# DECUS U.S. CHAPTER SIGs NEWSLETTERS

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# Digital Equipment Computer Users Society

Dear DECUS Member,

By the time you read this, Spring DECUS will be far in the past, but I am still recovering from a seven-day stretch of meetings from 7:30am till 11:00 or so every night. I would like to have more time to prepare this message, but another deadline is approaching, and I'm going to take the holiday weekend off and spend some time away from a keyboard and DECUS and my real-time job, so this letter is going out now!
First off, yes readers, we did have some problems with print quality in the May issue. The RSTS section really came out poorly, but we're not sure exactly why. Other two up sections, (HMS, L&T, RT,) look reasonable. We are dealing with a new printer (located in the Midwest so that we save a lot on bulk mailing costs,) and we're still getting used to each other. Hopefully we will have things sorted out the time you read this.

Everyone seemed to agree that Cincinnati was one of the best. Several things important occurred at the symposium that involved the Newsletters, and I want to make you aware of what happened.

For the first time, the Newsletters had a booth at DECUS. It was right next to the Store, so we were easy to find. The booth let us show first time DECUS members just what the SIG's Newsletters were all about. Members could sign up there, (or renew their subscription,) or take home a form and send it in later. We also answered a lot of questions from readers who weren't sure when their subscription would lapse (or when it had.)

We also handed out a small survey to attendees which we hope will give the Editors a better idea of what the readers wanted in the newsletters. To all of you who took time to stop by the booth and fill a survey out, "Thank you."

All in all, though it wasn't SRO quality, the booth was definitely a hit, and we plan on continuing it. The only thing we could have used were a few more volunteers to spend time in the booth. If you came by the booth and didn't find anyone to talk to we're sorry about that, and hope to have things better supported by next Symposium.

The other thing that came out of Spring DECUS was a consensus of opinion from LRP, (Communications Committee Long Range Planning,) CommComm Exec, and the NLC, (National Lug Council,) that there needs to be more communication between the SIGs Newsletters and the local LUG Newsletters. For the first time I was aware of, several SIGs Newsletter Editors attended a LUG Newsletter Editor session Friday Morning, and exchanged thoughts on how to nurture this communication between SIGs and LUGs.

Since it seems like such a great idea, how do we start this interchange? I humbly suggest the following.

For LUG Newsletter editors, if you have something you think would be of interest to readers outside your LUG, send a copy to the appropriate SIG Newsletter editor, or to me. If it's a length article, most editors have systems with Kermit or some other protocol available for transfer. We're not fussy, we'll use DCS, BITNET, INTERNET, FIDONET, anything but hairnet to transfer files. There's also the U S mail and floppies or tapes too.

Better yet, if you can swing an added name or two on your mailing list, add me or your favorite Newsletter editors to your mailing lists. We may see something that fits beautifully into an upcoming issue.

Some of our editors publish LUG news sections, listing upcoming meetings and topics. I wish more editors would. The only problem is that editors would have to have the information by the 15th of any month to get it into the Newsletter that comes out 6 weeks later. Any LUG editors are welcome to send meeting information to the appropriate editor.

Don't forget the other direction. If you see something in the SIGs Newsletters that you would like to use, (maybe you're having a meeting with a central topic, and some reprints from the Newsletters would make a great handout,) get in touch with the editor. Most of us will be glad to send you sources any way we can.

In conclusion, I think if this idea is to work its the LUG editors who must start the ball rolling. We SIG editors are outnumbered about 150 to 22, and we don't know who the local Editors or LUG chairs are. There are a lot of people on DCS who are also LUG chairs or editors. How bout it folks? Could a few of you take some time and get things started.

If anyone wants to talk to me, or put me on a mailing list, please write or call.

Frank R. Borger
Michael Reese Medical Center
Dept. of Radiation Physics
Lake Shore Drive at 31st St
Chicago, IL 60616
1-312-791-8075

# welcome to

# tales from the DAARC side
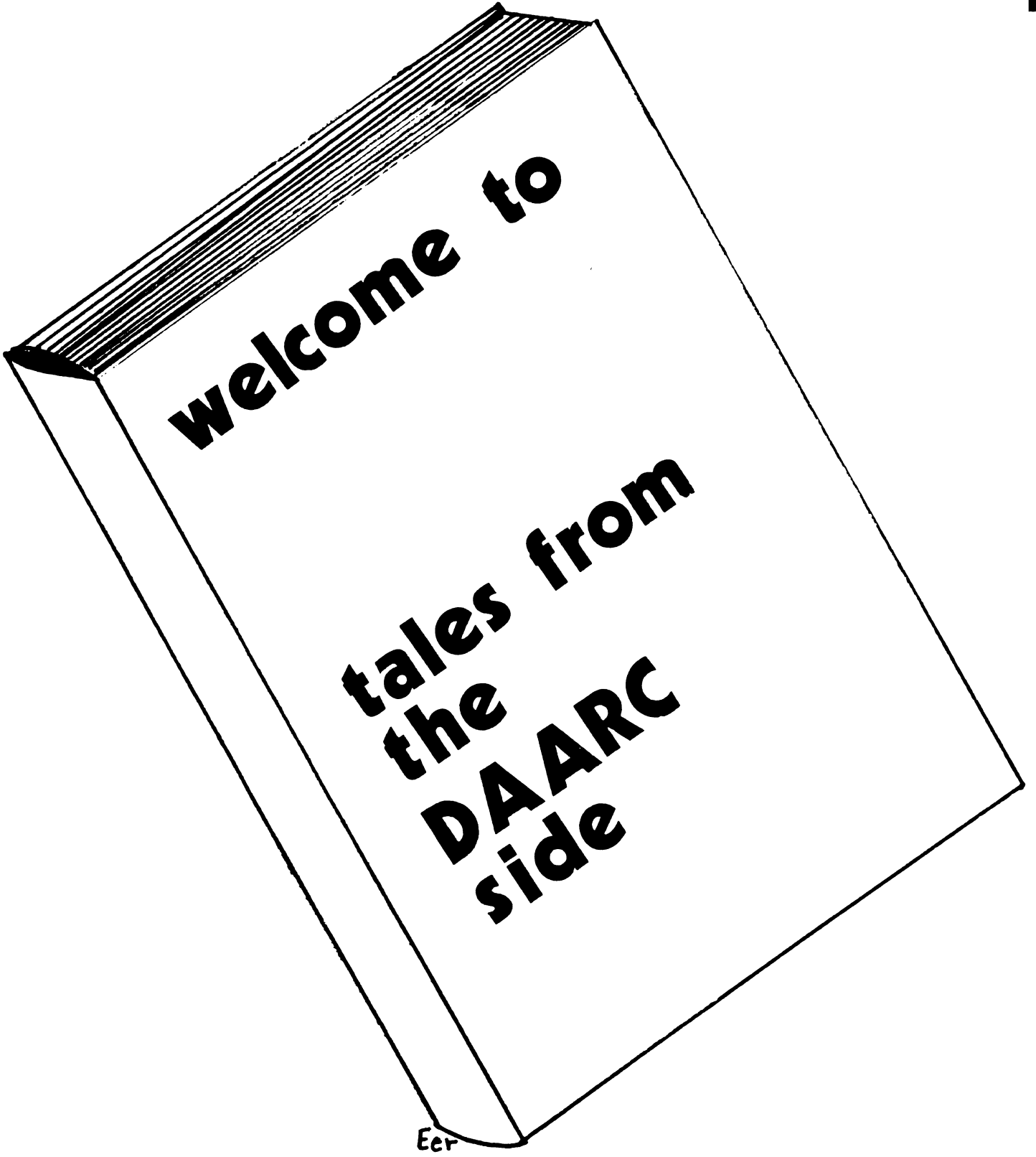
Eer

# SOME LIGHT ON DAARC

## Jim Deck DAARC Sig Chairman

There seems to be a mystery to some people as to what the DAARC SIG is all about. At its inception, it was felt that the name DAARC (Data Acquisition Analysis Research and Control) was fairly descriptive. Let it be known to all of DECUS that DAARC embraces all who practice their computer crafts in REAL TIME or are concerned with the analysis of data. Without a philosophical discussion of just what REAL TIME is, (perhaps an excellent DECUSERVE topic) let me say that those who must acquire data from industrial processes or laboratory experiments as well as those who must try to make some sense from the data they've collected will find the DAARC SIG a gathering place for their peers.

Now that you know, come join us and expand your horizons while sharing with others who face similar problems. Problems peculiar to those who would gather in the DAARC.

# THANKS FOR THE HELP

## Dale Hutchison DAARC SIG Newsletter Editor

Having just returned from the DECUS Symposium in Cincinnati, I have been asked to extend the thanks for the DAARC SIG for the help received from the following members and friends.

| | | |
|---|---|---|
| Roger Frazita | Stan Schultes | Bill Tippie |
| Cummins Engine Co. | Corning Glass Works | Kinetic Systems |
| Jim Duba | Mike Gallant | Jeff Kita |
| Cummins Engine Co. | Cummins Engine Co. | CODA Systems |
| Dale Hutchison | Tom Vaughan | Jane Furze |
| Cummins Engine Co | CODA Systems | ?? |
| George Winkler | Jim Deck | |
| CPC International | Inland Steel Research Labs | |

We would also like to extend our thanks to the many folks from Digital Equipment Corporation that gave sessions, manned the booths, attended working group sessions, and helped out in general. As always there is a chance that I have missed someone, If I have, please accept my apologies.
For those of you that weren't fortunate enough to be able to attend the Symposia, you missed a lot. Following is a brief article from Jim Duba with a first timers point of view.

In other news, Proceeding from this symposia can be ordered. Contact the DECUS office for prices, etc. (617-480-3418).

# First Time at Symposia

## Jim Duba, Cummins Engine Co.

After working with DEC hardware and software for about five years, I finally got to go to a symposium. I want tell about what it feels like to be among a large group of DEC users in a very friendly environment. What it feels like to go to session after session until they blur and merge and you can only separate them by referring to your notes. Finally, I want to encourage all DECUS members to go to one of these things.

I understand that about 5700 people showed up for the symposium in Cincinnati. Everything was very well organized and the attendees went along with the organization in a cooperative, friendly way. The organizers should be congratulated and their privileges increased.

These 5700 people moved purposefully from place to place. Conversations were often quiet and intense. People really stick to business. Even at parties people were talking computers, exchanging business cards, and taking notes.

A lot of the people moving around were searching thru the available sessions. What happens is you sit in a session and it doesn't fit, branch to another that might. Sitting and branching go on until something satisfactory is fount. Matching skills and interest to sessions is somewhat difficult because of the large number of sessions and the sometimes funny way they are scheduled against each other and the abstract doesn't provide a lot of information about how detailed the session will be.

I talked with people from corporation presidents to lowly programmers. With those still coming to grips with basic DCL to wizards running in kernel mode. I sat in sessions ranging from glossy product overviews to details about how interrupts work. I left sessions out of boredom and because I couldn't keep up.

I learned a lot and I was able to answer a couple of questions. That's what DECUS is all about. It has reached a critical mass so that everything going on in DEC LAND is represented. The more people that get there, the better the representation will be. I really want to encourage everyone to go to the next symposium, because someone out there will have answers to my next set of questions.

# VAX/VMS REALTIME PERFORMANCE CHARACTERIZATION

## Eric Gauthier and Bill Forbes, Laboratory Data Products, Systems Engineering

The distinguishing feature of realtime applications is the necessity of responding to asynchronous events within a critical time-window. Furthermore, the time constraints are usually absolute; if the system fails to respond within the required time-window for even a single event, the application as a whole fails. For this reason, designers of realtime computer systems have an extraordinary need for accurate, reliable, and detailed information about the performance characteristics of their systems. The purpose of this paper is to show how the LDP Systems Engineering group gathers and interprets realtime performance information and to get feedback on the appropriateness of our methods and results to user applications.

The information presented in this paper is meant to serve as a basis for discussions of VAX/VMS realtime performance. It does not constitute a committment from DEC as to what realtime performance is achievable on your system operating under your particular application load (see below).

## WHAT ARE REALTIME PERFORMANCE DATA USED FOR?

The need for performance information is felt throughout all phases of a realtime application development project. In the early stages, the application designer must select a platform system and make preliminary configuration decisions. Systems which fail to meet minimal performance criteria are excluded from further consideration, while those which can meet the performance demands of the application are subsequently evaluated according to less rigid criteria, such as system cost, ease of development, maintainability, and so forth. In the mid-stages of the project, realtime performance testing is used to determine whether the implementation of the design is achieving the expected performance. Moreover, in this phase, the design is often "fine-tuned", either in response to changes in the target application or through a desire to build in the maximum marginal performance capacity so that future extensions of the application can be implemented easily. In the final stages of the project, performance testing is important in integration testing and final system qualification.

Given this diversity in the possible goals of performance characterization, it is difficult to define a set of metrics which meet every need. The problem is compounded by the fact that any given set of performance metrics can (and should!) be interpretted differently, depending on the intent of the evaluation. In general, there are two kinds of questions that performance data address:

• What are the performance characteristics of the system?

• What is going on "inside" the system that affects its performance?

When seeking to answer the first type of question, users generally want to know whether the worst-case performance, with respect to some particular metric, exceeds some threshold requirement for their application. In this case, they are looking for a single number that is a valid metric of worst-case performance.

When seeking to answer the second type of question, users need information in a form which exposes the factors which contribute to variation in the metric. In this case, the ultimate goal of performance evaluation is to optimize the design so as to get the best or most consistent performance.

# TIMING HISTOGRAMS - WHAT DO THEY SHOW?

Realtime performance testing differs from non-realtime testing in that every individual data value across many thousands or millions of iterations of the test is of potential interest. Average performance is generally of little interest to realtime users. For this reason, the results of realtime performance test are often cast into a histogram in which the incidence of each value across many iterations is represented. From such histograms, it is possible to extract not only the mean and maximum timing, but the position and relative magnitude of various peaks in the distribution, as well. Such peaks and other characteristics of the shape of the histogram can reveal a great deal about the underlying factors which affect performance. There are two main classes of factors which contributeto the variability of realtime performance results: pre-empting events and blocking events.

Pre-empting events are those which cause the processor to suspend execution of the code path which is being measured and execute a higher-priority code path to service the event. When the high-priority code path completes, control returns to the pre-empted path and it is allowed to complete. If the measured code path is frequently pre-empted by some particular event, a peak will appear in the performance histogram, indicating that a code path of some fixed length was interpolated within the measured code path on some of the test iterations.

Blocking events are those which can prevent the measured code path from executing, if the blocking code path happens to be in the process of executing when the code path to be measured becomes computable. However, if a blocking code path becomes computable AFTER the measured code path begins to execute, the measured code path will complete before the blocking code path executes; that is, no pre-emption will occur. Blocking events cause the appearance of plateaus in the region of the mode of a performance histogram.

The interpretation of complex performance histograms can be difficult due to the cross-interaction of multiple blocking and pre-empting events. However, simple histograms can be used to analyse the nature and interactions among small numbers of blocking and pre-empting events.

# "YOUR MILEAGE MAY VARY..."

For most realtime performance metrics, the modal (most common) timing is relatively invariant, since the most common outcome of a well designed test is that the measured code path executes without being blocked or pre-empted. However, the maximum timing observed over many iterations of a test is highly dependent upon the occurance of pre-empting and blocking events. In short, the maximum value of a metric is usually more indicative of system load than it is of the basic performance of the code path being measured.

For this reason, it is impossible to state what the guaranteed performance of a system will be unless the measurements are performed under identical load conditions. In this context "load" includes not only what processes are running concurrently with the test, but what the software and hardware configuration of the system is, since these things affect the distribution and availability of system resources. The data which we have included below are presented in the context of the particular hardware and software configuration shown and should not be generalized outside that context.

## 1 BASIC METHODOLOGY

### 1.1 Test Conditions

When characterizing a system's performance it is very important to understand the exact configuration of the system under test (SUT). That understanding includes the complete hardware and software configuration, and the system loads. When reporting performance results it is very important the results remain within the context of the SUT's configuration. This bundling of data and system definition should allow for repeatability in testing, and discourage the misuse of performance numbers. We ask that the numbers reported here be kept intact with the system definitions so as not to lose their context.

Hardware Configuration

The hardware configuration of a test system is a fundamental part of a test scenario. The location of devices on the bus is very important in the case of simultaneous interrupts. When devices of equal priority level request an interrupt, priority is given to the device which is electrically closest to the processor.

The results presented in this report were generated on two different Q-bus based systems. Each hardware configuration is listed below.

1. MicroVAX II

   Configuration: A
   Serial Number: WF610K6540
   Microcode Rev: 00
   Hardware Rev: 00

   Slot Device Rev Description
   1 KA630 H2 CPU Board with VT100 as console
   2 MS630-BA O2 4MB Memory
   3(AB) KWV11-C M1 Realtime Clock
   4(AB) DZV11 C1 Asynchronous Serial Interface
   5(AB) DEQNA-M F2 Ethernet QBUS Network Adaptor
   5(CD) TQK50 F1 TK50 Controller
   6(CD) RQDX3 C1 Disk Controller
   RD53-A A1 71 MB Disk Drive
   RD52-A B1

2. VAX 3600

   Configuration: B
   Serial Number: WF728D6358
   Microcode: 1
   Hardware: V2.0

   Slot Device Rev Description
   1 KA650 proto CPU with VT241 as console
   2 MS650-AA A1 8 MB ECC Memory
   3 KWV11-SA A1 Realtime Clock
   4 TQK70-SA X22 TMSCP Controller
   TK70-AA X06 295 MB Tape Drive
   5 KDA50-QA E02 SDI Controller
   6 KDA50-QA E02 Second Module of SDI
   RA82-JA C2 622 MB Disk Drive

Software Configuration

Another fundamental part of a test scenario, and the most frequently overlooked, is the software configuration. Important characteristics of the software configuration are the operating system and version, SYSGEN parameters, and installed images.

The operating system is an obvious factor in performance measurements. Different operating systems may have very different code paths, device drivers, etc., and the results from testing may only be used to show the advantages/disadvantages between the two. All tests shown here were run under VAX/VMS X4.6.

For the current tests, all processes ran at an elevated software priority and their working set limits in the User Authorization File (UAF) were changed to the values shown below.

Working Set /Limit= 1024 /Quota= 2048 /Extent= 2048
Adjustment enabled Authorized Quota= 2048 Authorized Extent= 2048

Installed images are a factor of performance because installation can cause memory to be allocated from non-paged pooled memory. This can reduce the amount of memory available to realtime processes.

The SYSGEN parameters of a system determine the configuration of the operating system. It is important to show these parameters for each SUT because they determine such things as process quantam, global pages available, the size of the free page list, and many other factors that are critical to realtime computing.

One SYSGEN parameter that was changed for our tests is REALTIME_SPTS. This defines the number of system page table entries that may be used by realtime processes. The entries are used to map process-specified buffers into system space. The number of entries must be greater than or equal to the number of pages in buffers that have been specified by processes connected to interrupt vectors.

The SYSGEN parameters are available by contacting the DAARC Newsletter Editor.

Dale Hutchison
Cummins Engine Company
4720 Baker Street Ext.
Lakewood, NY 14750
(716) 456-2191

### Installed images for Test System A (MicroVAX II)

**DISK$VAXVMSRL4:{EMACS}.EXE**

| | | | | |
|---|---|---|---|---|
| EMACS;1 | Open | | Shar | |
| EMACSSHR;1 | Open | | Shar | | Lnkbl |

**DISK$VAXVMSRL4:{SYS0.SYSEXE}.EXE**

| | | | | | |
|---|---|---|---|---|---|
| 2020V2A10;1 | Open | Hdr | Shar | | |
| ANALIMDMP;1 | | | | Prv | |
| AUTHORIZE;1 | | | | Prv | |
| CDU;1 | Open | Hdr | | Prv | |
| COPY;1 | Open | Hdr | Shar | | |
| DCL;1 | Open | Hdr | Shar | | Lnkbl |
| DELETE;1 | Open | Hdr | Shar | | |
| DIRECTORY;1 | Open | Hdr | Shar | | |
| EDT;1 | Open | Hdr | Shar | | |
| EVL;1 | | | | Prv | |
| FAL;1 | Open | Hdr | Shar | | |
| FTSV;1 | Open | | Shar | Prv | |
| FTSVEXEC;1 | Open | | Shar | Prv | |
| INIT;1 | | | | Prv | |
| INSTALL;1 | | | | Prv | |
| LINK;1 | Open | Hdr | | | |
| LOGINOUT;1 | Open | Hdr | Shar | Prv | |
| MAIL;1 | | | | Prv | |
| MONITOR;1 | Open | Hdr | | Prv | |
| NETSERVER;1 | Open | Hdr | Shar | | |
| NICONFIG;1 | | | | Prv | |
| PHONE;1 | | | | Prv | |
| RENAME;1 | Open | Hdr | Shar | | |
| REQUEST;1 | | | | Prv | |
| RTPAD;1 | | | | Prv | |
| SEARCH;1 | Open | Hdr | Shar | | |
| SET;1 | Open | Hdr | Shar | Prv | |
| SETP0;1 | Open | Hdr | Shar | Prv | |
| SETRIGHTS;1 | | | | Prv | |
| SHOW;1 | Open | Hdr | Shar | Prv | |
| SHWCLSTR;1 | | | | Prv | |
| SUBMIT;1 | Open | Hdr | Shar | Prv | |
| TPU;1 | Open | Hdr | Shar | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| TYPE;1 | Open | Hdr | Shar | | | |
| VMSHELP;1 | Open | Hdr | Shar | | | |
| VPM;1 | Open | Hdr | | Prv | | |

**DISK$VAXVMSRL4:{SYS0.SYSLIB}.EXE**

| | | | | | | |
|---|---|---|---|---|---|---|
| ADARTL;1 | Open | Hdr | Shar | | Lnkbl | |
| BASRTL;1 | Open | Hdr | | | Lnkbl | |
| BASRTL2;1 | | | | | | |
| COBRTL;1 | Open | Hdr | | | Lnkbl | |
| CONVSHR;1 | | | | | | |
| CRFSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| DBGSSISHR;1 | Open | Hdr | Shar | Prot | Lnkbl | |
| DCLTABLES;10 | Open | Hdr | Shar | | Lnkbl | |
| DCXSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| DEBUG;1 | Open | Hdr | Shar | | Lnkbl | |
| DISMNTSHR;1 | Open | Hdr | Shar | Prot | Lnkbl | Nopurg |
| EDTSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| FDLSHR;1 | | | | | | |
| FORRTL;1 | Open | Hdr | | | Lnkbl | |
| LBRSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| LIBRTL;1 | Open | Hdr | Shar | | Lnkbl | |
| LIBRTL2;1 | | | | | | |
| MOUNTSHR;1 | Open | Hdr | Shar | Prot | Lnkbl | |
| NMLSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| PASRTL;1 | Open | Hdr | | | Lnkbl | |
| PLIRTL;1 | Open | Hdr | | | Lnkbl | |
| RPGRTL;1 | | | | | | |
| SCNRTL;1 | Open | Hdr | Shar | | Lnkbl | |
| SCRSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| SECURESHR;1 | Open | Hdr | Shar | Prot | Lnkbl | |
| SMGSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| SORTSHR;1 | | | | | | |
| SPISHR;1 | Open | Hdr | Shar | Prot | Lnkbl | |
| SUMSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| TPU$CCTSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| TPUSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| TRACE;1 | Open | Hdr | Shar | | Lnkbl | |
| UVMTHRTL;1 | Open | Hdr | Shar | | Lnkbl | |
| VAXCRTL;2 | Open | Hdr | Shar | | Lnkbl | |
| VAXCRTLG;2 | Open | Hdr | Shar | | Lnkbl | |
| VMSRTL;1 | Open | Hdr | Shar | | Lnkbl | |

**DISK$VAXVMSRL4:{SYS0.SYSMSG}.EXE**

| | | | | | |
|---|---|---|---|---|---|
| CLIUTLMSG;1 | Open | Hdr | Shar | | Lnkbl |
| DBGTBKMSG;1 | | | | | |
| FILMNTMSG;1 | | | | | |
| NETWRKMSG;1 | | | | | |
| PASMSG;1 | | | | | |
| PLIMSG;1 | | | | | |
| PRGDEVMSG;1 | Open | Hdr | Shar | | Lnkbl |
| RPGMSG;1 | | | | | |
| SHRIMGMSG;1 | Open | Hdr | Shar | | Lnkbl |
| SYSMGTMSG;1 | | | | | |
| TPUMSG;1 | Open | Hdr | Shar | | Lnkbl |

**Installed images for Test System B (VAX 3600)**

**DISK$VAXVMSRL4:[SYS0.SYSEXE].EXE**

| Image | Open | Hdr | Shar | Prv/Prot | Lnkbl | Nopurg |
|---|---|---|---|---|---|---|
| ANALIMDMP;1 | | | | Prv | | |
| AUTHORIZE;1 | | | | Prv | | |
| CDU;1 | Open | Hdr | | Prv | | |
| COPY;1 | Open | Hdr | Shar | | | |
| DCL;1 | Open | Hdr | Shar | | Lnkbl | |
| DELETE;1 | Open | Hdr | Shar | | | |
| DIRECTORY;1 | Open | Hdr | Shar | | | |
| EDT;1 | Open | Hdr | Shar | | | |
| EVL;1 | | | | Prv | | |
| FTSV;2 | Open | | Shar | Prv | | |
| FTSVEXEC;2 | Open | | Shar | Prv | | |
| INIT;1 | | | | Prv | | |
| INSTALL;1 | | | | Prv | | |
| LINK;1 | Open | Hdr | | | | |
| LOGINOUT;1 | Open | Hdr | Shar | Prv | | |
| MAIL;1 | Open | Hdr | Shar | Prv | | |
| MONITOR;1 | Open | Hdr | | Prv | | |
| NICONFIG;1 | | | | Prv | | |
| PHONE;1 | Open | Hdr | Shar | Prv | | |
| RENAME;1 | Open | Hdr | Shar | | | |
| REQUEST;1 | | | | Prv | | |
| RTPAD;1 | Open | Hdr | Shar | Prv | | |
| SEARCH;1 | Open | Hdr | Shar | | | |
| SET;1 | Open | Hdr | Shar | Prv | | |
| SETP0;1 | Open | Hdr | Shar | Prv | | |
| SETRIGHTS;1 | | | | Prv | | |
| SHOW;1 | Open | Hdr | Shar | Prv | | |
| SHWCLSTR;1 | | | | Prv | | |
| SUBMIT;1 | Open | Hdr | Shar | Prv | | |
| TPU;1 | Open | Hdr | Shar | | | |
| TYPE;1 | Open | Hdr | Shar | | | |
| VMSHELP;1 | Open | Hdr | Shar | | | |
| VPM;1 | Open | Hdr | | Prv | | |

**DISK$VAXVMSRL4:[SYS0.SYSLIB].EXE**

| Image | Open | Hdr | Shar | Prot | Lnkbl | Nopurg |
|---|---|---|---|---|---|---|
| ADARTL;1 | Open | Hdr | Shar | | Lnkbl | |
| BASRTL;1 | Open | Hdr | | | Lnkbl | |
| BASRTL2;1 | | | | | | |
| COBRTL;1 | Open | Hdr | | | Lnkbl | |
| CONVSHR;1 | | | | | | |
| CRFSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| DBGSSISHR;1 | Open | Hdr | Shar | Prot | Lnkbl | |
| DCLTABLES;5 | Open | Hdr | Shar | | Lnkbl | |
| DCXSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| DEBUG;1 | Open | Hdr | Shar | | Lnkbl | |
| DISMNTSHR;1 | Open | Hdr | Shar | Prot | Lnkbl | Nopurg |
| EDTSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| FDLSHR;1 | | | | | | |
| FORRTL;1 | Open | Hdr | | | Lnkbl | |
| LBRSHR;1 | Open | Hdr | Shar | | Lnkbl | |
| LIBRTL;1 | Open | Hdr | Shar | | Lnkbl | |
| LIBRTL2;1 | | | | | | |
| MOUNTSHR;1 | Open | Hdr | Shar | Prot | Lnkbl | |

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|---|---|---|---|---|---|
| PASRTL;1 | Open | Hdr | | | Lnkbl |
| PLIRTL;1 | Open | Hdr | | | Lnkbl |
| RPGRTL;1 | | | | | |
| SCNRTL;1 | Open | Hdr | Shar | | Lnkbl |
| SCRSHR;1 | Open | Hdr | Shar | | Lnkbl |
| SECURESHR;1 | Open | Hdr | Shar | Prot | Lnkbl |
| SMGSHR;1 | Open | Hdr | Shar | | Lnkbl |
| SORTSHR;1 | | | | | |
| SPISHR;1 | Open | Hdr | Shar | Prot | Lnkbl |
| SPMSHR;1 | Open | | Shar | Prot | Lnkbl |
| SUMSHR;1 | Open | Hdr | Shar | | Lnkbl |
| TPU$CCTSHR;1 | Open | Hdr | Shar | | Lnkbl |
| TPUSHR;1 | Open | Hdr | Shar | | Lnkbl |
| TRACE;1 | Open | Hdr | Shar | | Lnkbl |
| UVMTHRTL;1 | Open | Hdr | Shar | | Lnkbl |
| VAXCRTL;2 | Open | Hdr | Shar | | Lnkbl |
| VAXCRTLG;2 | Open | Hdr | Shar | | Lnkbl |
| VMSRTL;1 | Open | Hdr | Shar | | Lnkbl |

**DISK$VAXVMSRL4:{SYS0.SYSMSG}.EXE**

| | | | | | |
|---|---|---|---|---|---|
| CLIUTLMSG;1 | Open | Hdr | Shar | | Lnkbl |
| DBGTBKMSG;1 | | | | | |
| FILMNTMSG;1 | | | | | |
| NETWRKMSG;1 | | | | | |
| PASMSG;1 | | | | | |
| PLIMSG;1 | | | | | |
| PRGDEVMSG;1 | Open | Hdr | Shar | | Lnkbl |
| RPGMSG;1 | | | | | |
| SHRIMGMSG;1 | Open | Hdr | Shar | | Lnkbl |
| SYSMGTMSG;1 | | | | | |
| TPUMSG;1 | Open | Hdr | Shar | | Lnkbl |

## System Load

In all of the tests the interval timer was running, causing an interrupt at IPL 22 every 10 milliseconds. This interrupt could have blocked our ISR tests but could not have pre-empted them. This is due to the fact that the KWV interrupts at IPL 20 but the ISR is executed at IPL 23. The system services or context switch tests could have been either pre-empted or blocked because timings are recorded in process context at IPL 0. Network activity was disabled by stopping both NCP and LATCP. All disk I/O was done after the time critical code was completed. All test processes locked their P0 pages into memory to prevent paging. In the case of the system service tests, paging could occur on some iterations because the system services themselves were not locked into memory.

The only system processes running during the testing were SWAPPER and NULL. There was no OPCOM nor ERRFMT present.

## 1.2 Timing Methodologies

One important issue in realtime performance testing is how events are timed. Our tests use the KWV11-C Realtime Clock Module.

The KWV11-C provides many modes of operations. The interrupt latency tests use the KWV to generate an interrupt and time the latency to ISR, AST, and process code. First, the BPR of the KWV is loaded with a random negative number. The KWV then counts up; when it reaches zero it generates an interrupt and continues counting. When the ISR for the KWV interrupt is entered, it immediatly disables the internal oscillator of the KWV and records the time. Upon exit of the ISR the oscillator is enabled, allowing for the next routine to repeat the process and record its latency.

The overhead incurred when stopping the KWV upon entry of the different routines is included in all of our timings. This has been done to show the latency until some 'useful' operation can be performed. The time to arrival at the beginning of the ISR is not very helpful to a user because nothing has actually happened yet. On the other hand, the time it takes to arrive and perform one instruction at the ISR level is of interest, as it represents the time within which an elementary task could be accomplished.

The system service timings and context switch timings use the KWV merely as a counter. The process first maps a portion its virtual memory to physical I/O space and directly addresses the control registers of the KWV to start and stop the counter.

The overhead incurred by this method of timing is shown in our tests by the 'NULL' timing. The first time recorded is the time to start, stop, and read the clock. This should give you a good idea of the overhead included within the other timings.

Synchronization is yet another problem of performance characterization. The test could become synchronized with many events on the system; the interval timer or another process are two of these.

We avoid synchronization by loading the KWV with a random number before generating an interrupt. This assures us that an interrupt will be generated at an undetermined time, thus reducing the risk of synchronization.

## 1.3 Statistical Considerations

An important concern we have in our testing is the number of iterations we perform. All results shown here represent tests of one million iterations. The histogram itself should determine the number of iterations. The ideal test scenario performs enough iterations so that the histogram will display no obscure events, which occur a very small percentage of the time. If an event takes place that causes an exceptionally long latency, then the number of iterations of the test should be increased to attempt to produce more of those events and to smooth out the histogram.

Interrupt Latency Test Sequence

- Map I/O page into process space for direct I/O
- Initialize data structures
- Top of test loop: Assign channel for KWV
- Preset counter (5000 +/- 2000), start, and enable interrupts
- Wait for appropriate flag to be set
- Record ISR, AST, and process latencies
- Cancel I/O - SYS$CANCEL
- If loop count >= the number of iterations for this test, then exit; else return to top of the loop

INTERRUPT RESPONSE DATA

- Test system A
- base IPL = 0
- SW priority = 18
- Wait for VMS LEF set in AST (process is in LEF wait state)
- CONINTERR driver

1,000,000 data points. Test time = 02:24:09.24

VAX/VMS X4.6 on node 11-NOV-1987 11:24:02.44 Uptime 0 03:48:14

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|--------------|-------|-----|-----|-----|-----------|--------|
| 00000020 | NULL | COM | 0 | 0 | 0 03:39:50.06 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.88 | 0 | 0 |
| 00000031 | GAUTHIER | CUR | 18 | 883 | 0 00:00:14.97 | 2374 | 312 |

Latencies (microseconds)

|         | MIN | MEAN | MAX  | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---------|-----|------|------|------|-------|-------|-------|-------|
| ISR     | 36  | 39   | 115  | 39   | 40    | 40    | 43    | 80    |
| AST     | 604 | 619  | 1990 | 614  | 654   | 676   | 744   | 1018  |
| Process | 780 | 805  | 2170 | 790  | 830   | 910   | 920   | 1360  |

VAX/VMS X4.6 on node 11-NOV-1987 13:48:11.68 Uptime 0 06:12:23

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|--------------|-------|-----|-----|-----|-----------|--------|
| 00000020 | NULL | COM | 0 | 0 | 0 04:59:44.36 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.88 | 0 | 0 |
| 00000031 | GAUTHIER | CUR | 18 | 1000946 | 0 00:50:33.18 | 2937 | 314 |

INTERRUPT RESPONSE DATA

- Test system B
- base IPL = 0
- SW priority = 18
- Wait for VMS LEF set in AST (process is in LEF wait state)
- CONINTERR driver

1,000,000 data points. Test time = 01:47:18.49

VAX/VMS X4.6 on node 10-NOV-1987 15:11:50.89 Uptime 0 00:09:40

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|--------------|-------|-----|-----|-----|-----------|--------|
| 00000080 | NULL | COM | 0 | 0 | 0 00:09:10.07 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.09 | 0 | 0 |
| 0000008C | GAUTHIER | CUR | 18 | 660 | 0 00:00:04.41 | 1914 | 326 |

Latencies (microseconds)

|  | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---|---|---|---|---|---|---|---|---|
| ISR | 18 | 21 | 43 | 21 | 21 | 21 | 21 | 31 |
| AST | 260 | 268 | 688 | 268 | 270 | 286 | 290 | 318 |
| PROCESS | 310 | 328 | 750 | 320 | 320 | 340 | 360 | 370 |

VAX/VMS X4.6 on node 10-NOV-1987 16:59:09.38 Uptime 0 01:56:58

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|---|---|---|---|---|---|---|---|
| 00000080 | NULL | COM | 0 | 0 | 0 01:31:58.43 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.09 | 0 | 0 |
| 0000008C | GAUTHIER | CUR | 18 | 1000700 | 0 00:19:28.04 | 2349 | 327 |

INTERRUPT RESPONSE DATA

- Test system A
- base IPL = 0
- SW priority = 18
- Wait for user defined flag set in AST (process is CUR)
- CONINTERR driver

1,000,000 data points. Test time = 02:15:02.38

VAX/VMS X4.6 on node 10-NOV-1987 18:32:08.12 Uptime 0 08:15:07

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|---|---|---|---|---|---|---|---|
| 00000020 | NULL | COM | 0 | 0 | 0 05:28:41.16 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:02.20 | 0 | 0 |
| 0000004D | GAUTHIER | CUR | 18 | 1015765 | 0 02:11:48.90 | 38906 | 345 |

Latencies (microseconds)

|  | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---|---|---|---|---|---|---|---|---|
| ISR | 36 | 39 | 128 | 40 | 40 | 40 | 44 | 82 |
| AST | 438 | 449 | 1648 | 446 | 470 | 500 | 504 | 682 |
| Process | 550 | 563 | 1760 | 560 | 580 | 600 | 610 | 900 |

VAX/VMS X4.6 on node 10-NOV-1987 20:47:10.50 Uptime 0 10:30:09

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|---|---|---|---|---|---|---|---|
| 00000020 | NULL | COM | 0 | 0 | 0 05:28:43.53 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:02.20 | 0 | 0 |
| 0000004D | GAUTHIER | CUR | 18 | 2015827 | 0 04:16:17.16 | 39511 | 291 |

INTERRUPT RESPONSE DATA

- Test system B
- base IPL = 0
- SW priority = 18
- Wait for user defined flag set in AST (process is CUR)
- CONINTERR driver

1,000,000 data points. Test time = 01:43:56.60

VAX/VMS X4.6 on node 10-NOV-1987 16:59:47.80 Uptime 0 01:57:37

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-------------|-------|-----|-----|-----|-----------|--------|
| 00000080 | NULL | COM | 0 | 0 | 0 01:32:29.23 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.10 | 0 | 0 |
| 0000008C | GAUTHIER | CUR | 18 | 1001343 | 0 00:19:33.65 | 4117 | 361 |

Latencies (microseconds)

|         | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---------|-----|------|-----|------|-------|-------|-------|-------|
| ISR     | 15  | 18   | 42  | 19   | 19    | 19    | 19    | 31    |
| AST     | 174 | 183  | 612 | 180  | 184   | 200   | 200   | 226   |
| Process | 210 | 220  | 650 | 220  | 210   | 230   | 230   | 260   |

VAX/VMS X4.6 on node 10-NOV-1987 18:43:44.40 Uptime 0 03:41:33

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-------------|-------|-----|-----|-----|-----------|--------|
| 00000080 | NULL | COM | 0 | 0 | 0 01:32:30.07 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.10 | 0 | 0 |
| 0000008C | GAUTHIER | CUR | 18 | 2001379 | 0 02:00:00.85 | 4679 | 367 |

INTERRUPT RESPONSE DATA

- Test system A
- base IPL = 0
- SW priority = 18
- Wait for VMS EFN set at FORK level (process is in LEF wait state)
- CONINTERR driver

1,000,000 data points. Test time = 02:04:16.79

VAX/VMS X4.6 on node 11-NOV-1987 13:49:10.11 Uptime 0 06:13:22

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-------------|-------|-----|-----|-----|-----------|--------|
| 00000020 | NULL | COM | 0 | 0 | 0 05:00:23.18 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.91 | 0 | 0 |
| 00000031 | GAUTHIER | CUR | 18 | 1001598 | 0 00:50:47.51 | 5008 | 350 |

Latencies (microseconds)

|         | MIN | MEAN | MAX  | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---------|-----|------|------|------|-------|-------|-------|-------|
| ISR     | 36  | 39   | 105  | 39   | 40    | 40    | 43    | 80    |
| Process | 420 | 430  | 1790 | 420  | 420   | 460   | 470   | 650   |

VAX/VMS X4.6 on node 11-NOV-1987 15:53:26.90 Uptime 0 08:17:39

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-------------|-------|-----|-----|-----|-----------|--------|
| 00000020 | NULL | COM | 0 | 0 | 0 06:20:31.46 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.91 | 0 | 0 |
| 00000031 | GAUTHIER | CUR | 18 | 2001624 | 0 01:22:14.65 | 5494 | 351 |

INTERRUPT RESPONSE DATA

- Test system B
- base IPL = 0
- SW priority = 18
- Wait for VMS EFN set at FORK level (process is in LEF wait state)
- CONINTERR driver

1,000,000 data points. Test time = 01:40:56.62

VAX/VMS X4.6 on node 11-NOV-1987 12:30:33.63 Uptime 0 02:47:08

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|---|---|---|---|---|---|---|---|
| 00000080 | NULL | COM | 0 | 0 | 0 02:46:04.73 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.12 | 0 | 0 |
| 0000008E | GAUTHIER | CUR | 18 | 1498 | 0 00:00:24.65 | 6644 | 336 |

Latencies (microseconds)

|  | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---|---|---|---|---|---|---|---|---|
| ISR | 20 | 22 | 63 | 22 | 22 | 22 | 23 | 36 |
| Process | 180 | 194 | 820 | 190 | 180 | 200 | 200 | 240 |

VAX/VMS X4.6 on node 11-NOV-1987 14:11:30.25 Uptime 0 04:28:05

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|---|---|---|---|---|---|---|---|
| 00000080 | NULL | COM | 0 | 0 | 0 04:08:58.48 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.12 | 0 | 0 |
| 0000008E | GAUTHIER | CUR | 18 | 1001513 | 0 00:13:49.18 | 7014 | 348 |

INTERRUPT RESPONSE DATA

- Test system A
- base IPL = 0
- SW priority = 18
- Wait for user defined flag set in ISR (process is CUR)
- CONINTERR driver

1,000,000 data points. Test time = 01:54:03.72

VAX/VMS X4.6 on node 10-NOV-1987 20:48:00.52 Uptime 0 10:30:59

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|---|---|---|---|---|---|---|---|
| 00000020 | NULL | COM | 0 | 0 | 0 05:29:13.69 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:02.23 | 0 | 0 |
| 0000004D | GAUTHIER | CUR | 18 | 2016461 | 0 04:16:31.56 | 41656 | 350 |

Latencies (microseconds)

|  | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---|---|---|---|---|---|---|---|---|
| ISR | 36 | 39 | 108 | 40 | 40 | 41 | 43 | 82 |
| Process | 70 | 79 | 940 | 70 | 70 | 110 | 110 | 190 |

VAX/VMS X4.6 on node 10-NOV-1987 22:42:04.24 Uptime 0 12:25:03

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|--------------|-------|-----|-----|-----|-----------|--------|
| 00000020 | NULL | COM | 0 | 0 | 0 05:29:15.00 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:02.23 | 0 | 0 |
| 0000004D | GAUTHIER | CUR | 18 | 3016488 | 0 06:05:14.74 | 42160 | 308 |

INTERRUPT RESPONSE DATA

- Test system B
- base IPL = 0
- SW priority = 18
- Wait for user defined flag set in ISR (process is CUR)
- CONINTERR driver

1,000,000 data points. Test time = 01:36:18.73


VAX/VMS X4.6 on node 10-NOV-1987 18:44:14.06 Uptime 0 03:42:03

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|--------------|-------|-----|-----|-----|-----------|--------|
| 00000080 | NULL | COM | 0 | 0 | 0 01:32:52.18 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.12 | 0 | 0 |
| 0000008C | GAUTHIER | CUR | 18 | 2002029 | 0 02:00:06.24 | 6458 | 336 |

Latencies (microseconds)

|         | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---------|-----|------|-----|------|-------|-------|-------|-------|
| ISR     | 14  | 15   | 43  | 16   | 15    | 16    | 17    | 28    |
| Process | 20  | 29   | 410 | 20   | 20    | 20    | 30    | 40    |


VAX/VMS X4.6 on node 10-NOV-1987 20:20:32.79 Uptime 0 05:18:22

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|--------------|-------|-----|-----|-----|-----------|--------|
| 00000080 | NULL | COM | 0 | 0 | 0 01:32:52.72 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.12 | 0 | 0 |
| 0000008C | GAUTHIER | CUR | 18 | 3002045 | 0 03:34:17.15 | 6954 | 347 |

\* The Process latency numbers are cast into a histogram with a bucket size of 10 microseconds. The 20 microseconds quoted here actually represents a range from 20-30 microseconds

Context Switch Test Sequence

- Lock process's P0 space into memory to prevent paging
- Map I/O page into process space for direct IO
- Create global event flag cluster - SYS$ASCEFC
- Map global section for communication with proc. #2
- Initialize data structures
- Set proc. #1 priority = 25
- Create proc. #2 at priority = 20
- Wait for proc. #2 to finish initialization
- Top of loop:                                    Current Process

a) Clear and start clock [1]
b) Stop clock and store (T0) [1]
c) Clear and Start clock [1]
d) SYS$SUSPND [1]
e) Stop clock and store (T1) [2]
f) Clear and Start clock [2]
g) SYS$RESUME on proc. #1 [2]
h) Stop clock and store (T2) [1]
i) Clear and Start clock [1]
j) Wait for a common event flag - SYS$WAITFR [1]
k) Stop clock and store (T3) [2]
l) Clear and Start clock [2]
m) SYS$SETEF [2]
n) Stop clock and store (T4) [1]
o) Clear and start clock [2]
p) SYS$HIBER [1]
q) Stop clock and store (T5) [2]
r) Clear and start clock [2]
s) SYS$WAKE on proc. #1 [2]
t) Stop clock and store (T6) [1]

• If loop count >= the number of iterations for this test, then exit; else return to top of the loop

Timings T1, T3, and T5 represent the time to switch context from a higher priority process [1] to a lower priority process [2] when the higher priority process enters a voluntary wait state.

