or days to determine can now be accomplished in minutes.

DataCalc is available for the VT100, and soon for the VT52 terminals. DataCalc supports all standard mathematical operations; i.e., add, subtract, multiply, divide and exponential, and several special functions such as @SUM (sum a column or row), @AVG (average of a column or row) and @CNT (the number of value entries in a row or column). Commands supported include

Replicate, Insert (row or column), Delete, Edit, Title Fix, Split Windows, Variable Column Widths, and others. DataCalc spread sheets can also be stored, retrieved, and printed in boardroom quality report formats.

DataCalc is priced at $895 and a Dealer program is available. For more information call or write: DATATREND, 1363 S. State, Suite 346, Salt Lake City, Utah 84115, 804-487-0531.

SELANAR CORPORATION ANNOUNCES GRAPHICS SOFTWARE PACKAGE FOR CP/M AND MP/M SYSTEMS

Santa Clara, CA — Selanar Corporation, manufacturer of the popular retrofit graphics enhancements for alphanumeric terminals, has announced a low-cost graphics software package for CP/M and MP/M system.

The new package, called SGPLOT, provides software support for Selanar's graphics enhancements for the DEC VT100 and TeleVideo 925 and 950 terminals. SGPLOT enables DEC VT180/VT18X and TeleVideo TS801 CP/M systems interfaced to one of Selanar's graphics boards to generate graphic displays. SGPLOT is similar to the CALCOMP and VERSATEC instruction set utilizing FORTRAN subroutines such as PLOT, PLOTS, AXIS, LINE, SCALE, GRID, OFFSET, SYMBOL, NUMBVER, FACTOR, TONE, NEWPEN and WHERE to facilitate the development of graphics applications programs.

In addition to the standard CalComp-compatible primitive graphics instructions, SGPLOT also features higher level statistical routines which create displays of user-specified quantitative and labeled data such as pie charts, bar graphs, 3-D bar graphs, and line drawings. These routines are designed for easy use by the non-programmer for commonly used business and scientific displays, for quick and easy report production, or for data analysis and technical applications.

Additional features of the SGPLOT software package are automatic saving of plot files, a built-in diagnostic subroutine, and program selectable display window with adjustable scale. The package also gives the user the ability to plot user-specified functions and to create additional subroutines. A single command will convert calculated values or data to plotted numerals, and one command will draw labeled and calibrated graph axes.

The Selenar graphics enhancements provide 1225 × 240 dot resolution on the terminal screen with an addressable plot area of 65K × 65K. The addition of the graphics board does not affect any of the terminal's original capabilities. Selanar's graphics enhancements in conjunction with the SGPLOT software package feature variable character sizes, vertical and horizontal lettering, full ASCII character set, relocatable origin, and variable density area fill. Several options are available for interfacing to hardcopy devices.

The SGPLOT software package is priced at $450 and is available immediately. For more information, contact Selanar Corporation directly at (408) 727-2811.

FINS-11

It is with great pleasure that we announce a new product: FINS-11. This product is a special hardware/software integrated package developed by DEC and Tidewater Research Systems to produce a militarized version of the PDP-11 for use by the U.S. Navy. It is fully submersible and can travel at 15 knots, due to some recent hardware breakthroughs we have made which have resulted in the TUNABUS. FINS-11 also features the OCTOBUS, a high speed bus with eight ports.

During a highly rigorous and lengthy field test, during which time FINS-11 terrorized twelve towns on the Rhode Island coast and at Cape Cod last summer, the Underwater Research Labs used FINS-11 to do process control on clam beds using special communications software called DECWET-11. The Navy particularly liked the FINS-11 D/A converter ROM package which plays "Anchors Aweigh" whenever it comes out of the water (Richard Rogers' 'Victory at Sea' is also available but requires the special buoyancy option for the ROM).

Field Service has been attending special classes for SCUBA training off Martha's Vineyard to enable them to tackle support of FINS-11. FINS-11 is supported in HOSS by Martin Minnow.

Special hardware features of FINS-11 include:

1. High powered cooling fins
2. Bubble Memory
3. SQUID ink injection line printer
4. Micro-fish reader (GUPPY)
5. Admiral mode replaces Kernel and Supervisor modes

Software features of FINS-11 include:

1. A very forgiving operation system — COS-11 (Chicken of the Sea), written in CORAL with real-time extensions
2. MACkeral-11 Assembler
3. FILET file transfer system
4. A powerful user interface, COD (Command Operations Decoder)
5. An Unlimited freshwater node pool
6. STARFISH — VAX Emulator
7. The block structured ALGAE-60 high level language
8. CRABS (Comprehensive Random Access Batch System) which allows jobs to be spawned up to the batch stream
9. The heart of COS-11 is the ATOLL scan which will trap tasks that are floundering or wading for nodes
10. Autopatch is accomplished by running SUBS (System for Updating Binary Software) in amphibious mode

One of our field test sites was Jacques Cousteau, who ran a special version of the system, called OYSTER, which was written in PEARL. Since he is a distinguished user, we substituted John Denver's "Hail Calypso" for "Anchors Aweigh".

NEW SYSTEM COMMUNICATION MODULE FOR LSI-11 COMPUTERS BY MDB SYSTEMS

Orange, CA — A systems communication module, LSI-11/23 compatible, that provides multiple features, has been developed by MDB Systems, Inc., the world's largest independent manufacturer of interface products for DEC computers.

Designated the MLSI-SCM11, the module has an EIA RS-232/20 ma current loop interface for connection to a system console device.

Baud rates are switch selectable from 110 to 38.4 baud by edge mounted switches, which precludes powering the system down and removing the board to change data transmission rates.

LEDS for Transmit and Receive lines provides the user instant visibility to assess line activity which eliminates the need for a break-out box or scope to determine this activity. Module also has limited Modem Control.

Two sockets on the board are provided for Bootstrap programs or Read Only Memory from 2732/2716 PROMS with address ranges up to 22-bit addressing. ROM capacity is 8KB.

A Programmable Line Time Clock, with four level interrupt, offers the ability to enable or disable interrupts under program control. This feature provides KW11-L compatibility to users of larger operating systems such as RSX11-M, RSTS-E and UNIX.

Price: $450.00 in single units; Delivery: 30 Days ARO.

NEW CATALOG AVAILABLE FROM MDB SYSTEMS, INC.

Orange, CA — A twenty page illustrated catalog which describes over 100 items for LSI-11 computers, is available from MDB Systems, Inc., the world's largest independent manufacturer of interface products. Included in the products are Communication Interfaces, Peripheral Device Controller, Multiplexors and Chassis Assemblies. The catalog also contains interface information, schematics, and Input/Output pin connections of the various products.

To receive a copy of the MDB Systems, Inc. brochure entitled "Computer Interface Products for use with Digital LSI-11/2 & 11/23 Computers" contact MDB Systems, Inc. 1995 North Batavia Street, Orange, California 92665. Telephone - 714/998-6900 Telex - 910-593-1339.

¼" CARTRIDGE MAGNETIC TAPE SYSTEM FOR Q-BUS COMPUTERS

Woburn, MA — AVIV Corporation has introduced a complete cartridge magnetic tape system for DEC's LSI-11/2 and LSI-11/23 computers. The Cartridge System, Model TFS 903, contains an AVIV designed and manufactured single quad card controller Model TFC 903, a Kennedy cartridge tape drive Model 6450, and a rack mountable enclosure.

The system is fully software compatible with all DEC operating systems and UNIX using TM-11 driver. Up to two cartridge drives can be connected to the controller in radial fashion.

The system provides high storage capacity of up to 21 Mbytes per cartridge and high data integrity. These key features are the result of high density recording based on group coded recording (GCR).

Four track read after write serpentine recording and 30 ips speed make the system suitable for disk backup in the range of 20-80 Mbytes. The start/stop mode allows for incremental backup.

The controller is 2901 microprocessor based and is full contained on a single quad card. Self test and micro diagnostics are standard features of the controller. A large FIFO buffer simplifies system configuration.

AVIV's ¼" Cartridge Magnetic Tape System for Q-Bus computers, Model TFS 903, is priced at $3900 and delivery is 30 days ARO.

AVIV corporation has manufactured a complete line of tape controllers for DEC and DG minicomputers since 1976 and is the

industry's leading supplier for 6250 GCR systems. Detailed specification data on the new ¼" Cartridge Magnetic Tape System and the single board TFC 903 is available from AVIV Corporation, 6 Cummings Park, Woburn, Mass. 01801. Telephone (617) 933-1165. Contact Victor B. Vogel or Edmond W. Arsenault.

RELEASE 3B OF ADR'S EMPIRE FEATURES NEW EDITING CAPABILITIES AND OTHER FACILITIES

Princeton, NJ — Applied Data Research today announced Release 3B of EMPIRE, a financial decision support system for IBM and plug compatible computers that supports IBM's MVS/TSO and VM/CMS operating systems and DEC-10, DEC-20 and VAX computers.

Release 3B includes editing capabilities that allow users to easily establish and maintain EMPIRE files. Users can edit contents of the files in the same session in which they produce graphs, do regression analyses or perform other decision support functions. Users can still opt to employ existing system editors.

With a new online HELP facility, users can quickly review available commands and their uses. They can obtain an explanation, at a terminal, of EMPIRE's commands. Users can type the word HELP and receive a message which lists the valid responses or further explains the current prompt. HELP messages serve to explain more fully what an EMPIRE prompt requires the user to do.

EMPIRE's graphics capability has been enhanced by new options, including additional types of graphs and added device support. The new graphs supported include bubble graphs, commonly used in strategic planning applications, and filled in multi-color bar charts. Graphs can be produced using IBM, Tektronix, Hewlett Packard, DEC and TTY (ASCII Terminal) graphics devices.

New statistical capabilities also have been added to EMPIRE. A hierarchical consolidation facility allows a corporation with multiple locations and divisions to easily model and consolidate its business units.