Timings T2, T4, and T6 represent the time to switch context when a lower priority process [2] is prempted by a higher priority process [1].

T0 is the time to read the clock.

## CONTEXT SWITCH TIMINGS

• Test system A
• base IPL = 0
• SW priority = 25 (process 1), 20 (process 2)

1,000,000 data points. Test time = 01:16:25.78

VAX/VMS X4.6 on node 19-NOV-1987 09:00:28.30 Uptime 0 00:17:58

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|---|---|---|---|---|---|---|---|
| 00000020 | NULL | COM | 0 | 0 | 0 00:16:47.15 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.15 | 0 | 0 |
| 0000002B | CTXSW1 | CUR | 18 | 275 | 0 00:00:09.19 | 1447 | 326 |

| | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|---|---|---|---|---|---|---|---|---|
| T0 | 39 | 39 | 856 | 39 | 39 | 39 | 39 | 49 |
| T1 | 544 | 555 | 1452 | 550 | 592 | 612 | 638 | 770 |
| T2 | 728 | 741 | 2100 | 732 | 790 | 866 | 868 | 966 |
| T3 | 256 | 260 | 1152 | 256 | 260 | 316 | 388 | 396 |
| T4 | 360 | 366 | 1726 | 362 | 362 | 422 | 426 | 512 |
| T5 | 240 | 245 | 1116 | 242 | 240 | 370 | 374 | 378 |
| T6 | 692 | 701 | 2062 | 694 | 752 | 824 | 828 | 920 |

VAX/VMS X4.6 on node 19-NOV-1987 10:16:54.08 Uptime 0 01:34:24

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-------------|-------|-----|-----|-----|-----------|--------|
| 00000020 | NULL | COM | 0 | 0 | 0 00:16:48.75 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.18 | 0 | 0 |
| 0000002B | CTXSW1 | CUR | 25 | 362 | 0 00:36:21.14 | 2212 | 315 |

CONTEXT SWITCH TIMINGS

- Test system B
- base IPL = 0
- SW priority = 25 (process 1), 20 (process 2)

1,000,000 data points. Test time = 00:35:18.42

VAX/VMS X4.6 on node 11-NOV-1987 09:06:21.37 Uptime 0 12:44:00

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-------------|-------|-----|-----|-----|-----------|--------|
| 00000080 | NULL | COM | 0 | 0 | 0 12:40:38.87 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.20 | 0 | 0 |
| 00000091 | CTXSW1 | CUR | 18 | 8913 | 0 00:01:13.63 | 15967 | 427 |

Timings in microseconds

|  | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|------|-----|------|-----|------|-------|-------|-------|-------|
| T0 | 11 | 13 | 360 | 13 | 13 | 14 | 14 | 65 |
| T1 | 244 | 251 | 659 | 250 | 252 | 229 | 304 | 313 |
| T2 | 421 | 428 | 823 | 427 | 431 | 450 | 475 | 478 |
| T3 | 110 | 114 | 504 | 114 | 114 | 129 | 137 | 164 |
| T4 | 154 | 160 | 783 | 161 | 161 | 179 | 181 | 211 |
| T5 | 101 | 105 | 701 | 106 | 106 | 121 | 127 | 154 |
| T6 | 404 | 411 | 813 | 410 | 411 | 431 | 459 | 462 |

VAX/VMS X4.6 on node 11-NOV-1987 09:41:39.79 Uptime 0 13:19:19

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-------------|-------|-----|-----|-----|-----------|--------|
| 00000080 | NULL | COM | 0 | 0 | 0 12:40:39.52 | 0 | 0 |
| 00000081 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.21 | 0 | 0 |
| 00000091 | CTXSW1 | CUR | 25 | 8997 | 0 00:15:11.46 | 16835 | 428 |

System Service Timing Test Sequence

- Lock process's P0 space into memory to prevent paging
- Map I/O page into process space for direct I/O
- Initialize data structures
- Top of loop:
  a) Start the clock
  b) Perform system service
  c) Stop clock and record the time
  d) Repeat steps (a)-(c) for each system service

- If loop count >= the number of iterations for this test, then exit; else return to top of the loop

System Service Timings

- Test system A
- base IPL = 0
- SW priority = 18

1,000,000 data points. Test time = 01:16:09.74

VAX/VMS X4.6 on node 20-NOV-1987 08:26:49.93 Uptime 0 00:17:19

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 00000020 | NULL | COM | 0 | 0 | 0 00:15:25.97 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.18 | 0 | 0 |
| 0000002D | GAUTHIER | CUR | 18 | 389 | 0 00:00:09.60 | 1349 | 347 |

|  | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| NULL | 36 | 36 | 876 | 37 | 36 | 36 | 40 | 103 |
| SYS$SETEF | 202 | 204 | 1086 | 202 | 204 | 258 | 260 | 332 |
| SYS$CLREF | 140 | 141 | 979 | 141 | 140 | 194 | 196 | 264 |
| SYS$READEF | 149 | 151 | 1022 | 150 | 150 | 204 | 208 | 278 |
| SYS$SETIMR | 322 | 328 | 1208 | 326 | 330 | 384 | 386 | 464 |
| SYS$CANTIM | 284 | 290 | 1174 | 288 | 290 | 344 | 348 | 428 |
| SYS$SCHDWK | 316 | 323 | 1696 | 320 | 322 | 378 | 382 | 460 |
| SYS$CANWAK | 286 | 296 | 1156 | 294 | 294 | 350 | 354 | 434 |
| SYS$SETPRI | 221 | 224 | 1608 | 222 | 224 | 279 | 283 | 356 |

VAX/VMS X4.6 on node 20-NOV-1987 09:42:59.67 Uptime 0 01:33:29

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 00000020 | NULL | COM | 0 | 0 | 0 00:15:29.87 | 0 | 0 |
| 00000021 | SWAPPER | HIB | 16 | 0 | 0 00:00:00.18 | 0 | 0 |
| 0000002D | GAUTHIER | CUR | 25 | 493 | 0 01:16:15.26 | 2368 | 349 |

System Service Timings

- Test system B
- base IPL = 0
- SW priority = 25

1,000,000 data points. Test time = 00:27:14.82

VAX/VMS X4.6 on node 11-NOV-1987 14:11:58.63 Uptime 0 04:28:33

| Pid | Process Name | State | Pri | I/O | CPU | Page flts | Ph.Mem |
|-----|-----|-----|-----|-----|-----|-----|-----|

```
00000080   NULL       COM   0       0          0 04:09:18.96   0      0
00000081   SWAPPER    HIB   16      0          0 00:00:00.14   0      0
0000008E   GAUTHIER   CUR   18      1002161    0 00:13:55.16   8777   347
```

|            | MIN | MEAN | MAX | MODE | 95.0% | 99.0% | 99.5% | 99.9% |
|------------|-----|------|-----|------|-------|-------|-------|-------|
| NULL       | 9   | 12   | 355 | 12   | 12    | 12    | 12    | 33    |
| SYS$SETEF  | 70  | 77   | 481 | 77   | 78    | 79    | 97    | 99    |
| SYS$CLREF  | 41  | 43   | 392 | 43   | 44    | 48    | 50    | 66    |
| SYS$READEF | 46  | 50   | 396 | 50   | 50    | 52    | 55    | 74    |
| SYS$SETIMR | 119 | 129  | 539 | 128  | 130   | 150   | 153   | 155   |
| SYS$CANTIM | 98  | 109  | 455 | 109  | 110   | 130   | 131   | 134   |
| SYS$SCHDWK | 114 | 126  | 757 | 126  | 128   | 147   | 148   | 150   |
| SYS$CANWAK | 94  | 109  | 453 | 109  | 110   | 128   | 130   | 133   |
| SYS$SETPRI | 80  | 93   | 495 | 93   | 94    | 94    | 112   | 114   |

VAX/VMS X4.6 on node 11-NOV-1987 14:39:13.45 Uptime 0 04:55:48

| Pid      | Process Name | State | Pri | I/O     | CPU            | Page flts | Ph.Mem |
|----------|--------------|-------|-----|---------|----------------|-----------|--------|
| 00000080 | NULL         | COM   | 0   | 0       | 0 04:09:20.86  | 0         | 0      |
| 00000081 | SWAPPER      | HIB   | 16  | 0       | 0 00:00:00.14  | 0         | 0      |
| 0000008E | GAUTHIER     | CUR   | 25  | 1002254 | 0 00:41:08.05  | 9891      | 356    |

## Contributions

This newsletter is a volunteer activity. There are no compensations given to any author or editor. Articles and letters for publication are encouraged from anyone. They may include helpful hints, inquiries to other users, reports on DECUS and SIG business, summaries of SPRs submitted to Digital, or any information of interest to users of either DATATRIEVE or 4th Generation Languages. However, this newsletter is not a forum for job and/or head hunting, nor is commercialism appropriate.

Machine readable input is highly desirable and machine–to–machine transfer of material is preferred, but most anything legible will be considered for publication.

Please send contributions, or for further information please contact either:

**Editorials and letters to the editor within the Wombat Examiner and 4GL Dispatch are solely the opinion of the author and do not necessarily reflect the views of the Digital Equipment Computer Users Society, Digital Equipment Corporation, or the author's employer. All editorials are marked as "An Editorial"; letters to the editor always begin "Dear Editor".**

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## About the authors...

**Joe H. Gallagher** is the nuclear medicine physicist and radiation safety officer at Research Medical Center in Kansas City, MO. He is also the proprioritor of a small user training and software development company. Dr. Gallagher is the past Chair of the DTR/4GL SIG and the current newsletter editor.

**David M. Foster** is Software Consultant with Sofware Services Engineering at Digital Equipment Corporation. This organization provides corporate software support for customers using Digital's 4GL products. David has done RALLY support, training, and consulting for two years.

# Letters to the Editor

Dear Editor of the Wombat Examiner & 4GL Dispatch:

I am looking for any one with experience using DATATRIEVE and CMS together. We are currently developing a moderate size decision support system using large DATATRIEVE summarization and reporting procedures. Our normal development practices include the use of CMS. Using CMS in the DATATRIEVE development environment is proving less friendly than in a 3rd generation development environment. I can be reached at the GE Lighting, Nela Park, Cleveland, Ohio. My phone is 216-266-8588.

<div align="right">Bill Wood</div>

Dear Editor of the Wombat Examiner & 4GL Dispatch:

An Application Factory (Cortex) Working Group of the DATATRIEVE/4GL SIG is in the process of being formed. Anyone interested should contact:

> Eric S. Dubiner
> duPont
> Information Engineering Associates
> Nemours Building TFD, Suite 9510
> Wilmington, DE 19898
> 302-773-6780 or 302-773-6785

# Dear Wombat Wizard

## Joe H. Gallagher, Research Medical Center, Kansas City, MO.

Dear Wombat Wizard:

I am running a menu-driven application in DATATRIEVE and I would like to disguise the fact that I am using DATATRIEVE. How do I get rid of the DATATRIEVE startup banner? The startup banner looks like:

```
VAX Datatrieve V4.X
DEC Query and Report System
Type HELP for help
```

<div align="right">Signed,<br>The DTR Disguiser</div>

Dear Disguiser:

There are two ways to solve your problem: the first is quick and dirty and the second is really the right way.

First, the cute way. Include in your DTR$STARTUP command file the following:

```
OPEN TT:
```

Then reassign your SYS$OUTPUT to the "bit-bucket" (the null device) and start DATATRIEVE like:

```
$ define/user sys$output nl:
$ run sys$system:dtr32
DTR>
```

This will start DATATRIEVE without the startup banner, but if you live at the DTR> prompt, you'll see the prompt and command twice.

The "right" way to disguise DATATRIEVE is to

1. Copy DTR$LIBRARY:DTRMSGS.MSG to your application's source directory.

2. Edit DTRMSGS to remove the offending message text, or replace it with something else. The startup message is at .BASE 171 SIGNON. You might also want to change some other messages to make them more customized for your application. For example, if your application sometimes generates messages like "Can't take MAX, MIN, or AVERAGE of zero objects" you might change it to be "There aren't any YACHTS to find the average price for!" Just be careful not to change the number or type of substitution directives (the !xx parameters in the messages).

3. Compile and link the message source file. Place the resulting .EXE in your application's run-time directory if you want only your application affected. Or replace DTRMSGS.EXE to change the messages for DATATRIEVE for the whole system. The DATATRIEVE documentation discusses compiling the message file, but the basic idea is this:

```
$ MESSAGE/LIST DTRMSGS
$ LINK/SHAREABLE=my_dir:DTRMSGS DTRMSGS
```

4. In the command file which runs the application, include the assignment of the logical DTRMSGS which points to the new message file.

```
$ DTR :== $DTR32
$ DEFINE/USER DTRMSGS my_dir:DTRMSGS
$ DTR
```

You could also change the startup message in DTR-11 by changing LB:[1,2]QUERY.MSG by editing the MSGS.SEQ file that came on the distribution kit. In any case, this should allow you to disguise the fact that you are using DATATRIEVE by hiding the DATATREIVE startup banner.

<div align="right">
Signed<br>
The Wizard
</div>

---

# Product Status Report

## Lorey B. Kimmel, Associate Newsletter Editor, Baltimore, MD.

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The following is a list of Digital Equipment Corporation software products of interest to the DATATRIEVE/Fourth Generation Language Special Interest Group. Although it is not totally complete, at least you can use this list to have some idea of what products were released when.

| Product | Version | Announce Date | Prerequisite Software |
|---------|---------|---------------|----------------------|
| VAX DATATRIEVE | 4.1 | 11/87 | |
| | 4.0 | 2/87 | |
| | 3.4 | 6/86 | VMS 4.4 |
| | 3.3 | 11/85 | VMS 4.2 |
| | 3.2 | 5/85 | VMS 4.0 |

| Product | Version | Announce Date | Prerequisite Software |
|---|---|---|---|
| DATATRIEVE 11 | 3.2 | 11/87 | |
| | 3.1 | 8/84 | RSTS 9.0 |
| | | | RSX 4.1 |
| | | | RSX+ 2.1 |
| | | | Micro RSX 1.1 |
| | | | VMS 4.0/RSX 1.0 |
| | | | Micro RSTS 1.0 |
| DECreporter | 2.0 | 2/87 | |
| | 1.1 | 4/86 | VMS 4.3 |
| | 1.0 | 11/85 | VMS 4.2 |
| VAX TEAMDATA | 1.2 | 12/87 | VMS/Rdb |
| | 1.1 | 2/87 | |
| VAX RALLY | 1.1 | 1/87 | VMS/Rdb |

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# Spring 1988 DECUS Update

Pat Scopelliti, Associate Newsletter Editor, Corning Glass Works, Corning, NY

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The 1988 Spring DECUS in Cincinnati was another enjoyable, but work filled event. Here are some of the significant events from the symposium.

Don Stern officially took over the office of DTR/4GL SIG Chairperson, replacing Joe Gallagher. Joe was presented with some gifts from the SIG in appreciation of his outstanding term as SIG Chair. The SIG will still have Joe's services; he is taking over the duties of Newsletter Editor.

Some new by-laws were also adopted by the SIG at the Friday afternoon Steering Committee Meeting during the symposium. The new by-laws provide for the office of Vice-Chairperson who will assist the Chair, represent the SIG in the absence of the Chair, and serve as Chairperson in the event of a vacancy in the Chair's office due to resignation or incapacity. The by-laws also formally create the positions of Working Group Chair, Working Group Coordinator and Volunteer Coordinator. These positions were in common use, but were not officially recognized until now.

Working Group Chairs and their Counterparts met as a group for the first time during the symposia. Present were representatives from the Accent-R, PowerHouse, FOCUS, Oracle, SmartStar, and RALLY Working Groups.

On the software front, notable by its absence was the anticipated next version of DATATRIEVE and companion products. However, if one logged in to the cluster in the demonstration hall, CDD+ (Version 4.0) was found tobe running. Obviously, this was a portend of things to come.

The SIG Steering Committee also tentatively scheduled the next Woods meeting for the Boston area on August 18-20.

# Developing Applications in DATATRIEVE; Style and Convention

Joe H. Gallagher, Ph. D., 4GL Solutions, Overland Park, KS 66212

Within the framework of the DATATRIEVE language where keywords and language syntax is specified, a programmer has a great deal of freedom to influence the readability and maintainability of created dictionary objects and DATATRIEVE code. This freedom is mostly vested in the naming of elementary and group fields and dictionary objects (domains, records, tables, procedures, and plots). But this freedom extents to the naming of files and even to the formatting (or non-formatting) of nested compound statements.

## Field Names

As examples of how the naming of elementary and group fields affects the readability and usability of DATATRIEVE, consider three essentially equivalent record definitions. The first record definition is as follows:

```
define record ml-rec using optimize
    01 ml-rec.
        03 ln pic x(18).
        03 fn pic x(12).
        03 mi pic x.
        03 a1 pic x(30).
        03 a2 pic x(30).
        03 ct pic x(15).
        03 st pic x(2).
        03 zp pic 9(5). ;
```

The programmer of this first record definition learned BASIC about 10 years ago when only two character names where allowed (and maybe hasn't learned anything more since). Certainly the programmer is a very poor typist; he can't type more than two characters at a time without making a mistake. While the record definition is technically correct, procedures using this record definition are unlikely to be easily readable.

The second record definition is:

```
define record mailing-list-record using optimize
    01 mailing-list-rec.
        03 mailing-list-last-name        picture x(18).
        03 mailing-list-first-name       picture x(12).
        03 mailing-list-middle-initial   picture x.
        03 mailing-list-address-line1    picture x(30).
        03 mailing-list-address-line2    picture x(30).
        03 mailing-list-city             picture x(15).
        03 mailing-list-state-code       picture x(2).
        03 mailing-list-zip-code         picture 9(5). ;
```

The mother of the programmer of this second record definition was obviously frightened by a COBOL compiler. Procedures written with this record definition are verbose and unwieldy; column headers look peculiar. Joining this domain with others is absolutely clear, but certainly interminably long. It is also clear that the programmer of this record definition does not type at all. If he had to type and use such long field names,they would certainly be shortened.

The third record definitions is:

```
define record mailinglist-record using optimize
   01 mailinglist-rec.
      03 name.
         05 last-name pic x(18).
         05 first-name pic x(12).
         05 middle-init pic x
            valid if middle-init = " " or
              middle-init bt "A" and "Z".
         05 print-name computed by choice of
           middle-init eq " " then first-name ||| last-name
           else first-name ||| middle-init |". "| last-name
           end-choice              edit-string is x(34).
      03 address1 pic x(30).
      03 address2 pic x(30).
      03 city pic x(15).
      03 state-code pic x(2)
         valid if state-code in state-code-table.
      03 zip-code pic 9(5).
      03 print-citystatezip computed by
         city||", "|state-code|"  "|
         format zip-code using 9(5) . ;
```

Now, as you might have guessed, this third record definition was written by a DATATRIEVE programmer. The field names are of modest length, but completely and accurately describe the field. Validation clauses are included on MIDDLE_INIT and STATE_CODE; conveniently formatted composit print buffers, PRINT_NAME and PRINT_CITYSTATEZIP, are included in the record definition.

It is amazing how different in appearance and functionality these three essentially identical records are!

## Domain names

Now consider the naming of domains. Since the name of the domain is the object or "target" of many statement or command verbs, selecting a domain name which is a plural noun creates the most natural syntax in DATATRIEVE. YACHTS, OWNERS, FAMALIES, PETS, and EMPLOYEES are some of the familiar example domains used in DATATRIEVE documentation. Most DATATRIEVE programmers do observe this domain naming convention. There is one notable exception to this convention. Where a plural noun which describes the contents of the domain has a singular equivalent, this equivalent is sometimes used as the domain name and describes the aggregation of "things" in the domain. An example of this would be the one used above, MAILINGLIST. Following the normal naming convention one would used NAMES_AND_ADDRESS rather than MAILINGLIST; but names and address make up the mailing list (i.e, the mailing list is the aggregation of names and address).

Violating the standard naming convention with something like:

```
define domain QUICK using yachts-record on yachts.dat;
```

gives peculiar DATATRIEVE statements like:

```
ready QUICK
        for QUICK with loa gt 12

        . . .
```

Using a part of speech other than a noun (or perhaps a possessive pronoun like MINE, YOURS, OURS, etc) spoils the English-like syntax of DATATRIEVE and certainly gives little indication as to the contents of the domain.

## Record names and top-level group field names

The choice of a record name is probably the least important naming choice that a DATATRIEVE programmer makes. The record name appears only in the domain definition and the record definition; it is used no where else in DATATRIEVE. The only real necessity is that the name be chosen in a non-confusing way. A name such as YACHTS-TABLE would be a poor choice for a record name. My preference for a record name is to use the name of the domain followed by "-RECORD". By appending "-RECORD" it is absolutely clear that it is a record definition.

Unlike the record name, the top-level group field name is frequently used when restructuring a domain and sometimes in print statements. Examples in Digital's documentation usually name the top-level group field as either the domain name or the record name, but the well-known example of YACHTS is an exception where the record name is YACHT and the top-level group field is BOAT. The Application Design Tool (ADT) names both the top-level group field and the record name as the domain name followed by "-REC". I prefer to give the top-level group name a name which is different from both the domain and record name. Like ADT, I prefer to use the domain name followed by "-REC". When initially learning DATATRIEVE (several years ago), I was very confused by the lack of convention in naming domains, records, and (particularly) top-level field name. While the name conventions I have described are certainly not the only possible ones, I have found them to be relatively easy for beginning DATATRIEVE users to grasp.

## Table names

Table names can be any unique name, but I have always found it least confusing if the table name contains the word "TABLE." Such table name as STATE_CODE_TABLE or TITLE_OF_ADDRESS_CODE_TABLE provide clear indication of the contents of the table and an almost natural syntax when used in a print or validation statement such as

```
print state-code via state-code-table
```

or

```
03 state-code pic x(2)  valid if state-code in state-code-table.
```

## Hierarchy names

Many DATATRIEVE programmers bitten with the "relational bug" try to avoid using hierarchies such as views. But the data structure of lists or one master record with a variable number of detail records occurs very often in many kinds of applications. The syntax of accessing fields that are in lists is certainly not a trivial as accessing non-hierarchical fields. However, some (if not most) of the difficulties are resolved by choosing appropriate names for the lists and list elements. Consider the following record definition for a domain named PATIENTS:

```
define record PATIENTS-RECORD using optimize
01 patients-rec.
   03 name pic . . .
      . . .
   03 number_of_diagnoses usage is byte
      valid if number_of_diagnoses between 0 and 9.
   03 diagnoses occurs 0 to 9 times depending on
      number_of_diagnoses.
      05 diagnosis pic x(n).
         . . .
   ;
```

By naming the list as a plural noun (just as we did with domains) and the elements of the list as singular nouns, we create the most natural DATATRIEVE syntax for referring to heirarchies. In this case, a record selection expression and a print statement would look like:

```
find patients with any diagnoses with
    diagnosis = "flat feet"

print name, all diagnosis of diagnoses of current
```

When it comes to naming the list in a view, I depart from my own convention.  Rather that use a record definition like:

```
DEFINE DOMAIN SAILBOATS OF YACHTS, OWNERS BY
01 SAILBOAT OCCURS FOR YACHTS.
   03 BOAT FROM YACHTS.
   03 SKIPPERS OCCURS FOR OWNERS WITH TYPE EQ BOAT.TYPE.
      05 NAME FROM OWNERS.
;
```

My preference for the view definition would be:

```
DEFINE DOMAIN SAILBOATS OF YACHTS, OWNERS BY
01 SAILBOAT-REC OCCURS FOR YACHTS.
   03 BOAT FROM YACHTS.
   03 OWNERS-R OCCURS FOR OWNERS WITH TYPE EQ BOAT.TYPE.
      05 NAME FROM OWNERS.
;
```

I prefer a list name like OWNERS–R to SKIPPERS since it is not completely clear that SKIPPERS is a list of OWNERS.

## Formatting

Formatting procedures and record definitions improved the readability of the code or definitions.  I have a strong preference that procedures should be indented four spaces for each level on nesting.  Such code would look something like:

```
. . .
for foo begin
    if ( . . . ) then begin
        statements
        end else begin
        more statements
        end
    end
```

If the number of levels of nesting is very large, then two spaces of indention for each level should be more practical.

For record definitions, I preference three spaces of indention.  A record definition would then look like:

```
define record foo-record using optimize
01 foo-rec.
   03 first-foo-field . . . .  .
   03 second-foo-field . . . .  .
   03 group-field.
      05 first-group-field . . .
         first clause on field
         second clause on field
         last clause on field.
   . . .
;
```

By using three space of indention, one space between the level number and the field specification, and indenting the clauses under the field specification, the resulting record definition is readable and maintainable.

I am not suggesting that the style and conventions which I have described here are the only way or even the best way of writing code and definitions in DATATRIEVE. It is a way that works for me; you should find what works best for you.

---

# RECORD–LEVEL SECURITY IN A VAX RALLY APPLICATION

DAVID M. FOSTER, Digital Equipment Corporation, Continental Blvd. (MKO2-1/J12), Merrimack NH, 03054

## Abstract:

VAX RALLY is a fourth generation application development system from Digital Equipment Corporation. This article is part of a series that describes special techniques that customers have found useful when developing applications with RALLY. This article explains a security scheme for protecting data from unauthorized users.

## Introduction

This article describes a method for providing one kind of security for data accessed through a RALLY application. This method handles situations where several users need access to certain records in a relation, but must be denied access to other records in that relation. We will use a simple personnel application as an example. The goal is to allow each manager to read and update records for his/her own department(s), but not for other departments. We do not assume that each manager is in charge of only one department.

In the past, we have recommended using Rdb/VMS views to solve this problem. However, when multiple views refer to a single Rdb relation, the RALLY application must contain a DSD and a form/report for each view. There must also be a mechanism to direct each user to the correct form/report and block him/her from the others. For even a small number of users, this clutters the application. It also makes maintenance almost impossible. When the responsibilities of a manager change, for instance, you may have to create new views, DSDs, and Form/Reports (F/Rs) or change old ones. When one form/report changes, all the form/ reports that perform the same function on other views must also be changed.

The solution proposed here requires only a single DSD. In summary, the mechanism is as follows:

1. Create the DSD.

2. Write an external link program to obtain the username from the system and assign it to a global variable. Execute this program at application startup.

3. Create a relation in the database with two fields:

   o  The first field is the name of a user. The username here should match a username on the system.

   o  The second field is the identifying key of a record that user is allowed to access.

   We call this the security relation.

4. Use the security relation as a "filter" to determine which records are retrieved for **each** type of form/report in the application:

  o For query mode forms, create a subset list of values (LOVs). The LOV retrieves only the records from the security relation where the username matches the current username. It displays the corresponding key values. You use this LOV to validate the key field in the query screen. That is, when users want to query the database, the LOV limits them to only the key values for records they are allowed to see.

You must also make this key field required on queries. A technique for doing this is described later.

  o For update mode forms, use the security relation as the parent group and perform a query initially, using the current username. The result is a child group containing only the records the user is allowed to see. Disallow query on this screen. Note that in a simple application, you might not need an update screen. Users can update through the query form.

  o The insert mode form can use a subset LOV, as in the query form. That is, a user can enter a new record only if the record's key field value is linked with that user's name in the security relation.

The result is a kind of Access Control List internal to the RALLY application. However, with traditional ACLs or passwords, users receive an error message when they try to access forbidden data. With this solution, users never see error messages and are never told explicitly that there are records in the database that they are not allowed to see.

The example that follows shows how this solution might be implemented. The sample application uses a modified version of the EMPLOYEES relation in the PERSONNEL database, which is shipped with each Rdb/VMS kit. EMPLOYEES has been changed to include a DEPARTMENT_ CODE field, to avoid too many levels of joining. The values for DEPARTMENT_CODE were copied over from JOB_HISTORY, where the department ID for each employee's current job is stored. The idea is to allow each manager to see only the employees in his/her department.

We use the username to retrieve a subset of the security relation. Then we use the records retrieved from the security relation to retrieve the corresponding subset of employee records. The usernamed FOSTER sees only the records marked with asterisks.

```
Username              Security Relation        Employees relation
--------              -----------------        ------------------

FOSTER    --+         Name      Dept.          Id      Name      Dept.
            |         ------    -----          -----   -------   -----
          +---> *FOSTER    ELEL  ---+--->  *00015   Jones     ELEL
          +---> *FOSTER    SALE  ---+--->  *00017   Gore      ELEL
                 MCKIM     SPMG     +--->  *00019   Jackson   SALE
                 MCKIM     ADVD     +--->  *00034   Duke      SALE
                                           00047   Bush      SPMG
                                           00076   Hart      ADVD
                                           00089   Dole      ADVD
```

In this example, the user's name is not a field in the relation that the user wants to see. If it were, the problem would be much simpler. This case will be discussed later.

Each section of this article describes one of the steps in implementing the technique.

## Creating the SECURITY Relation, Form/Reports, and DSDs

This section describes how to create the SECURITY relation, along with the basic DSDs and form/reports for the application.

1. Create a new relation called SECURITY in the database. This relation has two fields:

   USERNAME    -- Datatype text, size 12

   DEPARTMENT_CODE -- Datatype text, size 4

2. Create three DSDs:

   o Create two DSDs for the SECURITY relation:

     - SECURITY_READ_DSD, marked for READ ONLY access

     - SECURITY_WRITE_DSD, marked for SHARED WRITE access

   o Create a DSD for the EMPLOYEES relation, EMPLOYEES_DSD. Make this a SHARED WRITE DSD.

     In this DSD, place the key field, DEPARTMENT_ CODE, first in the order of the fields. This will be important later. Do this by entering "Y" the field that asks if you want to edit the list of fields in the DSD. Delete DEPARTMENT_ CODE from its original position and use 'insert record before' to place it first.

3. Using the Builder Tools, create three form/reports:

   o EMPLOYEES_FR--a single-group form/report to be used for insert and query. The G1 group of this form/report points to the EMPLOYEES_DSD.

   o EMPLOYEES_UPDATE_FR--a two-group form/report:

     - The parent group is based on SECURITY_READ_DSD. Mark this group DOES NOT REPEAT.

     - The child group is based on EMPLOYEES_DSD. Mark this group labels ABOVE, repeats DOWN.

     - The two groups are linked by the DEPARTMENT_CODE field.

   o SECURITY_FR--a single group form/report pointing to the SECURITY_WRITE_DSD. A privileged user (database administrator or senior manager) uses this form/report to update the security information.

4. Use the Editing Environment to edit the USERNAME field in the EMPLOYEES_UPDATE_FR. Mark the USERNAME field non- displayed (path 7 7 1 under Edit a Field's Attributes). That is, the user sees the parent key, DEPARTMENT_CODE, but not his or her own name. At the same time, edit the image for the EMPLOYEES_UPDATE_FR to eliminate the label for the USER-NAME field.

5. Define the main menu for the application using the Menu Builder:

   | Form/Report | Mode |
   |------------------------|--------|
   | EMPLOYEES_FR | INSERT |
   | EMPLOYEES_UPDATE_FR | QUERY |
   | EMPLOYEES_FR | QUERY |
   | SECURITY_FR | BUD |

Note that the update form/report should be marked to be brought up in QUERY mode. You will execute a query initially, before the user sees the data, so you need to begin in QUERY mode. When the user sees the form, it will be in BUD mode.

Eventually, you should remove SECURITY_FR from the menu and hide it under another menu/task or in another application file, protected from end users.

## Subsetting Data using a Subset List of Values

At this point, you have a skeleton for the application, but every user can see all the records in the EMPLOYEES relation. Now you must add a mechanism to each form/report to create a subset of the data.

1. Define a global variable USERNAME to hold the current user name from the system. You will assign a value to this variable using an external link.

2. Create a list of values group in the SECURITY_FR called SECURITY_LOV_GRP.

3. Create two fields in SECURITY_FR:

    o DEPT--based on the SECURITY_READ_DSD field, SECURITY_DEPARTMENT_CODE. Name of parent group is SECURITY_LOV_GRP.

    o USERNAME--MAKE THIS A COPY FIELD. That is, choose 5 from the Create a Form/Report Field menu. The value for the field is copied from the global variable that contains the current username. This value is used to trigger an implicit query on the LOV's data source. When the LOV appears, only the records from the SECURITY relation that match the current username will be included in the LOV. If you are unfamiliar with subset LOV (sometimes called dependent LOV) note the following attributes carefully:

    ```
    Name of parent group?           SECURITY_LOV_GRP

    Store field in data source?     Y  [VERY IMPORTANT!]

    Name of DSD                     SECURITY_READ_DSD

    Name of DSD field               SECURITY_USERNAME

    Source for copy field:
            Field Type              GLOBAL VARIABLE
            Field Name              USERNAME
    ```

    When asked to mark the field's location, make the field non-display.

    o IMPORTANT: Under 7 – Edit additional attributes, choose 4 – Query by example attributes. This form lists operations NOT to perform in QUERY mode. Remove the X from the first attribute, Compute/Copy. (That is, "DO fill in computed fields and copy fields when the form is in QUERY mode".) Because the subset LOV mechanism involves a query, you must allow a copy field to be filled in when the form/re port is in query mode.

4. You have created the LOV that will bring up a subset of the SECURITY relation. That is, if the current username is FOSTER, the LOV will include the department codes for the departments that FOSTER manages. You want to attach this LOV to the DEPARTMENT_CODE field on the EMPLOYEES_FR. When you do, it will appear on both insert and query. On insert, it will force the manager to enter new employees only in the departments that s/he manages. On query, it will force the manager to enter one of his/her departments as a one of the conditions for the query.

5. Edit the EMPLOYEES_FR and the field G1_EMPLOYEES_DEPARTMENT_CODE. Under 7 – Additional attributes, choose 3 – List of values attributes. On the list of values attributes form, mark two fields:

o   Display list of values when cursor enters field

o   Validate this field against the list of values

For the source of the List of values, specify:

```
Type of List of Values:         FIELD
List of Values context:         SECURITY_FR
List of Values field name:      DEPT
```

*NOTE*

*Do not choose to have the cursor enter the list of values automatically. This will trigger a bug that will leave a hole in your security scheme.*

## Subsetting Data using a Before–Form/Report Query

Now you have created the subset LOV and attached it to the DEPARTMENT_CODE field in the EMPLOY-EES_FR, which is used for both insert and query. Now you want to perform a similar subsetting operation on the update form, EMPLOYEES_UPDATE_FR. This is much simpler:

1. Edit the form/report packet associated with EMPLOYEES_UPDATE_FR to disallow queries. Although this form/report is marked to be opened in query mode, it will be in BUD mode when you user sees it.

    o   Take menu path 5 2 8 2.

    o   The name of this packet will be EMPLOYEES_UPDATE_FR_QUERY_PKT.

    o   Choose 6 – Additional options.

    o   Mark X in the Query not allowed field. This does not disallow queries, but rather prevents the user from issuing the 'set query' command.

2. Write an ADL procedure, CALL_EMPLOYEE_FORM, that looks like this:

```
EMPLOYEES_UPDATE_FR.G1_SECURITY_USERNAME USERNAME; CALL_CMD(QUERY);
```

Remember, the parent group of this form report is based on the SECURITY relation. This procedure assigns the current username, stored in the global variable USERNAME to the G1_SECU-RITY_USERNAME field in the parent group and then performs a query. As a result, the only records on the screen are those whose department code value is associated with the current user in the SECURITY relation. If user FOSTER manages two departments, ELEL and SALE, FOS-TER will see two parent records and their associated children, the employees in the ELEL and SALE departments. Because the parent group is derived from the SECURITY_READ_DSD, which is a READ ONLY DSD, and because the key field in a child group is marked non–displayed, FOSTER cannot change the department code value.

3. Now attach this ADL procedure to the application by associating it with the form/report packet that calls the EMPLOYEES_UDATE_FR. Menu path 5 2 8 2 lets you edit a call packet. Choose 2 on the packet editing menu – before/after events:

```
Before form/report:
    call type: CALL
    item type: ADL PROCEDURE
    item name: CALL_EMPLOYEE_FORM
```

As mentioned in the beginning, if the user's name is a field in the relation, the problem is simpler. No security relation is necessary. For example, assume that the employee relation has a field containing the manager's name. To subset the relation, you simply get the current username and use it to drive a query that brings up the form's data, as described in this section. On insert, you can fill in the field automatically from the current username; on update, you can prevent the cursor from entering the field. This will guarantee that a user cannot enter an unauthorized username.

## Assigning the username to a Global Variable

At this point, you have implemented two methods for subsetting the data. Both use a global variable that contains the current username. Now you must assign a value to that global variable by getting the user name from the system. To do this, you need to define an external link.

1. First, write a program that calls LIB$GETJPI to get the current username. A sample COBOL program that does this is included at the end of this article. Compile and link the program using the linker options file, as described in the ADL User's Guide.

2. Create an external link USERNAME_LINK. For the number of this link, use the same number that you encoded in your program. In the sample program, the variable called "action" is the number of the link.

3. Define a parameter for the link, as follows:

```
Parameter number:  1
Parameter type: GLOBAL VARIABLE
Context name:
Field name:  USERNAME

Offset in parameter packet:  0

Read or Write designation:  WRITE ONLY
Format type:  STRING
Length of string:  12
```

4. Now you have written the program that gets the username, and you have created the external link within the application. The final step is to attach the link to the application by calling it from an action site. Because you will need the global variable from the beginning of the session, attach the link as a before menu action on the main menu (menu path 5 1 2 [MAIN_MENU] 4).

```
$ RALLY RUN APPLICATION
        |
        V
CALL USERNAME_LINK    [USERNAME := FOSTER]
        |
        V
CALL MAIN_MENU
```

When FOSTER runs the application, the USERNAME global variable is FOSTER from the beginning, and FOSTER is the value that subsets the DEPARTMENT records and the List of Values.

## Final Touches

One final problem: when you execute a query in RALLY with no fields filled in, RALLY retrieves all the records called for by the DSD. Assume the user has chosen the query form. When s/he presses the FIND key, all the records from the relation appear, including those that are supposed to be hidden from this user. Making the

DEPARTMENT_CODE field a required field does not solve the problem; RALLY does not require the field to be input on a query screen, even if you have marked it as required. This is a problem only if you intend to allow interactive queries.