EMPIRE's new simultaneous methodology applies a signal tracing technique to the solution of simultaneous equations. This method enables EMPIRE to produce solutions not typically solvable by other decision support products.

The EMPIRE Compare Analysis Technique provides the means to compare one time series against another time series. This is especially useful when comparing original and estimated data. Calculations for the two time series provide residual errors, percentage error, mean square error, mean percentage error and mean absolute percentage error.

"With these new enhancements, EMPIRE continues to be the most complete decision support system with modeling, graphical, statistical and assumption analysis facilities," said Barry Frankel, Vice President for ADR's Applications Products Division. "EMPIRE has proven its success in the areas of financial analysis and modeling, and we believe it will become increasingly important to other business activities as well."

The permanent license price for EMPIRE starts at $48,000. Monthly rentals, one and three-year leases also are available.

NEW HIGH—DENSITY BUBBLE—MEMORY SYSTEM FOR LSI—11 COMPUTERS

Dublin, Ca. — The Bubbl-Tec division of PC/M, Inc. has announced availability of its new high-density magnetic-bubble mass-storage memory system for Digital Equipment Corporation (DEC) LSI-11 computers.

The bubble-memory system will operate up to 5 times faster than a floppy disk, will consume 5 times less power, and vastly improve system reliability. Just three dual-height boards provide more storage than a dual-drive double-density floppy-disk system, and require no extra chassis or power supply. This new bubble-memory system is also less expensive than a floppy disk for many small-system applications in industrial control, communication systems, etc.

Bubbl-Tec's new bubble-memory system for LSI-11's is comprised of a dual-height controller module (designated the QBC-11/02 BUBBL-CONTROL™) and one or more dual-height bubble-memory modules (designated QBI-11 BUBBL-BOARD™).

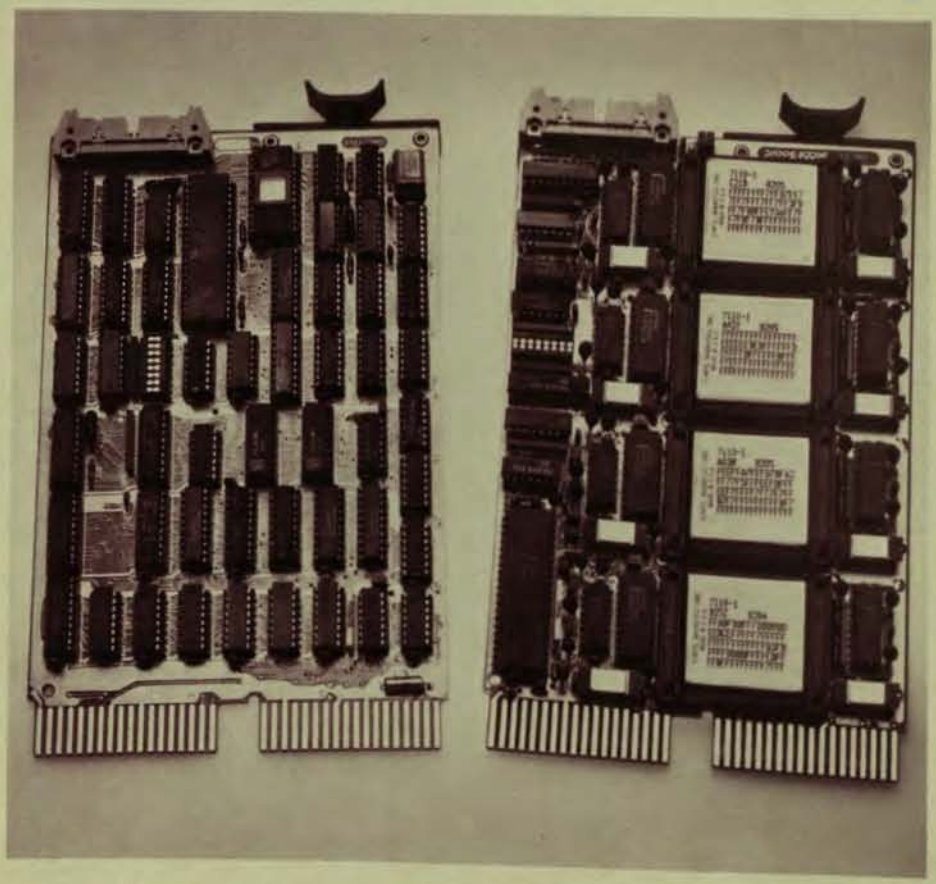
The QBC-11/02 controller uses an on-board single-chip microprocessor to provide the ability to control up to 16 QBI-11 bubble-memory modules. The microprocessor handles bubble-device formatting and control, interfaces the bubble-memory system to the LSI-11 bus structure, and provides for both soft- and hard-error detection and correction. As much as 8 Megabytes of bubble storage can be controlled by one QBC-11/02 module.

The bubble-memory system is fully compatible with all DEC software for the LSI-11, including the popular RT-11 operating system. A built-in RT-11 bootstrap is included on-board. No other hardware is required to make the bubble-memory system act as either a system or non-system mass-storage device. To user software, the bubble-memory system appears just like a standard DEC RXO2 floppy disk, but with much faster operating speed, and greatly improved reliability.

The controller also contains built-in self-diagnostics to simplify field maintenance of the bubble-memory system.

Each QBI-11 bubble-memory module is built on the standard DEC dual-height format, and contains 512 K-bytes of storage. A version with only 256 K-bytes of storage is also available. Access time to the first data byte averages less than 41 milliseconds, and data are transferred to/from bubble storage at a rate exceeding 270,000 bits per second. Power consumption for a typical system is less than 20 watts. Only +5-volt and +12-volt power are required. Systems capable of operation at environmental temperatures up to 85 degrees C are available.

The QBC-11/02 is priced at $479 and the QBI-11/256 at $1983 (quantity ten). Larger OEM discounts are available. Delivery 30 days. For more technical information contact Al Foreman at Bubble-Tec, 6800 Sierra Court, Dublin, California 94566; Telephone (415) 829-8700; TWX/Telec 910-389-6890.



LOW COST, POWER-LOSS DATA RETENTION FOR LSI-11 AT ADAC DEXPO/WEST BOOTH 427

Woburn, MA — ADAC's Model 1816CMOS battery-backed RAM memory boards offer up to 30-day retention of 8 or 16K word units of system data in the event of power outage or shutdown. Available in 168-hour and 30 day models for either 8K or 16K words, these half-quad boards plug directly into a single slot of the LSI-11 backplane.

On-board automatic switching and recharging circuitry keep the self-contained nickel cadmium batteries charged to peak efficiency. System data will be maintained at temperatures as high as 40°C for 30 days or longer. Full operating temperature range is 0° to 55°C.

Model 1816CMOS features write protect dip switches that are accessible while the memory board is positioned in the backplane.

Pricing for the 1816CMOS series is highly competitive with extremely low "per word" storage cost. Unit prices are: Model 1816CMOS-8S (8K, 168 hour retention) $695.00, -8L (8K, 30 day retention) $795.00, -16S (16K, 168 hour retention) $1095.00, -16L (16K, 30 day retention) $1295.00.

For complete details and for special quantity pricing information, contact: Mr. Ben Minsk, ADAC Corporation, 70 Tower Office Park, Woburn, MA 01801, Phone: (617) 935-6668, Telex: 949329.

NEW COMMUNICATIONS CONTROLLER MEETS REQUIREMENTS LONG SOUGHT BY VAX/VMS USERS

Irvine, CA — ABLE Computer announces the ABLE VMZ/32, a 16-line communications microcontroller with modem control and programmable DMA which meets the performance requirements sought by VAX/VMS users for the past year and a half. The ABLE VMZ/32 contains two 8-line multiplexers programmed to emulate the asynchronous line functions of two Digital DMF32 controllers. By combining the best features of a DH11 and DZ11, the VMZ/32 exceeds the performance and efficiency of either.

The ABLE VMZ/32 gives VAX-11/730, VAX-11/750 and VAX-11/780 system users their first chance to optimize the DMA capability of asynchronous communications on VMS software, according to Ray Ball, Director of Marketing. He said, "Our new controller is compatible with version 3 of the VAX/VMS operating system. It is fully transparent. No foreign software is required to use this valuable enhancement product. Our first customer put sixteen 19.2K baud users on-line and found an 85% idle time factor on his VAX-11/780. He really appreciated that improvement."

System overhead is reduced considerably by the use of DMA and SILO buffers which permit runtime selection of the optimal-data-transfer method by system software. During output operations, software can either select the SILO mode (32 characters per line) for handling short output requests or the DMA mode for long output requests. For input operations, a 48-character input SILO is available for each group of eight lines.

Performance is improved further by a software-transparent output throttle which allows an external device to control and optimize its own data rate. Other features include interrupt-driven modem control which eliminates the software overhead for program scan required by a DZ and on-board micro-diagnostics which automatically check the functions of the controller at every power-on and report exceptions in an LED display.

Physically, the ABLE VMZ/32 consists of a single hex-width board, distribution panel, and interconnecting cables. It installs into any hex-width SPC slot of a standard DEC DD11 backplane, or equivalent, in half the space and half the bus loading of either the DEC DZ11-E or two DMF/32's. An optional 16-line adaptor permits selection of EIA or current loop operation on a line-by-line basis.

The ABLE VMZ/32 is fully supported with documentation, application engineering, rapid board replacement and repair. Current users of the ABLE VX/DZ can buy field upgrade kits for a nominal fee of $750 and convert their existing ABLE products into the ABLE VMZ/2. Price for a single unit is $4250 U.S., and delivery is currently 30 days ARO.

ABLE designs, manufactures and distributes on a worldwide basis a broad line of UNIBUS-compatible data-communications, specialty-memory and general-purpose enhancement products for users of Digital Equipment Corporation computers. The company also manufactures the MAGNUM™, ENABLE ™ and MEGABOX™ computer system products.