To solve this problem, you must do two things:

1. Make the field first on the input order of the form/report, so the cursor must visit the field. That is why you put the DEPARTMENT_CODE field first in the DSD. If you had not, you would have to change the input order of the form/report to make the DEPARTMENT_CODE field first.

2. Write an ADL routine to make this field required. Attach the ADL routine as a after-field action on G1_EMPLOYEES_DEPARTMENT_CODE. Now the user must enter a value for DEPART-MENT_CODE, even when doing queries. Furthermore, the valid DEPARTMENT_CODE values are always available in the LOV, and the LOV is used for validation. Because the LOV is the user's own subset, the user can never choose an unauthorized DEPARTMENT_CODE.

    The routine might look like this:

    ```
    {Test to see if the field is empty.}
    IF (EMPLOYEES_FR.G1_EMPLOYEES_DEPARTMENT_CODE = '')
      THEN
        BEGIN
          ERROR(2);
          CALL_CMD(0);
          {This is an undocumented trick.  SET_FAILURE()
           does not work here; it lets the query execute.}
        END;
    ```

The final step is to hide the update form for the SECURITY relation under a privileged task, or in a separate application. The RALLY documentation explains how to do this.

The same principle can be extended to protect all data in the database that can be related in a child/parent relationship to the SECURITY relation. A further extension would be to give users access to the security relation. For example, imagine an application that tracks research and development projects. When a manager adds a new project, s/he specifies a project number. At this point, a form/report might be called that allows the manager to identify the users who can access information about that project. This form/report would include a List of Values showing the usernames in the security relation (reduced to unique values). When the manager selects one of the names, RALLY stores a new record for that name and the project ID number. Now the person named by the manager has access to the project information. New users of the system must be entered in the security relation by a privileged user.

Thie COBOL code for the external link begins on the next page.

```
IDENTIFICATION DIVISION.
PROGRAM-ID. RALLY_EXTERNAL.
AUTHOR.   David M. Foster.
*
*  This program retrieves the USERNAME using the RTL routine
*  LIB$GETJPI (a jacket routine to the $GETJPI system service).
*  Because $GETJPI always returned a 12-byte string padded with
*  blanks, we use the UNSTRING statement to strip the blanks and
*  get the count of meaningful bytes.  This is returned to RALLY
*  in the user_name_len variable.
*
*  To compile and link:
*
*  $ COBOL RALLY_EXTERNAL
*  $ LINK/SHARE RALLY_EXTERNAL.OBJ, RALLY_EXTERNAL.OPT/OPT
*
*  The .OPT file looks like this:
*
*  cluster=foo
*  collect=foo,$code
*  universal=rally_external
*  gsmatch=always,0,6
*  identification="rally external"
*
DATA DIVISION.



WORKING-STORAGE SECTION.
01   dummy_argument          pic s9(9)   comp   value 0.
01   ret_status              pic s9(9)   comp   value 1.
01   display_return_status   pic ZZZZZ9.
01   getjpi_ret_status       pic s9(9)   comp   value 1.
01   item_code               pic s9(4)   comp value 0.
01   jpi$_username           pic s9(9)   comp
          value external jpi$_username.
01   process_id              pic 9(9)    comp value 0.
01   process_name            pic x(12).
01   out_value               pic s9(9)   comp   value 0.
01   out_string              pic x(12).
01   out_len                 pic s9(4)   comp   value 0.
01   display_out_len         pic ZZZZ9.


LINKAGE SECTION.
01 arg_block.
   02 action                 pic s9(4)   comp.
   02 error_code             pic s9(4)   comp.
   02 help_number            pic s9(4)   comp.
   02 failure_flag           pic s9(4)   comp.
   02 param_area             pic x(1016).
   02 ext_link_1_parms   redefines param_area.
     03  in_value.
```

```
      04  user_name_len     pic 9(4)  comp.
      04  user_name         pic X(12).

PROCEDURE DIVISION using arg_block giving ret_status.
0.
   evaluate action
     when 1
     move jpi$_username to item_code
     call "lib$getjpi" using
       by reference item_code
       by value 0
       by value 0
       by value 0
       by descriptor out_string
       by reference out_len
       giving getjpi_ret_status
     if getjpi_ret_status is failure
     then
       move getjpi_ret_status to display_return_status
       display display_return_status
         exit program
     end-if
     unstring out_string
       delimited by SPACE
       into user_name
       count in user_name_len
   end-evaluate.
   exit program.
```
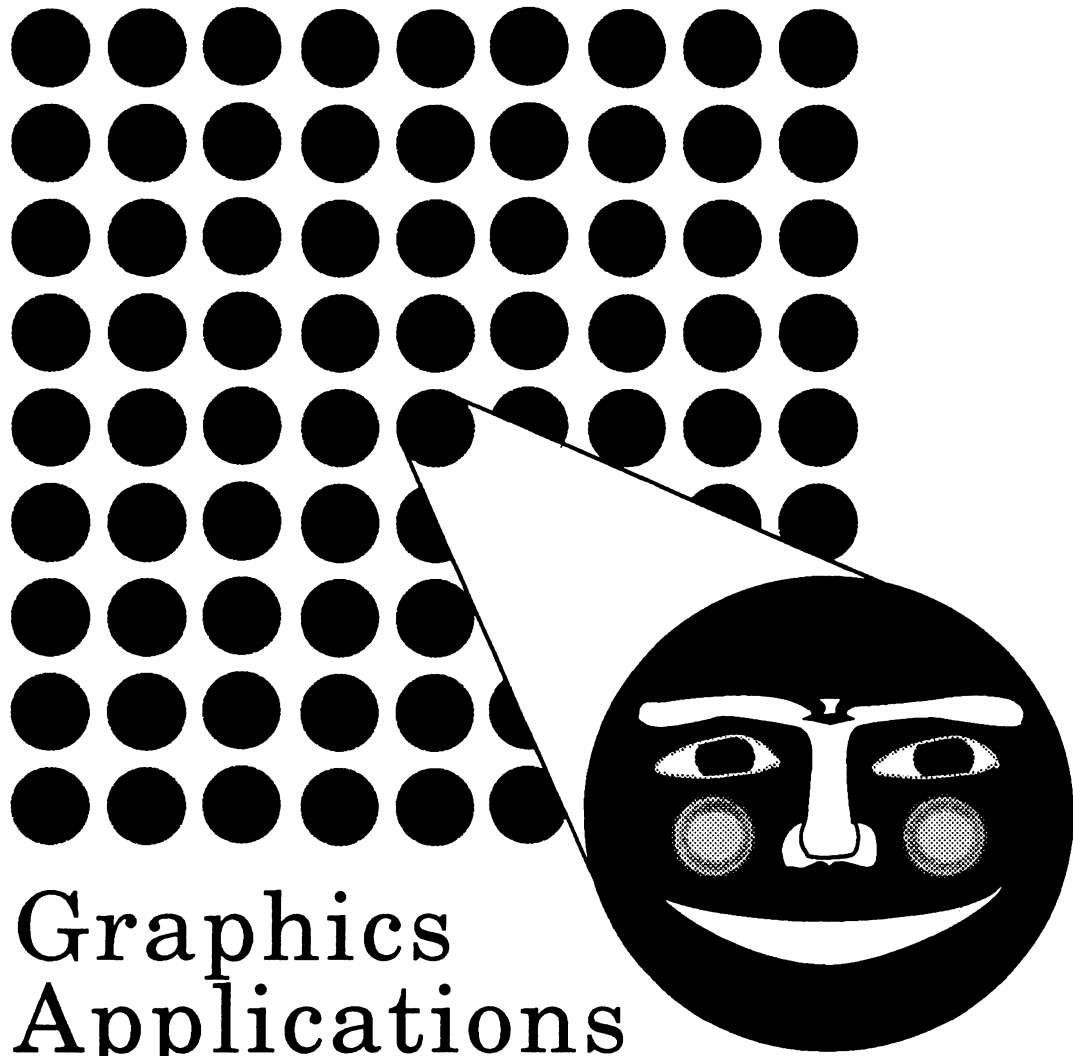
# Graphics
# Applications
# Special Interest
# Group
# Newsletter

# table of contents

# submissions

Articles, copies of viewgraphs, tips and tricks, and graphics output are all welcome submissions for the Graphics Applications Special Interest Group (GAPSIG) newsletter. There are many ways to make submissions:

1) Send in a tape. Tapes can be 1600 or 6250 BPI density. Your editor uses the Mass-11 word processing system from Microsystems Engineering Corporation, so submissions in this format are okay. Otherwise, provide straight ASCII documents. Please place any charts into a separate file. And, please enclose a letter with your address and any notes and description for format that you desire.

2) Send in paper. Hey, your editor can type and chew gum at the same time, so don't be afraid to send in hard-copy. And, if all you have is notes, FINE! Send them in!!! We have many folks who can take the ideas and flesh them out with English language extensions. Questions are desirable, too; DECUS should, in the opinion of your humble editor, be a place to trade information, so questions count for as much as answers here.

3) Mail to HAYS on DCS. If you have a DCS account and the article is all textual, mail it to HAYS on the DCS system.

Your editor's address appears in the **from the editor** section, so mail yours in today!
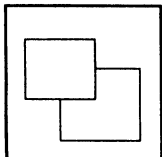
# from the editor

This editorial is solely the opinion of the author and does not necessarily reflect the views of DECUS, Digital Equipment Corporation, or KMS Fusion, Inc.

**Bob Hays**
KMS Fusion, Inc.
3621 South State Rd.
Ann Arbor, MI 48106

Well, I'm spoiled and spent for another few months; just got back from the Cincinnati Symposium two days ago. While the Symposium had its normal selection of no-shows and canceled sessions, all in all it appeared everyone enjoyed themselves.

Those of you reading this are probably used to changes, so this issue should sail right along. You'll notice the new warning (not yet certified by the surgeon general) about editorial opinion. This helps protect all concerned and notifies you, the reader, that I could be in "flame" vs. "analysis and reason" mode (personally, I like the warning).

The newsletter will be in two-up portrait mode from now on, based on long discussions with Frank Borger, our valiant Newsletter Committee Chairman. Frank deserves all the applause and credit available for taking on a job where you try to saddle and watch twenty-two or so different editors that may all be at least a little crazy (nuts?). Now that I've had a chance to meet some of the other editors, I'm no longer amazed at how great the newsletters are; these editors are a dedicated lot!

The Spring Symposium also saw the first-ever Newsletter Booth, where members came to find out about the SIG Newsletter. This method of providing members with information seems successful, and I would expect it to continue in Anaheim this fall.

There are many new issues to consider about the newsletters and DECUS in general raised in Cincinnati, but for now I want to rest and think about all the events from the last meetings. Therefore, this issue displays slides from a talk on the X windows standard delivered by Dana Laursen and Bob Toole from Tektronix, Inc. Keep your eyes on this space in the future for more information on X and DECwindows, not to mention tutorials on GKS and some image processing language comparisons.

# X, version 10

**Dana Laursen, Tektronix, Inc.**
**Bob Toole, Tektronix, Inc.**

## X presentations (version 10)

| | |
|---|---|
| Dana Laursen | X overview |
| Bob Toole | X programming |
| Dana Laursen | X toolkit |



Graphics Workstation Division
Tektronix, Inc.

## Interactive software architecture

hardware

operating system

| programmer | window system |
| | user interface tools |

user interface mgm't system

| user | windowed system utilities |
| | applications |
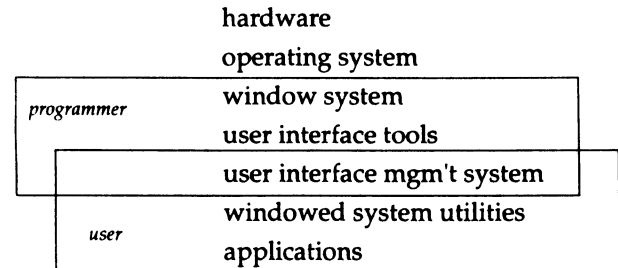
## Event types

mouse button or keyboard key
mouse motion
border crossing
window damage
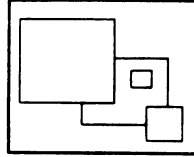
## Event processing

queue per process
preemptive selection
asynchronous aspects
simple and complex
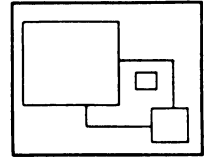
## Redisplay on damage events

server repaints background
client redraws window contents
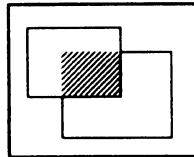
## Window hierarchy

event propogation
siblings are ordered (clipping)
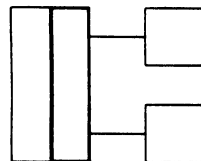parents clip children
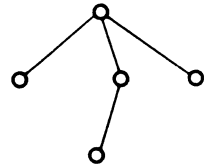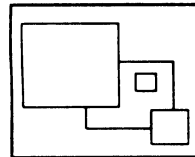
## Resources

server and client resources
databases
allocation and activation
deferred bindings
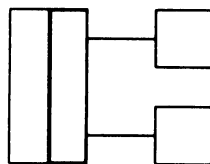
## Raster graphics

window-relative pixel coordinates
no display lists or transformations
graphics to display only
device-dependent representations
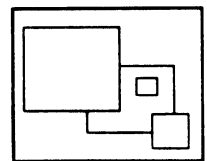
# References

Peter Hack    **The advantages of X,**
Computer Graphics World, 8-87

David Rosenthal   **Toward a more focused view,**
Unix Review, 6-86

Robert Scheifler,   **The X window system,**
Jim Gettys       ACM Trans. on Graphics, 4-86

# X capabilities (version 10)

variety of displays
device independent applications
network transparency
display of multiple applications
output to partially visible windows
low-level raster graphics
programmable window hierarchy
multiple interfaces (policy-free)
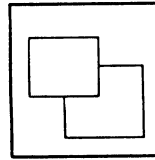
# Architecture

operating system and hardware
server and clients
terminal emulator and applications
window manager
libraries
client utilities
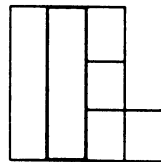
# X server

device-independent graphics
byte stream protocol
local and remote clients
requires OS driver, sockets, select()
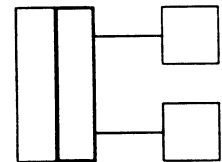
# Libraries

Toolkit        user interface

Xlib          windows
events
graphics
resources
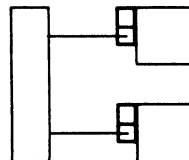
# X utilities

window managers
terminal emulator
image and printer filters
bitmap editor
font displayer
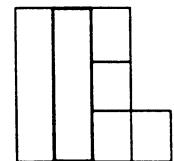
## Configurability

X defaults
window manager
command line options
key bindings
color names
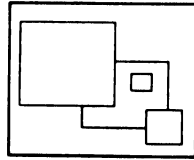
## User interface

xterm and uwm
qualified mouse buttons
multiple toolkits
chaotic ergonomic nightmare
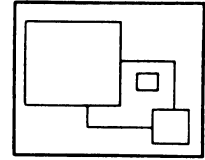
## Widgets

presentation & interaction = policy
widgets are windows
simple or composite
encapsulation
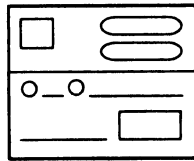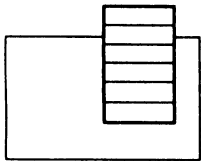
## Intrinsics

standard user interface primitives
interaction within & among widgets
input and dispatch
geometry management
context management
resource management
translation management
error handling
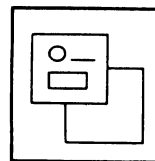
## X capabilities (version 10)

variety of displays
device independent applications
network transparency
display of multiple applications
output to partially visible windows
low-level raster graphics
programmable window hierarchy
multiple interfaces (policy-free)
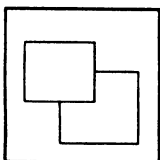
## X version 11

corrects many deficiencies
additional functionality
more complex
comparable performance at best
incompatible
standardization, frozen protocol
user interface toolkit
3-d graphics and other extensions

# THE

# DeVIAS

# LETTER

THE DeVIAS Letter
All the News That Fits, we print
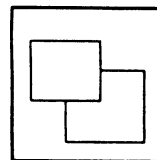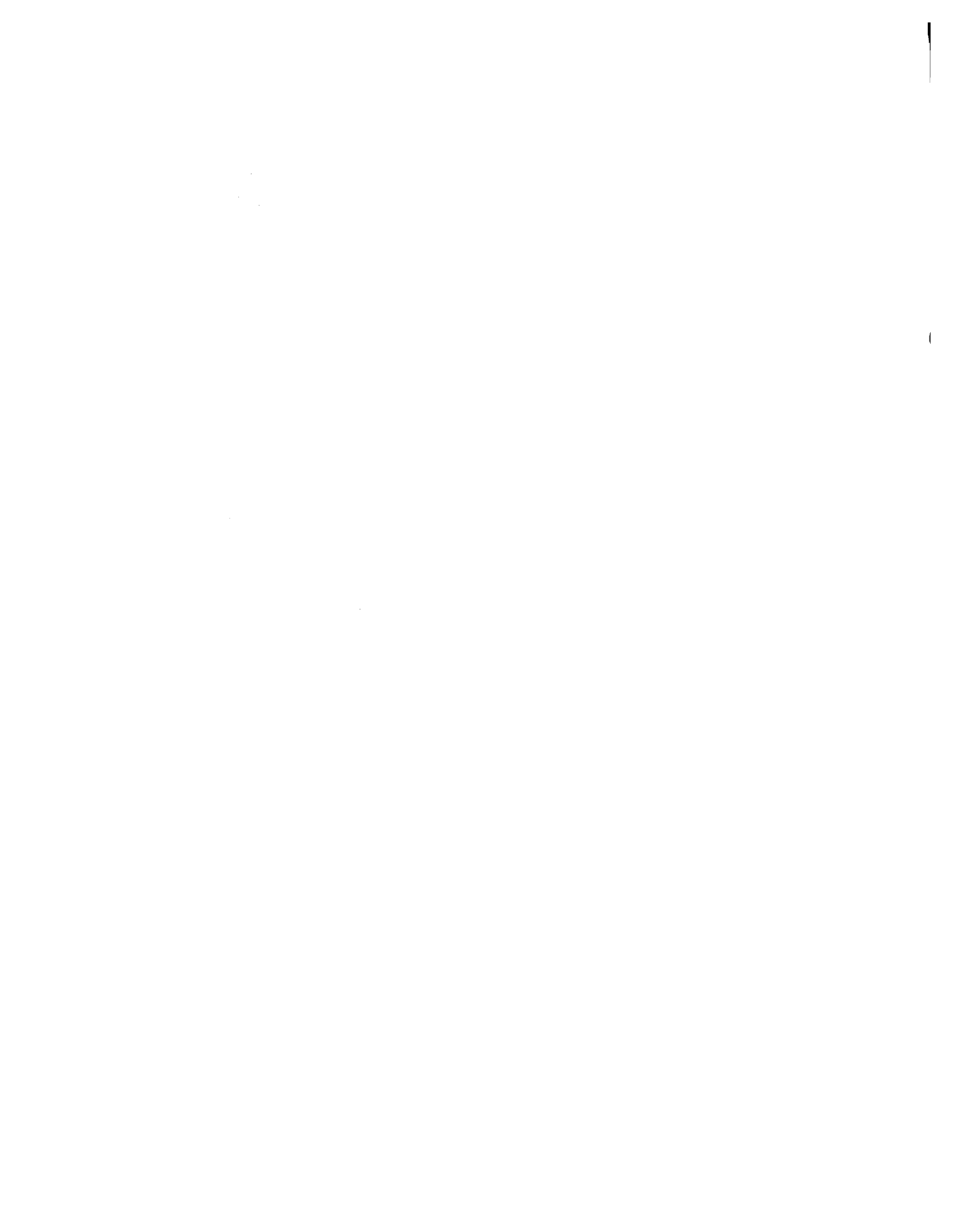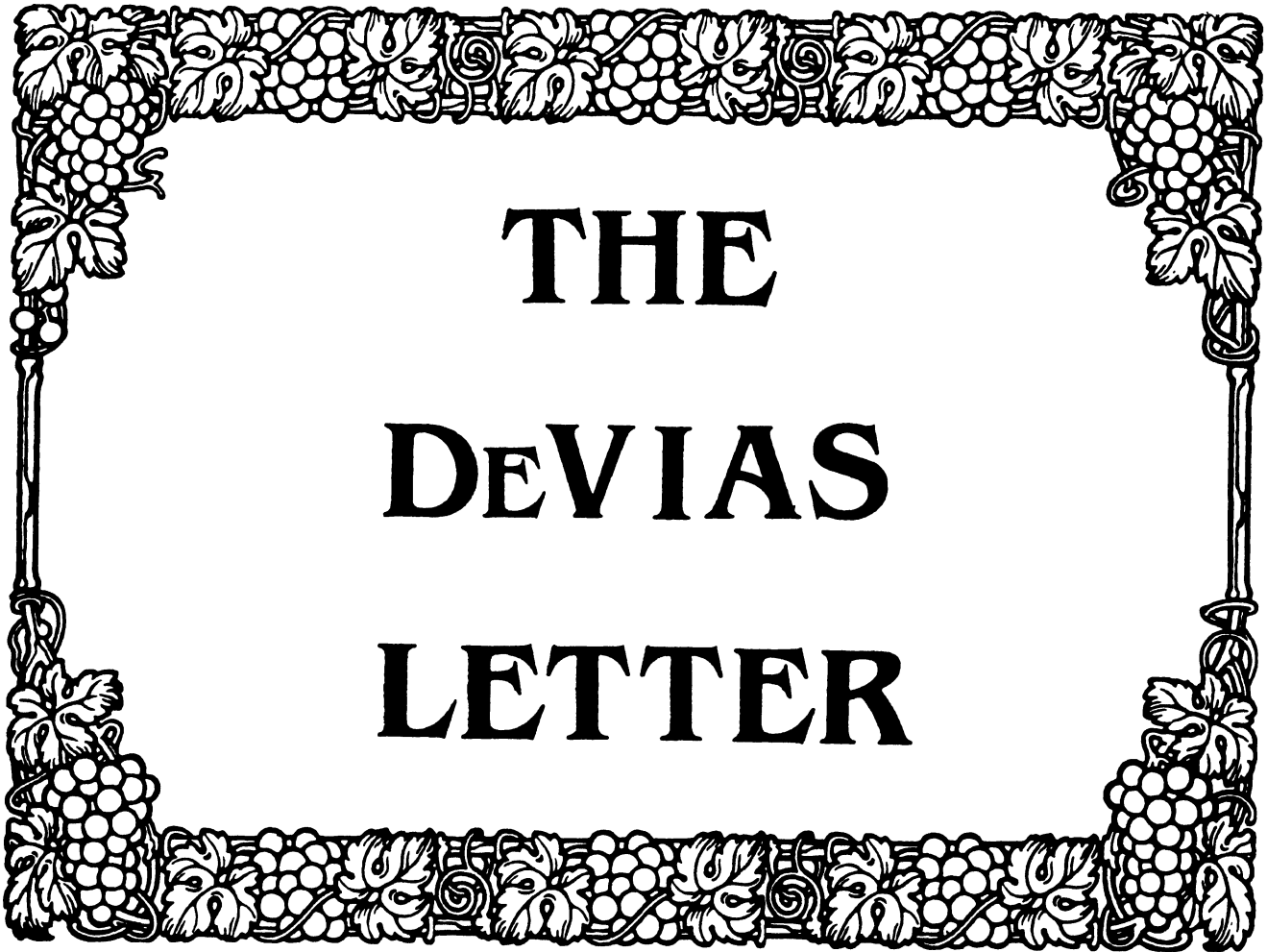
IAS   Mr Spot   —Network— Mr Vax VMS   Rover

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## FROM THE EDITOR'S KEYBOARD

The following editorial is solely the opinion of the author, and does not represent the views of DECUS or of Digital Equipment Corp. Responses to the Editor's remarks are heartily welcomed.

After a full week (as in 7 days straight) at DECUS, your humble servant would like nothing better than to be able to relax for a week or two, but as usual, no luck, a deadline fast approaches.

The major event that occurred at spring DECUS was that the IAS SIG has merged back into RSX, where it was once begat, some 5 years ago. The impact of continual user migration was especially felt at this symposium, which happened to be scheduled in conflict with the major military users' meeting, so that all our military users, and Nancyfaye Autenzio, our DEC counterpart, were not at Cincinnati.

Since this is also a small anniversary for me, having completed 2 years as your editor, it is with very mixed feelings that I compile this newsletter. Please excuse me if a few emotions leak out into this issue.

## IN THIS ISSUE

This issue will be devoted to the DeVIAS LUG/SIG, its past, present and future. We will look back at the history of DeVIAS, we will report on the present condition, and look forward to the future.

## CONTRIBUTION GUIDLINES

Contributions of articles, SPR's, letters, etc. will be accepted in any form, (including notes jotted on gravy-stained tablecloths.) They will be more happily accepted in one of the following formats:

Paper submissions will always be accepted. Publishing may be delayed until the editor gets some time at the keyboard to convert them to our current format. We can accept submissions by FAX. Call for info.

Contributions may be submitted on tape, (800,1600, 3200 or 6250 BPI,) DEC-tape II, and DecMate or RT11 floppies. We're not fussy, we'll even accept paper tape or cards. We can read any IAS/RSX, RT11, VMS format. Any media sent to us will be promptly returned.

We have 2400/1200 baud modems on our IAS system and our VAX, with KERMIT for electronic submission. Give the editor a call @ (312)-791-8075 (preferably later in the day,) to obtain access info, etc. You can also submit over DCS, by sending mail to BORGER.

If you have a problem you would like to submit to the Devias Demon, send it to the Editor at the following address. Answers to problems from members (or anyone) should also be sent to the Editor at:

Frank R. Borger
Michael Reese Medical Center
Department of Radiation Therapy
Lake Shore Drive at 31st St
Chicago, IL 60616

## TEN YEARS AGO THIS MONTH

Since the June and July issues of the RSX/IAS multi-tasker were combined in 1978, and were reported on last issue, no special section will appear this issue. Much of this issue will be nostalgia anyway.

## RSX AND IAS SIGS MERGER NEWS

At the Spring DECUS, the IAS and RSX SIG steering committees voted to merge into the RSX/IAS SIG. The proposal was submitted to the SIG council, was accepted, and went into effect at the close of the Symposia of Friday, May 20th, 1988.

Members of the IAS SIG steering committee met with the RSX steering committee, and are fitting in well (often in their equivalent positions,) in the combined SIG. Although some details and shuffling need to be worked out, the merger is going remarkably smooth.

For the present, it has been agreed to let the RSX/IAS SIG continue to publish both the Multi-Tasker and the DeVIAS letter, continuing a tradition that was maintained for two years when the DeVIAS letter and the Multi-Tasker were "bundled" into one package before the combined Newsletters came into being.

```
┌─────────────────────────┐
│    WHO'S WHO IN         │
│   THE DEVIAS LUG        │
│   AND THE IAS SIG       │
└─────────────────────────┘
```

In the following lists, we are attempting to list major members of DeVIAS and IAS, both past and present. We can't mention all the people who contributed their time and energy, so if we left someone out, please accept our apologies.

LUG/SIG CHAIRMEN:

Bob Curley
University of Pennsylvania
Inception thru spring 1986

John Roman
McDonnell Douglas
Spring 1986 thru Fall 1986

Mike Robitaille
Grumman - CTEC, Inc.
Fall 1986 thru Fall 1987

Alan Frisbie
Flying Disk Systems
Fall 1987 thru Spring 1988

NEWSLETTER EDITORS:

Stephen Keith
American College of Radiology
Inception thru June 81

Bob Curley
University of Pennsylvania
July 1981 thru September 1981

Mark Wiederspahn
University of Texas
October 1981 thru May 1982

John W. Drummond
Ontario Hydro
June 1982 thru January 1985

John Roman
McDonnell Douglas
February 1985 thru June 1986

Frank R. Borger
July 1986 thru .....

SYMPOSIA COORDINATORS:

John Jenkinson
Mostek Corporation
Fall 1983 thru Spring 1984

Ron Fussell
AFIS
Fall 1984 thru Spring 1984

Skip Stanfield
USAF
Fall 1985 thru Spring 1986

Mike Robitaille
Grumman - CTEC, Inc.
Fall 1986

Lynda Roenicke
Naval Ocean Systems Center
Spring 1987 thru Spring 1988

LIBRARY COORDINATORS:

Mike Robitaille
Grumman - CTEC, Inc.
August 1983 thru June 1986

Bob Schultz
INCO inc.
July 1986 thru September 1987

Ted Smith
University of Pennsylvania
October 1987 thru ...

DEC COUNTERPARTS & GURUS:
(Listed alphabetically)

William Auperlee

Nancyfaye Autenzio

Wayne Blair

Norm Booth

John Brady

Carol Chorlton

William Ferry

Mike Garcia

Cliff Harvey

Arnold Hay

Tim Leisman

Bob Mack

Alison Nylander

Mike Reilly

Ricardo Robles

Chuck Turley

OTHER STEERING COMMITTEE MEMBERS:

Kathleen Anderson (Whims)

Ray French (RSX Liason)

George R. Wells (Membership)

Thomas O'Keefe (CommComm rep)

Doug Reno (Member at large)

Kerry Wyckoff (Member at large)

Ken Guralnik (Whims, etc)


NEWSLETTER CONTRIBUTORS:

William F. Cael
P. L Evron
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Ed Herold
System Three Inc.
Paul Clayton
Stephen Keith
Tim Mahaney
Lawrence DCragg
Scott Wells
Bob Stodola
Darrell Thomas
Otto Titze
Frank Anderson
Ray French
Mark Wiedershahn
Frank Borger
John Hayes
Gary Cramblitt
J. G. Kromme
Alex Yovanovich
Bob Curley
Terry Bossert
Richard Evans
J. G. Kromme
Greg Milne
Jim Field
Sed Mir
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George Wells
Jeff Goudenough
Sandy Russell
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Mary Roberson
John Guidi
Bob Turkelson
William Wood
Dan Stebbins
J. L. C. Plasman
Jim Underwood
Anne K. Foley
Michael Scott Ward
Bob Short
John Roman
Mike Robitaille
Allison Nylander
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Arnold Hay
Carol Chorlton
Mike Garcia
Bob Molle
Terry Medlin
Ed Herold
Jim McGlinchy
Ellen Buffington
Ron Fussell
Klaus Centmayer
Dave Brown
Jim Williams
Jeff Mackenzie
Otto Lowas
Robert A. Ehle
Rebecca Marks
Wayne A. Blair

Erik Von Der Blauen
Linda Roenicke
Mike Robitaille
Steve LeFevre
Anon

## THE LORE OF IAS

In putting together this issue, it was hard to decide just what should go into it. There were several short submissions, such as Bob Curleys famous equation

$$\frac{2(NaCl\ aq)}{(C-C-C-C-C-C-C)}$$

What is that, why its Saline, Saline, over the Seven C's. (Bob warned readers that he would keep up that stuff until readers submitted to the newsletter. It worked!)

Also included is our page of IAS buttons and badges. I remember the furor when Stephen Keith brought the orange DeVIAS ribbons to a symposia, and DECUS said they weren't standard DECUS ribbons. Later Jim Hopp brought the famous BLACK IAS ribbons, to advertise the demise of IAS. Fortunately, IAS is still with us.

One of the most notable entries in the life of the SIG was the introduction of the "Sports Page" and the "Society Page" to the newsletter. Copies of these are included.

Another memorable issue contained the Dear IAS Enthusiast letter reporting on the marriage of Mike and Alison. It to is included here.

Of course, there is much more that should have been included, but couldn't be, due to space limitations. I hope this retrospective brings joy to all.

## THE PROGRAM OF THE MONTH CLUB

For this issue, we have included the famous "The Forty Seven Test"

## FIND THE HIDDEN FEATURE CONTEST

And, to close out this issue, every system has undocumented features, but IAS actually had a contest to find 3 new, undocumented features. Unfortunately, they were so well hidden, that no-one ever found them.

IAS SIG
STEERING COMMITTEE

I ADORE
IAS
SHARING

DEVIAS

I'M CRAZY
for
IAS
digital

1 1 1
1 0 1
1 2 3
digital

IAS
digital

IAS
digital

The First Great Interinstitutional MTREK Challenge Dinner was held at The Institute for Cancer Research at 19:00 on September 3, 1981. The challengers, representing Republic Management Systems, were the infamous Paul Clayton and his cronies, Bob Falcione and Rich Kolbe. The home team was represented by Bill Cael, Bob Rudkin, Bob Stodola, and Bill Wood, playing three ships in rotation.

The MTREK Challenge Dinner, played at highly irregular intervals, consists of two grueling hours of heated battle. The winners are then dined amid elegant surroundings, during which the match and other subjects of common interest are discussed, all at the expense of the losers. (The winners are privileged to make the official report of the results.)

The first hour, played under the ICR standard MTREK rules in universe number 645, resulted in the following scores:

| Institution | Ship number | Score | Total |
|-------------|-------------|-------|-------|
| RMS | 1 | -9067 | |
| RMS | 2 | -8077 | |
| RMS | 3 | 12695 | |
| RMS | | | -4449 |
| | | | |
| ICR | 6 | 34578 | |
| ICR | 7 | 54493 | |
| ICR | 8 | 38552 | |
| ICR | | | ***** |

The second hour, played with RMS's hotly debated modifications -- with which the ICR team had no experience -- in universe number 311, gave somewhat more balanced results:

| Institution | Ship number | Score | Total |
|-------------|-------------|-------|-------|
| RMS | 1 | 18555 | |
| RMS | 2 | 4223 | |
| RMS | 3 | 12376 | |
| RMS | | | 35154 |
| | | | |
| ICR | 6 | 9491 | |
| ICR | 7 | 19506 | |
| ICR | 8 | 43187 | |
| ICR | | | 72184 |

Afterwards, the ICR team was treated to a delightful meal at The Toll House Inn of Huntingdon Valley. The challengers, humbled by the devastating strategies of the ICR team, desired a rematch on the home field after a suitable period of practice.

SCENES AT THE SUITE



(New Orleans) Present at the fifth anniversary celebration
of the DeVIAS LUG/SIG at the New Orleans symposium were
three of the founders.  Above, from left to right, are
Tim Mahaney of the Naval Air Propulsion Center, Trenton,
New Jersey; Bob Stodola of the Institute for Cancer
Research, Philadelphia, Pennsylvania; and Bob Curley, of
the University of Pennsylvania, Philadelphia, Pennsylvania.



Also present, above, were three representatives of Digital
Equipment Corporation.  From left, they are Mike Reilly,
IAS Development Manager; Norm Booth, IAS Product Manager;
and Alison Nylander, IAS Product Engineer.
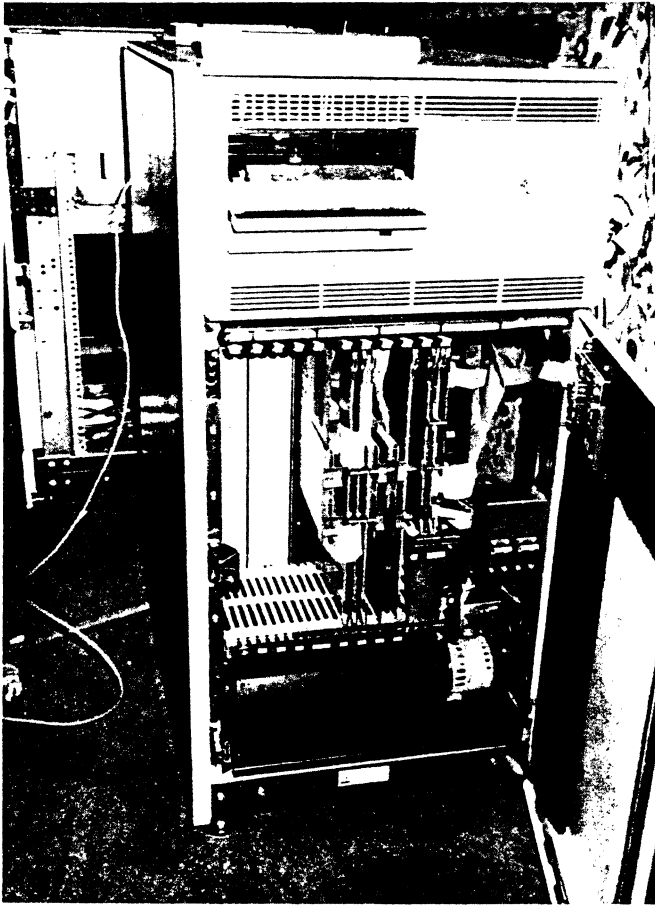
The guest of honor was an 11/84
running IAS Release 3.2 B (left).
The 11/84 was resplendent with
RC25, TU80, and matching VT240's.



Two IAS wizards present were Frank Borger (left)
and Bob Schuldt.

Division of Medical Physics
Department of Radiation Therapy
University of Pennsylvania
P.O. Box 7806
Philadelphia, Pennsylvania 19101
23 August 1987

Dear IAS Enthusiast,

It has been a long time since I last contributed to the
DeVIAS Letter. An important event has caused me to break my
silence. Since there is no official "Society Page" in our news-
letter (There was one occurrence of the "Sports Page" reporting
a massive M-Trek game!) this mechanism must suffice.

## WEDDING IN MASSACHUSETTS

Our friends Alison Nylander and Michael Reilly were married 8
August 1987 in Massachusetts in a clearing in back of the
couples' new house, encircled by woods. Michael and Alison
were, for those of you new to the IAS world, important software
engineers in IAS Development for a long time - from the time
when IAS Development was moved from Reading, England to Massa-
chusetts until about a year ago. They have contributed hugely
to IAS, but much of that is obscured by the "namelessness" of
operating systems - especially when you don't have the sources!
They have contributed mightily to DECUS, and the IAS SIG in
particular, through uncounted symposia sessions explaining the
technical aspects of IAS and Pre-Symposia Seminars when the IAS
SIG starting back when the SIG "really needed the money". Most
recently, they presented a seminar on C in Nashville.

I confess a lack of ability to describe, as is usual in this
circumstance, the gowns of the bride and bride's maids. I
can say that Alison was beautiful in a long white gown, but
that doesn't do her justice. I can also say that there was
some comment about Michael Reilly and Bob Curley both in
tuxedos! No blue jeans evident.

There were important visitors, from an IAS point of view: Bob
Mack, Bill Aupperlee, Wayne Blair and Richardo Robles. They are
all still involved with IAS. Yes, there was some shop talk,
but not much.

I am sure that I spoke for all of us in the IAS SIG when I
wished them well. The ceremony was simple and beautifully
done, causing me to remember when Barbara and I took our vows
"long ago". There was leaning white birch tree forcing the
recollection of Robert Frost's poem. I tend to get maudlin
when I return to New England, especially when invited to share
such a profound occasion.

# The Fourty Seven Test

This program performs a (perhaps infinite) test of memory. Although written in MACRO assembler (or just straight binary) it also manages to satisfy most of the stringent and rigorous criteria developed by the proponents of strictured programming. This is because the program consists (initially and at any point during its (perhaps infinite) execution, of a single instruction.

Further, the program is fully portable between all PDP-11's (and perhaps the VAX in compatibility mode). Apart from testing memory it also tests the program counter to the limit (literally) by running it backwards (Thus, it is not only written Top Down but also executes Top Down). The program does not require an operating system of any kind (and will quickly do away with any such if properly run.) The program is completely position independent.

TERMINOLOGY - The algorithm describing the Fourty Seven Test will be described in a new conceptual programming language called Ida (named after Charles Babbages dog). Ida is very much like 'Programmers Vernacular' - that is - poorly spelled English with a lot of gestures, aah's and um's.

PHILOSOPHY - Before beginning with the introduction to the Forty Seven Test I would like to present a bit of background behind its philosophy - but space does not permit. Since The Fourty Seven Test does not involve any data the discussion of Data Types can be elided. In a like vein, the 47 test does not involve any arithmetic or (explicit) transfer instructions. Therefore, Ida not only forbids the use of the GOTO instruction, it also disallows the CALL. In fact Ida only permits a single command: the Fourty Seven command (See footnote 4.7 of section 4.1.7.3.3.5.)

THE PROGRAM - A last minute hitch in ironing out some ambiguities in Ida forces us to revert to MACRO in presenting this program - but, as will be shown in the forthcoming seven volume Rationale, it is possible, using a context frozen grammar, to proove a unique one-to-one mapping between MACRO and Ida.

```
        .title   the fourty seven test
        .enabl   lc

;ASSEMBLY INSTRUCTIONS :
;
;EXECUTE/LIST/CROSSREFERENCE FOURTY
;
;DATA DEFINITION
;The Fourty Seven test requires only one piece of DATA, and that is
;the START_ADDRESS. This is defined in the following definition and
;is the default setting for a 28k (word) machine.
STARTADDRESS=160000-2 ;Change this to your liking

;The comment line below (;—) must begin with a semicolon. Otherwise
;MACRO will interpret it as a sequence of 66. unary minus signs.
;Since MACRO pushs a couple of words on the stack per unary operator,
;it very quickly runs out of stack space and crashs.

;————————————————————————————————
;       MAIN PROGRAM
;————————————————————————————————
;+
;PROGRAM ENTRY POINT
;
;The program is automatically started here by the concluding .END START
;sequence. RT-11 arrives here with the registers in a mess and no idea
;about what we're about to do.
;-
```

```
.=-1000+STARTADDRESS              ;define the start address

;+
;CODE SECTION
;
;The Code for the Fourty Seven Test is impure and should not be run in
;read-only memory (ROM, PROM or EPROM). Further, its use on machines
;with separate Instruction and Data spaces is unpredictable. To ehance
;portability prospects with future PDP-11 Assembler's we have chosen not
;to use mnemonics (since the information in the MACRO manual is all
;subject to change without notice), but rather, to return to direct
;octal-coded binary. Here follows the Fourty Seven Instruction :

.word    014747            ;The Fourty Seven Instruction

;PROGRAM CONCLUSION
;The rest of program has been left to your imagination - firstly, since
;it would take up valuable space in the MINI-tasker, and secondly since
;this program hasn't got a chance of running under RT-11 anyway.

.end     startaddress
```

As the concluding comment in the program points out, this program wont run. RT-11 produces a 'Not enough memory' message after an attempt to run this 112 block program. Therefore, we will have to dump Ida and do the job by hand. Thus:

(1) Stop the computer
(2) Load the number 014747 in the highest memory address
(3) Start the computer at the same address as above

This can be accomplished on an 28k LSI-11 with :

```
<break>
@157776/ xxxxxx 014747 [return]
@157776G
```

THE OUTCOME - The question is what will happen? Make a guess now. If you're a novice - then just try to guess what memory will look like after the test. If you know that, try to work out the terminating conditions of the program. Then come back to the next paragraph.