CAMBRIDGE DIGITAL SYSTEMS ANNOUNCES FORMATION OF CAMBRIDGE SOFTWARE GROUP AT IRUS

Cambridge, MA — Cambridge Digital Systems, a leading system integrator of high-performance DEC and DEC-compatible hardware and software, announced the formation of the Cambridge Software Group, to meet the increasing software requirements of Cambridge Digital's customers. The company made the announcement at the Independent RSTS Users Society conference in Boston.

The group's basic responsibilities are: (1) to integrate operating systems and other layered software packages that meet customer needs; and (2) to fulfill customer requirements for software support of Cambridge Digital's hardware products.

"Customers often come to us because they need to solve some system problem, and that includes software as well as hardware," said Jack Saltiel, president of Cambridge Digital Systems. "Ordinarily, one software vendor can not provide all the software necessary to solve a customer's requirements. Because we integrate the software products with the hardware configuration, we are able to assure the customer of a working system."

Cambridge Software offers a variety of software packages for PDP-11 - and LSI-11-based systems that include: TSX and UNIX* operating systems; RSX, RT, and RSTS operating systems from DEC; and layered products, such as data base management, cross compilers, languages, spreadsheet programs, emulators, and data acquisition packages from DEC and other software houses.

According to Dick Churchill, Cambridge Software Group's vice president, "Sysgens, reconfigurations, and software integration are tasks not commonly performed by users, and the lengthy process can be complicated and frustrating. At the Cambridge Software Group, this is the work we do best because we do it every day. Our customers can count on receiving either properly integrated systems or layered products that they can properly integrate into their own systems."

The Cambridge Software Group will also provide technical support, system updates, and patches to its customer base, as the need arises. "One of our strongest advantages," states Churchill, "is that our hardware expertise allows us to quickly solve whatever problems our customers have."

Cambridge Software is currently expanding the UNIX support group. Distribution agreements for a UNIX-based operating system and several layered products are already in place, and others will soon be completed. Said Churchill, "Our goal is to have software manufacturing rights for as many quality products as possible. This will allow us to respond more quickly to our customers' needs and to painlessly resolve distribution problems."

For further information, please contact: Jack Saltiel, Cambridge Digital Systems, 65 Bent Street, Cambridge, MA 02139, or call (617) 491-2700.

*UNIX is a trademark of Bell Laboratories.

PARAMIN'S GOLDEN GATE ... BRIDGING IBM/DEC

Wellesley Hills, MA — Paramin, Inc. has announced the release of its new software product, the Network Services Facility (NSF), a communications gateway that provides multi-terminal and applications access from non—IBM systems to IBM's System Network Architecture (SNA). As a mode within a communications network, the NSF is able to connect multiple interactive sessions to multiple IBM hosts.

Currently installed and working within the Commercial Union Insurance Company's corporate headquarters in the United States as a VAX 11/750 configuration, the NSF is also available in 11/780 and 11/730 configurations.

"The Network Services Facility is an 'evolutionary' product," according to Robert C. Broggi, Vice President, of the Paramin U.S. operation. New facilities are being implemented continuously, including enhancements such as, a single terminal concurrent access to multiple IBM, DEC, and other gateway accessed systems; and 3270 batch data stream and RJE facilities.

The NSF is available through Paramin development offices in the US and Europe. License fee for the NSF Software is $50,000., other pricing options for multiple installations are available. Paramin, Inc. is located at 31 Washington Street, Wellesley Hills, Massachusetts, 02181.

GRC ANNOUNCES STREAMING TAPE CONTROLLER FOR DEC LSI-11

Hartford, WI — General Robotics Corporation today announced a new streaming tape controller that interfaces the Archive and Cipher ¼ inch streaming tape drives to the DEC LSI-11 QBUS. This new product, designated the STV11, allows users to back up their hard disk systems in a fast, efficient manner.

The STV11 is packaged as a dual height LSI-11 QBUS module and emulates the DEC TM11 for full software compatibility with all DEC operating systems. A single 50 conductor

ribbon cable connects the controller to up to two Archive or Cipher streaming tape drives with 2 or 4 recording tracks. The device address and interrupt vector are switch selectable for ease of integration and for selecting a non-standard address and vector. From 10 to 45 megabytes of data can be stored on a single 450 foot tape cartridge depending on the tape drive model used.

Data may be recorded at rates up to 87,200 bytes per second on 90 IPS drives. These rates allow 1 megabyte to be recorded in less than 12 seconds. The controller incorporates CRC error checking and results in less than 1 non-recoverable error in every 10 billion bits. Recording methods allow a maximum tape usage efficiency of over 97%.

Shipments of the STV11 will begin in October, 1982. Pricing begins at $1,500 with quantity pricing as low as $945 (all prices F.O.B. factory). For more information call or write General Robotics Corporation, 57 North Main Street, Hartford, WI 53027, 414-673-6800, or call toll free 800-558-7832.

SCRIBE NOW SUPPORTS IMAGEN IMPRINT-10 LASER PRINTER

Pittsburgh, PA — Scribe[4], a powerful document production system, has added the IMAGEN Imprint-10, an intelligent non-impact laser page printer, to its comprehensive list of supported output devices. With the commercial availability of the IMAGEN support, Scribe users have yet another state-of-the art printer available to serve their document production needs.

Currently, Scribe is used at many sites to format and produce materials like reports, technical manuals, proposals, financial summaries, articles and book-length manuscripts. One of its key benefits is that it can output these documents to a broad range of printing devices. With a single command, users can get hard-copy from line printers for proof-reading, from robot typewriters for limited duplication, from photocomposers for camera-ready printing and from laser printers for volume distribution. Scribe supports to date more than 50 such sophisticated printing devices and has an on-going development effort to support additional new devices as they become commercially available.

The Imprint-10 laser printing, developed by the IMAGEN Corporation, Los Altos Hills, CA, is the latest new output device to be supported by Scribe. Priced in the $20,000 to $30,000 range, it offers users speeds of 600-900 lines per minute, resolution of 240 dots to the inch and flexibility in terms of mixing fonts and other images. Scribe, working with the IMAGEN, makes possible the full-page layout capability of a phototypesetter.

Available for DEC 10s, 20s, and VAXs, all Prime and the IBM 370 series, Scribe is priced from $12,500 to $49,500 depending on CPU. Substantial non-profit and education discounts are available.

For more information about Scribe and its comprehensive listing of supported output devices, contact Wayne N. McDaniel, UNILOGIC, Ltd., 160 North Craig Street, Pittsburgh, PA 15213 (412) 621-2277.

NEW AVATAR CONVERTS DUMB TERMINALS INTO INTELLIGENT COMPUTERS

Westboro, MA — Announcing that "now every dumb terminal can have a mind of its own," Ed Grace, president of 3R Computers

NAB Software Services, Inc.
N.A. (Nick) Bourgeois, Jr.
3236 Candlelight Dr. N.E.
Albuquerque, New Mexico 87111
(505) 298-2346

RT-11 / TSX-Plus General Purpose Magnetic Tape (MM, MS, MT) Driver Library (MTLIB) callable from eight popular languages.

TSX-Plus System Resources Utilization Accounting Package (TSRUAP)

	MTLIB	TSRUAP
Single CPU Binary License	$250	$550
User's Guide Document (prepaid)	10	10

RT-11 is a trademark of Digital Equipment Corporation. TSX-Plus is a trademark of S&H Computer Systems, Inc.

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CIRCLE D53 ON READER CARD

Inc., today introduced the Avatar TC1, the first entry in the new company's product line. Described as the development of a completely new computer category that's neither desk-top computer nor terminal, the Avatar TC1 is identified as a "Universal Terminal Converter." It immediately changes any dumb terminal into an intelligent one, enabling it to be used either as an independent desk-top computer or as an intelligent terminal with the capability to access and transfer data to the host computer — or as both — depending on the mode selected.

"It is, we believe, at once the answer to fulfilling two major needs. One is the increasing demand for personal or desk-top computer capabilities by middle and top management personnel. The second is the concern of Management Information System Directors and Data Processing Managers for maintaining the consistency and integrity of their organization's information systems," Grace continued.

It has been estimated that more than one out of every twenty white collar workers currently has a terminal on his desk and it is projected that number will increase to approximately one out of every *three* by the end of the decade. And, according to Fred Schlaffer, vice president of Research and Development, any terminal can be converted to an intelligent terminal in less than five minutes — with the personal computing capabilities of "any of the better micros out there." With its universal design, the Avatar TC1 self-adapts to the terminal and host and requires no modification to the terminal. "All it takes is an ordinary screwdriver and a few minutes," Schlaffer stated, "and you've got an industry standard microcomputer with 64KB memory which is fully compatible with any CP/M software."

The unit, the first of a series, is compatibly designed to integrate with the widest range of terminals, hosts and operating systems, and may be configured with either a single or dual diskette model and three asynchronous ports.