THE FOURTY SEVEN TEST consists of the instruction 'MOV -(PC),-(PC)'. This instruction effectively replicates itself in memory backwards. Thus it fills memory with the pattern 014747. It terminates by trapping when it goes below location zero. What happens then depends on the PDP-11 model involved. (Most LSI processors end up with alternating halts at 000000 and 177777 (which doesn't really exist). This instruction drives a PDP-11 backwards! But it also accomplishs a basic memory test.

THE FUTURE - I will consider submitting the 47 test (and Ida) to the DECUS library after it has been fully field tested (this usually takes, around five years). If enough user support emerges it may be worthwhile starting a 47-SIG. If you want a copy of the Fourty Seven Test then send a stamped addressed RL02 Disk to the following address:

Ian Hammond - HAMMOND-software - Am Felborn 22 - D-34 Goettingen - West Germany.

# A N N O U N C I N G

## FIND THE HIDDEN FEATURE CONTEST

The IAS Development Team has included certain undocumented features in Update B. These are currently for internal Digital use and may be supported in future updates. Three features have been identified by the IAS Development Team. This is your chance to show what you know about the system. Find the hidden features and win a prize.

### Rules

1. To redeem your prize you must indicate:

   o  what the feature is,
   o  what it does,
   o  where it is,
   o  and how to use it.

2. Judges are the Digital IAS Developers and their decision is final.
3. You must describe one of the three known features.
4. No Digital employees or their families may enter.
5. The entries must be received by the DeVIAS Letter Editor by December 1, 1985.
6. Winners will be announced and awards presented at the Fall, 1985 DECUS Symposium at Anaheim.
7. The awards have not been determined at press time. However, they will undoubtedly be truly outstanding.
8. Void where prohibited, regulated, or taxed.

So hurry now! Send all entries to:

      John Roman
      McDonnell Douglas Corporation
      Department N436
      600 McDonnell Blvd.
      Hazelwood, Missouri 63042

# GLOBAL ACCESS

DECUS
MUMPS
SIG

MUMPS
SIG
DECUS
US CHAPTER
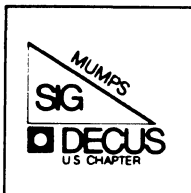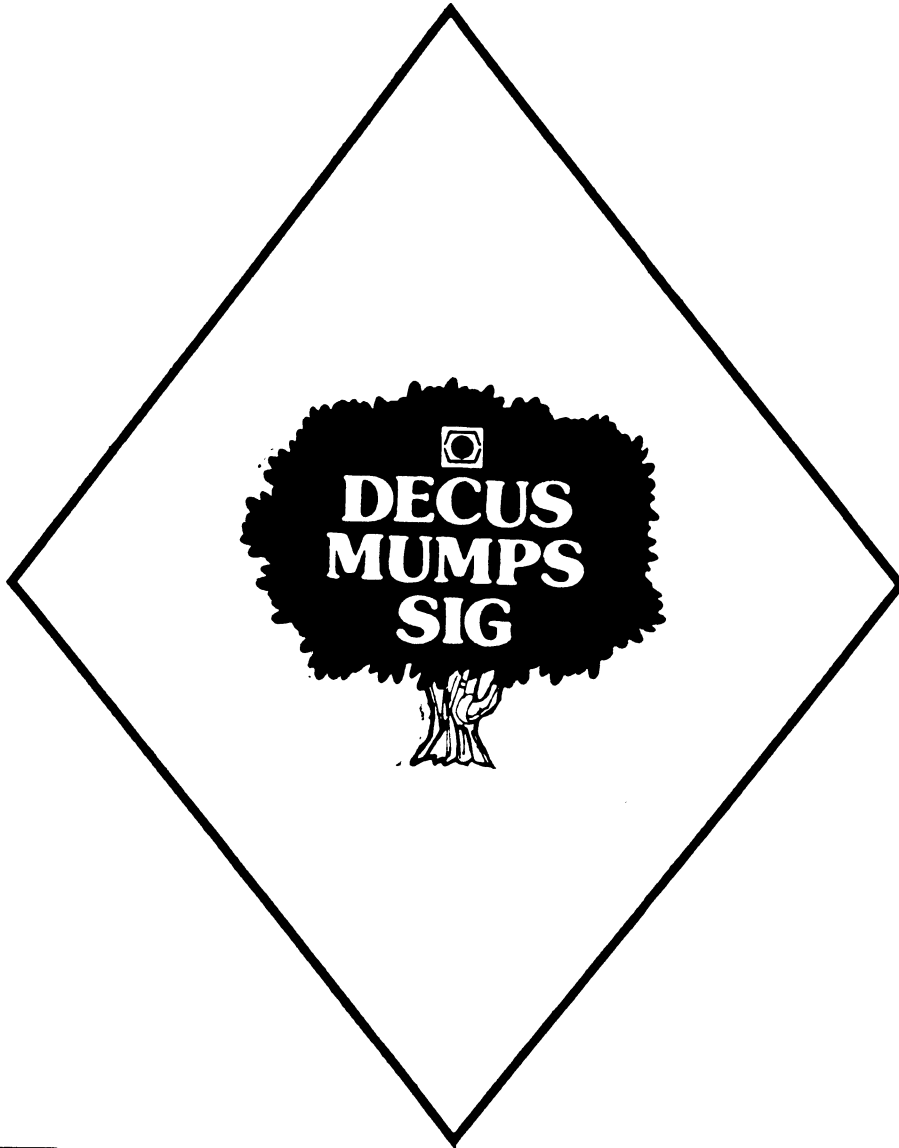
*"If you don't want it in the paper, don't let it happen."*

DECUS

**MUMPS means you never have to say you're sorting.**

## $VIEW(Editor)

I have just returned from a week of sun and fun in beautiful downtown Cincinnati, and so, it's time for Your Editor's Biggest Winners and Losers from the Spring Symposium. First the jeers:

Biggest Loser--The food service Gestapo who fanatically filled up all the tables (when there was plenty of extra room) and who dictated precisely where each attendee should sit. Mother please, I'd rather do it myself.

Also Ran--The four block walking distance to SIG suites in the Omni and Westin hotels. Quite a commute to go unwind after sessions.

Now the cheers:

Honorable Mention--Cincinnati itself. It's as close to the Northeast as any Symposium is going to get until Boston in the mid 90's, and the Convention Center fit the Symposium just about perfectly.

First Prize--Mitch Brown, the On-Site Scheduler. I schedule a pair of Birds-of-a-Feather sessions at every Symposium, and this time Mitch and I did it face to face while looking at his room availability worksheet. That sure beats shuffling forms back and forth; we really must make it a permanent fixture.

## $DATA

KERMIT-M is the MUMPS implementation of the popular Kermit file transfer program. Just about every computer you could name, from CP/M and MS-DOS machines to VAXes and some mainframes, has a Kermit.

The MUMPS Kermit was developed by David Rossiter at the New York State College of Veterinary Medicine in Intersystems M/11 MUMPS. I received Kermit-M from Columbia University, which is the clearing house for Kermit. I made the modifications to get it running under Digital DSM-11 and Micronetics MSM-PC. I have recently received the latest release from NYSCVM, and I will be creating a truly system independent version, which will include my enhancements.

I have found Kermit-M to be an extremely useful tool for maintaining multiple sites. We distribute patches to 25 sites via modem. This version of Kermit-M will talk to every other version of Kermit, and it supports server mode operations.

Kermit-M will be available through the standard channels and will be in the DECUS Library this summer. I don't think it will make the catalogue deadline, but if you call, you can order it sometime in July or August.

*--Contributed by Michael McIntyre*

*[Mike is the MUMPS Sig Library Representative. He expects to present a session on MUMPS programs in the DECUS Library during the Fall Symposium, and he actively solicits your submissions. You can contact him at the address shown in the SIC pages, at the back of every issue.--Ed.]*


## $HOROLOG

| | |
|---|---|
| July 22 | Submission deadline for September newsletter |
| October 17-21 | Fall '88 Symposium; Anaheim, CA |
| February ?13-17? | Canadian '89 Symposium; Vancouver, BC |
| May 8-12 | Spring '89 Symposium; Atlanta, GA |

## $ORDER("Mission")

A common document around DECUS committees is a "Statement of Mission and Goals;" a formal description of where you are going and what you must to do along the way. Use of *mission* in this context has always annoyed me. First off, mission has a set of historical connotations ("Your mission, Jim, should you choose to accept it...") that are simultaneously militaristic and frivolous. Second, and more important, mission comes from the Latin word *mittere,* which means *to send,* and carries the concept of "sent by higher authority." In DECUS, the reality of the situation is precisely the opposite: SMGs are used to convey information (usually, how a given unit intends to serve its constituency) up, rather than commands down. Accordingly, I set out to find a better word. The first that came to mind was *mandate.* Unfortunately, that still carries too much "higher authority." Serious research turned up many others, including *charge, office, duty,* and even *task.* (I don't even want think about the ramifications of that one!) However, none of them really hit the mark. So, I guess I will just have to admit failure on this one, and mission will get to stay where it is, right next to goals.


## $NEXT

As election time draws near, the September issue will contain coverage of how MUMPS will be used during the 1988 Democratic National Convention.
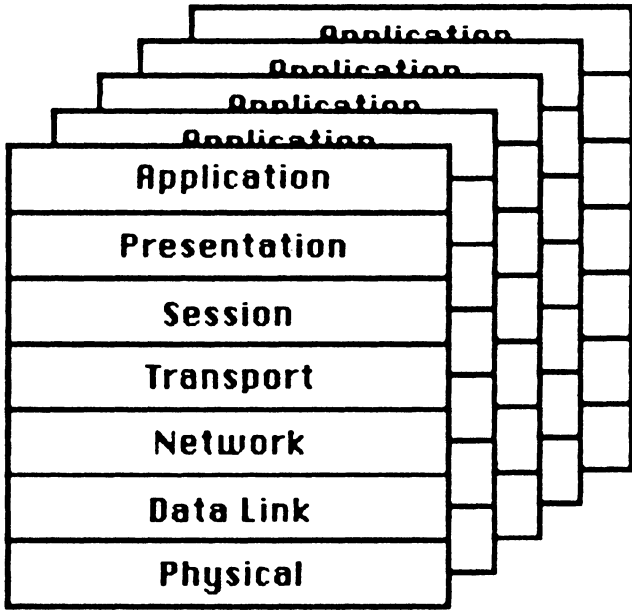
    $NEXT($ORDER)="Speak to"


## $RANDOM

"Money isn't everything; it can't buy poverty." --Joe E. Lewis

# NETwords

## The NETWORKS SIG Newsletter

| Application |
|---|
| Presentation |
| Session |
| Transport |
| Network |
| Data Link |
| Physical |

FROM THE EDITOR'S HAMMOCK
----------------------------

Another symposium has come and gone...
And I'm still digesting material gethered from Anaheim!
It seems the more I read, the more I realize I don't know!

This month I've found a good article to curl up in the
hammock with.   Splash some iced tea on a glass full of
ice cubes,  turn the sprinkler on low,  and relax.
Here is a clear and informative description how one
group at Westinghouse networked their Workstations.
The paper was presented at Fall, 1987 Symposium in
Anaheim, California, and published in the Proceedings.
I like the pictures.

Enjoy!

                              Judi Mandl
                              University of Ct. Health Center
                              Financial Management Info Systems
                              263 Farmington Ave.
                              Farmington, Ct. 06032

# Basic Networking for Office Automation

Robert Gary Mauler
and
Valerie Cabral Mauler


Westinghouse Electric Corporation
Baltimore, Maryland

**ABSTRACT**

**This paper will take the mystery out of networking Workstations for non technical people. Based on experience gained in networking over 250 PC and VAX Workstations, guidelines and recommendations will be made to help simplify the planning, installation, and check out of an Ethernet LAN. The goal of this paper is to help the poor soul who is told to "...automate our office and network our PC's while you are at it."**

After working with Ethernet since about 1982, and attending a lot of DECUS Networking sessions, we are surprised to find that there are still a lot of people out there that either don't understand or feel comfortable when designing or working with a network system based on Ethernet. The goal of this paper is to help the not so technical person become more familiar with Ethernet wiring systems, thus realizing that there is no magic going on. If you know and follow a few basic rules you too can successfully network your office.

Networking an office should be approached in an organized manner. Hopefully the network you install will be around for a long time, and so it is important to build a solid foundation upon which you can add. The first thing that needs to be done is what you are doing right now, that is learning about the topic and planning your network. Secondly, you must either install the network hardware yourself or at least supervise the installation to make sure it is installed per your design (you don't need surprises later on when you find out that an installer took a short cut). Thirdly, after installation of the networking hardware, the cabling and other active devices must be checked out to verify proper operation. And finally, you need to implement a network management system both to provide diagnostics capability as well as to provide statistics for planning future growth of the network.

This paper will deal exclusively with the subject of office networking using Ethernet. That is, we will discuss how to install a network in an office environment using Ethernet protocol and RG-58 50 ohm cable between the desktop workstation and the wiring closet. One of the first confusing things that you may encounter is the many terms used by vendors to say what we just said. You will hear terms such as ThinWire, ThinEthernet, Cheapernet, and even 10BASE2 used to describe Ethernet using RG-58 cable. In order to be consistent in this paper we will use the term "ThinWire", which is Digital's terminology. Another way of looking at ThinWire is to compare it to "Thick Ethernet" or the standard Ethernet RG-225 trunk cable. The main difference is that ThinWire is smaller in diameter, much easier to pull, and cheaper (Cheapernet). The size is the major factor that makes it practical to wire Ethernet right to the workstation on the office worker's desk. The other major difference between the two cabling schemes is the difference in cable connectors. ThinWire uses what is called a "BNC" type connector while the RG-225 cable uses an "N" style connector. BNC connectors are pictured in Figure 1. The BNC connector is what you might call a "twist & lock" since the connector is pushed on and then rotated 90 degrees to make the connection. On the other hand the "N" style of connector is threaded on. When it is necessary to connect a computer to the network there is a difference again based on the type of connectors. Typically

when using the RG-225 cable a piercing type of tap is made on the cable and then a device called a transceiver is clamped onto the cable. In the case of ThinWire, BNC type connectors are used. A BNC "T" connector allows two segments to be connected together and also provides a male connector to connect to the workstation's onboard transceiver.

Once you understand the terminology, it time to start learning the rules of networking. One source of these rules is a document from Digital Equipment Corp. entitled "Networks and Communications Buyer's Guide". Although it is an excellent source of information be aware that it only represents networking products from Digital. The same will be true of almost any document that you receive from a vendor. You need to shop around to get the big picture; there's more than one way to network a building.

When it comes to office networking there are only a few rules that you need to remember. First, the total length of a ThinWire segment is 185 meters or 606 feet maximum per segment. Although that may not seem like a whole lot, in actual practice it is more than enough. The second rule is that there can be no more that 30 nodes or devices maximum per segment. The 30 node rule also implies that there should be a maximum of 60

connectors per segment (30 nodes X 2 connectors per node). Here again, with the use of multi-port repeaters, as you will see later on, your network will probably never reach the maximum of 30 nodes on a segment. Third, ThinWire segments are to be connected together with BNC "T" connectors which are then directly attached to the workstation. In other words there should NOT be a length of cable between the workstation and the BNC "T" connector. In addition, if a workstation is removed permanently then it is preferable to replace the BNC "T" connector with a BNC barrel connector. The fourth rule is that both ends of an Ethernet segment of wire must be terminated with a 50 ohm terminator. In addition, one end and only one end should be grounded. All other connectors along the segment should be isolated from ground by using the plastic shields provided with your network interface card. In the case where you are using a multi-port repeater from Digital Equipment Corporation (DEMPR), then the requirements for 50 ohm termination and a ground on one end of the segment are provided for by the DEMPR. One last note before we leave these rules is that Ethernet is a multi-drop configuration and not a ring type wiring scheme. Therefore you must insure that you don't form a ring when wiring with ThinWire.
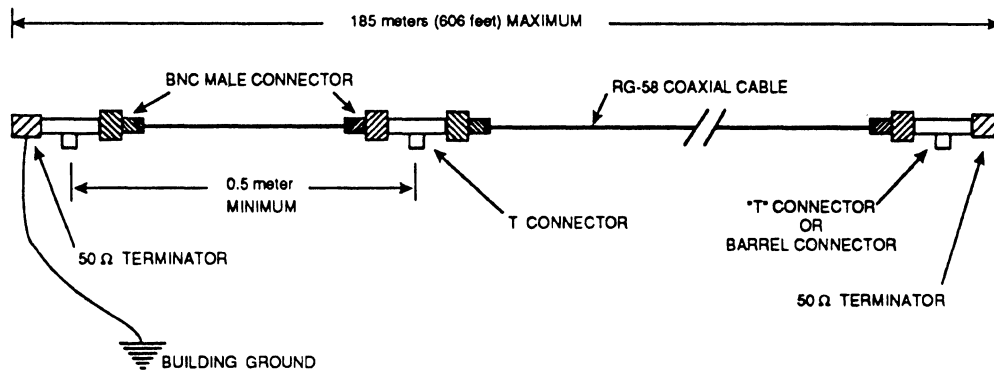


Figure 1

BNC "T" CONNECTOR / ADAPTOR    RG-58 Coax - ThinWire    50 Ω TERMINATOR

TRANSCEIVER

ThinWire Transceiver

TRANSCEIVER CABLE

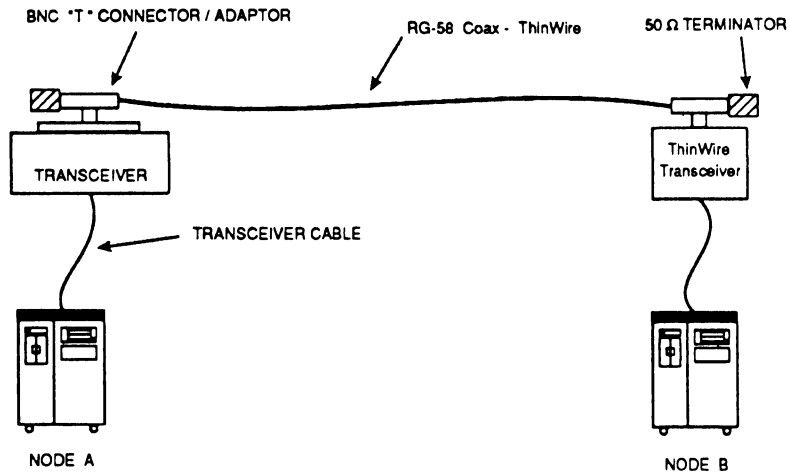NODE A                                                    NODE B

Figure 2

To form the simplest network it is going to take two nodes. There could be a few deviations such as one node being a terminal server and one node a VAX, but for this discussion we will assume that both are MicroVAX systems (see Figure 2). In the case of a MicroVAX, and for that matter most minicomputers, you will find on the back of the cabinet a 15 pin miniature D connector (looks like a small RS-232 connector) labeled Ethernet. The first item that you will need is a transceiver cable. The purpose of the transceiver cable is to provide DC power and digital data signals to a Ethernet transceiver. Here is where the real fun starts. The "transceiver" has had many flavors over the years. Back in the beginning it was just called a transceiver, but then DEC, Intel, and XEROX got together and came out with Ethernet Version 2. So then you had two types of transceivers, a Version 1 and a Version 2. To further complicate matters, another group of engineers got together and now we have an 802.3 standard. The main difference between these three types of transceivers is the "heartbeat test" or SQE (Signal Quality Error signal). Version 1 and 802.3 transceivers do not use the SQE signal while the Version 2 transceiver does. It is important to use the correct type of transceiver for a particular Ethernet device or controller. In some cases when you connect the wrong transceiver it just won't work. But things can really get bad if you connect a transceiver with heartbeat to a controller that is not expecting the heartbeat and mistakes it for a real packet collision. In this case the device will sort of work but you will wonder why the network is so slow.

One area of confusion that we have noticed is in how to mix Thick and Thin types of transceivers on a network. In Figure 2 there are two types of transceivers shown. The transceiver on the left represents a Thick transceiver that has an "adapter" to make it compatible with ThinWire wiring. There are several ways to make this transition. One very expensive scheme used by DEC is to employ what they refer to as a "Loop Back Transceiver". This method requires that the Loop Back Transceiver be modified by removing it's 50 ohm terminators and replacing them with "N" barrel and "N to BNC female" adapters. For those who are budget conscious there is another approach. AMP Corporation, the makers of most of the media attachment devices for DEC and other Ethernet vendors, offers an adapter that simply replaces the Thick cable clamp/tap assembly with a new assembly that provides a BNC "T" connector for ThinWire cabling. A big advantage to the AMP method is that the number of connectors in the cable path is reduced by four. Not only is this an obvious cost savings but there are less electrical RF joints to attenuate the signal and otherwise cause trouble.

The Transceiver on the right in Figure 2 is an example of a ThinWire Transceiver. A ThinWire Transceiver is one that is designed and built to connect directly to ThinWire cabling without the need for any adapter. If the network you are installing is in an office environment then you should take advantage of these smaller and lower cost devices.

As people see the advantages of networked workstations, the network will quickly grow beyond a single work group. A device called a Multi-Port Repeater is used to connect a building Ethernet Trunk cable to the ThinWire segments running to desks (see
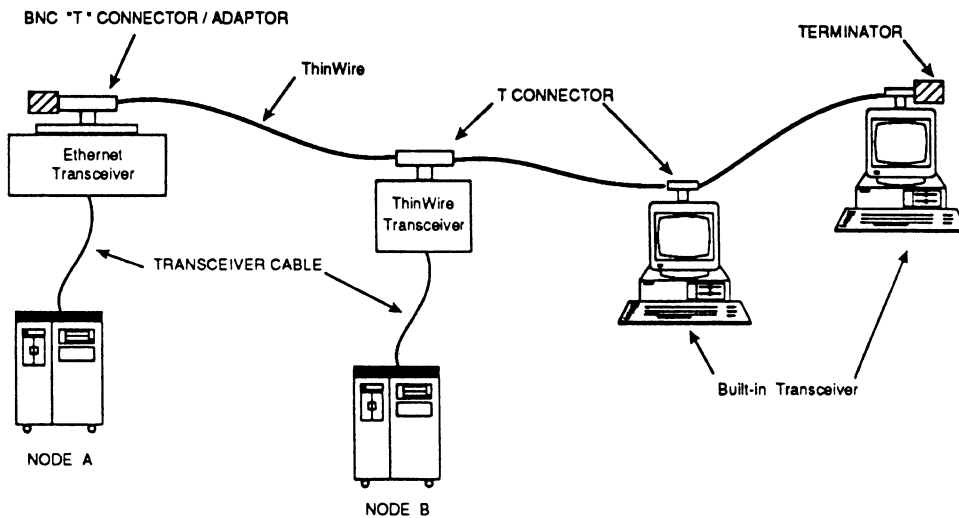


Figure 3

The network that is shown in Figure 3 takes our basic network one step further. We have now added two workstations. It is apparent from the illustration that there are no transceivers associated with the Workstations. But there must be transceivers, since any Ethernet connection is through a transceiver. In this case the workstation has its transceiver electronics built onto the Ethernet controller board or in some cases the CPU, memory, I/O, and network controller are all on one large motherboard. The workstation will have a BNC female connector protruding from the rear of the cabinet to which a BNC "T" connector is attached. If the Workstation is physically the last node on a segment then one port of the "T" connector is terminated with a 50 ohm terminator. Otherwise the "T" connector is placed in a "series" fashion.

Figure 4). Digital Equipment Corporation calls their device a DEMPR which stands for Digital Ethernet Multiple Port Repeater. This type of device is available from other vendors besides DEC, but for simplicity I will use the term DEMPR in this paper. The DEMPR should be placed in a wiring closet located such that the farthest workstation is within a 600 foot radius of it. A DEMPR has 8 BNC female connectors to which 8 ThinWire segments can be attached. If a port is not connected to an active segment then a 50 ohm terminator should be installed. An 802.3 type transceiver (non heartbeat) and cable is used to connect a DEMPR to the Ethernet Trunk cable. The transceiver used for this application would be the piercing type. A maximum configuration for a DEMPR will allow up to 232 nodes in a 600 foot radius to be connected.

50 Ω TERMINATION ON UNUSED PORTS

MultiPort ThinWire Ethernet Repeater

SEGMENT LED

SELF TEST PUSHBUTTON

BNC "T" CONNECTOR / ADAPTOR

T CONNECTOR

TERMINATOR

ThinWire

Ethernet Transceiver

ThinWire Transceiver

TRANSCEIVER CABLE

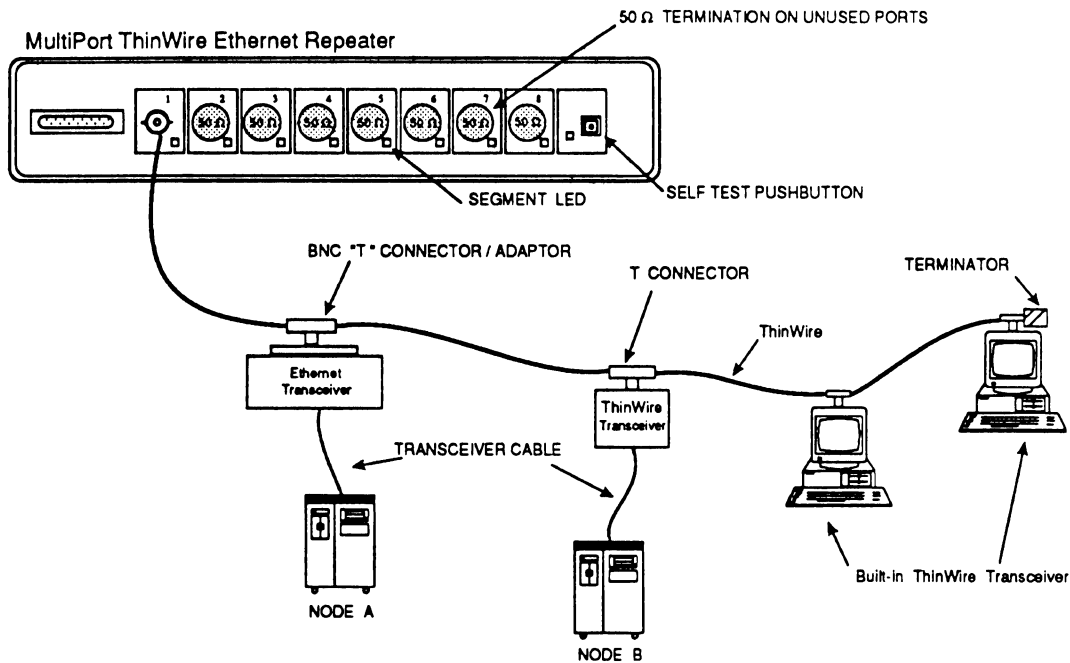Built-In ThinWire Transceiver

NODE A

NODE B

Figure 4

The DEMPR can also be used in a "local" configuration which means that it is not connected to an Ethernet Trunk cable. This type of configuration is useful in small buildings. For example, in a small three story building the wiring closet could be placed centrally on the second floor. From the second floor wiring closet ThinWire segments would be pulled to all three floors. If one DEMPR is not enough, up to eight can be connected using DEC's DELNI (Digital Ethernet Local Network Interconnect) or a similar type device. An example of this type of configuration is shown in Figure 5. With this type of configuration it is possible to connect up to 1,856 nodes.

ETHERNET LOCAL NETWORK INTERCONNECT

TRANSCEIVER CABLES

Figure 5

MultiPort ThinWire Ethernet Repeater
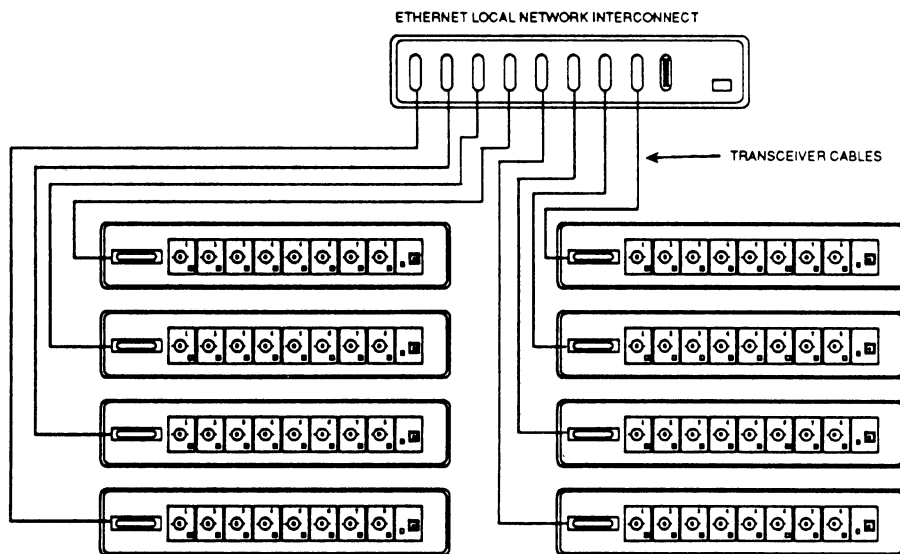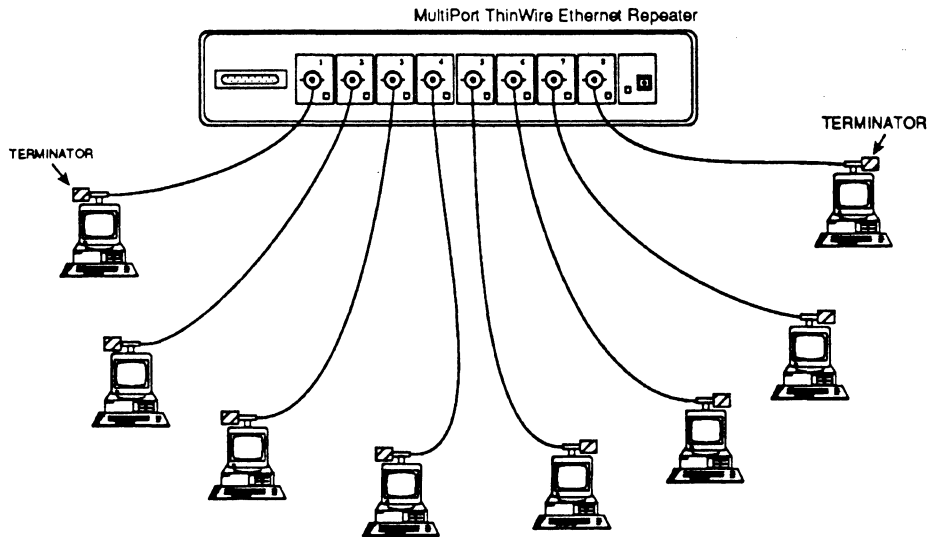


Figure 6

Up to now we have been talking about workstations that are connected in a serial fashion. Recently there have been announcements by DEC, 3COM, and SynOptics in the area of twisted pair wiring plans for Ethernet. The motivation for this is based on the fact that most buildings already have telephones installed that use twisted pairs. Therefore, there are usually twisted pairs already available at a site. In addition, the twisted pair technology is mature and well understood by installers and maintenance personnel. An advantage of the twisted pair wiring scheme is that it is a point-to-point connection. That is, the workstation is connected directly to the network through a repeater. This type of wiring makes it very easy to troubleshoot problems because there are only three pieces to worry about: the workstation, the copper wire, and the network repeater. In Figure 6, we show how a point-to-point configuration can be connected using ThinWire as the media. The picture would look almost the same if you were to use twisted pair media except that it would be necessary to add two adapters to convert from ThinWire to Twisted Pair and back again. These adapters would be placed between the workstation and the DEMPR.

As usual there are trade-offs to be made when deciding between serial and point-to-

point wiring plans. But it usually comes down to what your organization is willing to pay for. It should be easy to see that in the point-to-point wiring scheme, the cost of the DEMPR and its transceiver is only divided between 8 workstations. Whereas for the serial wiring plan the cost of the DEMPR, etc. can be divided among as many as 232 Workstations.

Now it is time to look at a practical application for all of the Ethernet devices we have been talking about so far. Figure 7 shows the layout of a typical office that you might be required to network. This example will allow us to explore ideas for placing computer equipment around the office, as well as several of the wiring schemes that are possible. Starting at the lower left corner of the floor plan you see a computer room. Although it is not necessary to have a computer room for a small MicroVAX, it does provide a central location not only for the computer but also for the user manuals, software distribution media, and storage of backup tapes. Another advantage is that the Server is out of high traffic areas where people might have a tendency to "push buttons". The next area along the bottom is a cubicle set aside for shared printers. This is definitely a necessity since printers require supplies of paper

as well as a table to hold print-outs waiting to be picked up. If your printers are within approximately 100 feet of the Server, then they can be hooked up using standard RS-232 wiring. If the distance is much farther or the VAX server does not have RS-232 ports then an Ethernet Terminal Server such as the DECserver-200 will be required to make the connection.

there are no workstations currently installed but a drop is installed for future growth. From there segment B is routed through the ceilings and down the walls of the offices along the top of the floor plan. In each office the ThinWire cable exits the wall through a face plate and attaches to a BNC "T" connector on the workstation. From there it continues on to the next office.
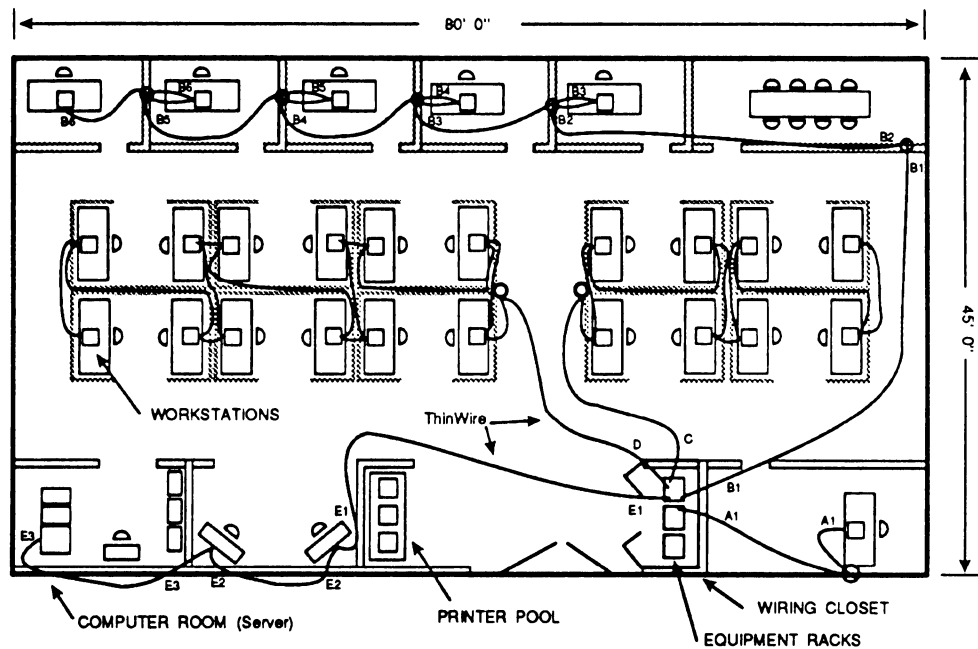


Figure 7

The next area that is shown is a wiring closet. We feel that all communications wiring should be pulled back to a wiring closet. The wiring closet should be large enough to handle both data and voice patch panels as well as data networking equipment such as modems, repeaters, bridges, and terminal servers. In addition the closet should be well ventilated and have independent power outlets. The wiring closet becomes even more important when you want to share twisted pairs with the telephone people so that you can run Ethernet over their unused pairs.

All ThinWire segments originate from the wiring closet. The first segment in our example is labeled A. This is wired as a point-to-point segment since it was convenient and there were no other nodes close by. Segment B starts out by going to a conference room where

The middle of the floor plan contains desks divided into cubicles using free standing partitions. In most cases the ThinWire is dropped down from the ceiling through some type of conduit to floor level. Then if you are lucky you will be able to route the ThinWire through data wiring troughs built into the cubicle partitions. If your partitions do not have a built in wire trough then you will have to improvise another way to keep the data cable off of the floor so that it will not be eaten by the cleaning crew's vacuum cleaners or floor polishers. As before, the workstations are connected in a serial fashion using BNC "T" connectors.

In this example, you will notice that the segments on the average have about 8 workstations in series. In addition, the typical total segment length is about 300 feet. In both cases we are not anywhere near the design

limits for ThinWire. By using DEMPR's to limit the number of workstations in series, it is possible to have multiple segments that are electrically isolated from one another. That is, if one of the office ThinWire segments gets cut by a vacuum cleaner, at worst it will only take out 5 to 10 workstations. It is true that it will take a little longer to isolate the problem since there are 10 to 20 pieces of coax per segment to check, but the coax is readily accessible in the wiring trough in the office partitions. Based on our experience over the past five years the failure rate is very low and once a problem is reported the failing part can usually be located within 15 minutes. By including short serial segments in an overall point-to-point scheme we have found the best compromise between the economy of serial wiring and the convenience of point-to-point.

obstacles such as fire walls, air conditioner ducts, etc. At the conclusion of the installation the design drawing and the as built drawing should be compared so that an accurate record is produced and filed for future reference. We would also suggest that a form such as the one in Figure 8 be used to build a data base on each segment that is installed. The information on this form will be invaluable to the person who may one day want to expand the network or who just wants to locate a problem with one of the workstations. As your network grows to the point where you want to use network management tools such as a LAN Analyzer or DEC's EtherNIM, then this table will allow you to easily find and identify nodes on the Ethernet cable.

Wiring Closet Location _____

Multi-Port Repeater ID _____

Sheet _____ of _____

Date _____

| SEGMENT ID | LENGTH | RUNNING TOTAL LENGTH | # CONNECTORS | RUNNING TOTAL # CONNECTORS | NODE NAME | NODE ADDRESS | ETHERNET ADDRESS | CPU TYPE | USER NAME | PHONE # | WORKSTATION LOCATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| | | | | | | | | | | | |

Figure 8

Keeping good records of the physical layout of your network cannot be over emphasized. There are three phases to this process. First, as you do your network design, estimates of cable lengths and placements must be made and recorded on the wiring plan drawing. Then as the cable is pulled the installer should record any modifications that have to be made because of unexpected

This brings us to the subject of network trouble shooting. What if it doesn't work? We believe that the best approach is to be positive, assume that it will work, and try to load your networking software. Nine times out of ten everything will be fine. But if the network does not come up, pay attention to any error messages you get on your terminal for possible software configuration errors.

Although programmers may wish to disagree, we have found that it is usually a software problem. If you happen to experience one of the rare occasions where the hardware does fail then it is time to take a look at the hardware. Fortunately, the engineers that designed a lot of the networking hardware on the market were very generous with LED's. Just about every active network device that I have used has had it share of status indicators. We recommend reading the instruction manual that comes with your particular set of equipment to see just what kind of information can be determined by observing the LED's.

These simple techniques to trouble shooting will resolve most hard failures. If you are experiencing intermittent or network performance types of problems, then you will probably need to use a device called a LAN Network Protocol Analyzer. For example, if it takes a lot longer to transfer files than you think it should at 10MB/sec then a LAN Analyzer can help by showing you statistics on network traffic. For example a good analyzer will allow you to determine the number of collisions per second, lost packets, jabber nodes, average packet sizes, etc.
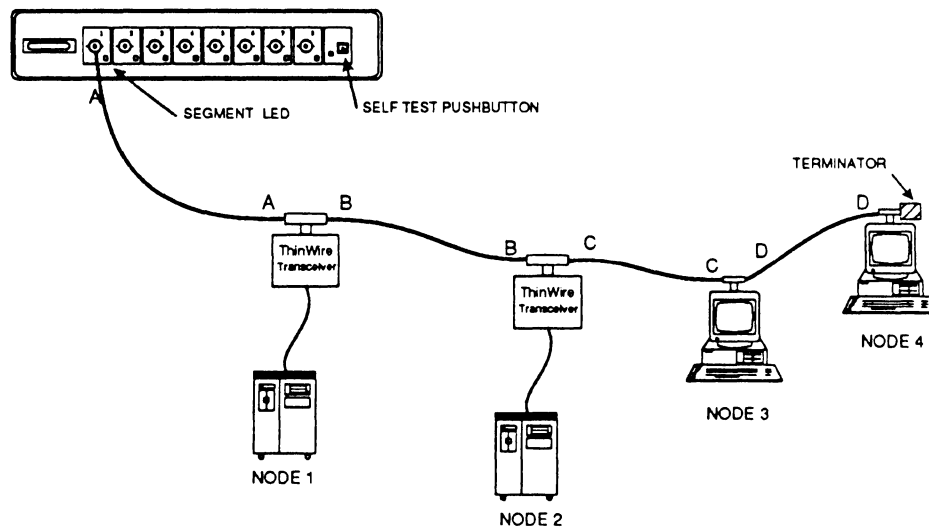


Figure 9

The "process of elimination" is a technique that will work in cases where there is a hard failure. By this we mean that nothing is going across the segment and a SEGMENT LED status indicator is probably lit on a DEMPR. Refer to Figure 9 to follow along with this process. The first step is to disconnect segment B from NODE 1 and replace it with a 50 ohm terminator. Then reset the SEGMENT LED by depressing the SELF TEST PUSHBUTTON and then letting it go. If the SEGMENT LED is on then segment A must be the problem. On the other hand if the SEGMENT LED remains off then that segment is working and you did not locate the problem. Then you must reconnect segment B and repeat this procedure on Node B and so on down the line until you locate the problem.