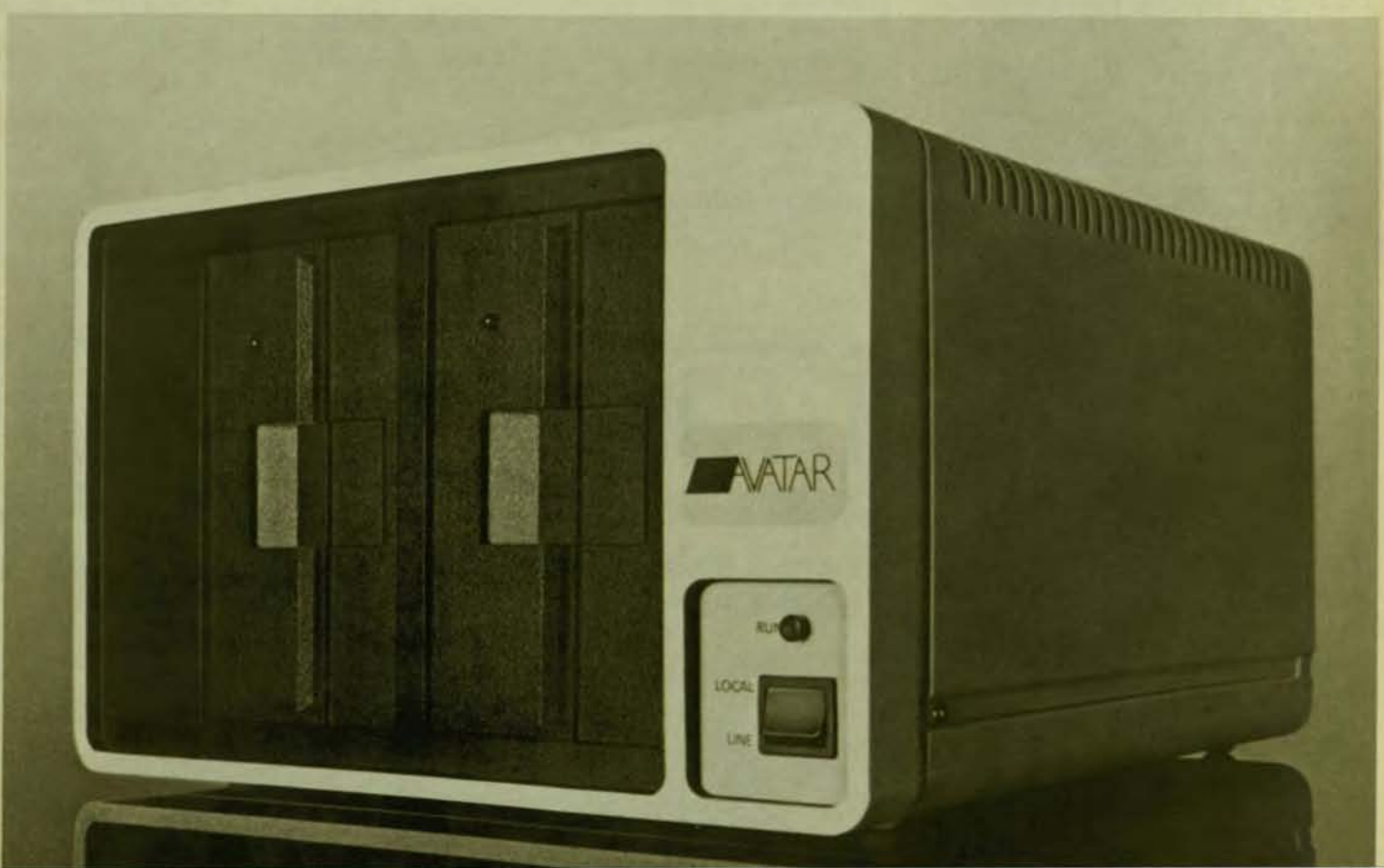
As the company sees it, the Avatar concept delivers a number of significant advantages to any system using one or more dumb terminals. In addition to offering the added productivity of a desk-top computer the Avatar does so in a way that is considerably superior to a separate, desk-top computer.

There are three major advantages, Brad Hebert, vice president of Marketing and Sales, pointed out: "Lower costs, productivity gains and the ability to access and transfer host data." Detailing the statement Hebert continued, "It begins with an initial lower investment cost. By utilizing existing equipment, the Avatar obviously costs less than any micro with comparable capabilities since the keyboard and terminal are already in place and paid for. It uses existing communication lines, which allows use of host peripherals plus the use of a local printer, if desired. Space requirements are lessened and redundancy of equipment maintenance is eliminated — while at the same time the user has the advantage of the generally higher quality CRT found on most terminals."

Productivity is increased since there is no need to learn new equipment or techniques. Further, the Avatar enables the use of both the host and the desk-top computer simultaneously.

Finally, and most important, the Avatar TC1 permits easy access and file transfer with the host computer — delivering a critical advantage: total integration — and integrity — of the organization's information base and decision support tools.

The Avatar TC1 is described as the first of a series of products, with the second version already in design and a "number of other products currently on the drawing board." The Avatar is a product of 3R Computers Inc., located at 18 Lyman Street in Westboro, MA.



ATLANTIC RESEARCH ANNOUNCES NEW DDCMP PROTOCOL DIAGNOSTIC MODULE FOR USE IN ITS INTERVIEW® 4500 DATA ANALYZER

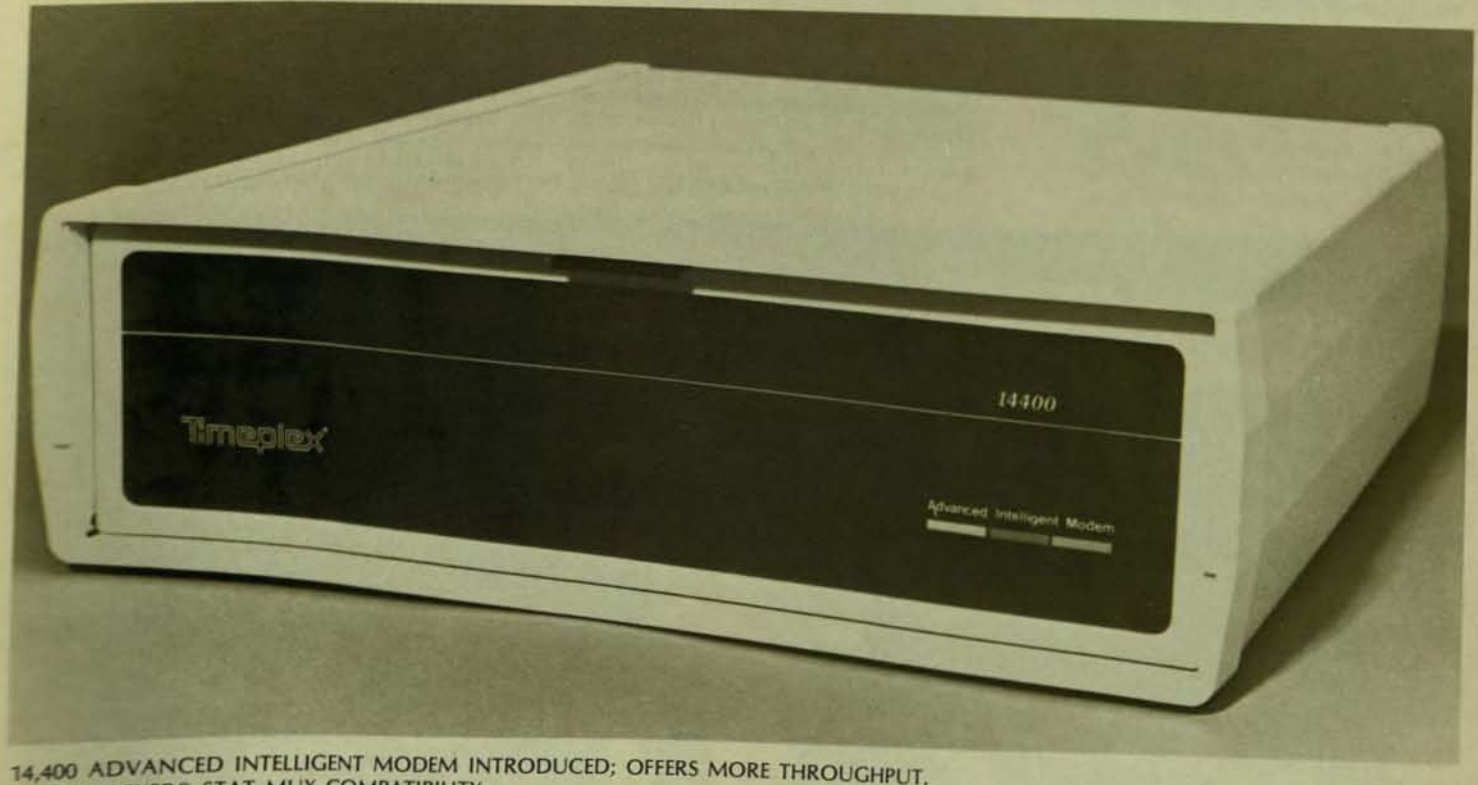
Alexandria, VA — Atlantic Research Corporation announces a new, powerful diagnostics module (Option 24) for Digital Equipment Corporation's DDCMP protocol for its INTERVIEW 4500 Data Analyzer. This is the first DDCMP protocol trace display in the industry providing extensive capabilities for monitoring as well as interactive testing of host and terminal.

ARC's INTERVIEW 4500 Data Analyzer is the industry's easiest to use and most powerful interactive diagnostic tester. With this new diagnostic module, testing a network using DDCMP is made extremely simple. Anyone familiar with data communications can walk up to the 4500 and use it in a very short time without having an in-depth knowledge of the complex bit/frame structure of the DDCMP protocol.

Some of the significant features of the new DDCMP diagnostic module include:

— Protocol trace display
— Automatic control header generation
— Automatic block check generation and testing
— Generate protocol violations to verify error recovery algorithm in device under test
— Control header expansion
— Real-time data display
— Traffic measurements and line utilization
— Synchronous and asynchronous operation

ATLANTIC RESEARCH ANNOUNCES NEW DDCMP PROTOCOL DIAGNOSTIC MODULE FOR USE IN IT'S INTERVIEW® 4500 DATA ANALYZER.



14,400 ADVANCED INTELLIGENT MODEM INTRODUCED; OFFERS MORE THROUGHPUT, MICROPLEXER® STAT MUX COMPATIBILITY

SAN DIEGO, CA — Timplex today introduced its SYSTEM SERIES 14,400 ADVANCED INTELLIGENT MODEM. The 14.4 K bit per second modem offers 50% more throughput on a voice grade private line than the standard 9,600 bps modem, is highly resistant to random fluctuations in phase and gain, and offers fall back speeds of 12,000 and 9,600 bps in case of line degradation. The 14,400 AIM is system compatible with the SERIES II MICROPLEXER statistical multiplexers and permits it to handle more synchronous channels or more and faster asynchronous channels on the input side.