Although it is difficult if not impossible to record on paper everything that we have learned about networking in the last five years, we hope that by pointing out a few areas where there is potential for confusion, newcomers to networking will feel comfortable with Ethernet wiring in an office environment.
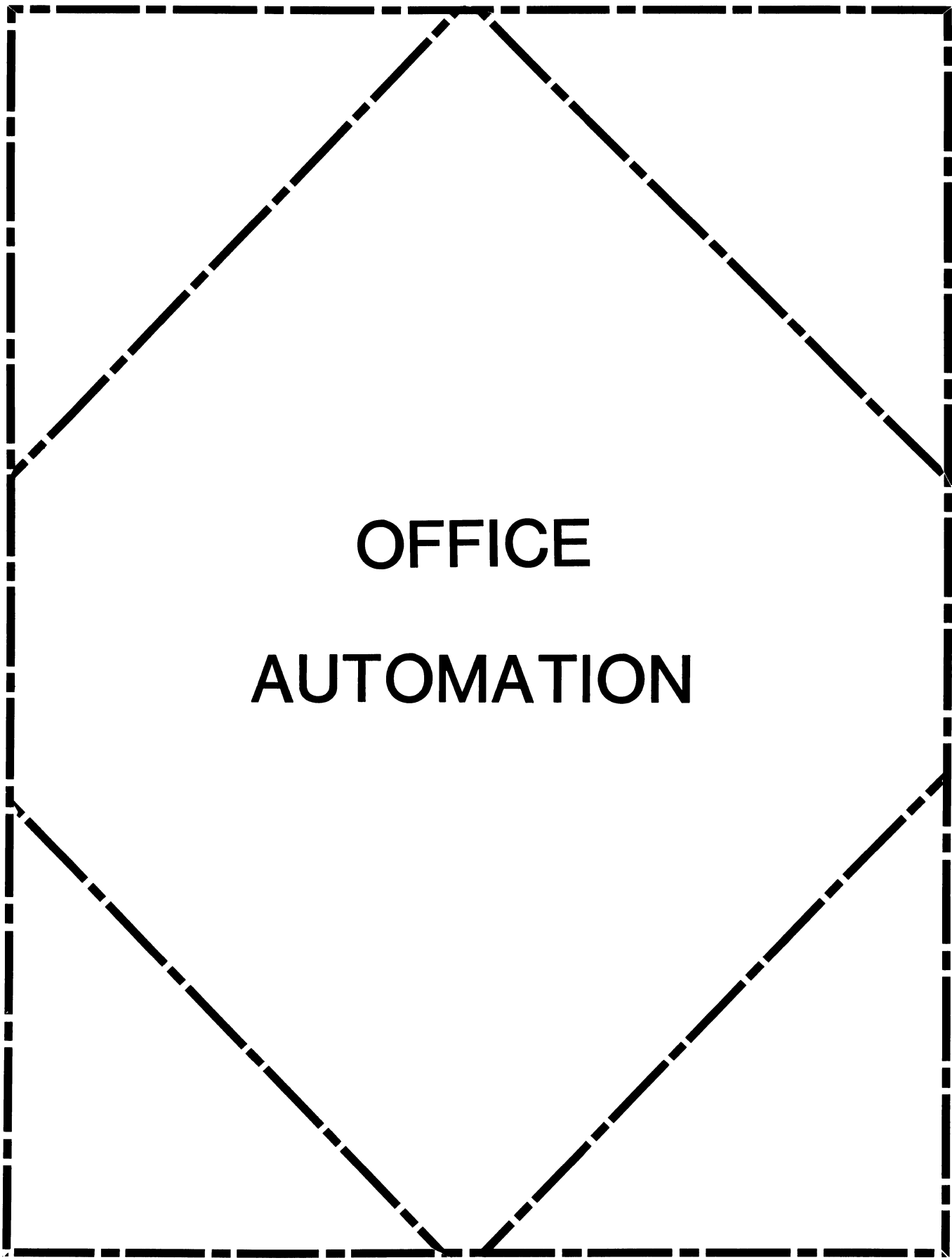
# OFFICE

# AUTOMATION

# IN THIS ISSUE...

# FROM THE EDITOR...

I was in the enviable position this month of having so many great articles to choose from, it was hard to decide what to publish first! Thanks to all of you who have contributed... keep up the good work!

I settled on another great technical article from Trace Roth on how to modify two Time Management calendars. And We have something a little different than our standard informational article, a request for information from you, our readers. We also had just enough time to squeeze in one or two informational items about the Cincinnati Symposium: One on the upcoming SIR listing and the other a note from our new SIG chair. For those of you who were unable to attend Cincinnati, Kit Trim (our terrific SIG chair for the last few years) officially turned the position of SIG Chair over to Joe Whatley (formerly our Special Projects coordinator). Fortunately Kit will still be with the OA SIG as the new Special Projects coordinator. Thank you Kit for all of your hard work and leadership, and welcome Joe.

August will be a busy issue with information about the SIR process and an article to update you on the status of the SIG Tape. September and October will be great issues highlighting a number of technical articles submitted by our readers. I invite you to stay with us for more great information sharing.

Regards,

*Therese LeBlanc*
OA Newsletter Editor
275 London Place
Wheeling, IL 60090

# MODIFYING THE STANDARD "TWO CALENDAR"

# PRINT OPTION IN TIME MANAGEMENT

## Trace G. Roth, O.H. Materials Corp.

I have modified the time management print options week's schedule (WS) and two calendars (TC) so that they will only print a time window for the week or day according to a start time and end time specified by the user. This replaces the standard options' 24 hour print window.

Here are the new name data commands for the options WS and TC on each
TMxx_PRINT form.

WS
CAL PRINT WEEK_SCH\FORM TMPRINT_TIME\IFEXIT\DO TMPRINT_TIME

TC
FORM TMGETSEC\IFEXIT\CAL PRINT TWOCAL\FORM TMPRINT_TIME
\IFEXIT\DO TMPRINT_TIME

There is an extra argument form that is called with these options that allows the user to enter a starting time and and ending time for their time window. This form looks like this and contains the following name data.

Time Management Print Time Window Selection

Schedule Starting Time: 8:00am

Schedule Ending Time : 5:15pm

```
.TYPE
ARG /OVERLAY/HARD='Time Management Print Time Window Selection'

.TYPE
/POST='GET #START_TIME=START_TIME\GET #END_TIME=END_TIME'

START_TIME
/VALID=CAL$TIME_CHECK:"START_TIME"/PUT_SAVE=#SM_BTIME

END_TIME
/VALID=C_TIME,END_TIME"/PUT_SAVE=#CAL_MTNG_ETIME
```

Once this information, start and end time, is received, the command file TMPRINT_TIME.COM is run. This command file runs a basic program, TMPRINT_TIME.EXE, that only writes the records in the selected time window.

Output from both of these options is shown here. If you like this type of output, please add these changes to your system. I believe that this is a great improvement over seeing all 24 hours output.

I would be most happy to send you this information electronically if so desired. Please let me know your preference.

Trace G. Roth
Software Analyst
O.H. Materials Corp.
Findlay, OH
(419) 423-3526 x4152

**Sample output of WS print option.**

Schedule for the Week of 12-Jan-1988

| | Monday 11-Jan-1988 | Tuesday 12-Jan-1988 | Wednesday 13-Jan-1988 | Thursday 14-Jan-1988 | Friday 15-Jan-1988 |
|---|---|---|---|---|---|
| 8:00am | | | Todo Sessi | | |
| 8:15am | | | *** | | |
| 8:30am | | | *** | | |
| 9:00am | | | *** | | |
| 9:15am | | | | | |
| 9:30am | | | A1 Shortcu | | |
| 9:45am | | | *** | | |
| 10:00am | | | *** | | |
| 10:15am | | | *** | | |
| 10:30am | | | WP I I Tra | | |
| 10:45am | | | *** | | |
| 11:00am | | | *** | | #Discuss TO |
| 11:15am | | | *** | | *** |
| 11:30am | | | | | |
| 11:45am | | | | | |
| 12:15pm | | | | | |
| 12:30pm | | | | | |
| 12:45pm | | | | | |
| 1:00pm | | | | | |
| 1:15pm | | | | | |
| 1:30pm | | | | | #WORK WITH |
| 1:45pm | | | | | *** |
| 2:00pm | | | | | *** |
| 2:15pm | | | | | *** |
| 2:30pm | | | | | |
| 2:45pm | | | | | |
| 3:00pm | | TM Meeting | | | |
| 3:15pm | | *** | | | |
| 3:30pm | | *** | | | |
| 3:45pm | | *** | | | |
| 4:00pm | | | | | |
| 4:15pm | | | | | |
| 4:30pm | | | | | |
| 4:45pm | | | | | |
| 5:00pm | | | | | |

# signify meetings in schedule.

Sample output of TC print option

Schedule for Tuesday    12-Jan-1988

```
ROTH                                        NAAB
 Time    Description                         Time     Description

 8:00am                                      8:00am TRAVEL TO DIGITAL OFFICE; 1701
 8:15am                                      8:15am ***
 8:30am                                      8:30am ***
 8:45am                                      8:45am ***
 9:00am                                      9:00am ***
 9:15am                                      9:15am ***
 9:45am                                      9:30am #WORKSTATION SEMINAR
10:00am                                      9:45am ***
10:15am                                     10:00am ***
10:30am                                     10:30am ***
10:45am                                     10:45am ***
11:00am                                     11:00am TRAVEL FROM DIGITAL BACK TO OH
11:15am                                     11:15am ***
11:30am                                     11:30am  ***
11:45am                                     11:45am  ***
12:00pm                                     12:00pm ***
12:15pm                                     12:15pm ***
12:30pm                                     12:30pm  ***
12:45pm                                     12:45pm ***
 1:00pm                                      1:00pm
 1:15pm                                      1:15pm
 1:30pm                                      1:30pm
 1:45pm                                      1:45pm
 2:00pm                                      2:00pm
 2:15pm                                      2:15pm
 2:30pm                                      2:30pm
 2:45pm                                      2:45pm
 3:00pmTM Meeting with Sharon Thomas 3:00pm
 3:15pm ***                                  3:15pm
 3:30pm ***                                  3:30pm
 3:45pm ***                                  3:45pm
 4:00pm                                      4:00pm
 4:15pm                                      4:15pm
 4:30pm                                      4:30pm
 4:45pm                                      4:45pm
 5:00pm                                      5:00pm


# sig schedule.



                    ********************



! TMPRINT_TIME.SCP
!
!       Modified from TMPRINT.SCP by Trace G. Roth on November 4, 1987
!                               O.H. Materials Corps
!       This script is used to print the CALENDAR.TMP file which has been
!       produced by the CAL PRINT function.
!
```

```
!       Modified so that a time window can be specified so that 12am
!       to 12pm is not printed.  User will specify starting and ending
!       times so that only a specific window of time is printed.

        GET OA$DCL='START_TIME == "' #START_TIME '"'
        GET OA$DCL='END_TIME == "' #END_TIME '"'
         DUMP CALENDAR.TMP
        COMMAND OA$LIB:TMPRINT_TIME.COM
         GET #PRINT_FILE=OA$DIR:"*.*;*".%WHOLE["CALENDAR.TMP"]
        .IF #PRINT_FILE EQS "" THEN .GOTO NO_FILE

        GET #PRINT_LISTFILE="TIMEMGT"/MAKE_FILE_NAME #PRINT_LISTFILE,"TIMEMGT"
        GET #COPIES="1"/GET #QMENU="-2"
        DO WPPRINT
         PURGE "CALENDAR.TMP"
         .EXIT

.LABEL NO_FILE
        DISPLAY There are no items to print.
         .EXIT


                        ********************


$!      TMPRINT_TIME.COM              Trace G. Roth   November 4, 1987
                                      O.H. Materials Corp.
$!      Command file called from TMPRINT_TIME.SCP on OA$DO
$!      Runs BASIC program to strip off unwanted times in calendar output.
$!
$       RUN DISK$SYSTEM:[ALLIN1.BASIC]TMPRINT_TIME
$        RENAME OUT_CAL.TMP CALENDAR.TMP


                        ********************


1!  TMPRINT_TIME.                    Trace G. Roth   November 4, 1987
 !                                   O.H. Materials Corp.
 !
5   MAP (R) STRING R$=80
 !
 !     open output file from time management for input.
 !
10  OPEN "CALENDAR.TPM" FOR INPUT AS FILE #3, &
    ORGANIZATION SEQUENTIAL VARIABLE, RECORDSIZE 226
 !
 !     open output file.
 !
    OPEN "OUT_CAL.TMP" FOR OUTPUT AS FILE #2, &
    ORGANIZATION SEQUENTIAL, &
    ACCESS WRITE, MAP R
 !
 !     get start and end input on form tmprint_time
 !
    CALL LIB$GET_SYMBOL ("START_TIME",SLEN(START_TIME$)
    SLENGTH = LEN(START_TIME$)
```

```
      IF SEG$(START_TIME$,1,1) = " "
      THEN IF SEG$(START_TIME$,SLENGTH-1,SLENGTH) = "am"
           THEN    START_TIME$ = SEG$(START_TIME$,1,SLENGTH-2) + "am"
           ELSE    START_TIME$ = SEG$(START_TIME$,1,SLENGTH-2) + "PM"
           END IF
      ELSE IF SEG$(START_TIME$,SLEGNTH-1,SLENGTH) = "am"
           THEN    START_TIME$ = SEG$(START_TIME$,1,SLENGTH-2) + "am"
           ELSE    START_TIME$ = SEG$(START_TIME$,1,SLENGTH-2) + "pm"
           END IF
      END IF
      CALL LIB$GET_SYMBOL ("END_TIME",END_TIME$)
      ELENGTH = LEN(END_TIME$)
      IF SEG$(END_TIME$,1,1) = " "
      THEN IF SEG$(END_TIME$,ELENGTH-1,ELENGTH) = "am"
           THEN END_TIME$ = SEG$(END_TIME$,1,ELENGTH-2) + "am"
           ELSE END_TIME$ = SEG$(END_TIME$,1,ELENGTH-2) + "pm"
           END IF
      ELSE IF SEG$(ENT_TIME$,ELENGTH-1,ELENGTH) = "am"
           THEN END_TIME$ = SEG$(END_TIME$,1,ELENGTH-2) + "am"
           ELSE END_TIME$ = SEG$(END_TIME$,1,ELENGTH-2) + "Pm"
            END IF
      END IF
      WHEN ERROR USE ERROR_ROUTINE
  !
  !      get first 9 records from time management file.
  !      these are the page header records
  !
15      FIRST_RECS%=0%
        UNTILL FIRST_RECS% = 2%
                GET #3
                MOVE FROM #3,REC$=80
              R$=REC$
                PUT #2
                GET #3
              R$=" "
                PUT #2
                PUT #2
                FIRST_RECS%=FIRST_RECS%+1%
        NEXT
        UNTIL FIRST_RECS% = 4%
                GET #3
                MOVE FROM #3,REC$=80
              R$=REC$
                PUT #2
                FIRST_RECS%=FIRST_RECS%+1%

        NEXT
         GET #3
         R$ = " "
        PUT #2
  !
  !    read until starting time record is reached.
  !
20      UNTIL CALTIME$ = END_TIME$
                GET #3
                MOVE FROM #3,REC$=80
                CALTIME$=SEG$(REC$,1,7)
```

```
              NEXT
    !
    !         write time records until ending time is reached.
    !
              UNTIL CALTIME$ = END_TIME$
                      R$=REC$
                      PUT #2
                    PUT #3
                      MOVE FROM #3,REC$=80
                      CALTIME$=SEG$(REC$,1,7)
              NEXT
    !
    !         write page footer informion.
    !
              R$=""
              PUT #2
              PUT #2
              R$="# signify meetings in schedule."
              PUT #2
          END WHEN

          HANDLER ERROR_ROUTINE
              CLOSE #3
              CLOSE #2
          END HANDLER
    40    END
```

---

# A REQUEST FOR HELP WITH MAIL MERGE

## Karen Paulaski, Collier County Clerk of Courts

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*NOTE FROM THE EDITOR:*

The following article was taken from a letter sent to me requesting information and/or help. I did not have a solution for Karen and suggested she publish her inquiry in the newsletter. If you can be of assistance, please contact Karen at the address published at the end of the article.

Regards,
*Therese*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

I am interested in obtaining information about mail merge functions for use in our VAX 8550, COBOL environment. The crux of the matter is, we do not want to become involved with an entire work processing system, only a mail merge function which we can incorporate into our existing menu driven Court System. We need to print data forms such as Warrants and Subpoenas for our Court System, by merging an input data file with the numerous forms necessary for government activity. If you have any information on software packages, or have had experience with similar functionalities - or know of anyone who has, I would greatly appreciate hearing from you. More information on our needs is as follows.

Currently our system's set up as a series of menus from which the users may select functions from pull down windows, and enter data interactively. The data is written to a batch command file, and passed to the batch section of the program where it is read and reported on accordingly. We want to keep the functionality the users are accustomed to and have them select the forms to be processed, and any other selection criteria, interactively from a menu. We would then like to be able to write a COBOL program to create the input data file, and create a forms file. These two files would be submitted to the mail merge in

batch and the forms would be created.

We will have to accommodate variable sizes of output files (10 to 5,000) blocks and be able to output a variable number of forms (1 to 500).

If you have any information regarding such a function you can contact me at (813) 774-8945 or write to:

Karen Paulaski
Collier County Clerk of Courts
M.I.S. Division
P.O. Box 413020
Naples, Florida 33941-3020

Thank you!

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# COMING SOON... SIR FEEDBACK FROM DEC

# AND NEW SIR LIST TO VOTE ON!

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SIR (system Improvement Request) Bulletin:

We had an exciting session in Cincinnati listening to DEC's response to our last list of top 25+ SIR items. You'll have the opportunity to see what all the excitement's about for yourself in the August issue. We'll reprint the SIR's and their responses for you to see.

And we've got a whole new list of SIR items just waiting to be voted on. They will be listed in the August issue along with a ballot so you can let DEC know what's important to you. The deadline for returning those ballots will be *around* September 1st, 1988... so you'll have to act fast. Stay tuned for more next month.

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# THOUGHTS ON CINCINNATI

## Joe Whatley, AO SIG Chair

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It is impossible to express my gratitude to all of the people who helped make Cincinnate a succes for the OA SIG. However, since I generally ignore the impossible . . . . . . . . . . . . . . . . . . . . . . . .

THANKS to the DECUS staff for doing what you do best — and you keep getting better.

THANKS to the speakers and session chairs — you made the success happen daily.

THANKS to the many Digital support people on the exhibit floor. our campground. our suite and the special demonstration room — you made the trip really worth it.

THANKS to the members who came to sessions to learn and share experiences with each other — you are truly the heartbeat of the symposia.

and finaly  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

THANKS to the energetic and enthusiastic volunteers of the OA SIG — you kept volunteering even when we ran out of jobs to give you - so, we made some more.

Joe Whatley
OA SIG Chair

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# PERSONAL COMPUTER

# SPECIAL INTEREST GROUP

# NEWSLETTER

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# PRO Section

## PALETTE ON A PRO 350

### By Peter Edmonds, Perth, Australia

This article describes personal experiences with the basic 2D drafting tool of  this Australian CAD/database system, which I have been operating for over 2  years.

## My Operating Environment

I operate a single-person consultancy in Naval Architecture and Ship  Design/Drawing work, mainly in small commercial vessels (up to about 30 m),  for construction in Western Australian yards.  A considerable proportion of my  work is not drawing production (and hence non-Palette); typically stability  submissions, scantling determinations, weight calculations, etc.

I run Palette on a PRO 350, with colour screen, and plot drawings up to A3  size on a HP 7475A plotter; this plotter also appears as a DEC LVP16.  Larger  drawings are plotted by a local bureau, where Palette is operated on a  contract drafting basis. I am, however, working towards buying and setting up a (superseded) larger plotter (Houston DP9), and adapting the driver software  to suit my system.

## Palette - General

Palette is a suite of CAD/Database software modules, which starts around the  basic 2D CAD module, and extends into modules for advanced drafting,  3D Wireframe, 3D Colour-Shaded Image, spatial and external databases, other  CAD applications, and user applications.

Palette originated in Australia, and was launched onto the market in 1978 by  Dr Michael McLean, its designer.  Since then, it has been sold extensively in  Australia and the United States, and is now sold in 28 countries.  It grew  up around the PDP-11 and the VAX computers, with all current development related to the VAX environment. The main development of Palette is now taking  place in the United States.

Whilst there are many extensions from the basic 2D drafting module, my  experience of these is very limited; restricted to a little work on 3D  Wireframe modelling.  My operations are most unlikely to support any of the  other major modules beyond the Independent Program Interface. This interface  will allow me to run my own applications without leaving Palette.

[Perhaps some other DECUS member would like to comment on experience with other modules. I look forward to Newsletter contributions on this.]

An early installation of Palette was at Carrington Shipyard, Newcastle, New South Wales. When I visited the site several years ago, I was most impressed by the way it was working within my own technology of ship design. At this visit, I had the 3D system demonstrated by Mike McLean, prior to it being handed over to the shipyard for production use.

## Why My Installation?
The availability of the PRO 350 as a "personal PDP-11", the downwards migration of the software onto this machine, and licence pricing policy (one-off sale, with optional software support), and a used PRO 350, resulted in an "affordable" access to a system that had proven iteslf in my own technology. The move into CAD also offered the prospect of enhancing my drawing production capacity, without having to find a suitably skilled person in times of heavy demand, then trying to find gainful work for draftsman (men? persons?) in times of lesser demand.

## Operation of the System
Palette is primarily keyboard command operated, but can use digitizer tablets, both for cursor positioning and commands. On the PRO, the numeric keypad provides 8-direction cursor movement, with speed control, in addition to the 4-direction movement with the standard cursor control keys.

In my installation I have stayed with the pure keyboard mode. My reasons for this were that the tablet would not provide full coverage readily of the total command structure (eg number input: back to the keyboard, or move through a "keypad" on the digitizer tablet), and that it also required eyes onto the tablet to operate; it would also cost another $2000 or so. I believed that the desirable path was to enhance my keyboard skill and touch type the comands and cursor positioning, leaving eyes free for watching the screen and the source material. Even though my touch typing is not as good as I would like it to be (I am around 30 wpm), I am quite happy with my choice, and have no wish to use a tablet.

The command structure is very well suited to learning, using combinations of meaningful letters. For example, the command LHL300;D is Line Horizontal Length 300 (; to terminate number) (mm) Draw. I find the system particularly attractive to use where I know the numbers (coordinates, lengths, etc) for what I am drawing.

Some items just have to be remembered. For example, C2 draws a circle (obvious from the C part) with a previously defined circle centre (CC) and passing through a previously defined circle point (CP).

The French Curves facility (for which I need a workable system in my environment) works very well, running a curve explicitly (no "best fit") through the data points, with choices of end conditions; tangential to an existing line, straight, or general. It also provides area and centroid calculations, at a few keystrokes; both of which I find very useful facilities.

## Learning to Use the System
Just before I purchased my system, I enrolled in a weekly class at one of our local Technical Colleges, where Palette is used as an introductory/training CAD system. This gave me some formal instruction, and practical operation under supervision, so I did not elect to have any formal training from Palette.

After I had started up my own system, I very soon passed most of what was being covered in class. I used the time to get some experience on the 3D Wireframe module.

I believe that an ideal training is a small amount of formal instruction, followed by working on real jobs, with ready access to experienced operators. My development has been particularly isolated, but Palette Systems now have a support person in Perth, who has proven most useful; mainly telephone queries and supply of documentation.

The User Society has yet to get functioning in Perth, despite an attempt just after I bought my system. This makes me realise how lucky we are with DECUS.

## Alternative Systems

At the time of my purchase, an IBM look-alike, suitably optioned up, and AutoCad fully optioned up (or VersaCad), would have been approaching my offered outlay on the used PRO, the software, and the plotter. These other CAD systems had not proven themselves in my technology, which I regarded as very important. The local vendor swung the deal with an offer to buy the system back after 3 months (less an appropriate rental) if I was not happy with it. The buyback time came and passed with not the slightest wish for me to return the system.

I have since operated AutoCad over a TAFE course, to give me some experience of this "widespread industry standard" system. I found the shifting of menus tiresome, after the direct access to all the commands available with Palette. As this was the second CAD system I was learning, I was forever thinking "What is 'Autocad' for (the Palette command I wanted)?" The use of the function keys, with no prompting beyond the keyboard labels, helped to avoid some menu shuffling.

Although at that stage my impression was probably severely coloured by my experience with Palette, and relative lack of experience with AutoCad, I was always very glad to get back to Palette.

## Experiences, Strengths and Weaknesses.

Palette is a system where one can start with a fairly small inventory of knowledge of its operation, and then add to this as the need arises. (Even now, I have not used the "grid" capability.)

I will never know the productivity gains that the change to CAD has achieved, as my basis for "before" was not sufficiently quantified. The gains depend very much upon the mix of types of work involved, and the inventory of drawings and symbols built up.

Palette works very well on repeating (with or without alteration) of drawing elements, as well as on "numerical" input, as outlined previously. It is at its worst (for me) on freehand sketching, particularly producing "pretty" drawing elements.

I greatly appreciate being able to generate drawing text at keyboard speed, also the quick and clean (minimal repairs) erasure of drawing elements. Also, I appreciate the freedom from dodging (or smudging) wet ink on the drawing, and of not having to repeat the drawing of elements. Some of this has been well reinforced by a spate of "traditional" drawing.

I have been surprised at how much I have been able to generate drawings within the limits of the A3 plotter. Instead of multiple views on one drawing, I often generate a booklet of A3 drawings; very easy to flick through the pages to find the part you require. It is frequently possible to hold elements of a final large drawing on a series of A3 sheets, or to dump parts of a larger drawing onto a series of A3 sheets for progress plots prior to completion, and then plot the final drawing at full size. Reduced scale plots can be used to extend the scope of the A3 plotter.

With my use of CAD, I came to realise that the scale of a drawing is often governed largely by the scale at which the draftsman is prepared to work, and a reduced scale can provide adequate definition for the user. A limit I have found here is on the text size, as this can be scaled down as a drawing or element is reproduced at a reduced scale. On scales, I have strongly resisted any moves away from the 1:10, 1:20, 1:25, 1:50 and multiples.

One limitation I have often found with scale and drawing size reduction is the decreasing space available for text, as the text size cannot be reduced too far.

Palette's smallest standard text size is 2.5 mm. For a period, I used the designated size of 2 mm, but I found that this led to user complaints. I now use the 2.5 mm size as my working minimum text size.

I have been able to use nominated scale factors to facilitate copying from existing drawings, where these form the basis for further drawing work (additions and alterations, etc). For example, working from an existing 1:24 drawing, to generate a new 1:50 drawing, I would initially set the scale as 1:2.0833 (1:50 / 1:24), copy the existing items using old drawing millimetre sizes, then reset the scale to 1:50, and add new item in finished job millimetre sizes; no multiplications during drawing required. This would, of course, work if one were digitizing off an existing drawing, too.

Palette allows the ready customization of function keys for particular commands or macros of command strings. For instance, I have extended the supplied single-key selection of drawing layer to single-key selection of the commonly-used line thicknesses and line textures, which I frequently change during drawing operations.

A personal feature of the CAD operation is that I enjoy the challenge of finding the technically elegant CAD solution to the immediate drawing requirement. Part of this arises because there are frequently several different ways of using the command structure available to produce the required end result.

A secondary benefit of my purchase of a Palette system is that it has introduced me to quite a powerful computer system (much potential still to be tapped), and to the world of DECUS. Hence this contribution.

Peter Edmonds
Perth, Western Australia

*Editor's note - I contacted Palette Systems for a little more information about their software. While they are not actively marketing Palette for the PRO any longer, they STILL will ship you a copy if you want it. Palette requires a PRO 350 or 380 with the extended bitmap option. A color monitor is optional but recommended. A data tablet is ALSO optional but recommended. Palette supports the HP plotter series. as the output device*

*Palette Systems is located at.    Unit 6,*
*Northwood Executive Park*
*10 Northern Blvd.*
*Amherst, NH 03031*
*(603)595-7673*
*Feel free to contact them for further information.*


# Updates to the PRO Public Domain Software Collection

## By Gary Rice, PC SIG Newsletter Editor

Since the last update, the following software has been added to the collection.
Catalog

| # | Description |
|---|---|
| S84-2 | Force is a program that will force characters to another keyboard. 'Detach' is a patch that will enable users to reconnect to a task after a modem hangup. |

ALSO:
Daofwk.* - Originally written by Jeff Hamilton. Will return the day of the week in <exstat> for the indirect command processor (...at.).
Duplex.* - Source and command files for Duplex. This version has been completely revised since Martin Heller's original copy appeared. I have added large ring buffers, taken the disk access routines out of the ast level and added support for Hayes compatible smart modems... The code has been modified so many times that it needs a major rewrite to neaten the code -- a task I have yet to find the time for. If there are any volunteers, please let me know, I can probably find some time. And will most likely get around to it within the year if no-one else does. Even

with data capture enabled and no error checking, Duplex 5.0ejc will run at 4800 baud with less than 2% received character errors.

Article.txt - Newsletter article to be submitted to the MULTI-TASKER.

Frg.* - Disk Fragmentation Utility - similar to HOL only it shows a histogram of contiguous blocks on the disk.

Priv.* - Set terminal privileged with password protection.

WHO.* - Shows logged on users and current tasks....

RTCLI.* - An alternate CLI for V4.n, V2.n RTCLI allows a non-privileged user to run privileged code or code at a very high priority for real-time or other time-critical applications. User is restricted to RUN [GGG,MMM]??????.TSK, ABO, WHO, RMD or MCR/DCL to exit to the appropriate 'normal' CLI. Excellent framework for creating you own CLI's.

LGOCLI.* - An alternate CLI for V4.n, V2.n LGOCLI allows users to type WHO, RMD, HELP and HELLO from logged out terminals without having to log-in. More sophisticated version (which simply means un-debugged and regularly crashes my system) will also allow BRO and ABO with password protection. Very handy for one pool is almost gone and someone hangs the system to where you can't even logon....

Hplib.* - Plotter library(s) for an HP7220C 8-pen plotter.

Testhp.* - Program which excercise the library and allows direct control of the plotter from a terminal.

*mac.cmd - Files to allow RMD M page to offer the option of setting the memory size.... the suggestion in the MULTI-TASKER several months ago of changing $SYSIZ is VERY DANGEROUS!!!! This works just as well and WILL NOT corrupt the exec. It also offers support for 132 col. M page display on VT102, VT105, and VT125 type terminals. We have 4Mb, and a normal RMD is absolutely worthless.

EXEcute.cmd - An indirect command file that will take F77 source code and produce, using F77 and TKB, the task image. Default mode asks which of many options are required. Compressed mode allows option specification in the command line. >EXE ? command produces syntax help message screen.

Graphit.* - F77 source program for a simple HP7220C graphing task. There is no documentation.

1 diskette; Sources included; NO objects; SOME task images
MACRO, FORTRAN-77


S84-3    **** BUG VERSION 2.0 **** Some insight -- what actually does bug do? It makes a copy of the specified task file, and "implants" some interface code in the task's stack (safely away from lower and upper limits). For this reason the task has to have at least the default stack size. The starting address of the task is suitably changed as if it were built with a debugger. Then the task being "bug'ed "talks" to ...BUG during the debugging session. Register info, etc. is passed between the two tasks during the debugging session. Note -- no special preparation is necessary for the task being debugged (you can "bug" EDT if you want). The original task file is left untouched.
ALSO:
TIZ - Task Image Zapper
CALC - Calculator and radix converter.
BRU - BRU command line builder.

1 diskette; sources included; SOME objects; Task images included
MACRO, FORTRAN-77, Indirect Command File processor


S84-4    HEX - Microprocessor object file management utility The HEX utility is designed to manipulate ASCII hex formatted files as output by cross-assemblers and linkers for microprocessors (Z80, 8085, 68000, etc.). HEX supports all of the popular ASCII hex formats: Intel, Motorola, Rockwell, RCA, TekHex, Extended TekHex, Texas, Mostek, Hex-space, Octal-space, and TCI, plus several binary ones: Whitesmiths', PDP-8 RIM and BIN, and PDP-11 object and task

formats.

2 diskettes; Sources included; NO Objects; NO task images
MACRO


F86-11 SLIDES.OUT is a copy of the slides presented at the session. The other files are the indirect command procedures, UIC.CMD and WHO.CMD as discussed at the session. Another file, named PROJECT.CMD, is a short command procedure which may be useful for displaying contents of a short file onto the screen of a VT241, in a manner suited for making slides or transparancies for a presentation.
ALSO:
The purpose of these files is to demonstrate how one could access the I/O page from Decus C. The example accesses a clock/calender card and sets the system time.

1 diskette; Sources included; NO objects; NO task images
MACRO, C, Runoff


Distribution of the Public Domain Library is handled in the following way: After looking through the "catalog" and selecting the items you want, send me enough diskettes to hold the software you desire. Diskette counts are listed with each catalog entry. Include a return mailer, box, carton, palette, etc. sufficiently large to hold the diskettes. Include enough postage to pay for the return trip. I will NOT use UPS. Sorry. 1st class mail is recommended, but parcel post is ok. I will then copy the requested software for you and send it along. Give me at least a week for ANYTHING (plus travel time). Large (more that 5 diskettes) orders will likely take longer. Specify the software you want by catalog number.

PLEASE don't ask for "specials". It took a lot of time to put THIS collection together.

Contributions are also welcome. However, if the work is NOT YOURS TO GIVE, please DON'T.

If you are submitting something to the collection, please include a signed copy of the following statement with your submission:

*The program that I am submitting to the Public Domain titled _____ does not contain technical data/information that is proprietary, classified under US Government Secrecy Laws, controlled by non-disclosure agreements with the US Government or third parties or governed by US Department of State's International Traffic in Arms Regulations (ITAR).*

*Full and irrevocable permission and consent is hereby given to DECUS to reproduce, distribute and publish in whole or in part, in any form and without restriction, this program or revision and any information relating thereto. The undersigned hereby warrants and represents that s/he has good and sufficient right, interest and title in and to this program or revision and the related information to grant such permission to DECUS.*

Send your requests or contributions to:   Gary Rice
                                          McDonnell Douglas
                                          5555 Garden Grove Blvd,
                                          Mail code: K20/200
                                          Westminster, CA  92683

Please include a daytime phone number. Several software requests that I have received required me to contact the requestor before I could send them what they wanted.

# PRO Software Update

## By Gary Rice, PC SIG Newsletter Editor

In an effort to keep you informed about software being shipped from various vendors, I began the following list in April, 1986. This list was last published in the May, 1988 issue of these Newsletters. This updated list reflects information that I have received as of May 21, 1988. An asterisk by an entry indicates that the item has changed or been added sine the last time the list was published. The changes are highlighted as well.

| DEC Software | List Price | Last Rev | Source of info | Still Avail? | P/OS v3 Supported? |
|---|---|---|---|---|---|
| 20/20 | 495 | 1.0.54 | User | Yes | UNK |
| Athena/Graph | 450 | 1.0 | DEC | Yes | UNK |
| BASIC-11/RT-11 (Replaced - See BASIC-PLUS/RT-11) | | | | | |
| BASIC-PLUS/RT-11 | UNK | 3.0 | DEC | Yes | N/A |
| CT*OS | UNK | 1.0 | DEC | Yes | UNK |
| Design Graphix/Executive | 595 | 1.0 | User | Yes | Yes |
| Easyentry | 995 | 3.0B | DEC | Yes | UNK |
| FORTRAN IV/RT-11 | 495 | 2.8 | DEC | Yes | N/A |
| Installation & Maintenance | UNK | 3.2 | DEC | Yes | Yes |
| LOGO | 350 | 1.4 | DEC | Yes | UNK |
| MAIL-PLUS | N/A | 1.0 | DEC | No | N/A |
| MJA Accounts Payable | 600 | 5.2 | DEC | Yes | UNK |
| MJA Accounts Receivable | 600 | 5.2 | DEC | Yes | UNK |
| MJA General Ledger | 600 | 5.2 | DEC | Yes | UNK |
| MJA Order Entry/Inventory | 600 | 5.2 | DEC | Yes | UNK |
| MJA Payroll & Personnel | 600 | 5.2 | DEC | Yes | UNK |
| NPL Information Management | N/A | 1.4 | DEC | No | UNK |
| Phoenix-PRO | 1795 | 1.0A | DEC | Yes | UNK |
| P/OS ADCCP Driver | UNK | 1.0 | DEC | UNK | UNK |
| P/OS (Diskette) | N/A | 1.8 | DEC | No | No |
| P/OS (Hard Disk) | 475 | 3.2 | User | Yes | Yes |
| P/OS Hard Disk (Arabic) | 783 | R3.1 | DEC | Yes | Yes |
| PRO 2780/3780 | 53 | 1.2 | DEC | DECUS | No |
| PRO Application Starter Kit | 399 | 1.0 | DEC | Yes | No |
| PRO/Associate | N/A | 1.0 | DEC | No | No |
| PRO/BASIC | 195 | 1.4 | DEC | Yes | Yes |
| PRO/Comm (diskette) | N/A | 1.8 | DEC | No | No |
| PRO/Comm (hard disk) | 195 | 3.0 | DEC | Yes | Yes |
| PRO/CPM-80 | UNK | 1.1 | DEC | UNK | UNK |
| PRO/Datatrieve | 495 | 2.0 | User | Yes | Yes |
| PRO/DECnet | 250 | 2.1 | DEC | Yes | Yes |
| PRO/FORTRAN-77 Debug (See PRO/Toolkit Symbolic Debugger) | | | | | |
| PRO/IVIS | UNK | 3.1 | DEC | Yes | Yes |
| PRO/Laboratory Subroutine Lib. | 300 | 1.2 | DEC | Yes | Yes |
| PRO/NAPLPS | N/A | 1.0 | DEC | No | No |
| PRO/Office Workstation | UNK | 2.0 | DEC | Yes | Yes |
| PRO/PRODUCER Toolkit | 300 | 1.6 | DEC | Yes | Yes |
| PRO/RDT | 495 | 1.1 | DEC | Yes | Yes |
| PRO/Scientific Subroutine Library | 300 | 1.3 | DEC | UNK | No |
| PRO/SIGHT | 295 | 1.1 | User | Yes | Yes |
| PRO/SNA | N/A | 1.1 | DEC | No | No |
| PRO/Smart Mailer | 53 | 1.0 | User | DECUS | Yes |
| PRO/Toolkit | 520 | 3.2 | DEC | Yes | Yes |
| PRO/Toolkit BASIC-PLUS-2 | 495 | 2.5 | DEC | Yes | Yes |

| DEC Software | List Price | Rev | Source of info | Still Avail? | P/OS v3 Supported? |
|---|---|---|---|---|---|
| PRO/Toolkit COBOL-81 | 495 | *2.5 | DEC | Yes | Yes |
| PRO/Toolkit DIBOL | 495 | 1.7 | DEC | Yes | Yes |
| PRO/Toolkit FORTRAN-77 | 495 | 5.2 | DEC | Yes | Yes |
| PRO/Toolkit PASCAL | 495 | 1.3 | User | Yes | Yes |
| PRO/Toolkit Real Time Library | 150 | 2.1 | DEC | Yes | Yes |
| PRO/Toolkit Symbolic Debug | 200 | 2.0 | DEC | Yes | Yes |
| PRO/VENIX | 495 | 2.0 | DEC | Yes | N/A |
| PRO/Videotex | 895 | 1.0 | DEC | Yes | UNK |
| Professional CTS-300 | 995 | 1.0 | DEC | Yes | N/A |
| Professional Real Time Lib/RT-11 | 250 | 1.0 | DEC | Yes | N/A |
| PROSE PLUS | 295 | 2.0 | User | Yes | Yes |
| RS/1 | 1900 | 12.0 | User | Yes | UNK |
| RSX Host Toolkit | UNK | 3.0 | DEC | Yes | Yes |
| **RT-11** | **550** | ***5.4D** | **DEC** | **Yes** | **N/A** |
| Supercomp-20 | N/A | 1.28 | User | No | UNK |
| Synergy | 695 | 2.0 | User | Yes | Yes |
| VAX Host Toolkit | UNK | 3.0 | DEC | Yes | Yes |
| WPS/Plus | 695 | 1.0 | DEC | Yes | Yes |

| 3rd Party Software (Vendor) | List Price | Rev | Info Source | Still Avail? | P/OS v3? |
|---|---|---|---|---|---|
| D-M-DRIVER for P/OS (PROTO SYSTEMS) | 195 | V2/V3c | Vendor | Yes | Yes |
| Fingraph (Graphic M*I*S) | N/A | 2.0 | DEC | No | UNK |
| IT*OS (Intermation) | UNK | 5.2 | User | Yes | UNK |
| **Online Disk Unfragmentor** (By Hand) | **59** | ***2.0a** | **Vendor** | **Yes** | **Yes** |
| PRO/Sentinel (By Hand) | 47 | 1.0 | Vendor | Yes | Yes |
| PRO/Session Logger (By Hand) | 29 | 2.0 | Vendor | Yes | Yes |
| PRO/Text Locator (By Hand) | 43 | 1.1 | Vendor | Yes | Yes |
| RDM Relational Data Manager (Interactive Technology) | 995 | 4.1C | User | Yes | Yes |
| SATURN-BASE (SATURN SYSTEMS) | 750 | 1.4 | Vendor | Yes | Yes |
| SATURN-CALC (SATURN SYSTEMS) | 500 | 3.0 | Vendor | Yes | Yes |
| **SATURN-GRAPH** (SATURN SYSTEMS) | **500** | ***2.1** | **Vendor** | **Yes** | **Yes** |
| SATURN-WP (SATURN SYSTEMS) | 600 | 5.0 | Vendor | Yes | Yes |
| SPSS/Pro (SPSS Inc.) | UNK | 1.1 | Vendor | Yes | Yes |
| TK!Solver (Software Arts) | N/A | 1 (2A) | User | No | UNK |

If you have received a shipment of software in the last month (and you DIDN'T get it in a fire sale), please compare the documented REV level to the one I have listed. If your software is more recent (or it isn't listed at all), please let me know so I can update the list. Also, if the source of my information is

listed as "DEC", I would appreciate hearing from a user, since I've found that hearing about it from DEC doesn't always mean that it is actually shipping. I will publish a new list each time it changes.

You can contact me at: McDonnell Douglas
5555 Garden Grove Blvd.
MS: K20/200
Westminster, CA 92683
(714) 952-6582


# PROgramming Quickie

## By Gary Rice, PC SIG Newsletter Editor

When I installed P/OS version 3, I found that several of my favorite DECUS programs (such as REI - the file REIncarnator, and CVL - the Change Volume Label program) as well as some of my OWN programs no longer functioned. When they attempted to do Logical I/O to the disk, the QIO call returned an error.

I tried many things to fix the problem and finally gave up. Work arounds were the best that I could come up with.

Recently I was discussing the problem with someone I know. As a result of that conversation, I obtained a code fragment that demonstrated a way to restore functionality to logical QIOs. After "fluffing" out the fragment, here is what I ended up with.

```
; DOLOGQ.MAC        This subroutine allows a privileged task to do Logical QIOs
;                   to a mounted disk when running P/OS v3.0 or above
;
; AUTHOR:           Anonymous
;
; CREATED:          Unknown
;
; REVISIONS:        March 24, 1988 - Turned fragment into a subroutine (Gary Rice)
;
; INPUTS:           None
;
; OUTPUTS:          None
;
; NOTES:            This subroutine enters "SYSTEM STATE" Therefore, linking MUST
;                   include /PR:0 to make the task privileged enough to do it
;
;**************************************************************
;
        .TITLE      DOLOGQ
        .IDENT      /V1.0/
;
; Global definitions
;
        .GLOBL      DOLOGQ
;
; Macros
;
        .MCALL      GTSK$S,WIMP$S,SWST$S
;
; If we are on P/OS V3.0 or later, we must have the T4.LIO bit set in
```

```
; T4.STS in order to perform logical I/O to a mounted volume, or all
; IO.RLB/IO.WLB activity will fail with IE.PRI errors.  The use of
; executive vectoring should let this task function on P/OS V2.0 and later.
; The T4.LIO bit is undocumentedin the Toolkit manuals, but is described in
; the fiche.
;
DOLOGQ:     SUB         #16.*2,SP               ; We need a 16 word buffer
            MOV         SP,R5                   ; R5 => buffer
            GTSK$S      R5                      ; Get task parameters
            BCS         10$                     ; If it faled, just give up
            WIMP$S      #GI.FMK,R5,#9.          ; Get system feature masks - since this
                                                ; subfunction was implemented beginning
                                                ; with P/OS V3.0, it will fail on older
                                                ; versions of P/OS
            BCS         10$                     ; If CS, must be older than V3.0
            SWST$S      #20$,#20$               ; Set bit in system state
10$:        ADD         #16.*2,SP               ; Fix up stack
            RETURN                              ; All done
20$:        MOV         @#$VECLC,R4             ;; R4 => $Stack
            MOV         $TKTCB-$STACK(R4),R4    ;; R4 => our TCB
            BIS         #T4.LIO,T.ST4(R4)       ;; Set logical I/O privilege bit
            RETURN                              ;; All done
            .END
```

To use it, simply "CALL" it from any program that needs to do Logical QIOs to a mounted disk and is running P/OS version 3.0 or above. The code CAN be linked into P/OS v2 images. With P/OS v2, it will simply do nothing.

The following test program in FORTRAN demonstrates that the MACRO routine actually works.

```
        BYTE  BUFFER(512)                        ! A 1 block buffer
        INTEGER*2 PARM(6), STATUS(2)             ! QIO variables
C
        CALL GETADR (PARM(1),BUFFER(1))          ! Get the address of the BUFFER
        PARM(2) = 512                            ! BUFFER is 512 bytes long
        PARM(5) = 1                              ! Set to read block 1
        CALL WTQIO ("1000,1,1,,STATUS,PARM)      ! Try to read the block
        TYPE *, STATUS                           ! Will ALWAYS fail on P/OS v3
        CALL DOLOGQ                              ! FIX it
        CALL WTQIO ("1000,1,1,,STATUS,PARM)      ! and try again
        TYPE *, STATUS                           ! Works this time!
        END
```

There are some special files that you will need to include in your LINK command to get the program to resolve all of the symbols and routines that DOLOGQ uses. Those files are EXELIB.OLB and POS.STB. They can be found on the P/OS base system diskette labeled "PRODCL2" in the directory [ZZPRIVDEV].

The command file that I used to link the previous FORTRAN program which I called QIO.FTN is listed on the next page.

```
QIO/PR:0=QIO,DOLOGQ
LB:[1,5]EXELIB/LB
LB:[1,5]POS.STB/SS
LB:[1,5]PROF77/LB
/
;
; EQUATE P/OS SYMBOLS TO LUNS
;
GBLDEF=TT$LUN:5
GBLDEF=WC$LUN:0
GBLDEF=MS$LUN:5
GBLDEF=FL$LUN:0
GBLDEF=HL$LUN:0
GBLDEF=MN$LUN:0
;
; DEFINE EVENT FLAG
;
GBLDEF=TT$EFN:1
;
; DEFINE CLUSTER SCHEME
;
CLSTR=PROF77,POSRES,RMSRES:RO
;
//
```

Send me your own PROgramming Quickie and I will publish it here in this on-going column in these Newsletters. (RX50 Please)

# Workstations Section

### A New Workstation Focus Within DECUS?

### By Mark Sebern Sebern Engineering Inc. Cedarburg, WI 53012 (414) 375-2200

There was a lot of workstation activity at the Spring Symposium in Cincinnati, including a number of sessions presented by the PC SIG and other DECUS SIG's. There was also a lot of interest in the DECwindows "technology demonstration" presented in the Digital exhibit hall.

One topic of discussion involved the best way of coordinating the various DECUS activities related to workstations of all types. Suggestions ranged from beefing up the coordination activities of the current Workstation Working Group (which was formed after a widely attended BOF at the Nashville Symposium), to the possible formation of a Workstation Special Interest Committee (SIC). The pro's and con's of the various alternatives were discussed, and the SIG Council seems to be moving in the direction of putting together a "woods meeting" for representatives from the various SIG's which have an interest in workstations.

Unfortunately, a lot of this discussion took place late in the week, and many interested DECUS members may have missed the chance to participate. If YOU have an interest in workstations (including VAXstation, Macintosh, and other vendors), please let your SIG steering committee know RIGHT AWAY. For the PC SIG, the people to contact arelisted on the next page:

Lynn Jarrett
PC SIG Chair
San Diego Union-Tribune Pub. Co.
350 Camino de la Reina
San Diego, CA 92108
(619) 293-1130

Tom Hintz
PC Working Group Chair for Workstations/Macs/Pro
University of Florida
IFAS Computer Network
Bldg. 120
Gainesville, FL 32611
(904) 392-5180

Again, the Cincinnati Symposium was an exciting one for workstation activity, and the PC SIG sessions were very well attended. Whether you made it or not, your opinions on how DECUS should address this emerging technology are very important. Let your voice be heard!

# THE mini·tasker

## DECUS

## RT-11 SIG NEWSLETTER
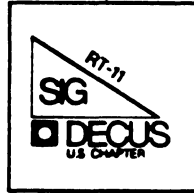
# RT-11 MINITASKER
## July, 1988

## Contents

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From the Editor:
Well, at the next-to-last minute I had to cancel my trip to Cincinnati. First DECUS I've missed since Miami Beach! So I can't give you a first-hand report of what went on. Apparently a lot of "regulars" didn't make it to this one, but fortunately Milton Campbell, our stalwart symposium coordinator was there and will give us his trip report. A brief one-pager appears in this issue, and a detailed account of the RT-11 Sessions follows next month. Scott Harrod took me at my word and sent a condensation of his idle thoughts about TeX, Newsletters, and the future of RT. (I also understand that Scott was one of the highlights of the "User Speakout in Cincinnati.) Gary Sallee's Introduction to KERMIT/RT is concluded in this issue with a description of the KERMIT protocol and file transfer. Gary has also provided a preview of the SCURT LUG meetings. For those of you who are in Southern California or can make it there at the times mentioned, those meetings are well worth attending.

Keep sending those cards and letters to

John M. Crowell
RT-11 Newsletter Editor
Multiware, Inc.
2121-B Second St. #107
Davis, CA 95616

REPORT FROM CINCINNATI
Part I

Milton Campbell
RT-11 SIG Symposium Coordinator


This is an administrative report, if I get time, I will do
something later about the content of some of the sessions.

The good news is that there was a broom closet available that
had only one chair.  I was able to reschedule the RT-11 sessions
into it.  The bad news is that RT-11 session attendance was
about the same as Nashville, so I had to put all the sessions
back in their original rooms.

Seriously, session attendance was about the same as recent
spring symposia.  The attendance at the RT-11 sessions I went
to ranged from 15 to 50.  The worst attendance I heard about
was one that had only 7 in the audience, only 2 or 3 other
sessions had under 15.  While I do not have the hard statistics,
this seems to be about the same as the last two or three spring
symposia.

There were the usual 5 or 6 1st time attendees at the Roadmap.

The RT-11 SIG put on 27 session hours, of which 6 hours had
some kind of change due to speaker cancellations.  Actually,
a total of 7 hours changed, but one replacement speaker
cancelled.  Thanks are due to Greg Adams, Rally Barnard and
Bill Walker for filling in with solid hour talks.  Special
thanks to Adam Bridge for filling in for 3 hours, including
one when he was clearly not feeling well.  On the whole, the
RT part of the symposium seemed to go fairly well, although
there was a definite lack of audience participation.  There
were relatively few audience questions at most of the sessions,
and the sessions that are driven by the audience were flat.
With the exception of the "Application Workshop", most of these
were not very useful.  Of course this is partly a function of
the maturity of the RT-11 products, but I think that it was
also a reflection of the overall symposium. The audience at a
number of the non-RT sessions I went to also lacked spark.
Several other Symposia Committee members also felt that we had
a very compliant audience this time.

The most important subject (for RT-11) was DECnet/RT, which is
comming soon (maybe this calender year).  The most popular RT-11
session (apparently) was a session discussing the use of RT-11
on the Goodyear Airships.

## LOOKING FOR A LITTLE TeX

### and

### Other Idle Thoughts


TEX


John Bullock's request in the January 1988 Minitasker for an RT implemenation of TeX caught my attention. Like Shal Farley (March 1988 Minitasker), I too have looked for an RT-11 version of TeX. I haven't had any success in finding it, but I'll add my comments anyway.

The TeX Users Group Membership List includes a list of computers on which TeX is currently running. PDP-11 is not on the list for any of the operating system; however, PDP-11 does show up in the listing of members by computer. Thus there are members of TUG who have PDP-11's, but are they running TeX on the 11? Darned if I know. A little over a year ago I wrote to several of those people asking if they had TeX running on a PDP-11 and if so where could I get information on it. I had two replies. One person said that TeX was written in Pascal so all one needed was a Pascal compiler and a linker. Since that didn't really answer the question "Do you have it running on a PDP-11?", I never followed it up. Perhaps I should have. The other reply was from a person who said that he was a member of TUG as an interested observer rather than an actual user. He didn't know of any PDP-11 implementations. He allowed that the 64kb addressing limit would be a major stumbling block.

I have also asked around at more than one DECUS Symposium, but with no better results than Shal reported in his letter. I agree with Shal in that it appears that if you want TeX on a single user system, then you'd best get a MS-DOS machine, a MacIntosh, or maybe even an Amiga. (Since the MS-DOS and MacIntosh implementations are commercial products, TeX is actually cheaper for a VAX than for a PC! That doesn't happen often.)

Shal mentioned two possible ways to port TeX to another machine: 1) port TANGLE and hence the whole WEB system in which TeX is written, or 2) port the the Pascal code generated by TANGLE. There may be a third method - start with one of the implementations of TeX in C. The article "TurboTeX: A New Port in C for Unix and MS-DOS" by Richard Kinch and Jennifer Vollbrecht in the April 1988 issue of the TUGboat (the TeX Users Group newsletter) describes one such conversion of TeX to C. In fact the methods they describe may be of more use than the actual result - particularly if a program exists to translate Pascal to Modula-2.

As Shal noted, TeX is written in WEB. The intent of WEB is not
only portability, but also good documention. The WEB source
file is supposed to contain the source code and the documention.
If the WEB source file is processed by the program TANGLE, the
result is a Pascal source file which is then compiled and linked
like any other Pascal program. On the other hand if the WEB
source file is processed by the program WEAVE, the result is a
TeX source file containing the documentation.

The input to TANGLE can include an optional change file which
modifies the main input file. The idea is to have the main WEB
source a sort of generic source file - more or less good for all
systems. Then you supply a change file which TANGLE then uses
to tailor the generic source file to the particular system.
Likewise WEAVE processes the generic file and the change file to
produce documentation for the specific version of the program -
the changes are even marked in the documentation.

According to the documention for TANGLE, TANGLE holds all of the
Pascal text in memory. For a large program like TeX, this means
that TANGLE needs large amounts of memory.

Although WEB, as implemented by Knuth, creates a PASCAL program,
there is really no reason why the same sort of scheme for
combining source code and documentation couldn't be applied to
other languages as well. In fact there are C versions of WEB.
(The C implementations of TeX do not use CWEB.) The WEB system
has also been adapted to Modula-2. See the October 1986 and
April 1987 issues of the TUGboat for information on CWEB, and
the July 1987 issue for information on MWEB.


Previewer for TeX

There is is a previewer for TeX DVI files which is written in
Modula. It is described in an article in the March 1986 issue
of the TUGboat. Obviously for best results you need a graphics
terminal. The program was written using a VAX/VMS Modula-2
compiler from the Univerity of Hamburg. It would be interesting
to know if this program would work using the Modula-2 compiler
for RT from ModulaWare, GmbH that John mentioned in his letter
in the January 1988 Minitasker. Of course even if it does work,
it isn't all that useful if you have to use a different machine
to generate the DVI files in the first place.


Older Software

It may be a strange combination of old and new, but has anyone
else tried to run Saturn Calc Version 2.3F on RT11 V5.4C (SJ

monitor)?   I'm  having  trouble with  it corrupting spreadsheets
when writing to a logical subdevice.   Is  this  a  problem  with
Saturn  Calc?   The  LD handler?  All of the above?  None of the
above?   It worked ok with RT11 V5.4A.


Faster Modems

Several companies (e.g.  U.S.  Robotics) now have 9600bps modems
for use on dial up lines.  Actually  they  are  9600bps  in  one
direction  and  300bps  in the other.  (The big print giveth and
the little print taketh away.) I  have  read  that  if  you  are
transfering  files  using  Kermit, you are better off to set the
modem for 2400bps.  The claim is that the Kermit protocol,  with
its  small  packet  size,  does  not  lend  itself  well  to the
situation where  transmit  and  receive  speeds  are  vastly
different.   Since  the VTCOM - TRANSF combination uses a longer
packet size, at least to start, perhaps it gives better  results
with this type of modem.  Has anyone tried it?  If so, what kind
of net transfer rates do you get?


SIG Newsletters

While  there are those that don't like the combined newsletters,
I for one like it.  I think it is  the  best  value  since  they
started charging for the subscription service.  Of course I turn
to the RT section first, but I usually skip through most of  the
others  as  well.  Sometimes I even find something useful in one
of the others.

I  have  also heard that there has been consideration of forcing
all newletters to use a common format.  Indeed in May 1987 a few
of  the  newletters began to use a common format.  These are the
newsletters at the beginning of the  "The  Big  One"  and  whose
names  are  shaded  in the table of contents on the front cover.
As  I  recall  the  consistant  format  was  supposed  to  make
everything  more  readable  and  also  increase  the  number  of
subscriptions.  As far  as  I'm  concerned  the  format  of  the
"shady"  newletters is neither easier nor more difficult to read
than the others.  (In fact the "easier to read" format has lines
longer  than  were  recommended  in  an  article  in  Digital's
Desktopics publication.) Certainly I can't imagine that  if  all
the SIG's used the same format, the number of subscribers to the
Newsletters would suddenly increase.

There  is  a change in the Newletters I would like, though.  Put
the expiration date on the mailing label.  As it is, the mailing
label  has  your  Decus number  and  the  date  your  order was
processed.  It's interesting to know when  they  processed  your
order,  but  when  I  look at the label I'd rather know when the

subscription runs out than when I paid for it. Is really all that hard to put the expiration date on the label?


After RT

Both John and Shal mentioned another topic of interest to me. It's what I have called "If not RT, then what?".

I'm one of those "small users" that John mentioned in his letter - someone who wants a "simple, uncomplicated, development and applications environment combined on the same hardware". Indeed an LSI-11 based system running RT-11 has provided just such an environment, but there are times it sure would be nice not to have the 16 bit address limitation. (Implementing TeX is an example.) So if I want to upgrade my system, what are the choices. I have thought of several.

VAX/VMS? No - too expensive. If the hardware costs don't get me, the software costs most certainly will. Last fall in Anaheim Ned Rhodes gave a talk comparing TSX and VMS. As I recall the software costs for the VAX were about 3 times that of the PDP. Of course he was talking a multi user system, but presumeably the ratio would be more or less the same for a single user system.

A newer PDP-11? Maybe. My system is far from the latest and greatest, so I can still increase perfomance simply by changing processor boards and adding some memory. I'd still have good old RT, but the addressing limitations remain. From a hardware standpoint this is probably the cheapest upgrade. Although the software will be less than for a VAX, it's still going to be more than for a PC.

An 80386 or 68020 based system? Which one? What operating system?

VAX/RT? Would be nice, but it would have to be priced competively with 80386 and 68020 systems. As Shal pointed out, that is the rub. Can DEC or any one else sell enough to get back the development costs? Sad to say I'm afraid this is a case of Digital doesn't have it now, and it's too late to get it.

I'm sure there are plenty of opinions out there on the ideal single user system. I'd be interested in reading them, and Jack Crowell is usually looking for something to print.


Scott B. Harrod
21084 N. Middleton Dr.
Kildeer, Illinois 60047

Mr. John M. Crowell
RT-11 Newsletter Editor
Multiware, Inc.                      April 27, 1988
2121-B Second St.   Suite 107
Davis, CA          95616

Subject: SCURT LUG Meeting Schedule

Dear Jack:

The SCURT (Southern California Users of RT-11) LUG holds regular meetings on
the forth tuesday, 9:00 am, on the CalTec campus (Room 151 Arms) in Pasadena,
California.  Below is a list this year's scheduled topics.  For a location map
or to be put onto the mailing list, please call Gary Sallee or Shal Farley.

SCURT is looking for meeting speakers and topics. If anyone is interested in
speaking or has a topic suggestion, please call Gary or Shal.

                        Sincerely,


                        Gary F. Sallee
------------------------------------------------------------------------------
               Southern California Users of RT-11
                   Digital Equipment Users Society

June 28, 1988: Hardware for Network Wiring Systems

July 26, 1988: Interface and Formats of High Capacity Tapes

August 23, 1988: The Design of a 5th Generation Continuous UPS

September 27, 1988: The 11/73 in VME Real Time Acquisition

October 25, 1988: Digital's Networking and Compilers for RT-11

November 22, 1988: The Transition to Programing in a 4GL

December 20, 1988: RT11 (TSX+) Hints, Kinks and Magic

January 24, 1989: RT11 Graphics & Desktop Publishing

*****************************************************************
Chairman:            Shal Farley          (818) 351-5493
Program Chairman:    Gary Sallee          (714) 970-2864
Membership Chairman: Greg Adams           (818) 980-6622
Tape Librarian:      Shal Farley          (818) 351-5493
Landlord:            Jonathon D. Melvin   (213) 202-1081
DEC Rep.:            Rich Milligan        (213) 417-4454

## Kermit/RT/TSX Introduction
### Gary F. Sallee

From Brian Nelson's K11ART.DOC, K11F85.DOC, and K11INS.DOC
Presented at the Regular SCURT LUG Meeting
Southern California Users Of RT-11
Pasadena, California

### ABSTRACT

This is an introduction to Brian Nelson's KERMIT from the
University of Toledo as it may be used in an RT-11 or TSX-plus
computer system. Topics covered will be what Kermit does, how I
use Kermit, what SYSGEN options are needed, how to set up the
needed hardware, how to install Kermit, how Kermit talks to
other Kermits, how to use KERMIT.INI, how to set up a dialing
list, and anticipated futures by Toledo and by SCURT.

### PART 2

(See June, 1988 Newsletter for Part 1.)

### THE KERMIT PROTOCOL

The Kermit protocol is designed to operate over normal
asynchronous terminal lines. All data and commands are
transferred with a packet oriented protocol, basically
consisting of a start of packet character (normally SOH),
followed by length, control, data and check sum fields.
Communications is half duplex. So for every packet sent, the
sender must wait for either an acknowledgement packet (ACK) or a
negative acknowledgement packet (NAK). Transmission is in
ASCII, with no requirements needed for the transmission of eight
bit characters or control characters other than the choice of
control-A for marking the start of a packet. All "control"
characters imbedded in the data are prefixed to convert them to
printable characters. The same applies to eight bit characters
if required by the characteristics of the line.

Since there are many different implementations of Kermit, the
protocol provides a mechanism by which the capabilities of two
connected Kermits can be negotiated to allow for differences in
the level of protocol support. Examples of optional protocol
features include data compression and transfer of file
attributes.

### TRANSMISSION OF FILE ATTRIBUTES

One of the things that two Kermits exchange before any file
transfer is an information packet, this packet tells the
receiving Kermit about itself. The last field in this packet,
the "CAPAS" mask, tells Kermit if the other one can process

attribute packets.  If two Kermit-11's are communicating, they
will find that each can do so, and the sender of a file will
then send over attribute packets indicating the need (or lack
of) for binary transmission, based on the file organization,
file type and protection code (for RSTS/E).

One of the optional features of the Kermit protocol is the
ATTRIBUTE packet.  The attribute packets allow a Kermit program
to send to a receiving Kermit information regarding the file
organization, size, cluster/retrieval size, protection and so
forth.  There is even a system dependent attribute packet type
that can be used to transfer things like the RMS11 IFAB (the
RMS/FCS attributes).

If the sending Kermit-11 is running on RSTS/E, RSX11M/M+ or P/OS
it will also send a copy of the RMS/FCS attributes so the
received file will be identical (to FCS and/or RMS) to the copy
on the sender's system.  Since other implementations of Kermit
may use this special system attribute packet, Kermit-11 always
sends an attribute packet telling the receiver what hardware and
operating system it is running on, and thus will only use such
data if they are compatible.  Of course, there will be times
when a file may be binary and Kermit-11 can't tell so, many
Kermit's have a SET FILE BINARY and SET FILE ASCII to allow the
user to override defaults.  Kermit-11 also has a SET FILE
AUTO/NOAUTO to disable it from trying to determine a file's
binary status.

## HOW KERMIT TRANSFERS A FILE

The means by which Kermit transfers a file is quite simple; the
protocol includes a START OF HEADER (normally a SOH, control A),
after which follows a LENGTH field, then a SEQUENCE character
and a TYPE field.  After this, the DATA follows, with a check
sum trailing the data segment.  The check sum can be one of
three types; 1) basically an additive sum wrapped into 6 bits,
2) the same but 12 bits in size, and 3) a CRC based check sum.
The sequence number increments for each packet sent, module 64.

The packet format is:

```
+-------+-----------+-----------+-------+-------------+-------+
| MARK  | char(LEN) | char(SEQ) | TYPE  |    DATA     | CHECK |
+-------+-----------+-----------+-------+-------------+-------+
```

where all fields consist of ASCII characters, and the char
function converts a number in the range 0-94(10) to a printable
ASCII character by adding 32(10).  The MARK, LEN, SEQ and TYPE
fields are one byte, the DATA field is variable in size, and the
CHECK field is one to three bytes in size.

The MARK (normally control A) signifies the start of a packet.
The length field tells how long the rest of the packet is.  The

SEQ field is used to insure synchronization used to detect lost
or duplicate packets.  The SEQ number wraps around every 64
packets due to the need to encode it as a printable ascii
character in the range 32 (10) to 126 (10).  The TYPE field
specifies whether the packet is a DATA or CONTROL packet.  The
DATA section is used for the actual transfer of data or
informative messages from a Kermit server, this field can be up
to 90 characters in length.  Any character whose low seven bits
fall in the range of 0 to 37 (8), i.e., char and 177 (8) is less
than 40 (8), will have the value 100 (8) exclusive or'ed
(xor'ed) with itself and be prefixed by a shift character, " #".
Other shift characters may be use for eight bit characters if
the line characteristics require such.  Data compression may
also occur in the data field, this is done with yet another
shift code and byte count sequence.  The CHECK field is a check
sum, either a one character, two character or three character
CRC check; the sender computes it and the receiver must compute
it and compare.  A check sum mismatch will result in the
receiver sending a NAK packet (negative acknowledgment) which
directs the sender to resend the NAK'ed packet.  The packet may
be followed by a terminator (likely an ASCII 13).  This
terminator is NOT part of the protocol and is sent only to tell
the receiver that a "line" is present.  Not all Kermit
implementations require this; all Kermits will discard data
outside of a packet in any event.

Error detection and recovery is by check sum, as noted, and by
packet read time outs.  If the packet should be corrupted the
check sum will be incorrect, the receiver will NAK the packet.
If an expected packet never arrives within the timeout period,
or if the received packet is not the expected one (as determined
by the SEQ field) the packet will also be NAK'ed.  There are
limits as to how many times an expected packet will be NAK'ed
without aborting the current operation.  The retry limit can be
changed with a SET RETRY n command.

## PACKET TYPES

    D Data
    Y Acknowledgement (ACK), text may be in DATA field
    N Negative Acknowledgement (NAK)
    S Send initiate (Send-Init)
    R Receive Initiate
    B Break (EOT, end of transmission)
    F File name header
    Z End of file (EOF, end of current file)
    E Error packet, text may be present in DATA field

    G Generic SERVER command.  The first character in the data
       field will be a command to a server, arguments may follow
       that character.
          I Login, user and password follow in data field
          C CWD, change working or default directory.

```
L Bye, Logout server
F Finish, Exit server, but do not log out
E Erase, delete files on server system
D Directory query
U Disk space usage query
T Type a file onto local kermit
R Rename file(s) on server system
K Copy file(s) on server system
W Who's logged in, as in show sys, sy/s, dev tt
M Send a terminal message to a user
H Help, the server responds with commands it can do
Q Server status query
P Program, run a program
J Journal
V Variable, alter a Kermit setting
```

C Execute host command.  The host command follows in the
data field.

Note that some of the generic server commands, as well as the C
packet (CWD), may not be feasible for a given environment.  For
instance, the REMOTE LOGIN command, which sends the generic I
command to the server, can only be done under RSTS/E; the
generic U command (disk space) is meaningless under RSX unless
one wants the free space on the entire volume.  No Kermit server
will abort on receiving a packet it can't execute, it will
simply send an error packet with an informative message saying
it can't process the requested function.

### A TYPICAL TRANSACTION

An example of a Kermit-11 kermit telling a VMS Kermit-32 server
to expect a file follows.  The Kermit-11 command was SEND
JUNK.TST.

```
(0)PDP sends:   A.   S~* @-#Y3~(  ,
(0)VAX sends:   A, Yp/ @-#Y3~!
(1)PDP sends:   A-!FJUNK.TST,-4
(1)VAX sends:   A%!Y,i
(2)PDP sends:   A'"D$ set ter/vt100#M#J$ xcc :== ccl cc
                #M#J$ xas :== ccl as#M#J!4S
(2)VAX sends:   A%"Y.5!
(3)PDP sends:   A%#Z,X"
(3)VAX sends:   A%#Y/R9
(4)PDP sends:   A%$B! #
(4)VAX sends:   A%$Y+I̲
```

In packet number zero, the Kermit's exchanged information
regarding their capabilities.  The PDP-11 sent an "S" packet
with the data for its maximum packet length, default time out,
number of pad characters to follow a packet (none, hence the
space), use a null for padding, end of line terminator (a <CR> +
32), the prefix character for control characters, a "YES" to say

the it can prefix eight bit characters with the default, that it
would like to use CRC block checks, that it will use a tilde for
data compression, and the "CAPAS" mask, which here says that it
can process attribute packets (discussed later).  Since the VAX
also sends a "3" for the check sum type, they will both switch
to CRC checks on the following packets.  In packet 1, the PDP11
sends the filename the VAX should use for the file it creates.
The VAX then sends the acknowledgement.  In packet three, the
PDP sends the first (and only for this file) packet of data.
Note that the sequence " #M #J" is a carriage return line feed
sequence with 100 (8) xor'ed into each character.  The " #"
character informs the other Kermit that it must xor the next
character with 100 (8).  In packet three the PDP11 sends an EOF
packet, the VAX acks it.  In packet four, the PDP sends a break
packet which tell the VAX that no more files (of a possibly
wildcard group) are coming and the VAX Kermit acks the break
packet.  Both Kermits now switch to the single character check
sum and the VMS kermit enters the server idle state.

More specific information regarding Kermit packets and state
transitions can be found in the references listed at the end of
the article.

## THE PDP-11 KERMIT-11 IMPLEMENTATION

The Brian Nelson (Toledo) version of Kermit-11 is written in
Macro-11 and can assemble and run on RSTS/E, RSX11M, RSX11M
Plus, P/OS, TSX-plus and RT11.  The RSTS and RSX file system
interface is via RMS11 version 2, while the RT11 interface
attempts to emulate the RMS11 subsystem.  The choice of Macro-11
for the implementation language was made for several reasons,
one being the availability of the assembler on all systems and
another being speed and compactness of the code.

RMS11 was used for RSTS/E and RSX to provide a common I/O
interface to the host file system.  Additionally, Bob Denny of
Alisa Systems further extended the RMS interface to support
remote file access over DECNET with Kermit, allowing commands
such as SEND NODENAME::[BRIAN.FUBAR]FILE.TYPE and other remote
file accesses over DECNET.  RMS11 version 2 also provides a very
simple and powerful means of doing wildcard searching, file
renames and file deletion via the $PARSE, $SEARCH, $RENAME and
$DELETE macros.

Points against RMS basically amount to it's size, RMS is quite
large even if overlayed.  This is helped by using the segmented
RMSRES available on RSTS/E and RSX11M Plus, though there is no
remote file access for RMSRES in the current release of
Kermit-11.  The other objection to RMS will come from RSTS/E
users, who are used to using files that normally lack file
attributes.  This is overcome by the ability of RMS V2 to create
stream ascii files.

The RSX11M/M+ and P/OS versions of Kermit-11, like the RSTS/E
and RT versions, receive eight bit data assuming no parity is
used.  Where parity is a must, Kermit-11 has to use a prefixing
scheme for eight bit binary data.  Like the RSTS/E version,
binary files are created as FIXED no carriage control files such
as used for task images.  Note that parity generation is done by
software in Kermit-11.  The P/OS version runs under control of
DCL.  Support for the PRO TMS (Telephone Management System)
option is now included.

The RT11 and TSX-plus version of Kermit-11 maintains source
module compatibility with the RSTS/E and RSX versions.  Each
version of Kermit-11 has it's own source file to deal with the
operating system, for RSX it is K11M41.MAC, for RSTS/E they are
K11E80.MAC and K1180S.MAC, and for RT11 they are called
K11RT*.MAC.  Apart from these specific files, all other source
files are shared.  The RT11 Kermit-11 can use either the version
5.x XL and XC handler for high throughput, or it can use
multiple terminal service to do all it's terminal I/O.  This
second option allows the use of any interface supported,
including the PDT150 modem port, DL/DLV11's and DZ/DZV11's.  The
drawback is overhead, the RT11 MT service can't sustain a rate
much past 1200 baud at most.  This is not a problem for Kermit,
however, due to it's half duplex nature and the fact that no
packet received is ever longer than the ring buffer size.  The
only problem is in when Kermit-11 is running as a terminal
emulator (the Kermit CONNECT command) where the data coming from
the remote host can easily overrun the executive's buffer.  A
SET RT11 [NO]FLOW command was added to force Kermit-11 to send
its own flow control to the host via XON and XOFF.  TSX-plus
users can connect to CL:  for dialing out, the exact means is
documented in the Kermit-11 users guide.  The disk i/o emulates
the RSTS/E and RSX RMS11 version, and each executive directive
has its error codes mapped into an unique global error code,
with the symbolic names corresponding to the nearest RMS11 error
name.  Wild carding is handled, of course, by non
file-structured access to the directory on the desired volume,
and supports full RT11 wild card file names.

## FUTURE DIRECTIONS

SCURT Additions:

CREATE FILE NAME, by Shal Farley.
Automatic SET SPEED when the modem connects, by Gary Sallee.

These two additions are working in house and need to be
integrated, by maybe January 1988.

Toledo Additions:

With the advent of packet switched networks and satellite
communications the Kermit protocol will likely be extended to

increase efficiency over such links. The main problem is the half duplex nature of Kermit. The half duplex packet acknowledgments can take up to several seconds in transit thus drastically reduce the throughput. There are several new possibilities under discussion.

## REFERENCE MATERIAL

The above describes only the PDP-11 Kermit-11 implementation. For further reading please see:

> "Kermit: A File-transfer Protocol for Universities"
>     Frank da Cruz and Bill Catchings
>     BYTE Magazine, June/July 1984

> "The Kermit Protocol Manual, version 5"
>     Frank da Cruz April 1984
>     Columbia University Center for Computing Activities

## INFORMATION ON OBTAINING KERMIT

> KERMIT Distribution
>     Columbia University Center for Computing Activities
>     7th Floor, Watson Laboratory
>     612 West 115th Street
>     New York, N.Y.  10025

Kermit is also usually found on the Decus symposium SIG tapes. Kermit-11 is available from DECUS as number 11-731

## WISH LIST

1. Allow device DOC:  or DK:  for KERMIT.INI.

2. Program TRANSFER to use SET PAUSE and XON, XOFF.  Pause at a <CR><LF> or at 63 characters, which ever comes first.

3. Send file protection status for RT-11 and TSX-plus.

4. Add WHO for TSX-plus.

5. Add hooks to allow external processing of data or commands.

    5.1. Allow command files to run through CONNECT mode.

    5.2. Allow custom data compression and expansion.

    5.3. Allow custom data encryption and decryption.

    5.4. Allow server for X-Window.

    5.5. Allow directory tree search through devices and logical devices.

5.6. Allow entire custom user interface, with Kermit file
     transfer.

5.7. Allow entire custom file transfer, with Kermit-11 user
     interface.

**Digital hardware that Kermit is currently available for:**

| Machine | Operating System | Program Language | Contributor |
|---------|------------------|------------------|-------------|
| DEC PDP-11 | MUMPS-11 | MUMPS-1982 | Cornell U |
| DEC PDP-11 | RSTS/E | Macro-11 | U of Toledo |
| DEC PDP-11 | RSX-11/M | Macro-11 | U of Toledo |
| DEC PDP-11 | RSX-11/M+ | Macro-11 | U of Toledo |
| DEC PDP-11 | RT-11 | Macro-11 | U of Toledo |
| DEC PDP-11 | RT-11 | OMSI Pascal | U of Toronto |
| DEC PDP-11 | TSX-plus | Macro-11 | U of Toledo |
| DEC PDP-11 | Unix 2xBSD | C | Columbia U |
| DEC PDP-11, ... | Unix V7 | C | Columbia U |
| DEC PDP-8 | OS8, RTS8 | PAL-8 | R. Hippe |
| DEC Pro-3xx | P/OS | Bliss, Macro | Stevens I.T. |
| DEC Pro-3xx | P/OS | Macro-11 | U of Toledo |
| DEC Pro-3xx | Pro/RT | Macro-11 | U of Toledo |
| DEC Pro-3xx | Venix V1 | C | Columbia U |
| DEC Pro-3xx | Venix V2 | C | Columbia U |
| DEC Rainbow | CPM86 | ASM86 | Columbia U |
| DEC Rainbow | MS-DOS | MASM | Columbia U |
| DEC Rainbow | QNX 1.x | C | Merrell-Dow |
| DEC VAX | Ultrix-32 | C | Columbia U |
| DEC VAX | VMS | Bliss,Macro | Stevens I.T. |
| DEC VAX | VMS | C (VAX-11 C) | Columbia U |
| DEC VAX | VMS | Pascal | U of Toronto |
| DEC VAX, ... | Unix 4xBSD | C | Columbia U |
| DEC VT-180 Robin | CPM80 | Turbo Pascal | Jeff Duncan |
| DEC VT-180 Robin | CPM80 2.2 | M80,LASM | ACC |
| DECmate-II,III | CPM80 2.2 | M80,LASM | ACC |
| DECsystem-10 | TOPS-10 | Bliss, Macro | Stevens I.T. |
| DECsystem-20 | TOPS-20 | MACRO-20 | Columbia U. |

# LW Handler for Apple Laserwriter

## John M. Crowell

By the time this appears in print, I should have finished (as much as I finish anything) my LW handler for the Apple Laserwriter. Before I send it to the DECUS Library, however, I'd like to have it shaken down by as many people as possible.

Basically, it is a serial line printer handler that translates text into Postscript or allows postscript programs to pass through unaltered. Font seletion, size, margins, page sizes, etc. are settable by escape sequences and defaults are SET-able.

This handler should work for just about any Postscript device including the Laserwriter, and DEC's Scriptprinter. I'll be using it on a PRO-350, but it'll work with normal DL-type serial ports too.

If you have a Postscript device on the end of a serial line and would like to field test this handler (and send me a report on how well it performs or how badly it doesn't), drop me a line (and a blank floppy) and I'll send you a copy.

John M. Crowell
Multiware, Inc.
2121-B Second St. #107
Davis, CA 95616

I guess I should say the usual words about LaserWriter being a trademark of Apple Computer, and Postscript probably belongs to Adobe.

DECUS
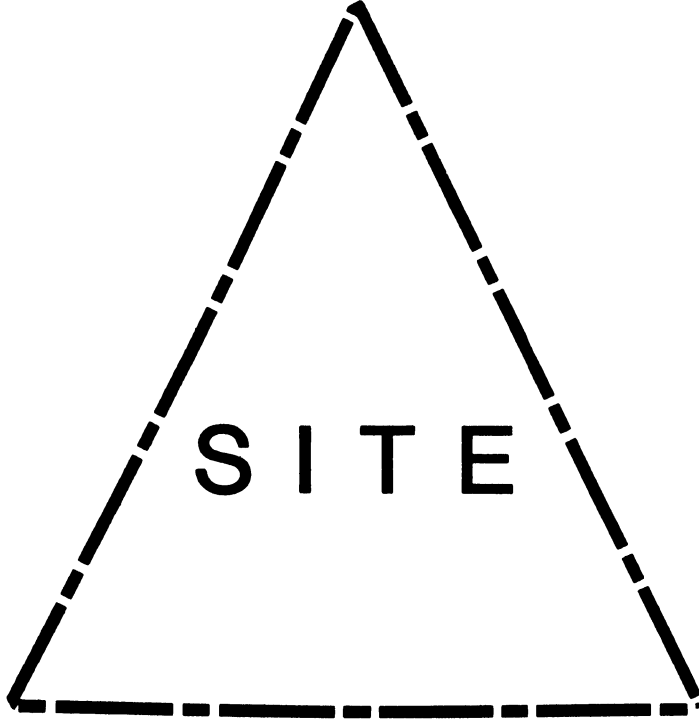
SITE

SIT

# LETTER FROM THE EDITOR

Welcome to the July issue of the Site,
Management, and Training SIG Newsletter.

This month we have a very interesting article on
power available in the United States from Bruce
Barton.

Next month look for details on new working groups
formed at the Spring 88 Symposium in Cincinnati.
Submissions should be sent to:

Gregory N. Brooks
Washington University
School of Medicine
Department of Pediatrics
400 South Kingshighway
St. Louis, MO. 63110
(314) 454 2237

I can accept VMS backup tapes, tar format tapes,
WPS Plus documents, Mass 11 documents, IBM PC
5 1/4 (low and high density) floppies (Word Perfect,
Microsoft Word, Mass 11, or WPS), and of course
good old Runoff source.

I'm rather new to BITNET but you can send me
mail or submissions via BITNET to:
BROOKS_G@WUMS

Look forward to new submissions and/or comments
from our readers.

Greg Brooks

# THE RA60 AND THE ART OF AVOIDING 220 VOLT POWER ALL ABOUT AC POWER

## By Barton Bruce, Cambridge Computer Associates

Editor's note: The following was extracted from the
Pageswapper VAXnotes system for publication.

In reading all the above (previous VAXnote
messages concerning RA60 power) it is clear there
is a considerable amount of confusion about the
power generally available in the US. It is really not
terribly complicated. There are always exceptions
and weird things that have interesting histories, but
most power you will find near your computer room
falls into a few simple categories. Read on and I will
either clear up a few things for you or totally con-
fuse you.