CARROLL TOUCH TECHNOLOGY ANNOUNCES TOUCH SYSTEM FOR DEC VT100

Champaign, IL — Carroll Touch Technology announces the introduction of an infrared touch input system for the DEC VT100. Now available in production quantities, this touch system from Carroll allows for innovative diagnostic routines and down loadable format.

Carroll's touch input system for the VT100 uses scanning infrared beams. Infrared LEDs are mounted on the side and bottom of a "window frame" composed of printed circuit cards. Phototransistor detectors are mounted opposite the emitters to form an X-Y grid of infrared light beams. The beams are not visible to the user, yet each point where an X and Y beam intersect is a touch point.

The window frame is mounted directly on the VT100 terminal so that the beams of light are parallel to and directly in front of the display surface. The window area is scanned repeatedly to detect whenever a light beam has been broken (obstructed).

Carroll's touch input system is designed to work in high ambient light conditions. A patented design samples the ambient light at each phototransistor shortly before that device is polled to determine whether a stylus is present.

From the outside, DEC VT100 terminals with Carroll's touch input system look identical to those without.

For VT100 users, Carroll's touch input system provides a natural interface between man and machine. No keyboarding or special computer skills are required for operation. The addition of touch expands the unit's flexibility and possible applications for the terminal.

Carroll's touch input system for the VT100 is available in single quantities for $1595 each; OEM discounts are available. For information, write or call: Carroll Touch Technology, 2902 Farber Drive, Champaign, Illinois 61821, 217/351-1700 or Carroll's VT100 distributor, INDEC, 510 Lawrence Expressway, Suite 210, Sunnyvale, California 94086, 408/738-3083.

NABU COMMERCIAL TERMINALS ANNOUNCES GRAPHICS CAPABILITY

Rochester, NY — NABU Commercial Terminals (formerly Volker-Craig), has announced the addition of a graphics board, available on two of their most popular video terminals.

The company has released graphics versions of the NABU 3100 and the NABU 4404 (the CHAT), and has plans to introduce other graphics terminals commencing in the first quarter of 1983.

The NABU 3100/GX is a Z-80 microprocessor-based, smart ANSI compatible video terminal. In addition to graphics capabilities, it incorporates all the features of the NABU 3100 — including full editing, a buffered edit mode, 4 character highlighting attributes, double-width character, 16 user programming string keys, host/user writeable status line and split screen.

The economical NABU 4404/GX is a conversational graphics terminal which incorporates all the standard features of the NABU 4404 (the CHAT) including switch-selectable compatibility with the Lear Siegler ADM-3A/5*.

Both the 3100/GX and the 4404/GX are available with standard black/white display or with optional green or amber display.

The plotting resolution for both new terminals is 512 by 250 with automatic scaling for PLOT-10 and GINO-F software compatibility. A graphical cursor (GIN) is provided for interactive use with the host computer.

Five modes of operation are available with the NABU graphics terminals. In the VDU mode, the terminal acts as a standard alpha-numeric terminal. In the Vector Mode, the terminal emulates a Tektronix graphics terminal and lines can be drawn automatically by simply calling out end points. In the Alpha Mode, up to 35 lines of 73 characters each can be displayed on the screen to annotate graphical drawings. In the Block Mode, rectangular blocks in white or black can be created in the same way as vectors by entering co-ordinates. In the GIN Mode, a 5 × 5 dot graphical cursor is provided for host interactive applications requiring transmission of intersect point addresses. Graphical cursor position is controlled by the cursor arrow keys on the keyboard.

Any standard NABU 3100 or NABU 4404 (previously sold as the VC3100 and the VC4404) can be field-upgraded for graphics applications. The NABU graphics board is available for field or factory installation.

In January of this year, Volker-Craig was acquired by NABU Manufacturing Corporation, and commencing September 1st 1982 the company will continue business as NABU Commercial Terminals.

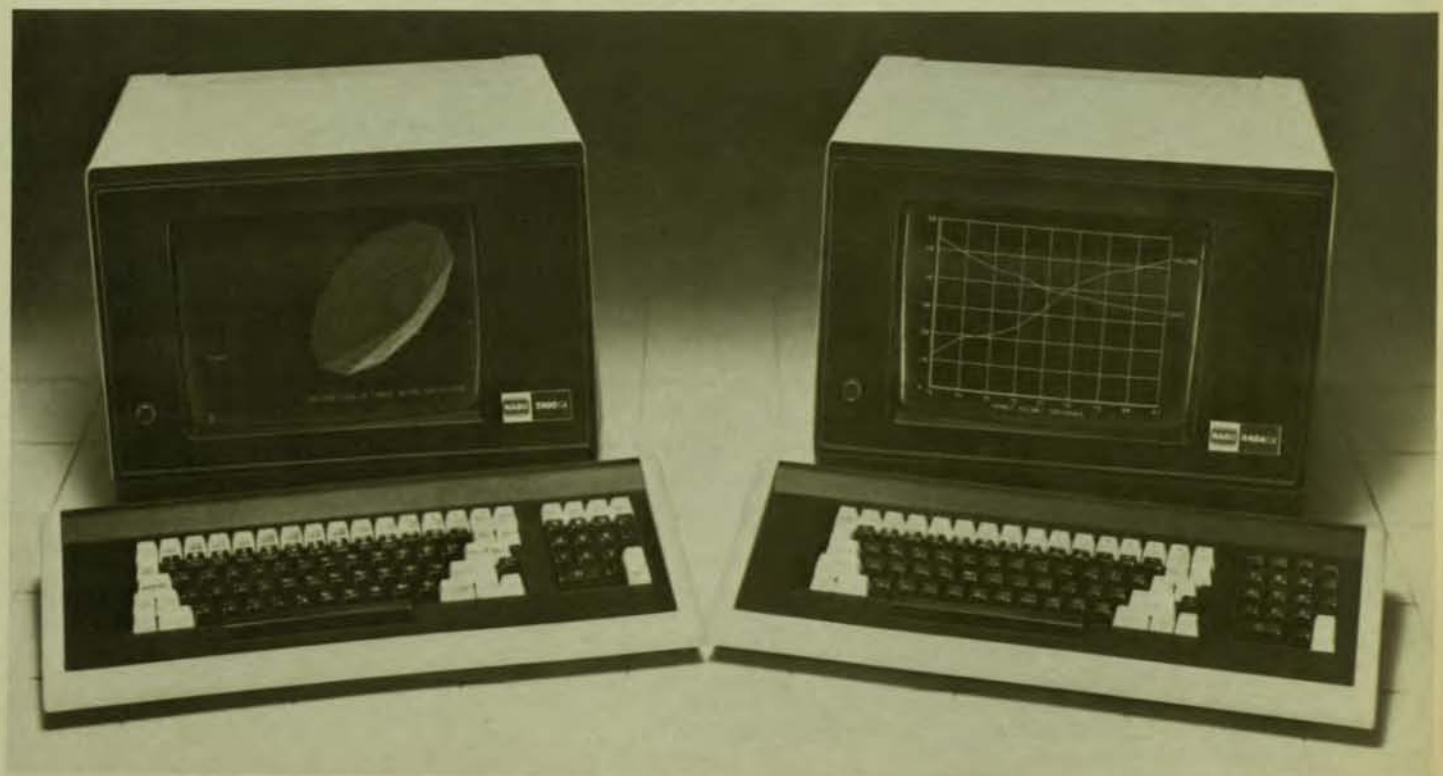
For more information contact: NABU Commercial Terminals, 333 Metro Park, Rochester, New York, U.S.A. 14623. Telephone: (716) 475-1221.

*Registered Trademark of Lear Siegler.

MCBA RELEASES NEW MANUFACTURING PACKAGE FOR DEC® PDP®-11s

Montrose, CA — The availability of Standard Product Routing (SPR) in DIBOL® for the DEC PDP-11s was announced here by MCBA (Mini-Computer Business Applications, Inc.). SPR is the application package within MCBA's Manufacturing System which

The NABU 3100/GX and the NABU 4404/GX. Two new Graphics terminals from NABU Manufacturing.



facilitates effective routing, by handling data concerned with operations, tools and notes used in standard product manufacture.

MCBA's SPR takes advantage of space saving techniques such as General Routings and Route Numbers, allowing the user to efficiently route several products on the same primary routing, or to share common operations between products. SPR supports "Same-as-Except" routings. If used in conjunction with MCBA's Shop Floor Control package, SPR allows routings to be copied into a shop order.

MCBA's SPR supports interactive entry and editing of routing data, handles routings for multiple locations per item, provides tooling information control, and accumulates operation costs (standard labor) to the part level. Notes are stored by operation, making them valuable for operational instructions. Like all the packages of MCBA's Manufacturing System, SPR supports multi-companies offers password security, and accesses all features through menus.

SPR requires MCBA's Inventory Management (I/M) package, and can interface to three other packages in the Manufacturing System. Source code licenses for MCBA's SPR are $2,000 for ten uses; MCBA's I/M is $4,000 for ten uses. MCBA is headquartered at 2441 Honolulu Avenue, Montrose, California 91020; (213) 957-2900; telex 194188.

GENERAL TERMINAL ADDS LOW-COST DEC VT-100 ALTERNATIVE TO PRODUCT LINE

Tustin, CA — Continuing its thrust in the terminal emulation marketplace, General Terminal Corporation (GTC) introduces a compact, low priced alternative to Digital Equipment Corporation's ANSI 3.64 VT-100 terminal.

In addition to standard VT-100 features, GTC's Model SW10, priced at **$995**, incorporates space-saving compactness and intelligent capabilities, as well as direct access to all terminal operating characteristics via the keyboard rather than switches.