Lets start with single phase 'house' or small office
power. The immediate source is a single phase
distribution transformer generally with a single
center-tapped secondary winding. The centertap is
grounded, and is referred to as the 'neutral', or
'grounded current carrying conductor' or, especially
in reference to color coding, the 'identified' conduc-
tor. This neutral is electrically half way between the
ends. The voltage we normally get in such service
ranges from 220 to 250 across the two ends (or
'hot' wires), and obviously is 110 to 125 from either
hot leg to the neutral. If you have ever wondered
why some devices carry a nominal 117 volt rating,
just average 110 and 125. If this is hard to visual-
ize, let us draw a simple analogy. A flashlight cell is
generally about 1.5 volts (actually 1.54 for a plain
zinc-carbon cell). The two cells stacked in a
flashlight have 3 volts from end to end, and 1.5
from the center connection to either end. Note,
though that the center connection would be (-) in re-
lation to one end and (+) to the other.

For house power it is desirable to have the voltage
to ground be as low as possible from any 'hot' wire,
and yet have as high a voltage available where work
needs to be done so the least amps will do the job.
With the center point grounded, people are only ex-
posed to a nominal 120 volts to ground, but 240 is
available to do the work at one half the amps that
would be needed at 120 volts. One half the amps
needs one half the wire size, etc... Another nice
benefit is that a 3 wire circuit carrying the 2 hot
legs and the neutral can be broken down to serve 2
sets of 120 volt loads which if wired separately
would need 2 wires each, or 4 wires. When fed to-
gether, the neutral carries only the difference, and
not the sum of the two 120 volt loads fed from op-
posite hot legs. If the 120 volt loads are both ex-
actly equal, there is NO current in the common
neutral wire. Three phase power gets a little more
complicated, but is still easy to understand. If you
imagine a generator with 3 separate windings each
physically arranged 120 degrees from each other
such that the sine wave of the alternating current

in each winding looks exactly the same, but is phase shifted 120 degrees from the next winding, you have a good starting point to understand how it all works. Each of those windings could be kept separate, and each wired to the corresponding 3 similar and separate windings of a motor. The connection between generator and motor would require 6 separate wires - 2 each for the 3 separate windings in each machine. As the generator rotated, the magnetic fields in the motor's 3 windings would change in the same rotary sequence that the corresponding windings have current induced in them by their relative motion to a magnetic field. This rotating magnetic field is what makes 3 phase motors so nice. They really want to turn. A single phase motor would really prefer to just sit and hum and get hot if some extra tricks weren't played to coax it to spin.

Now let's look at those 3 separate windings, each with 2 wires. There is no need to keep them all separate. There are 2 standard ways to interconnect them.

If 1 wire from each winding were to be connected together to make a common point and that point were to be grounded and labeled 'neutral', and the 3 remaining wires were diagrammed as points on a 3 pointed star radiating out from the common center (and labeled 'hot' or 'phase' legs/wires), you would have what is called a STAR or WYE connected 3 phase 4 wire circuit. If, rather than running a motor, each hot wire were to be used separately for a single phase connection between itself and the common centerpoint neutral, and if each of our windings were 120 volts, we could power 3 separate 120 volt circuits and the common neutral would carry ONLY the unbalanced current if the 3 loads were not equal.

This is almost that same as our single phase neutral that only carried the difference, but here we have a 120 degree phase relationship, so it is not quite so simple. The maximum the neutral would carry is what any 1 phase leg carried when the other 2 had NO current flow. The minimum is no amps at all if all three phase legs are equally loaded. This is great because we get the work of 3 separate 2 wire circuits using only 4 wires, and like our 120/240 single phase example we have not only a maximum of 120 volts to ground, but have a higher voltage between phase legs to deliver more power at less amps to loads that are designed for it.

BUT, we do not quite get 240 volts. In our star, each winding was 120 volts, but also had its sine wave 120 degrees shifted from either other winding, so 2 windings that seem to be connected end to end via the common (grounded neutral) center point don't have their end points apart by the simple sum of their voltage the way our 2 flashlight cells did. If you think of 3 sine waves graphed on top of each other 120 degrees apart (each peaks 1/3rd of a full cycle later than its predecessor) it should be clear that no 2 reach full voltage at the same time. The actual voltage between any 2 hot legs is the the square root of 3 (1.7326...) times the hot leg to neutral in a star connected circuit. 208 volts is 1.7326 times 120. That is where the common 208Y/120 volt power comes from. Another very popular combination is 480Y/277 volt power, but more of that later.

The other common connection is DELTA. Simply connect our 3 separate windings together to form a triangle - each of the 2 ends of any winding connects to a different other winding. The voltage between these corners may be any of several popular voltages ranging from 240 to 440 or 480 or 550 or even 600. Common electrical wire is rated up to 600 volts. Beyond this 'barrier' is another world of higher voltage power distribution, and is not what we are talking about here.

Basic DELTA power has no neutral halfway point and may not have any connection to ground at all! No-ground lets the whole circuit 'float' above ground at any voltage it wants, much as you do as you shuffle across a rug in winter getting a static charge thousands of volts away from whatever you zap when you get close. In the floating DELTA circuit it may be some weak piece of insulation that can hack the nominal voltage but not the static voltage that gets zapped. To eliminate this, some part of a DELTA circuit may be grounded. It might be a corner. If the circuit voltage were 240 volts, the curious programmer trying to connect his computer would find the following confusing state of affairs. There would be 240 volts between any 2 of the wires, and to ground 0 volts from 1 wire and 240 volts from the other 2.

This is not exactly like home power, and where is the 120? Obviously there isn't any. But if this were in a small factory that needed a bit of 120 volt power, but certainly was too small to need any extra transformers, another trick is pulled. If a

center-tap in the middle of one of the sides of just one of the windings were to be grounded instead of a corner, and wired as the neutral with the 2 ends of that winding being our 2 hot legs, we get vanilla that is exactly like what we get at home. EXACTLY. But, in that factory we still have that 3rd corner of the DELTA triangle. Don't even dream of connecting between this guy and the grounded neutral on the far side (it is actually 208 volts to ground in this example). Just as the NEC (National Electric Code) makes a issue of having the GROUNDED CURRENT CARRYING CONDUCTOR 'Neutral' colored white or light gray (as opposed to the frame bonding safety ground, colored 'green'), it also REQUIRES this 3rd corner of a DELTA wired this way to be ORANGE or otherwise distinctly flagged (at any point where a connection could be made and the neutral is present - i.e. in any box or cabinet, but not the whole length of the wire in a pipe) to identify it as the 'WILD Phase' so no one ever uses it with the neutral. See NEC 215-8.

If you have a true floating DELTA, it is possible to derive a central, groundable midpoint using only 3 auto-transformers (single winding inductors - no separate primary/secondary windings) wired star connected. You get 240Y/139 volt power (yuk). If each auto-transformer had a partial winding tap, you could get 125 volts to your new midpoint and, yes, between these taps there would be 208 (i.e. regular 208Y/120). For this configuration the NEC requires the autotransformer full winding be able to carry the potential full unbalanced (3 phase legs not equally loaded) current to the neutral wire. The vanilla 'boost/buck' autotransformer is NOT so constructed, so a special one is required.

There is a Delta that is actually only 2 delta connected windings with the 3rd simply left out! It is call aptly 'Open Delta', and for many purposes behaves like the full delta.

The best suggestion is if you find DELTA power of any flavor and need 208Y/120, forget all 'cute' ideas and simply put an appropriate voltage ratio fully isolating 3 phase delta-wye (primary, secondary) transformer in there and get honest 208Y/120 out, regardless of what was or wasn't grounded on the input.

This is a feature of most transformer based computer room power conditioners (e.g. Dec's H9772-xx), but could be done with just an inexpensive transformer.

Note that the transformer was specified as DELTA primary and WYE secondary. You won't get a WYE primary, normally. The DELTA primary connects equally well to a WYE or DELTA source - just get the right voltage.

The NEC has specific categories of allowable devices and locations. There is an up to 120 volt to ground category (their wording includes 'nominal' - so 125 is included). There is yet another that tops at 277 volts to ground. That is the phase to neutral voltage for 480Y/277 circuits voltage is extremely popular. Even a modest 5 ton computer room air conditioner with electric reheat and humidifier needs a formidable hunk of wire to run it at 208Y/120, but, as an example, uses a significantly smaller cable if at 480Y/277.

A plain 2 wire branch circuit using a phase leg and the neutral and protected by a single pole 20 amp breaker normally can be loaded to 80% (16 amps). Any quality wall switch carries at least a 277 volt rating. Standard fluorescent fixtures are readily available with either of 2 different voltage ballasts, 120 volt or 277 volt (note: NOT 240 volt!) - same price. At 120 volts and 16 amps you can put 1920 watts on that circuit, at 277 volts you get 4432 watts. Many buildings do their general distribution and power everything possible at 480Y/277, and have small transformers on each floor to supply the 120 volt outlets. Seldom are these transformers then large enough to carry a sizable new computer. 480Y/277 is nice! But if that is what is lurking in your computer room you will need a transformer. The 480Y/277 is generally hauled over to the center of the computer room, fed into a power conditioner / distribution system (fancy transformer + integral breaker panel) sitting smack in the middle of the power hungry cabinets, and transformed, filtered, voltage stabilized down to 208Y/120, and from there distributed.

If you still have any RP04 class drives you really need 3 phase, and if any 2 phase legs are interchanged, your disk spins BACKWARDS. Newer devices, such as CDC-9766s typically come at 208 volts single phase. The cord has 3 wires. The green frame ground, and 2 phase legs. NO neutral.

Many DEC cabinets (now we get to where this all was heading - finally) want 30 amp 125 volt (same as 120, or 115) 3 wire outlets (frame ground, neutral, and 1 hot wire). If their needs are a bit piggier, this turns into a 4 wire circuit (just add another hot wire - must be a different phase leg so neutral conductor current doesn't climb). So far either of these 3 or 4 wire popular DEC connections could be fed equally well from a 208Y/120 3 phase service, or plain old 120/240 single phase. For the piggiest cabinets they want to add yet another phase leg (hot wire) bringing the total to 5 wires. This delivers 3 times what they got with a 3 wire cord. Can you blame them?

But, the same rule applies. The newly added phase leg MUST be different from the previous 2 again to keep neutral current down. Single phase power can't do this. You need 3 phase power. All this to power a cabinet that in many cases ONLY needs 120 volts 2 wire (hot + neutral) + the 3rd safety green ground to each of several separate loads in the cabinet.

Ignoring the machines that really need the higher voltage or 3 phase, a large cabinet nominally needing 30 amps 208Y/120 could be fed with 90 amps 120 volts! Why not! You could take the 3 hot legs in the cabinet's cord and feed them the from the same phase leg with a 90 amp breaker, BUT the wires are then NOT individually protected, AND the neutral wire in the cord originally sized for 30 amps now carries up to 90 amps. The same goes for any similar neutral wiring inside their power controller. DON'T DO IT.

You could buy 3 old 861-C 120 volt controllers each with a 3 wire 30 amp 125 volt cord and plug and provide each with its own 30 amp 125 volt branch circuit. The individual 120 volt loads in the cabinet could then be evenly distributed between the 3 controllers hogging the bottom of the cabinet. The controllers can be set for remote control and wired to all switch together, if necessary.

DEC's remote control wiring seems to just be to turn things off and on all together. I have never been aware of any sequencing they do at the power controller level. One of the 3rd party power controller manufacturers (either Marway or Pulizzi) has been claiming some power sequencing ability in their controllers. DEC's RA81 disks can be sequenced with the drive's sequence cables. The RA60

drives never had this capability. From their respective books the following startup currents were extracted. The vastly different times makes this an apples to oranges comparison. These are all just the 120 volt 60 Hz ratings. RA81s run at 7.8 amps, but take a 35 amp peak surge for 4 seconds to start. RA60s run at 7.5 amps but pull 190 amps for 1/2 cycle (1/120 second) to start.

If you do not have 120/240 or 208Y/120, plug your RA60 into a separate 120 volt outlet, but if your wiring is that old, pray. Some households do run ranges and dryers and water heaters on 208 rather than 240 volts and don't even know it. If you are in a large CONDO or apartment building, there is a fair chance there is 208Y/120 power. They may only bring 2 phase legs to any one tenant (so they can use the cheaper 120/240 single phase style breaker panels) and they give different pairs of 2 phase legs to different tenants to balance the load. You still only get 208 between the two hot legs.

Simple resistance heaters will use 75% of their 240 volt wattage at 208 volts ((208/240)**2 ). At least until the voltage drops so far they stall or burnup overheating, motors will fair somewhat better because as the voltage drops, the motor will draw more amps (as it tries to maintain synchronous speed) rather than less as a heater would. Many window air-conditioners have a dual rating and just produce less cooling at 208 volts but run. Some MUST be retrofitted with a 'HARD START' or low voltage kit because they were originally not engineered as conservatively. This may be an additional run capacitor, or a small temperature sensitive varistor to wire across the run capacitor to give higher starting torque. Some devices simply can't be run on low voltage and are best dealt with by using a 32 volt boost/buck auto transformer wired to boost. A developer building such a building can often simply order appliances setup for 208 volts. Heater coils are sized accordingly. The tenant gets stuck ordering an air conditioner for the wrong voltage because no one told him he had 208 volt power.

Of course there are many other problems, such as power factor where current drawn may not be in phase with the voltage, but they are beyond the scope of this note.

# UNISIG

## Editor's Thoughts

This month, we have three articles on three very diverse topics. First is **What's a SVID?** by James Livingston. Jim gives us a brief recap of the development of Unix, setting the stage for an explanation of the SVID. He concludes with some very positive statements about the SVID - more positive than one usually reads from users of Berkeley Unix.

Next, **Unisig Returns from Triumphant Swiss Tour** by Kurt Reisler, our illustrious Unisig Chair. Kurt and several other Unisig steering committee members recently attended the Swiss DECUS Symposium in St. Gallen, Switzerland. I think his account of the trip will be interesting and informative to all.

And third we have another article from Jim Livingston, **UNIX vs OS/2: Is There Really a Battle Here?** Jim cuts through a lot of the hype and dogma of the Unix-OS/2 discussion. He gives a brief description of OS/2, and even has some good things to say about it.

Unfortunately, there were no jokes submitted for the *Joke of the Month* contest. So everyone who simply didn't get around to sending in their jokes will send them for next month's contest, making next month's contest that much more competitive. I'm looking forward to some major yuks from my mail next month! Don't let me down. Instead of the *Joke of the Month*, this month there will be a one-time only contest. The first 20 people who send me a note (hardcopy) saying that they read this Unisig newsletter, and including a self-addressed, stamped envelope, will receive a crisp, one dollar bill. If you want to include any other comments with the SASE, they are always welcome.

As always, your comments, suggestions, and articles are encouraged. Please send hardcopy to :

<div style="text-align:center">

Sharon Gates-Fishman
NDC Systems
730 E. Cypress Ave.
Monrovia CA 91016

</div>

or e-mail to:

<div style="text-align:center">

amdahl!cit-vax!ndc!sgf

</div>

# What's a SVID?

*by James Livingston*

There are, in the UNIX world, lots of implementations of the operating system characteristics which, taken as a whole, are identified as UNIX. I leave out, by the way, an entire collection of things which are called "UNIX-like." There are enough differences between full UNIX implementations that it's useful to say, in a general way, what are the general trends to be seen in just this class. It's likely that "UNIX-like" products are a transient phenomenon, anyway.

As you might expect, AT&T is a central corporate figure in the UNIX world. It is, after all, their invention. They sell supported licenses for a number of UNIX implementations (ten, as of their most recent count) for different computers, and have spent considerable money on promoting their current version, which is called "UNIX System V, Release 3.0". Can you imagine anyone in our industry (or out of it, for that matter) having failed to see their "Consider it Standard" advertising campaign for generic UNIX System V?

It is AT&T's stated objective to make UNIX System V an industry-standard operating system, and that's not as purely self-serving as it may appear at first glance. There is little disagreement that standards have beneficial effects when they're adequately observed, whether they are officially blessed by some standards body like ANSI, IEEE or ISO, or simply the result of a fact of life, like IBM PCs.

Certainly industry-wide adoption of a UNIX standard would make life simpler for application developers, and it is they who will determine the ultimate fate of the operating system. Whether or not it's a good idea for a single vendor exclusively to define a standard is a different question. I'd like to spend more time on the general matter of standards, and on the standards movement in the UNIX milieu, in particular, but I think that's better left for a column of its own.

A second major force in the development of UNIX as we know it today is the University of California at Berkeley's Computer Science Research Group. It is they who are responsible for the 4BSD versions of UNIX, which were developed for the VAX from the initial (non-virtual) UNIX-32V implemented by Bell Laboratories. A number of computer system vendors, most notably Digital and Sun Microsystems, base their operating systems on 4.2(3)BSD UNIX, the latest releases from Berkeley.

So the primary forces in the UNIX marketplace are AT&T's System V, and Berkeley's 4.2(3)BSD. These two versions of UNIX are different in a number of ways that make it difficult to write common applications software for them, as well as to transport users easily from one to the other. If it were not the case that derivatives of 4.2(3)BSD are the only (available) successful VAX implementations of UNIX, it is not hard to imagine AT&T's dominance of the UNIX market becoming beyond effective challenge.

As it is, however, AT&T have chosen not to continue supporting System V on VAX hardware. That means there's a place for 4BSD UNIX for the forseeable future. This situation, in the worst case, could guarantee that there'll be two major variants of UNIX as long as there are VAXen, and that its opportunity to become a widely-used operating system standard will remain unexploited. We'll see below how I think this impasse is likely to be avoided.

Let's consider now what would be the most important aspects of an operating system, from the point of view of the applications developer. First, of course, is the presence or absence of a certifiably portable language for creating applications. There are a number of such in use today, although C, the implementation language of UNIX, itself, is not yet one of them. C is, however, in the midst of a nearly-complete IEEE standardization effort, and so will soon be made available in a consistent form across a number of operating systems, including, but not restricted to UNIX.

The next factor the applications developer must care about is the form of the interface to the services of the operating system. If that interface is syntactically and semantically consistent across instances of the operating system on different hardware, the developer is assured that applications will run in the same way, regardless of the underlying hardware (timing considerations excluded, of course).

Enter the System V Interface Definition (SVID), a product of AT&T that I think has considerable merit. It is a definition of the syntax and semantics of the services provided by the UNIX System V operating system, given in a published prose form. It specifies, for example, the effect of issuing a "malloc()" memory allocation system call, together the C syntax for the type and number of its arguments and function return.

The SVID doesn't look to me like a static document that will be quickly made obsolete. It has had two issues since its introduction in January 1985, and has grown from one to three volumes. The first two describe the "System V Base" and "Kernel Extension". The second gives five more extensions, "Base Utilities Extension", "Advanced Utilities Extension", "Administered Systems Extension", "Software Development Extension", and "Terminal Interface Extension". The third volume describes an "Enhanced Terminal Interface Extension" and a "Network Services Extension".

The purpose of this publication, in the words of AT&T, is "...to help establish a single UNIX system standard, and thereby encouraging[sic] the development of portable applications software, and, finally, to offer end-users a wide range of computers with compatible operating systems and applications." For the moment let's leave aside the fact that successful establishment of this standard would give AT&T a competitive advantage, if one that is likely to be short-lived. It does provide one way to accomplish the goal they've set, and that we'd agree is desirable.

As a reminder, I said above that the SVID wasn't the only thing happening on the UNIX standards front. Other efforts are afoot, and may well have an effect on the SVID, itself. Still, it's here, and being maintained by AT&T. It provides a prescription for making a "standard" UNIX. All a hardware vendor must do is implement it, and all the applications which are available for UNIX will run on it, and the vendor can so claim. What could be wrong with this picture?

Well, this may be shocking, but some folks in our industry have been known to claim capabilities for their systems which, upon investigation, have been strangely absent. So what's to be done about this sort of vendor? Make it possible to certify conformity to the "standard" is one answer. That strategy has been used to good effect for languages, in the past.

AT&T evidently think it's a good strategy, too; they offer a SVID Validation Suite (SVVS) to go along with the SVID. With that, vendors can verify their conformity to the SVID for themselves, and lay legitimate claim to adherence to the standard by getting AT&T to certify their claim with the same SVVS. Mind you, all this has a cost associated with it, but that, too, is another story.

So now you see what I alluded to in the first part of this discussion: Ultrix-32, version 2.2 is based upon 4.2(3), but includes the features of System V to a degree of faithfulness which enables them to be certified as in conformity with the SVID. I believe that certification only applies to release 2 of System V at this moment, but it would not be beyond imagining that Digital would have a subsequent Ultrix release validated against the new issue of the SVID.

Whether or not Digital chooses to do this will depend upon their perception of the market's demand for it; as I said, it's not free, and if there weren't demand from customers for it, certification against the SVID wouldn't make good business sense. On the other hand, one or more of the other standards efforts may come to a fruition which obsoletes the SVID. My bet would be that whatever the standard becomes, finally, it will owe a considerable debt to the SVID. It will be an interesting development to watch.

# UNISIG RETURNS FROM TRIUMPHANT SWISS TOUR

*by Kurt Reisler - UNISIG Chairman*

The UNISIG Traveling Symposium Tour has returned from an unprecedented and highly successful trip to the DECUS Switzerland Spring Symposium which was held in early March in the city of St. Gallen. While it is not unusual for members of the US Chapter Board of Directors to travel to non-US symposia, this trip was unusual in that it was the first time that an international trip was jointly funded by the Boards of the US Chapter and the host country. Additionally, this was the first time that members of the US Chapter travelled to a foreign chapter for the specific purpose of providing (technical) speaker support (in this case, for the Unix and OA streams).

The trip came about as a result of many months of joint effort by members of the US Chapter's UNISIG steering committee and the Swiss Symposium Coordinator, Graham Tritt. The Swiss initially contacted the UNISIG Chair (Kurt Reisler) in late September 1987 to enquire about the possibility of providing speakers for the forthcoming Swiss symposium. After discussions at the UNISIG Woods meeting in October 1987 established that the UNISIG Steering committee could, indeed, provide a speaker pool for the Swiss Symposium, the "negotiations" began in earnest via electronic mail (over uucp). Once a tentative schedule of both symposium sessions and presymposium seminars was established, both the Swiss and US parties had to present the proposal to their respective Boards of Directors to obtain approval for the necessary funding.

Several written presentations were made to the members of the US Chapter Board of Directors at the Fall '87 Symposium in Anaheim. Core members of the the UNISIG Steering Committee augmented the written presentations during meetings with individual members of the Board and subsets of the full Board. Several conference calls to Switzerland were also made to clarify various procedural and financial issues. The eventual outcome of these efforts was the unprecedented (and experimental) joint funding of a trip to the Swiss DECUS symposium by members of the UNISIG steering committee.

Although the original proposal provided for sending 10 speakers to Switzerland, various Stateside commitments limited actual participation to seven members of the steering committee. The extremely varied technical background of those members who did participate, coupled with an extraordinary amount of advanced preparation made it possible for the seven UNISIG steering committee members to present 6 pre and post symposium seminars and 12 technical sessions at the symposium itself. Additionally, several members of the UNISIG steering committee participated as panelists in three other technical sessions organized by the Swiss. Steering committee members who made the trip included Kurt Reisler (UNISIG Chair), Dorothy Geiger (Administrative Daemon), Steve Lazarus (Symposium Coordinator Emeritus), Steven Stepanek (Seminars Representative), Ed Gould (Standards Coordinator), Bill Cheswick (Session Notes Editor), and Jeff Gillium (Member at Large).

The group departed the United States from various cities on both coasts on Friday, March 4th arriving almost simultaneously in Zurich on the morning of March 5th. After collecting baggage and counting heads in the customs area of the Zurich airport, the group boarded the train for St. Gallen, site of both the pre-symposium seminars and the symposium itself. That night, UNISIG was finally able to meet the members of the Swiss Board with whom they had been working so closely (yet at such long distance) for the past several months. After meeting with the Swiss Board, UNISIG took advantage of the presence of the majority of the steering committee to hold a Woods meeting at which they planned for the Cincinnati and Anaheim symposia (minutes for the Woods Meeting will be published separately).

The first of the presymposium seminars were held on Sunday the 6th, with additional seminars held on Monday the 7th. The Symposium itself was held from the 8th through the 10th, with the UNISIG speakers presenting continuous session streams on the first and third days. Post-symposium seminars were then held in Geneva and Bern on the 12th of March. No UNISIG sessions were scheduled for the second day of the symposium so that the Steering Committee members could have a day to attend sessions, recover from the trip, or participate in a marathon training session that took place in a variety of cities around Switzerland. Since English was the "official language" of the symposium, there were no major language problems during the sessions.

Audience reaction to the sessions was uniformly enthusiastic; the normally reticent Swiss asked many questions during and after every session. Although only 2% of the more than 350 attendees were Unix users, nearly 10% of these attendees attended the Unix sessions. Surprisingly, the Unix sessions drew well even when scheduled directly against the "heavy duty" VAX sessions.

At the conclusion of the Symposium, Kurt Reisler and Dorothy Geiger were invited to attend a meeting of the Swiss DECUS Board of Directors. This meeting served as a wrap up for the symposium, a planning session for the next symposium and a general business meeting for the Board. All of the Swiss Board members were extremely pleased by the cooperation between the US and Swiss Chapters, and with the quality and quality of the UNISIG sessions.

As a result of the "UNISIG Traveling Road Show", it is anticipated that there will be more such cooperative efforts between the US and other DECUS chapters. In addition, some members of the Swiss board are planning to not only attend US Symposia, but to present technical papers as well. All participants in this experiment have high hopes that cooperation between the US and International DECUS chapters will continue to flourish.

The Unisig Steering committee would like to express their thanks to the Board of Directors of the US chapter for approving the funding of this trip, and to the Swiss Board for their approval and funding as well. It is worth noting that without this jointly funded effort, there would have been only a single Unix session at the Swiss Symposium. The Swiss have reported that this effort has fostered increasing support by Digital (Europe) for Swiss DECUS.

# UNIX vs OS/2: Is There Really a Battle Here?

*by James Livingston*

I read many of our industry's publications, as I expect most of you do. One of the topics I find cropping up more, of late, is the "developing battle for supremacy" between UNIX and Microsoft and IBM's OS/2. I use quotes to indicate that I'm not sure just how meaningful is the notion of a general battle between UNIX and OS/2 for the title of "supreme operating system", or some such.

In fairness to its participants, I must admit that the dialogue to which I refer tends to be focussed upon computing in the business office, rather than in the wider computing environment. Further, it is usually found in the context of microcomputing, a further limitation on the marketplace under discussion.

Still, the "contest" is getting coverage in the wider marketplace of ideas, and the assumptions I've mentioned aren't always prominently featured. Moreover, the recent emergence of the workstation marketplace has added some new implications to the dialogue. This leads me to think some discussion of the UNIX vs. OS/2 issue from a broader perspective could be useful.

First, I should note that, by OS/2, I mean the operating system being developed jointly by Microsoft and IBM for the "protected" operating mode of the Intel 80286 and 80386 microprocessors. While it was announced with the PS/2 series of IBM personal computers, it is currently available in preliminary form only, supporting just the 80286, or 80386 running in 80286 emulation mode, and suitable for use only by software developers.

This operating system enables the use of the 16Mbyte address space inherently available to a process running in an 80286. Yes, that's the microprocessor in the PC/AT and clones, now including the VAXMate, that have been trumpeted for the last two-plus years, as we see in the awful ad copy from computer retail stores, to have access to "...a full 640K bytes of RAM memory![sic]" under DOS 3.x.

No delivery date has been announced for native 80386 support, either. That's right; the way you use the cheap, widely-available 80386-based machines with OS/2 is as fast (16-bit) 80286es, and it's not known when that will change for OS/2! By the way, the little beggars are really quick on small, computationally-intensive benchmarks like the Sieve of Eratosthenes, even in this limited mode. We'll come back to a more general look at 80386 vs. other processor performance issues in another column, however.

As an interesting aside, Microsoft are reported to have sold some 2000-plus of their preliminary developer's kits in the last nine months or so, at about $3000.00 apiece. I think $6M+ is a nice gross on a partial beta test, don't you? Maybe these personal computer software vendors have something to teach the wider computer industry about profit-making?

OS/2 is intended to be the replacement for MS-DOS on microcomputers with memory-mangement hardware. In contrast to the latter, rather simple-minded program loader, OS/2 is a real operating system, if a single-user one.

It uses, in the current preliminary release, the hierarchical file system of MS-DOS. Apart from the lack of support for multiple users in this file system e.g., groups of access permissions, it looks to a user about as you might expect.

One shortcoming most Digital users will identify right away is that file names can have at most eight characters, and file name extensions three. UNIX users will also note, with some displeasure, that pathnames are single case (upper). In addition, pathnames are set off from device names via ":", while directory components are set off from each other and the file name by "

The capabilities that make OS/2 really interesting are to be found in the multitasking support it contains, together with its ability to manage the microprocessor's virtual memory capability. Processes are no more limited in size in OS/2 than they are in any other virtual system, and there is a built-in "lightweight process" notion, called "threads" of execution. These threads are minimal process context, i.e., dispatching information, including priority, a stack, time slice, processor state, and a mathematical coprocessor state. Threads of execution are available in addition to process hierarchies, as most of us know them from UNIX and VMS.

The scheduler of OS/2 provides gross and fine-grained options for scheduling processes and threads. It operates generally like VMS, using three classes for processes: time-critical, normal, and idle-time. Thirty-two priorities are available at each level, and the scheduler can be told to adjust levels for the "normal" class so as to yield a time-slicing behavior. In that time-critical scheduling is pre-emptively priority driven, it is somewhat more deterministic than is scheduling in most UNIX systems. Further, each thread in a process has its own priority.

To support its multitasking operations, OS/2 provides a rather complete selection of interprocess communication mechanisms: pipes, queues, semaphores, shared memory, and signals. While the implementation of signals leaves considerable to be desired, relative to the least of UNIX implementations thereof, the rest of the features should prove to be serviceable.

Queues differ from pipes, mainly, in that they have no maximum transmission size like the 64Kbyes of pipe writes. The entries in a queue are memory identifiers, or "handles". In addition, queues have specifiable protocols, i.e., FIFO or LIFO, and can be emptied in random order by the server.

Use of memory in OS/2 should be tailorable as is that of VMS and UNIX System V.3, in that support for shared libraries is present. The precise nature of the support is not as clear to me as I would like, but remember that not very much detailed information is currently available on any aspect of OS/2's features.

As far as I can determine, the capability exists to create shared libraries which, if the routines in them are carefully crafted, can be modified without so much as a relink of the application tasks that use them. That would appear to require entry-point vectoring, as used by both VMS and System V.3, but OS/2 seems to provide the support by making the linker and loader conspire to defer binding of these "dynamically linked libraries" until run-time. I think that the whole business depends very heavily upon the segmented architecture of the 80286, but my curiosity will have to wait for its satisfaction until more information is available.

Last, OS/2 supports the intrinsic memory management capabilities of the 80286, as I noted earlier. These are as you might expect also: memory references go through mapping hardware that associates a descriptor with each base address in the mapping table for a process. Access protections are enforced, thereby providing protection against errant processes, and virtual memory is implemented via segment swapping, as needed. Clearly, the systems in which we'll find OS/2 will have hard disks, as most ATs and clones do now.

Well, there is a very brief description of OS/2. You'll note that it's a serious entry into the world of operating systems for microprocessors, and that it has many features that are similar to those of UNIX. There are, in fact features in OS/2 that have been proposed as desirable enhancements to UNIX; threads, in particular, come to mind as a feature of Mach, a proposed successor to UNIX. So how does one evaluate the question I started with? Is there a battle here?

I think the thing I've done, so far, is to de-emphasize one very important fact about OS/2: it runs *only* on 80x86 microprocessors and therefore only on computers which use those microprocessors. While the machines in this class are legion, UNIX also runs on those microprocessors, and it *uses* the native capabilities of the 80386.

That fact makes two things important, to my mind: first, applications developed under UNIX running on almost *any* processor can be ported to the 80x86 family UNIX implementations, so there are more potential sources for UNIX applications than there are for OS/2 applications. Second, the availability of 80386 UNIX engines at today's and tomorrow's prices cannot help but spur yet *more* software development for UNIX.

But what, you may say, about the ocean of MS-DOS applications that will make all our business people rush to buy OS/2 systems for software preservation? The UNIX implementations for the 80386 machines that I know about have the ability to execute MS-DOS programs as processes under UNIX, so they have the same ability to preserve the software investment of a business as does OS/2. So, where's the battle? I think it's in the minds of those who write from the limited perspective of the PC/AT/clone marketplace. Yes, there'll be a battle there, of sorts, but it'll be between folks whose comparison levels have been formed by exposure to nothing more helpful than MS-DOS. Any developer who's used UNIX, and has a choice of development platforms, will very likely choose to develop on UNIX, even if the software being developed is targeted for OS/2. And there's every chance, it seems to me, that she'll develop her application for UNIX first, while she's at it.

# NEWSLETTER OF THE VAX SYSTEMS SIG

# Pageswapper

*Our Mascot*
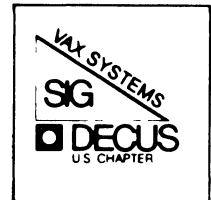
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## Contributions

Contributions and suggestions for this newsletter are constantly needed. Articles, letters, technical tips, or anything of interest to our SIG are greatly appreciated. The editor prefers submissions be made electronically. Magnetic tape and hard copy will be accepted, but may delay publication.

Please do not submit program source. It is difficult to typeset and is better distributed on the VAX SIG tape. Please do not submit "slides" from DECUS Symposia presentations or other meetings. They are generally a very incomplete treatment for those readers of the *Pageswapper* who are not so fortunate as to be able to travel to Symposia. Please DO write articles based on such slides.

Send your contributions to:

ARPAnet/CSnet/NSFnet: ctp@cs.utexas.edu
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## VAX SIG Advanced Software Q&A

## 1987 DECUS Fall U.S. Symposium

Editor's Note: The following is a edited transcription of the VAX SIG Advanced Software Q&A at the 1987 DECUS Fall U.S. Symposium help on Friday, December 11, 1988 in Anaheim, California. No material has been added, but some material has been edited for clarity or removed entirely. Comments by the session chairman are not indented. Discussions of a single question are separated from each other by centered lines.

[At the beginning of the session, the Digital VMS software engineers present were asked to identify themselves.]

My names Forrest Kenney I work in the terminal driver.

I'm Jim Crispa and I'm covering batch print.

Keith Wolfe, the file system in BACKUP.

Todd Floulau, DCL and mail.

Terry Cassidy, DECnet VAX.

Scott Davis, VAXclusters or volume shadowing.

Dave Tiel, VAXclusters.

Richard Bishop, performance.

George Clayborn, AUTOGEN and general performance issues.

Stan Amway, VMS exec.

Steve Feille, VMS exec.

James Sing, DECnet VAX performance.

Wayne Cardosa, VMS exec.

Mary Edo, DECnet VAX.

Peter Vatney, RMS and RMS journaling.

Ron Shaffer, System management and licensing.

Rod Gamanche, Multiprocessor and MicroVAXes.

Kathy Morris, just about anything.

Harriet Cohen, product management.

I'd do a virtual Andy Goldstein announcement. He'll be with us in about ten minutes.

Okay, thank you very much, but before we do anything else I'd like a round of applause for these people for being here, not just now but all week and also incidently for creating VMS for us. I was asked by Harriet Cohen to ask you a couple of questions just based on show of hands.

Q. How many of you have MicroVAXes?

A. That's about a 100%.

Q. And, how many are running local area VAXclusters?

A. About 50, 50% of the room.

Q. CI based clusters?

A. 80

Q. Both?

A. About 30%.

Q. And, how many have either 83 or 88 hundred multi processing machines?

A. [No answer on tape]

Q. How about 782s? 782s, show of hands?

A. A few

Q. Okay, how many people only have MicroVAXes and nothing larger?

A. Okay, I consider that a sampling error, because the sites small enough just use MicroVAXes are intend to be the ones small enough to not sent many people to DECUS, but so, that's probably not representative.

Okay, I don't think there's any other things before we get started. Standard DECUS Q&A protocol, please state your name and affiliation at the microphone. One question to a Q entry and first questioner please.

---

Q. Okay, my name is Bill Wisethorne, I'm with Schlumberger Well Services in Dallas and hopefully this will set the tone for the rest of the day here. This question I've been asking several people throughout the week about and have been bunching from one to another, so since I've got you all in one place, maybe this will get an answer. We have a situation where we're running 780s in a wide area network, using satellite links and we are trying to get some better performance out of our link. We are currently using a 112KB line and our effective throughput is approximately 30KB. Now, we've gone through and I've talked with the hardware people and they seem to think that the problem was the DECSA router, so I had my people take that out of the chain and we ran a test this week that went from a 4.6 machine in the Richfield, Connecticut to our 4.5 machine in Denver and we still got the same 30KB throughput on our 112 KB line. We've played with line buffer size, we've played with transmit pipeline quotas, pipeline quotas, anything and everything we could get our hands on that even looked remotely like it would effect the performance. Where do we do from here?

A. I believe what you want to do is make sure that both nodes are running VMS 4.6 and then you want to make sure that the transmit pipeline, the numbers, well depending on the satellite link, you want to make sure that's a fairly high number. I think it defaults to somewhere in the order of 6 or 8 and you want at, maybe, .....

Q. Right, we had it up to 32, we tried it anywhere between 25 and 32.

A. But, on the 4.5 system I don't believe it's working properly.

Q. So, transport pipeline then is definitely without a doubt...

A. That's the one that's going to keep the packets in the air without acknowledgements, that's the thing you're probably going to want to twiddle most to try and get the performance.

Q. Yeah, because when we first tried this, we had both systems running 4.4 and we didn't see any difference. We called software support and they said, hey that's news to us, it works as far as we know.

A. I think you found that it didn't work the way we thought it did and....

Q. So, if we upgrade everybody to 4.6...

A. All you have to be concerned about is the 2 nodes that are talking over the satellite link.

---

Q. Peter Elky, with Phoenix Leasing. On the next major release, on the terminal driver changes how is communicating with terminal set to /MODEM....before a carrier is present.. specifically for outgoing things or talking to devices that supply carrier only for notification of the connection or not and not so much for preventing you from talking to data....

A. The change doesn't affect outgoing lines at all. There's nothing changed in that at all.

---

Q. Stan Rose from Bankers Trust. Terminal driver question, another one. We would like to be able to set terminal characteristics on the prototype UCB, UCB0, for devices like NV devices, LAT devices, so we can have different characteristics. We might want to have sys mass words on for NV devices and not on for LAT devices and other things of that nature. It seemed that would be a fairly [simple] change to allow us a SET TERM NV0 or LTA0 and it would take care of all of that, today we have to do it by just patching it, we don't want to do.

A. Really, noted, because of the way the devices are constructed what appears to be simple is really not. It would require inventing a new mechanism for manipulating devices. We'll take it make and look at it for some future time after future unannounced.

---

Q. John Burnett, STS Consultants. I had a DECnet VAX question. This may be fixed in 4.6, we're not running 4.6 yet and if it is fixed I'd like to know about it, otherwise I'd like to know what we can do. Apparently the NCP SET LOGGING SYNC NODE option does not work. We have tried this and we've tried to set the sync node up to be a different node on the local node and it does not change it either the volatile or the permanent database. Basically it does not send the events over the net the sync node. What we've had to do to get around that is say, NCP SET LOGGING FILE node:: the device we want. We're just trying to send it to the terminal, hard copy for logging purposes. Can you give me any idea about why that's not working in 4.5?

A. No as a matter of fact it really is a new bug to me, I haven't even heard of that.

Q. Okay, so that's not a known problem that would be fixed in 4.6 or this future....

A. No, definitely not 4.6.

---

Q. Okay, another problem related to that that cropped up when we did the work around was that when we do SET LOGGING NAME node:: terminal name: what we find is we've got an 8200 which is supposed to be the logging console is on that and then we've 2 MicroVAXes running MicroVMS 4.4 connected to that among others, those are the important ones. 8200 is running VMS 4.5, we find that we have fail processes hanging around and failing to exit fail and revert to net server processes. When they connect up from the MicroVMS 4.4 nodes to create a fail process on the 8200 on the VMS 4.5 they open the file which is just a terminal write the stuff to it and close it and I've turned on fail dollar log/logging for the Net server processes for the fail processes, apparently what's happening is it's in a closed operation, it's waiting for a receive AST that's never delivered. So, those two fail processes from the remote, MicroVMS nodes hang around indefinitely.

A. All right, just at [this] DECUS I've heard of another problem with fail poses the same around and that's fairly new to me too. I haven't heard of that and I know there's no fix so far in 4.6.

Q. Dennis Costello, Cornell University and I have several VT340s and apparently they are now supported in VMS 4.6, so I like that. However, they do not seem to be supported in FMS or WPS and there doesn't seem to be any kind of software that does anything with the mouse and I'm wondering if anybody wants to comment on any of those three. I was able to get WPS to work, but FMS is still a mystery. If I set the 340 to really be a 340 instead of pretending to be 240, on 4.5 it wasn't recognized, in 4.6 it comes up and says it's a VT300 series terminal and that works fine. However, if it's set up that way WPS will not start up correctly, it will now because I patched the WPS Plus Dollar logging, just for log in command file. FMS I have not been able to get it to work on a 340 unless I tell it that's it's 240.

A. .What you're seeing is the fact that some of the layered products have not caught up with the new terminals and you really need to take these problems directly to the developers of those products.

Q. Does anything support the mouse?

A. Nothing that I'm aware of. The mouse is really only supported in ReGIS node and so to use it you kind of have to write your own locater port support for it at this time.

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Q. Dave Cooke, Maxi Care Corporation, I've a VMS system services question. We have an AST routine that is running as a result of a supervisor mode AST delivery, one of the things that the AST routine does is it queues a VMS lock to a user mode resource. We found that while it queues the resource to the correct resource block, the lock block itself is taken out in the supervisor mode. Our problem is that then when we fall out of the AST routine and revert back to user mode we can't delete the lock because now we're in user mode and it doesn't recognize that it's a supervisor mode lock block. We tried to use the declare change mode handler to get us into supervisor mode to delete the lock and found that you have to be in the mode that you desire in order to declare the handler. Consequently it doesn't appear that there's anyway to get to supervisor mode. Do you have any comments on this?