The terminal has additional function keys and a printer port with "pass-through" capabilities for interface to a 132-character printer. Its small footprint and light weight (26 lbs.) provide increased portability.

Each of the 12 programmable function keys can store 20 character user-defined character /code sequences. The keys are used to give predetermined execution orders to the terminal or the host, providing 12 selectable functions with a single keystroke.

The terminal's convenient setup display allows operators to view all standard operation parameters by pressing the "SETUP" key which automatically calls a plain-English listing of the terminal setup status to the video display screen. A user can simply key through the parameters to adjust brightness, turn on cursor blink, set baud rates, and other functions — rather than having to adjust any knobs or switches on the back of the terminal.

The SW10 also incorporates a simulated block mode transmission, allowing users to go off-line, fill the screen and edit text, and then go back on-line to transmit the data. In addition, the unit's inherent split screen management capability allows the screen to be divided into two or three zones of variable length.

Other features include a high contrast, low-glare, easy viewing green or white phosphor monitor, lightweight movable keyboard, and a programmer's mode which enables the user to view all programming commands not ordinarily displayed. The communication interface is RS-232C asynchronous bi-directional through the terminal's primary port, with 20 MA current loop as a standard feature, offering eight variable speeds up to 9600 baud. Printer interface is also RS-232C. Display capacity is 1920 characters, 80 characters per line, 24 lines with a 25th status line.

While single unit price of the SW10 is $899, OEM quantity discounts are available. Delivery is 30 days ARO.

General Terminal Corporation is headquartered in Tustin, California, with manufacturing facilities in Burlington, Mass. The company manufactures a complete line of programmable microprocessor-based video display terminals and emulators for data processing systems.

THE XYPLEX™ System, a Distributed Front-End and Switching System Announced

Harvard, MA — Xyplex, Inc. has just introduced a new system which gives a terminal user fast, efficient, and convenient access to the various computer resources within a company. The XYPLEX™ System provides the user with the ability to connect to a wide range of computer systems performing various distributed processing functions. The computer systems can range from personal business computers, word processors, and small laboratory systems to mid-range timesharing systems and large main frame processors.

The XYPLEX System's integrated front-end processor maximizes communications speed and computer capacity at the same time that it eliminates the cost and complexity of direct cable connections between terminals and computers. The front-end function removes the terminal handling burden from the host computer including character echoing and special character recognition.

Within the local environment (a building or campus) a single cable is used to connect all the terminals and computers allowing any terminal user to access the computers or other terminals. Inter-building connections are provided by gateways using telephone lines, private microwave channels or fiber optic links.

Terminals interface to the System using cluster controllers. Computer systems connect to the XYPLEX System with Host Interface Units or cluster controllers.

The System is currently in customer field test at a large medical research facility and at a large insurance company's timesharing center. Reductions of processor busy time of over 100% for many applications have been measured. This has resulted in faster response time and the ability to service more users simultaneously.

Availability of Host Interface Units for other computer systems as well as the availability of the gateways will be announced shortly.

For additional information, contact: Robert H. Rosenbaum, Vice President, Marketing and Sales, Xyplex, Inc., Oak Hill Road, Harvard, MA 01451, (617) 456-3963.

*Trademark of Digital Equipment Corporation

QPLOT GENERAL SUMMARY

Old Lyme, CO — QTECH Associates is proud to offer a graphics package called QPLOT for Digital Equipment Corporation VAX-11 computer systems running under the VMS operating system. QTECH's primary design goal was to develop a competitively-priced, easy-to-learn-and-use, device-independent graphics package which struck a balance between "real-world" functionality and an over abundance of "bells and whistles". All too often large sums of money are spent for graphic software with features that are rarely, if ever, required.

The major component of the QPLOT package is the QPLOT library containing routines which are used by an application program to produce graphic images on various graphic devices. It is written in FORTRAN and offers the following features:

Device Independence - QPLOT can plot on virtually any graphics device that can draw a vector. A user learns only one graphics "language" and, by simply varying a single parameter, may direct output to many different graphic devices. This permits the use of low cost graphics terminals for program development and output preview with final plotting directed to higher resolution devices without reprogramming.

Flexibility - QPLOT offers two basic modes of operation. First, QPLOT can output directly to a selected device during program execution. Second, QPLOT can produce an intermediate plot file (IPF) during program execution. The IPF then may be directed via the post-processor (QPOST) to selected devices without costly re-execution of the application program.

Versatility - The QPLOT library includes routines for two-dimensional rectangular and polar plotting, three-dimensional rectangular plotting with hidden line removal, flow charting, mapping, and typesetting.

Simplicity - QPLOT is easy to learn and use. The number of parameters required by the various routines is kept to a minimum and, for many applications, default values minimize the number of lines of code to get the job done.

Adaptability and Expandability - QPLOT can easily adapt to changing requirements and graphic devices. It is "open-ended" to permit adding device handlers as new graphic devices are developed and/or acquired.

The QPLOT package also includes several utility modules which are built upon the QPLOT library. QPOST is the post-processor which can direct an IPF to any supported device without re-execution of the application program. For example, a user may validate graphic output on a low cost raster graphics display and then redirect the output to a drum plotter for final plotting. QSIMCAL is a simulation library for the basic Calcomp routines. An existing Calcomp application program may use QSIMCAL as an interface to QPLOT to achieve device-independence. QPRINT produces "pretty" documents using the QPLOT character fonts from listing files, FORTRAN formatted files and RUNOFF output files.

It is QTECH's policy to provide all reasonable device handlers you may require

so long as the device can draw a vector, it has a VMS system driver and QTECH has access to the particular device. Most on-line devices are accessed by the VMS terminal driver which is called at the system service level for efficiency. Some on-line devices are accessed via direct memory access (DMA) parallel interfaces which are vendor supplied together with a corresponding VMS device driver. Off-line devices are accessed via magtape and the VMS magtape driver. Detailed instructions are provided in the QPLOT Reference Manual for adding your own custom device handlers. Source files are included as examples of device handlers for the various device types.

QPLOT is distributed on 9-track magtape and can be shipped within one (1) week following receipt of your order. Although not normally required, QTECH can also provide installation.

MISCO'S NEW CATALOG FEATURES CABLE SELECTION GUIDES FOR DEC, DATA GENERAL, AND H-P SYSTEMS

Marlboro, NJ — Misco, Inc. today introduced a new 64-page catalog that features new Cable Selection Guides for those seeking the right cable to span the computers and terminals in either DEC, Data General, or Hewlett-Packard Systems.

The color-coded selection guides are then linked with other Misco cable guides that specify the length, weight, and price for varying quantities.

In the new catalog, Misco also introduced two new "hanging" storage units for tape reel libraries, seven new Data General cables, one DEC and four H-P cables. Misco also announced two null-modem junctions, commonly called modem eliminators — one for DEC and Data General systems and one for H-P applications. When connecting terminals directly to CPUs in local environments, the null-modem junctions look like modems to the CPU, thereby, eliminating the need for the modems.

The new tape library storage units are designed to speed the identification, filing and retrieval for all sizes and types of hanging tape reels. Gravity stabilizer bars keep the reels neatly aligned and labeling strips allow easy identification. The storage units come in cloud white to coordinate with any decor. One stores up to 300 reels and the other up to 600.

The price of the single reel library is $265 with the double unit at $395. The new cables range in price from $26 to $149 with the null-modem junctions for DEC and General Systems at $26 and for H-P at $32. Quantity discounts also are available. All products are available for off-the-shelf delivery from Misco's Marlboro, NJ, warehouse.

The new catalog is in full color with 64 pages listing complete lines of brand name products ranging from magnetic media and ribbons to Ergometrix furniture and security devices.

Misco markets nationally its full line of brand-name computer and word processing supplies and accessories. A free catalog is available by phoning (800) 631-2227 or writing to Misco at 404 Timber Lane, Marlboro, NJ, 07746.

PLUS SIZE (2MB) VAX-11/780 MEMORY

Santa Ana, CA — Standard Memories Division of Trendata Corporation announces a plus size semiconductor add-in memory for use in all DEC VAX-11/780 and VAX-11/782 computers.

The Standard Memories PINCOMM 780S+ memory modules provide up to 2 M-bytes of storage capacity on a single card using full 64K bit RAMs and are hardware and software compatible with DEC VAX-11/780 and VAX-11/782 computers using DEC MS780 memory systems or DEC MA780 multiport memory systems. They are installed directly into these memory systems without modification to DEC hardware or system cabling.

Memory card capacities of 1024KB and 2048KB are standard for the PINCOMM 780S+. Depending on size version, they are equivalent to 4 or 8 DEC 8210 256K-byte semiconductor memory cards.

Each memory data word stored by the PINCOMM 780S+ is 72 bits wide, consisting of 64 data bits (eight 8-bit data bytes) plus 8 error correction check bits. The check bits allow for single bit error correction and double or multiple bit error detection.

An on-line/off-line switch allows the memory to be switched off-line as an aide in trouble shooting or when configuring a system. All RAMs are contained in high reliability sockets and 2 spare RAMs are provided on-board. Other features include a Power On LED and an LED indicating operating condition for each 512KB bank of memory. Also featured is compatibility with Battery Backup and CPU controlled memory margin testing capabilities of MS780 and MA780 memory systems.

As an option, the Trendata D780S Memory Diagnostic is available. It is offered as a floppy diskette directly usable in the internal floppy disk drive present in all VAX-11/780 computers. It is used as a stand alone diagnostic which will print in English language the status of the memory or error output information keyed to the PINCOMM 780S+ allowing isolation of a specific faulty RAM.

The PINCOMM 780S+ is offered with a 4 YEAR WARRANTY.

First deliveries were made in August 1982. The 1024K-byte version is priced at $3400 and the 2048K-byte version at $6225 in a single lot. Quantity discounts are available.

To order, please contact Miles S. Efron, Vice-President Marketing and Sales, Trendata/Standard Memories, 3400 West Segerstrom Avenue, Santa Ana, California 92704. Telephone: (714) 540-3605. Toll-free lines outside California are: (800) 854-3792 and (800) 432-7271 from within California.

LINE PRINTER CONTROLLERS AVAILABLE

Bartlett, IL — Neoteric Systems Incorporated has introduced the LPC16/Q and LPC16/U Line Printer Controllers designed to add Teletype's 300 line-per-minute printing capabilities to Digital Equipment Corporation LSI-11 and PDP-11 processors.

The LPC16/Q and LPC16/U line printer controllers interface the Teletype Model 40 printer with DEC LSI-11 series (QBUS) and PDP-11 (UNIBUS) processors. The controllers are identical to the DEC line printer interfaces, LPV11 and LP11, and are totally transparent to all DEC software. The LPC16/Q and LPC16/U mount in the processors' backplanes or expansion boxes. The interfaces consist of only one board and require no printer modification.

The Teletype Model 40 printer delivers 300 line-per-minute, accurate, high quality printout with uninterrupted service. It is easy to maintain and is backed by a nationwide service organization. Friction or tractor feeds, 80 or 132 column formats are available.

The LPC16/Q and LPC16/U line printer controllers and the Teletype Model 40 printer may be purchased separately or as a package from Neoteric Systems Incorporated. Very economical, the Teletype printer and controller combinations are priced less than most high speed printers alone.

Neoteric Systems Incorporated also offers other standard hardware products and standard software as well as custom designed software and hardware. For further information on the LPC16/Q, LPC16/U, or other products and services, contact: Russ Berube, Neoteric Systems Incorporated, 320 South Main Street, Bartlett, IL 60103. Phone: (312) 289-1950.

SSP ANNOUNCES CARE CENTER AGREEMENT

Springfield, IL — SSP Time Share has announced an agreement with Care Information Systems, Inc., Springfield, to become an authorized CARE CENTER. The licensing agreement calls for SSP to market and operate the "CARE/DM SYSTEM", a comprehensive computerized health care system for medical and dental practices.

SSP Operations Manager Steve Rau said his company will now devote its total resources to sales and operation of the CARE/DM SYSTEM. "After experimenting with the CARE/DM SYSTEM, we found that the revenues generated were twice what our general time-sharing operations were producing," Rau said. "The CARE marketing techniques have enabled us to get into local doctors' and dentists' offices to demonstrate how the CARE/DM SYSTEM brings a valuable return on investment. The medical and dental fields are ripe for computerization and we're going to capitalize on it."

SSP becomes the third authorized CARE CENTER. Centers are currently being installed in St. Louis and Peoria, with six other agreements pending. Under the CARE CENTER arrangement, Care Information Systems, Inc. provides investors with all necessary equipment, software and training to serve the medical and dental markets. A variety of revenue-sharing plans are available.

For more information on CARE CENTERS and the CARE/DM SYSTEM, contact: Care Information Systems, Inc., 3009 South Sixth Street, Springfield, IL 62703, (217) 522-CARE.

"SCREEN" CONQUERS DATA ENTRY FRUSTRATION

Burbank, CA — Applied Computer Products Corp. (ACP) has announced the release of SCREEN, a utility which makes data entry faster and less frustrating for the end user and reduces, by 50% to 80%, the amount of code necessary to handle data entry and display functions in a DBL program. It is written in Macro-11 to run on DEC PDP and LSI-11's running DBL with TSX or TSX-PLUS. A COBOL-PLUS version is under development now with CTS-300 & CTS-500 (DIBOL-11) versions expected to be released by the end of the year.

By giving data entry operators limited

Word Processing functionality within entry fields, SCREEN saves time. "No longer will operators have to finish entering all the fields on a screen before going back to correct an earlier one," said John Fisher, President of ACP. "Additionally, it does not permit undefined characters to be entered into a field. Thus, an operator cannot enter alpha characters into a numeric field. And in the event of an entry error, the entire field does not go blank; meaning the operator need only correct the characters that were wrong, rather than entering the entire field all over again. SCREEN does not accept character strings longer than the field length, again saving operators from needing to redo incorrect entries."

SCREEN's formatting utility automatically inserts slashes in dates; parentheses around area codes; a hyphen in between the exchange prefix and the last four digits of a phone number; dollar signs where appropriate; and decimal points. SCREEN permits up to nine decimal places for decimal numbers; "knows" the number of days per month and will not let an operator enter days that do not exist, such as the 31st of February; and sets the system date as the default date. All of these features are designed to save entry time and reduce operator frustration due to less flexible screen utilities.

SCREEN comes with a display utility which allows messages, defaults, prompts or headings to be displayed with advanced video options such as reverse video, blink, or centering on the line. It is possible to display the default in reverse video, and then if the default is not selected, to have the standard prompts appear. Thus the operator would be able to see the default before selecting it. SCREEN allows for the creation of scrolling regions which may be stopped or started at will or their direction may be changed. Headings can be created for screens or for the entire program so that operators would know what module they are in. Up to eight different control codes may be passed back to the program for the user to tell the program what option is wanted.

SCREEN is priced at $1500 for the end user. OEM discounts are available. Documentation describing what it is, what it does, and how to use it is available from ACP's marketing agent: Glenn A. Barber & Associates, Inc., 15010 Ventura Blvd., Suite 304, Sherman Oaks, CA 91403, (213) 907-6622.

STUDENT COMPUTER LAB MANUAL FOR DEC-10 USERS

Ogden, UT — We have developed a Student Computer Lab Manual for users of the DEC-10 computer which students at Weber State College in Ogden have found very helpful. We would like to make this manual available to DEC-10 educational users nationwide. This 90 page manual shows beginning students the mechanics of using most of the facilities and software on the DEC-10 computer.

The chapter number and titles are as follows: Chapter 1, Introduction and Sign On Procedure; Chapter 2, Introduction to SOS; Chapter 3, Additional SOS Commands; Chapter 4, Monitor Commands and Control Key Functions; Chapter 5, Using COBOL; Chapter 6, Using FORTRAN; Chapter 7, Using PASCAL; Chapter 8, Using RPG, II; Chapter 9, Using the IBM Assembler Simulator; Chapter 10, Using BASIC; Chapter 11, The SWITCH.INI File; and Chapter 12, Using RUNOFF.

The language chapters do not present an in depth discussion of the elements of the language but show only the mechanics of creating, editing, compiling and executing programs with the appropriate data files.

Send inquiries and/or orders to Hart Associates, 199 West 5400 South, Ogden, Utah 84403. Phone: (801) 479-5814 or (801) 392-6211.

VAX/PDP-11 DBMS USERS GAIN COMPREHENSIVE REPORT WRITER WITH ADABAS-M

Reston, VA — Software AG of North America, Inc. announces the release of a comprehensive report writer for ADABAS-M DBMS users on Digital Equipment Corporation VAX-11 computers running under the VAX/VMS operating system and the PDP-11 series under RSX-11M, RSX-11M-PLUS and IAS.

According to Software AG President John Maguire, "The ADABAS-M Report Writer allows a VAX/PDP user to select, manipulate, and format data to satisfy specific output requirements such as reports and special forms, and may be used to produce formatted output for inclusion into other documents as well. The ADABAS-M Report Writer language uses the same easy-to-use data manipulation
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purchased for $40,000, acquired on a monthly rental or 2-, 3-, 4- or 5-year lease plan. Installation, training and one set of the documentation is included in the cost of the system.

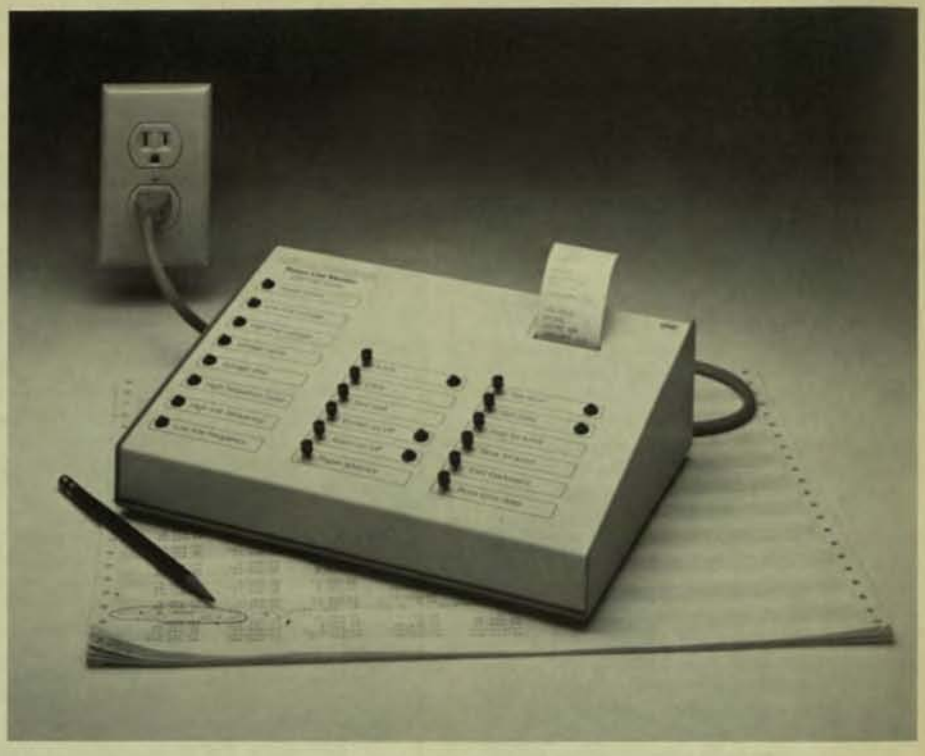
Software AG of North America, Inc. develops and markets systems software products and specializes in data base management systems.

LOW-COST POWER MONITOR FOR DEC SYSTEMS

Foster City, CA — This power line monitor checks 120 Volt AC power line for disturbances that can disrupt or damage DEC systems: power failure, low line voltage, high line voltage, voltage spike, voltage drop, high frequency noise, high line frequency, and low line frequency. With a built-in clock, calendar, and thermal printer that prints alarm messages in English, the monitor sells for $975.

Unlike more expensive power line monitors, the alarm thresholds on this unit are pre-set at the factory, although the user can adjust them through a limited range with trim pots. The unit includes a lock to prevent casual tampering with the control settings, and a pair of relay contacts for interfacing with external alarm systems. A similar unit without a built-in printer is available for less than $350 (Model GS-2, with printer; Model GS-1, without printer).

For more information, contact Alex McEachern at (415) 570-5355, Billings McEachern Inc., 402 Lincoln Centre Drive, Foster City, CA 94404.



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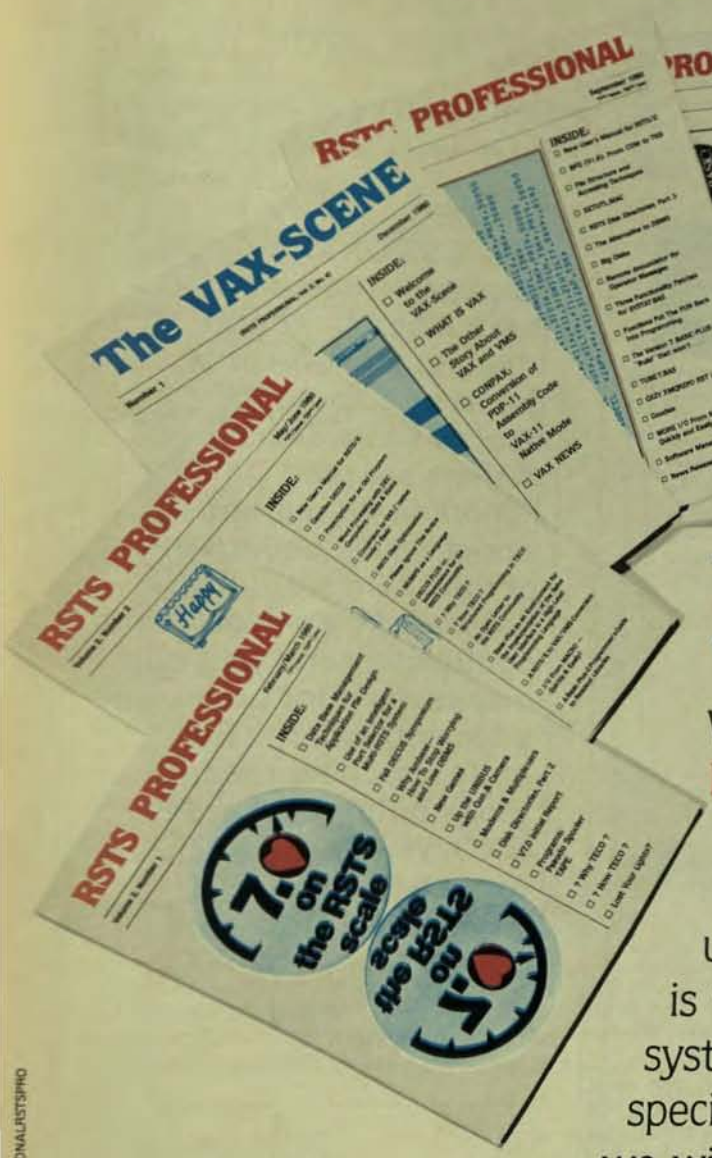

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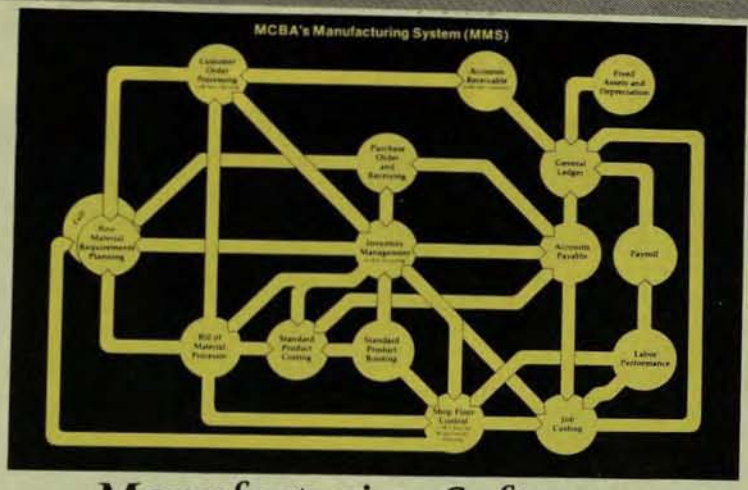

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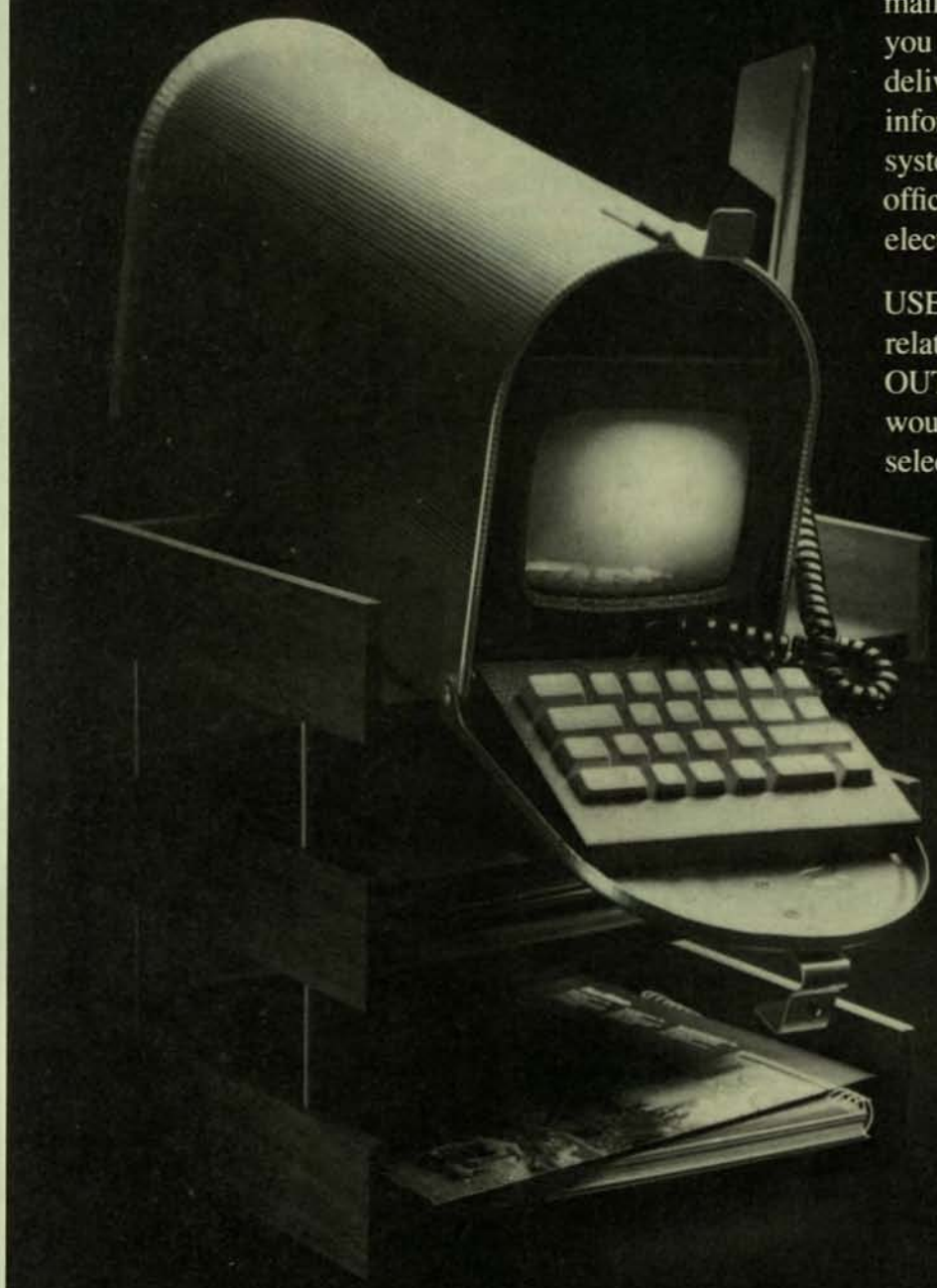

Sooner or later you will be using electronic mail. It just makes good sense. When you do, you will want a system that is complete—a delivery system, a scheduling system, and an information manager. Your electronic mail system will become an essential part of your office environment. USER-MAIL is such an electronic mail system*

USER-MAIL's power is easy to control. It relates to the way you work. Electronic IN, OUT, and HOLD baskets are just what you would expect. You can scan your IN basket, selecting only those message subjects you wish to read. Or, you can place a message into your HOLD basket for a number of days to have it automatically reappear in your IN basket on the appointed day. You can even have USER-MAIL recall specific messages by providing your own selection criteria. Replying, forwarding, and sending to groups are as easy as can be. And these are just a few of the features in store for you.

You owe yourself a closer look. Write for a brochure or give us a call direct.

NCCS USER 110

North County Computer Services, Inc.
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(714) 745-6006, Telex: 182773

*USER-MAIL is currently available on DEC computers using the RSTS operating system.
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"We put the ABLE VMZ/32 on line in 16 minutes. With 16 users operating EDT at 19.2K baud, the MONITOR showed 85% idle time. We were genuinely impressed."
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