A. Well, it's if you want the lock to [be] accessible from user mode, it sounds like what you should do is be specifying user mode in the optional access mode in the end queue call to begin with and that will make it a user mode lock.

Q. The access mode field in an NQ system service only impacts the name space that's used, it does not impact the ownership protection of the lock.

A. Right it applies to the resource block, not the lock block. The lock block is taken out in the current mode.

Q. When you try to delete the lock block from another mode it doesn't see it.

A. Well, it's not that it doesn't see it, it's that the protections prevent you from manipulating it.

Q. Correct, yeah the same affect.

A. So, you are on the right track by trying to get into supervisor mode to manipulate the lock....

Q. Right, our problem there is that first of all you can't... in order to declare a change

mode handler you have to be in the mode that you're declaring the handler for. You cannot change mode to supervisor because the DCL dispatcher does not recognize non DCL vectors. Now...so consequently you're pretty well locked out. The only way that we could come up with was to change mode to Exec and then drop back down, but that's a real cludge.

A. That would certainly work. I believe that you could also manipulate the lock from executive mode.

Q. Oh, so change mode exec and delete the lock from exec mode?

A. Yes. And, in that case I believe you would have to specify the access mode, not to indicate the privilege of the lock, but to be in the right name space.

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Q. Jim Brosiato, Computer Systems, Consultant. On native BI processors with a native Ethernet interface several versions of VMS from some of the recent field tests versions up, the ET driver complains about something it doesn't like in the micro code of ZEBNX, the messages have gotten a little bit subtler since some of the field test versions, but it's still complaining about something on both DEBNT systems and DEBNA systems, what do we need to do to satisfy the driver, what is it trying to tell me and what might I be missing by not solving this problem?

A. I'm just trying to remember now....I'm almost sure that it means that there's a certain level I know of VNT that's out, that ET driver doesn't support or it's warning you that it doesn't support and there's an ECO or FCO that you have to apply to the board.

Q. This is an 8700 that was installed last October.

A. That could still be that that has to be applied. Is it a VNT that you're talking....

Q. In the 8700 it's a DEBNA, the latest and greatest.

A. I am a little surprised at that. I thought the problem was the VNT code, all I can do is say, you know, SPR the problem, if it really is a BNA.

A. (from audience) Stan Rose. I've given this about three times today, since I picked it up this morning at the network session. Here's the information on DEBNET and the DEBNA. The DEBNET is being replaced with the DEBNA which will be at rev F and that's done by part number EQ-01486-01. Now the DEBNA is probably today at rev D and that's being replaced with rev E DEBNA. The rev E DEBNA you get by getting part number, these aren't the FCO number's, these are the part numbers, EQ-01500-01. Once you get those upgrades, either the DEBNA to DEBNA or the DEBNET to upgrade you then need a new ET driver which it goes on 4.5 or 4.6 and the part number from field service to get that is EQ-014500-02, but I think it may be just 01500-02, I'm not sure about my hand writing. There is also a new diagnostic to support that and that's EQ-01500-03, okay, so there are four part numbers there, one for the DEBNA to DEBNA, one for a DEBNA upgrade and one for a new ET driver and one for new diagnostic and the person who spoke earlier said do not run the new ET driver with the old DEBNET or the old DEBNA....

A. Sounds right, thank you.

A. (from audience) There's one more piece to that that Lance Schmidt, if he's still around can speak about and that is ?????? from Dow Chemical. It turns out there's a text file that is referenced during the start up on any 8xxx machine with Pro-380, I think you said it was an 8700. Okay, the test file is horribly out of date, in fact it's banished in rev 6 of the Pro-380 counsel code as I remember from the release notes. The test files been out of

date for a couple of years apparently.

Q. What ET driver comes with the 4.5 and 4.6 distribution kits.

A. Which one?

Q. What do I need to do to make this thing right. What ships with the kits?

A. Well, what you have to do is apply the upgrades. I'm fairly sure that the ET driver in 4.6 is a fairly rewrite of the one in 4.5. So, what you want to do is to upgrade your BNA to what was it E or F and then go up to 4.6.

Q. Previously things like this where hardware was coupled to software showed up in the release notes, what happened this time around? I can't believe that I'm the only person that's seen this.

A. I'm not too sure why that didn't hit the release notes.

Q. How many people have seen this problem?

A. Well, we'll make a note to make sure that 4.7 or if we can put the note in 4.7, release in.

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Q. My name is Richard Garlette, I work at Bankers Trust. My question concerns logging of memory errors. In order to save logging redundant errors, VMS....apparently logs only a fraction of the actual errors or it may start logging the errors depending on the rate of errors, so you have several kinds of thresholds there either an absolute number of errors or an absolute number errors per time and that's fine. However, what we've experienced on 8000 series machines, this 8700s, is we would get a few errors, that is one a day, and the machine maybe booted once a week so we would get seven a week. Now the threshold for absolute number of errors is sixteen, so as a result we would never see the log entry for any of these errors. Now you might say, well don't worry about it, however, we worried about it and field service said don't worry about it and the next night after that meeting there was a catastrophic failure and the machine crashed because this one a day suddenly became, you know, five thousand per second or something. We've asked field service, we've asked CSC could they change the logging thresholds so that at least you log the first and the seventeenth rather the sixteenth and the thrity second so that you would always get a log on the very first one or the very first queue, even if you don't log all of them so that we could see what these were and the field service could think about and the only thing we've got so far is a workaround going into the system using SDA and actually reading out the buffers which are in memory and give a bunch of X digits to the field service people and they scratch their heads on what that means. We've SPR'd this months and months ago and really haven't gotten much of a response. It seems like a very simple fix, at least a simple minded fix to start logging in number one rather than number sixteen, if that happens to be our threshold.

A. Okay, first in case...not everybody realizes that only refers to corrected errors, not to hard errors.

Q. Yeah, they were corrected until that famous Tuesday night.

A. And, basically that algorithm was the consensus of memory engineering, field service and CSSE and we do what they asked us to. They felt that logging on an occasional one provides absolutely no information. Not being a memory expert I won't attempt to defend that, I'm simply explaining why we do it.

Q. Yeah, on the other hand one of the group said in Colorado that we recently had spoken

to on some of the new facilities that allows them to analyze proactively possible error situations putting more intelligence into VAXsim and products like that say they were very surprised that there's data out there that's not available to look at it and so, you know, I speak to you as a corporation and I think you have to accept the question as a corporation. If there's somebody somewhere else that gave a different opinion, you know, we really would like this sort of thing addressed, because a simple minded analysis in this case was correct. Namely you get one a day, sooner or later it's going to catastrophic. No matter what anyone else tells me I'm going to believe that because that's always the way things tend to work, so I think that you have the information there let us look at it.

A. Okay. Noted. We'll check and see if they've changed their opinion.

Q. You might tell them your opinion, too.

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Q. Dick Nickcart, Kalamazoo College. Ever since we've put up version 4.6, when we backed up our user files, we have occasionally gotten messages, always in pairs saying that there was a warning that RMS journaling was before RMS journaling and after RMS journaling was not going to be enabled on the copy or something like that and the syntext of the message I don't remember, except that it had an obvious place at the end for the file name to appear but it didn't. We don't have RMS journaling and never have. The number of occurrences of this message is growing. Earlier I raised the issue and was told that I probably had a system management message file mismatch, so I went back and I called home and my operator did a differences of the listing file of the first and second shipments of the VMS 4.6 that we got and they're identical. I obviously can't compare it to the write copy, but I'm curious...first off it puzzles me...if I were to get RMS journaling in the future that I might do a back up and restore and lose the journaling.

A. I think I talked earlier this week about this, the problem is that in the release of 4.6 at one stage we did get the sys manager message file confused. If that's still confused than you really need to talk to telephone support and get that sorted out and get the date of the file sorted out.

Q. We got a second shipment, a whole second shipment. DOC set and tape and everything and that was supposedly because the first might maybe have had a problem with it and those two were the same.

A. Is this a cluster environment?

Q. No, stand alone 750.

A. Were you a field test site for 4.6?

Q. Field test for nothing.

A. I'm sorry I don't know what that is, I'd like to talk to you about it afterwards, if you catch me afterwards I'd.... The problem is new to me in the sense that if you replace the right file that the messages are correct, perhaps the version of backup is what we need to look at, but I'm pretty sure the message numbers didn't change, Andy just suggested that. I'd like to address the other thing you mentioned though, and that was the your fear that if you got RMS journaling that you'd lose the journal. The design of journaling is such that that is the correct result. What backup does is exactly right in that it disables journaling on the output file and this the right thing to do and journaling is designed to help you and work with the backup copy if you should make the restore.

Q. I guess my question comes, suppose I decide to compress my disk by running an image backup and restore will I also lose the journaling then?

A. At the moment in version 1 when you compress your disk you will have remark all the new files for journaling.

Q. I hope that's well documented for the people who have journaling.

A. There's a big note in the RMS journaling file and we will be looking at how to make that a little easier in the future release.

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Q. Tom Boutel, US Geological Survey. We've got a VAX 780 with a foreign UNIBUS peripheral, it's for a plotter and also has a foreign driver. We noticed that a short time within two to three days after we reboot the system the CSR address as reported by SYSGEN SHOW CONFIG increases by 4. I found this when I was investigating a little problem we had with paper run on, I still haven't figured out if they're related. And, you know the run on is not a real problem as it ends after about 400 feet of 36 [inch] wide paper, but.... I just need to get some idea whether this is a driver bug I should be looking for or you know, what I should be looking at.

A. Is that the virtual address that it shows up in the SHOW CONFIG display that increases by 4 or is it the physical address?

Q. Whenever it says CSR.

A. Well, there's two addresses, one is physical and the other one is virtual.

Q. Not under....

A. Does the number start with 80 million.

Q. No.

A. No. So, it's 76 or 77.

Q. Right.

A. Proctol, that's the physical address. Just asked a question, does SHOW/UNIBUS show it as moved also?

Q. I haven't checked that.

A. Because if it moved....All right I'm afraid you've stumped the panel. (applause).... About the only thing that comes to my mind is that you have either this device or some rouge peripheral which is responding incorrectly to the UNIBUS pole which is in turn causing all the other floating CSRs to shift. That's about the only suggestion I can make.

A. (from audience) Could I make a comment on the other one...He's got a Versatek, it's got two CSRs and it will show at differing place at differing times.

Oh, no he stumped the panel....he didn't stump the SIG Steering Committee, but he stumped the panel.

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Q. My name is Larry Kilgallen. VAX is a VAX, but unfortunately an Ethernet driver is not an Ethernet driver is not Ethernet driver. I've had considerable compatibility problems with the driver for the DEBNT or DEBNA or is there a new name this week. The problem relates to preallocated buffers. Now, developing this on a small machine and building up we found that there's no problem, you can just specify preallocated buffers and you get

them, but in this particular driver under 4.4, 4.5 or so with the DEBNT there is a limit all of a sudden of 26 or so preallocated buffers which makes it very hard for someone to run varying products on the machine, either DEC or third party, all of which make use of these buffers. Then when the site in question converted to the DEBNA and then had to also upgrade the 4.6 and then field service had to come in an wave their hands over it and put in a patch driver and you know things that were related earlier, after than conversion the number buffers allowed to be preallocated was raised to 43 or something like that and they were told that was as much preallocation as was allowed in the driver because the hardware couldn't take it any more. Why on earth is this a hardware issue. I understand that you can only give a certain amount to the device perhaps, but why can't the driver hold onto them so that multiple products can work on one machine at the same time?

A. Off hand I really don't know the answer to that. It was my understanding and I'm not the data link driver but it certainly was my understanding that there was some sort of hardware limitation. Off hand I just can't tell you what that is.

Q. There's a hard coded number in the original driver and if you look in the micro fiche it says this is a parameter which you might want to change on a per site basis, apparently the dual for changing is the patch utility which not, you know, and all this whole area is totally undocumented in the book on how to do QIO's to Ethernet devices.

A. Well, if that's what the code says, you're at your own risks in terms of altering that number. I know that there were some more considerations than just software, I think it has to do with trying to not take...I mean, it has to take all that memory from you for non-page pool....

Q. Yeah, I have a parameter to jack that up.

A. Right. I'll talk to the developers again about the problem. You are aware that there's another problem that's fixed with releasing some of those buffers... There's a few people who have reported to me that some of those buffers aren't being released and there's a phase coming in 4.7 for that. The symptom will be that when you open up the fifth protocol and open and close the fifth protocol on there a number of times eventually you'll get either an insufficient virtual memory or no IO channel and that's a bug that's being fixed. I've told a few people it's fixed in 4.6, it really is fixed 4.7.

Q. Is that only the fifth protocol or the fifth, sixth and seventh.

A. Yeah, it's only if it the fifth. The work around is to open a dummy fifth and then fool around with the sixth.... What most of the people are finding is that people are trying to do connect to COM, to use console carrier. It will turn out that to connect the ??? with 2 protocol will be the fifth one and they'll connect up and down a couple of times and all of a sudden they'll get reported no IO channel. So, on booting we should open up five dummy protocols so that when our users open up things asynchronously we don't have to tell them you're allowed...

Q. If the fifth protocol is bouncing up and down, then open up a dummy fifth and then use the sixth until you get the path.

A. Okay, thank you. That would be a great submission for the software dispatch.

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Q. Bruce Bower, General Electric. I first asked this question about two years ago and then a year and a half ago, so you've had plenty of time to think about it. I have a situation where I have a single tape drive, I have users who like to create tapes. Occasionally these tapes go to multiple volumes. For security reasons and various other reasons we degauss

all the scratch tapes. Let me make sure I've got all the facts right here. Can't determine before hand that this user is going to go to a second tape or third tape or fourth tape and preinitializing tapes after they're degaussed is not a viable alternative. How do I create that second or third or fourth volume. REPLY/INITIALIZE, and REPLY/ to both require the tape a valid label and REPLY/BLANKTAPE requires that the user who is creating the second tape has privilege, clearly I don't want to give my users privilege.

A. Is this using BACKUP or is this using some other....

Q. BACKUP handles it just fine, this is using for example COPY.

A. We'll eventually figure out who gets to answer this one. Certainly in my mind requiring privilege for REPLY/BLANK is wrong, because after all it's the operator that's taking that option and the operator is presumably is trustworthy, you know, to invoke the blank tape process in which ignores anything that might be on the tape, you understand the problems with trying to read a blank tape....

Q. Yes, I do and I certainly hope my operator is trustworthy, but that's an entirely different issue....

A. Yeah, right separate problem. So, okay, we'll I was handling this to Keith, he handed it back to me, Keith has been grubbing around in the magtape ACP lately. We'll go back and have a look, if in fact, as we're checking on user privilege it ought to get fixed and we'll look into it.

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Q. Ken Robinson at Bellcore. I put this question on a NOTE[S] system at the exhibit hall and I'll ask it here also. It's a link question, I'm doing a build up of a software project product and we have a lot of executables and I'd like to get the same identification in version number and all these executables through the ident option in the link statement. I'd like to be able to do that globally so all the users don't have to put this in their link statement and some may forget and some may do it wrong. I'd like to something like the link dollar op, link dollar options log or something that currently exist I haven't found yet in link to let me do this.

A. I about all we can say on that is noted thank you for your suggestion.

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Q. Keith Chatwick, Fermia Lab. Let me start off my question by asking the assorted panel if they participated or noted the events of the VAXfam cluster this morning from roughly 8:15 to 8:30? Rather 9:15 to 9:30.

A. There are comments from the back row that many of the people were still sleeping, I and several other people were thoroughly aware of it, yes.

Q. Yes. I am a system manager of a 4.5 CI base cluster and a 4.6 LAVC cluster and have heard that 4.7 has gone to software distribution and I'm wondering what my exposure is on this particular hole.

A. Okay. People want to know what happened, a trivial FORTRAN can crash the system and that's all I'm going to tell you. DEC is not terribly well set up to do emergency distribution of patches for killer problems like this. I am not the person to answer that question. There is a corporate task force that's working on that problem. You can rest assured that the spring security problem got the corporations attention in a real big way and unfortunately when you have a 10 billion dollar company with 100,000 sites, things like this don't get solved over night. The answer is, we're working on it and I believe you

can expect some kind of reasonable solution. I can't make any promises about when or exactly what they'll be.

Q. Could it at least, can you at least answer the question as if the problem exist in earlier versions or don't you know that.

A. Our terminal driver maintainer says it's probably been there a while.

Q. When's it fixed?

A. It's not. Let me just make one more comment. Obviously when we get back to Nashua next week, I am sure Forrest is going to sit down and you know poke this one out and we should have a patch to correct the problem in a very short period of time. The big problem is always is making the patch available to the customers. What we've done is as soon as we have a patch for a killer like this we make it available to the CSC and you know, unfortunately that's the extent of what we in software engineering can do about the problem.

Q. Excuse me a quick comment on that. Could you at least make it so that the folks at CSC would make it on line so we can pull it off.

A. We can certainly make that suggestion to them.

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Q. Okay, this is Ken Barons from Rockwell International. Here's my question. It has to do with a VAXstations, VAXstation software, the problem comes up when I have between forty, actually between thirty and forty windows on the screen, about half of them display in data at once. Everything freezes. The cursor no longer tracks the mouse, nothing happens. I guess I should tell you it's a VAXstation 100, I am running version 1.2 and I was wondering if there is a newer version of the VS 100 software and I've also got some other symptoms. The symbiont process that is controlling this VAXstation does go away, there's no notification of it and I can't start another one because it says it's there.

A. Okay, unfortunately I'm afraid we're not going to be able to help you on that one....oh, I'm sorry. I'm told there is someone in the audience who is willing to deal with this. There's a person over there who's shaking his head. The VAXstation 100 software is produced by an organization in DEC other than us VMS development, so nobody up here can tell you a whole lot about it. My apologies.

Q. Is it true that the softwares no longer supported?

A. That's an obsolete project. I believe if you check there should have been a letter sent to all supported sites at least a year ago that I remember announcing the status of that product. It is not true that the VS 100 software is no longer supported, but it is true that the VS 100 software is no longer supported by the VMS organization. The software now resides is my understanding with our software services organization and they are responsible for all maintenance and updates to the software or fixing anything that goes wrong.

Q. Colorado or Atlanta know nothing about it.

A. Right. It is handled at a corporate level for VS 100 customers, but it the responsibility of the software services organization.

Q. So, the bugs might be fixed?

A. The bugs could be fixed. I'm sorry there is not a definite answer we can give to that one because it is not the VMS product.

Q. Pete Sevy, Dow Chemical. This ought to be a quick and easy one, because I asked it a year ago in San Francisco and I just want some clarification of it. Support for RX02s and their actual Q-bus controller on MicroVAXes and VMS version whatever it is in the future. Is it going to be there?

A. We have no plans to support RX02s on Q-bus.

Q. How about if it happens to work on the UNIBUS can we move over the driver like we did before?

A. For us to support a device it has to go through a number of testing processes and qualification and diagnostics have be written for it and all kinds of things to that effect. ???? you won't see us very often pick up an older device and support it on a bus that's new to the VAX family. That doesn't say that if you didn't try it might not work, we don't know, we haven't tried it, we don't use those, so your guess is as good mine. Q-bus and UNIBUS are very similar. There's probably a good chance it might work, but it wouldn't be supported.

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Q. I'm Earl Kates from Lockheed Missile and Space Company, I need to know whether I will write an SPR or contact software services to get VMS to run on my VAX. I have a 782?

A. Are you talking today or in the future?

Q. Future.

A. We have some upgrade programs in place. Your sales rep should have talked to you about this, if he hasn't, if you'll give me your name I can pursue this and talk to you about it off line.

Q. Okay, because he told us that 782 would be supported and I thought I'd better ask.

A. In point of fact the 782 will not be supported in the future major unannounced release. So, if we can discuss this off line I'd be glad to do that.

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Q. I'm David Kathy from Texas Instruments. First I would like to give kind of a bit of an answer for the guy that's wanting to do the SET TERMINAL on a virtual device or a templet device. What we have done is gone into SYSGEN, modify the DEV_DEPEND and DEV_DEPEND2 and then connect the device and then change the Dev depend, dev depend to back to what we wanted it for. So, when you do the connect to the templet device it will pick up a new set of parameters rather than the current default. Now, for my question, I have a modified print symbiont. The modified symbiont has to do some of that little extra work when it starts up and I'm going into the start task for the output routine. In order to start that up it's going to take a, maybe, a somewhat lengthy point of time. I need to pass a PSM$ pending, so in order I can run multi stream, otherwise I'm forced to just go through a single stream in order to maintain what I'm doing otherwise I might get a stalled queue on one and everything else would stall also. I was wondering if you're planning on any kind, if there's any kind of support or ideas.

A. I'm not that familiar with the internal of the symbiont, but I'd be happy to talk with you afterwards and take it back to our symbiont developer.

Q. Gregg Avery, this is also symbiont question, but a little bit simpler I hope. We have a couple of different sites and at one of the other sites the guy there has an LN03 plus and we also have a laser printer, laser jet, both of us experience blank pages printing out at the beginning. When he called up tech support after talking to a couple of different people, they said yeah, we know about problem the fix is put a form feed in your reset module, by adding that form feed you'll actually get rid of the extra blank page. He did that and it worked, I did it and it didn't work for the laser jet, what's really going with these extra form feeds and why does it work on the DEC printer and not on the HP printer?

A. Gee, I really don't know. Again, why don't you see me afterwards, I'll get the details down and maybe we can have our symbiont developer get an answer back to you.

Q. Bill Wiespone with Schlumberger Well Services in Dallas. First I get a kind of a comment as I was standing in line here I hear about this possible security bug feature whatever that may or may not crash my VAX, but because DEC is unable, unwilling or whatever to figure out a way to discuss security problems I now have to go back to my boss and tell him that my sixty five machines may or may not be subjected to a security hole, but I've got no way of finding out what that hole is, is whether or not I'm exposed, not exposed and I think it's about time that DEC do something to figure out some kind of way to talk about and/or disseminate security information to the registered VMS users.

A. Right. Please understand. I fully sympathize with you. Please understand that among those registered VMS users are very likely the hackers that are trying to break into your system...

Q. I disagree with that....

A. What's going to happen... Believe me there are.

Q. ???? the question we keep tapping dancing around it, but let me get on to my question. I know it's not the form I just felt that that needed to be brought up.

A. As Andy eluded to earlier, we do in fact have a corporate task force working on this problem. We have representation from our legal people, from our manufacturing people who distribute the patch, from engineering, from all the appropriate groups. We are concerned. This is a serious problem. It's become much more serious now that we have networks that convey information much more rapidly than was the case a few years ago when it was paper only. So, we are not ignoring this problem, but it is a very very difficult problem to solve and it's going to take some time and some work on a lot of people to solve it.

Q. Right and I understand that. All right my question is somewhat relatively simple, maybe and that is dealing special SYSGEN parameters. Now, surely somewhere, somehow those are documented someplace and every now and then I need to know what a particular parameter is and what it does and they're not covered in the regular SYSGEN manual. Are there any plans to document these, ever?

A. In general one of the primary reason the SYSGEN parameter ends up being special is that its usage, the semantics of its usage or if it bit and coded etc., are all subject to change. Okay, now if we document that, that's as much as committing to that interface and we're not about to do that for some of those parameters. Now, the argument that you might make and it's a valid one is that some of those parameters that are tried and true and well understood might very well either be eliminated or be put into the non special class,

but special SYSGEN parameters by their very nature are meant to be undocumented in general.

Q. Okay, but also by their very nature they critically affect the operation of your machine and if you get yourself in a situation where your machine is crashing because you have too small a SLI symbol table or a PIO pages, for example and you have no idea what's going on, you don't have anywhere to turn to and I think that from a system managers standpoint, anything that affects the operation of the machine should be documented someplace and if you don't want us to touch it, just put do not touch on it.

A. Okay, it sounds like the type of parameters you're describing are, in fact, either should be removed or should be fully documented because if you have to tweak them on a fairly regular basis in order to achieve performance goals, system management objectives or whatever, then by their very nature they should be documented and they shouldn't be special and I think you have a legitimate beef that you should make to the SPR mechanism.

Q. Okay, even if they're not regularly tweaked, it only has to happen once.

A. I would comment that several SYSGEN parameters are better documented in the on-line SYSGEN help, than they are in the manuals.

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Q. David Swain, Auburn University. We have a problem with disk quotas that's been around for awhile and people will have just a few files in their account and suddenly the operating system says their disk quota is full and you can rebuild a disk and it fix it and....last Spring in Nashville this was brought up and we were told you all were looking at it so...what's the news.

A. We're looking at it. It's not something that we can reproduce in our lab with any degree of reliability or certainty. When it does happen we can't detect or predict where it's going to happen from.

Q. So, it has happened in the lab, though?

A. We have seen it, yes. We've seen it happen, but unfortunately when it happens, when we're looking to the right it happens on the left or behind us. But, we are pursuing the problem, we haven't given up on it.

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Q. Jim Neilings, Hughes Research. I have a VAXstation II/GPX and normally using that stand alone if I do a SYSGEN CONNECT CONSOLE I get access to CSA0 which is printer....what I'm using as printer port....serial port. If I use that same machine in LAVC SYSGEN CONNECT CONSOLE basically does nothing. Is there some way that I can in fact get to that serial port?

A. You're unable to get to the console serial port?

Q. That's correct. If I do the SYSGEN CONNECT CONSOLE I get no error message, but then if I try to do something to CSA0, it says no such device.

A. Does it show device show CS....show the device?

Q. No.

A. Unless somebody here has an answer I guess you've stumped the panel again. When you do a show device can find an OPA0?

Q. Device type OPA0 or device name OPA0 on that system, I'm not sure.

A. Do you find the CSA1 then?

Q. No.

A. And, you don't find and OPA0 or haven't you looked for it?

Q. I don't remember looking for OPA0 there.

A. I'm sure why it would be doing that, but it's possible that it's leaving the ????? loaded for that device and treating it as the output device. And, look for that and see if it helps.

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Q. Allen Frisbee. I have a MicroVAX II with a pair of RX33s and I discovered that I cannot format them, if I use the INIT/DENSITY=DOUBLE switch, I get an error message saying invalid IO function code. However, it works just fine on my friends MicroVAX 2000.

A. We are expecting to support the RX33 on MicroVAX II in the next major release.

Q. Well, yes...but it's currently in the systems and options catalog, I paid out good money for it and now I'm stuck with something that won't format.

A. We had to do an ECO to the MSCP architecture in order for us to provide a way to get that function through our MSCP drivers off to the RQDX3 controller. Since the VAXstation 2000 has an RX33 sitting on a different kind of bus, a different kind of interface, we were able to offer that capability in the first release of the VAXstation 2000, MicroVAX 2000, but we couldn't get it into the Q-bus I without an ECO 2, essentially the whole and the CP protocol. Therefore, it's taken us a little longer to get there and you'll just have to wait a little while longer and we're sorry about that. You can format those floppies with diagnostic and I realize that's unfortunate that you have to go stand alone to do that, to run the diagnostics, but we're fixing that as fast as we could, it just took us longer.

Q. Unfortunately the diagnostics you refer to are only available to field service, not to customers. So, I'm stuck again and your sales force is selling these. So, what's an interim solution?

A. There is no other solution right now. We're sorry about that, we put it in as fast as we could, it will be there in the next release.

Q. If I sent you a box of floppies, will you format them for me?

A. What do I get.

---

Q. Dennis Costello, Cornell University. I have a lot of users who are fairly naive, maybe I am too on this point. They like to run long batch jobs and they might be writing to files, they look or just sequential write files, nothing very exciting, it's all from FORTRAN...The thing is since the job tends to run for days they would like to be able to look at the file periodically and inspect it and see how the jobs going. Now, obviously they could do this the same that you do the log file, close it, open it for a pen periodically, but if they didn't do that is there anyway that you can look at such a file, just type it out, look at what it says even if the last few records aren't correct?

A. Okay, well the answer is if you open the file with FORTRAN, you say, ACCESS=SHARED, then the current version of RMS will in fact track the end of file correctly. The TYPE utility in particular does open the file shared, TYPE will type a log file that's currently

open for write, so I believe you can do what you want. It doesn't involve any special commands.

Q. Yeah, that works for the log file, but to write the log file the FORTRAN parameter will just write to SYS$OUTPUT or whatever, but if they're writing to an explicitly opened file?

A. We had somewhat the same problem and the solution we used was to use the FORTRAN open specifying shared and then periodically call the RMS SYS$FLUSH routine to write out any records that were buffered and we used the mechanism that's in place for getting the FAB address from the FORTRAN run time system to call the RMS routine.

Q. Okay. These....all the wrong way of looking at it. All that requires that you make changes to the programmer that's writing this. I want to have something that's completely written completely naively and then I want to just look at the file without getting this.

A. You could probably write a utility that opens the file specifying user provided interlock and that's completely overrides all RMS locking and you just open the file and dump it out.

Q. Okay, I'll try that.

---

Q. Phil Knecett, Consultant. I have a problem with VMS running VWS 3.1 on a monochrome workstation. I have a compute bound process in one window, updates to the other windows go exceedingly slow. I've talked a number of other VWS users and they see the same behavior. Now, on the surface it would seen that at best I...for example I'm running a link or a compiler or something that's really eating CPU and the other window or in might not even be in a window for that matter and... it seems that at best, at worst I should get 1 over N or the CPU to do my updates and I should go perhaps half as fast. Indeed I think I would get better because I should be getting a scheduler priority boost because the VWS driver I hope is doing IO and getting me that boost. Any ideas why updates are slowed down so much when I have a compute down process on a workstation? I mean it goes down by a factor of 10 or more.

A. I'm sorry but it appears that we don't have any VWS expertise here on the panel to help you.

Q. I talked to the VWS people in the booth at least and none of them had any idea, they all thought it was your fault, so.....

A. Question for you. Is the workstation a GPX or a VAXstation?

Q. No, Monochrome, QVSS, you know, old flavor....

A. A QVSS?

Q. Right...QVSS...Monochrome.

A. Okay, I can address part of the question. You did ask about the priority boost. Now, there is a minor hitch here in that because the VWS driver operates within the process context there is no actual wait for that's executed by the process to wait for the IO, unfortunately the priority boost is tied right into the wait for mechanism, therefore in fact, you do not get the priority boost. There's not a whole lot that I can say about your performance being apparently worst then 1 over N, unless in fact it turns out you are doing say, something like a compile or a link which is in fact doing disk IO which giving it a priority boost and is therefore in fact making the apparently compute down job somewhat higher an effective

priority than the job that's updating the window.

Q. Good, so what I need to do is dittle what parameter in order to make that be delayed longer until it gets the priority boost. I want the scheduler to wait longer to give it the priority boost.

Q. Now, unfortunately the priority boost is given on each IO and wait for. About the only thing that you could do which is not particularly supported would be to find the priority boost table in SCHED and patch it, because the different types of wait fors are done with a class number, there's a little table in there that's indexed by class that has the actual boost values.

A. I think that explains my observed behavior anyway. Thank you.

---

Q. Dave Cooke, Maxi Care Corporation. We have a problem with RMS. We're using shared sequential files open for access in all modes. One thing I might mention is we're using version 4.5 of VMS. We've tried installing the 4.6 RMS EXEC and we still see the problem. What appears to be going is are occasionally some processes we may have as many as say twenty or thirty processes opening this file simultaneously and at some point we make a request that all these processes close the file, we find a situation where one or more processes will close the file but they still retain their internal channel to the file. When they reopen the new file they get a new channel to file and that channel is subsequently used for all the IO. The old channel remains, but no further activity takes place on it. The only way that the channel is ever released is when the process finally terminates. Do you have any suggestions?

A. We haven't heard of this problem. It's a new problem that you should definitely SPR. If you feel like digging in with analyze system a little bit yourself, have a look at the process, have a look at the apparently dangling channel, see if the IO count is zero, that is, you know, see...do a SHOW PROCESS/CHANNEL, see if it's marked busy, if there are any IOs outstanding, is there a deaccess pending on it, that sort of thing. Any sort of diagnostic information like that would be useful.

---

Q. Bob Lanford, the Medical College of Virginia I would like to know how the terminal numbers, type numbers and names are determined. For instance, if just SET TERMI-NAL/INQUIRE it figures what kind of terminal you are and if you're working with the SMG routines, it seems to know and it even has a name for it, but there's not document correspondence between the integers stored in the unit control block I believe it is and the names. It seems to be adjustable or it seems to work, but I don't know how to predict what numbers will be given.

A. There's two parts. The first one is how does it determine, there's a known set of who are you sequences the set turn runs through to ask the terminal who are you, literally who are you and looks for set responses back and it will run the table and if you happen to get a device that requires that you go to the end of the table, it will take a little while to complete. The second half is that there's a definition it's TTY DAS which contains the device type and the device name string for VMS supported terminals. For foreign terminals, for SMG, that's handled a little differently and I can't give you the exact details of how SMG does it.

Q. Is there anyone there that who can? It doesn't seem to be documented.

A. For SMG for the foreign terminals, the numbers are known because they're negative where the Digital supply terminals are positive. There's nothing, no specific allocation scheme,

they're just allocated in ascending or descending order and as it find it when it's processing turn table when you can define your terminal. Okay?

Q. How does it know which, I mean, all the DEC terminals are defined in the SMG term table as well, but I haven't seen anything that says this one's getting a positive number this one's going to get a negative number.

A. Well, we know it's a DEC terminal, we supply the definition.

Q. But it's in the same file that I put my definitions in. I mean maybe, you know, that's not a good way to do it, how does the SMG term table compiler recognize, does it just have a list of all the names that are DEC names?

A. Actually I believe it does. I believe it uses the same list that Forrest was talking about for all the Digital terminals.

Q. I see, so it sort of ignores the device replys....?

A. Yes. When SMG starts up, we actually do a ?? DVI and we find out from the terminal driver or sense motor which ever one it is, I don't recall off hand.

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Q. Vince Televeris, Script Corporation. At the, one of the shadowing disk talks, it was mentioned that there's special considerations for running shadow, using, shadowing your system disk. And I was wondering if anyone up there could tell me what they are?

A. What particular special considerations are you referring to?

Q. Well, I think it was something in, with respect to stand alone backup.

A. There's special considerations for booting the system disk off of shadow sets. You specify in one of the registers to VMB two different units numbers when you booting off of a shadow set, one is the virtual unit number of the shadow set and it's denoted by the sign bit being on. The other is a single member of the shadow set which is the disk that you'll boot off of if the virtual unit is not created when you're booting and you want to make sure that all systems in the cluster specify the same physical member to be the default one that you boot from if there is not a virtual unit created when the system is booting.

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Q. Steve Wright from ???? Software in Virginia. We support a bunch of sites and regular 780s, 785 type VAXes and a fair number of MicroVAXes, we're having trouble getting AUTOGEN to configure VMS images the way we want in configured and aside from going into the start up and deinstalling and reinstalling raffs of layered products, I'm wondering if there's anything wrong with it, if you know what you're doing. Editing that file, then converting it back to its original format which we get for analyzing it.

A. Back to its original format, could you describe what you mean by that?

Q. Well, you do an ANALYZE/RMS/FDL which saves its format, its block span and it has a couple of other attributes that we're not sure if there's something that relies on those attributes and then we edit the file. It creates an output file that's a different format and we convert it back to the original format.

A. VMSIMAGES.DAT is just a sequential file, certainly editing that file is something that can be done in any editor, but is, you know, certainly we can't support that function. I will tell you that AUTOGEN will recreate that file each time that it's executed so bearing

that in mind, you know, you're on your own there, but it's....

Q. I guess what it boils down to is, is there anyway to make AUTOGEN create the file correctly? No necessarily for the layered products but for the stuff that comes with VMS. PHONE for example, we can't get it to install PHONE. I mean, it would nice to use PHONE on a MicroVAX with thirty users.

A. There are two versions of, okay, that brings up the different issue. Two versions of VM-SIMAGES.DAT, in quote, big VMS AUTOGEN creates that file, in Micro VMS that file is not created by AUTOGEN but ships with the kit. In an attempt to minimize memory consumption by the installed image list and if there is sufficient memory then those steps that we talked about earlier might be appropriate for your site. That is not created by AUTOGEN in Micro VMS.

Q. Would there be anything wrong with taking a 16 meg VMSIMAGE.DAT from a 780 and putting it on a MicroVAX II, with 16 meg?

A. Micro VMS due to the kitting procedures and perhaps if you have tailored all files may not find files that are in that file and hence at boot time you would see, you know, rather nasty error messages.

---

Q. Keith Carston from Data Quest. The problem I've been having is with an ISAM file. It has a primary key and alternate key, the alternate key has embedded in it the primary key and I've got about ten thousand records, about a six to eight thousand block file and what I do for the particular application that I'm using it for, I pull in a set of records, the particular example I've been working is 116, play around with the alternate keys, the non primary key portion of the alternate key and then write those, rewrite those records back and if I do that after a series of times the index buffers wind up or the index buckets wind up getting messed up and when I pull in records again the same 116 records, instead of getting 116 records I'll a hundred and ten or a hundred and twelve. I'll redo the indexes, write them back, pull them back in and all of a sudden I've got 116 again and if I do that a couple of times it winds up corrupting the ISAM file. This is an outstanding question and they did suggest that I turn off...I had no duplicates on both the primary and the alternate key, they suggested that I change the no duplicates to duplicates allowed on the alternate key even though that's impossible and we're arguing over that one right now, but you shead any light on this problem?

A. When you, first of all which version of VMS are you running?

Q. 4.6...

A. And, when you mess around with the alternate keys are you in fact creating any duplicates?

Q. It's impossible, I'm not modifying the primary key, so there are no duplicates. I am creating....what I am creating is...let's say I have one...I have one field and in the alternate key and then thats followed immediately by the primary key to make the whole alternate key, so field A and then the alternate key. So, what I do is I tweak field A and field A may either have a unique value across the whole data base or it may have a duplicate, but it won't cause a duplicate key simply because the primary key is in there and is unique.

A. Well, any time you get crock file doing normal operations RMS that's a bug. I would definitely SPR that, so that we'll see it.

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Q. Al Metzsinger, Eastman Kokak Company. Is it true that automatic....that the SYSGEN parameter of automatic centered increment, not increment, adjustment has to be an even multiple of quantum and can't be below quantum?

A. Yes, it does and the reason is that the automatic working set adjustment mechanism is triggered at quantum end events and therefore you have go through a quantum end event in order to have automatic working set adjustment happen and so therefore, it makes sense to have it be a multiple, ???? a quantum.

---

Q. Dennis Costello, Cornell University, again. We would like to be able to do things like SET HOST DTE/LOG to a terminal server port, has a modem on it and the modem is set both incoming and outgoing and therefore it is declared as a service and we can connect to the service through the terminal server and use it as outgoing modem, we can dial in and connect to wherever we want, but the one thing we can't do is SET HOST DTE/LOG and that will very handy sometimes. Alternatively, if the current developer is in the room and wants to do the programmatic interface for ???? connect to give me the same functionality that would help, but I'd like to have the same kinds of functionality that I had when I had the modem or a PC or any other kind of device like that attached to a hard wired port that I do in the terminal servers.

A. Yeah, we've had that request from a number of people and we're working on it providing the capability for set host DTE won't be coming real quickly, but it will be in the future. An application program that what's to do similar things has a mechanism in 4.6 to connect to a terminal server port and....

Q. Yeah, the QIO call, what I think it was a poor choice because it broke a lot of code and it broke a [tape skipped here]....to fix.

A. It didn't actually break the code, it just added new things that you should...[couldn't do]... the code that you have control of.

Q. Right, but it cost me a lot of functionality there, that I haven't been able to get back. I call that a break.

A. Okay, it's as noted.

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Q. Glen Zorin, from ADP. I've been setting up a DECnet asynchronous DECnet link through a DZ32. I've been able to get it to work through the DZ11 and DMF32, but the problem with the DZ32 is it comes up, it runs, everythings fine and dandy, but I dissolve the link in the channels the port on the DZ32 hangs forever. The only way to get it back is to reboot the system and I've had field service in, they say it's software, they've softed out my board, they've run diagnostics, I've called Colorado support and they say, it must be the hardware. The only other side affect I got is on the DZ32 when I do the set terminal, every port on the DZ32 gets an error count of one, but if I do a set terminal a second on that port after booting the system I do not get an increase of error count on that port, but I can run terminals in and out of that port, in and out of those ports no problems and I was wondering if maybe you have some insight on what is going on with me. I'm running 4.5 of VMS currently.

A. No, off hand I don't have any insight. All I can do is say, have you SPR'd the problem?

Q. I called Colorado support, but I haven't SPR'd it, but they just saying it's hardware call field service.

A. It sounds like software to me and perhaps at 4.5 there could have been a problem. There were a number of fixes in 4.6, so I think that the first thing you should do is try to get up to 4.6.

Q. I have to wait till 4.7 is released.

A. Okay.

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Q. I'm Tim Mahany, I'm with DGM & S. About five or six months ago I sent a sample of an extremely trivial file to Colorado which would cause the print symbiont to go into kind of random block selection mode for printing. I got, I actually got a phone call relatively quickly from Colorado. The representative didn't believe me and submitted it and said by the time he got to the machine room there was paper all over the floor. I was wondering if someone could give me any kind of hope as to when that might be fixed? It's reproducible and I think it's either a three or four byte file that will do it.

A. I don't know if it's your file or not, but I seem to recall seeing an SPR that our printer symbiont person is working on. You see, I don't know specifically if it's your problem, but we have something that's similar to that description.

Q. Colorado said it was submitted to engineering, I didn't know whether that was the garbage can or what, you know.

A. Yes....I believe we're working on it, but I don't know the status of it. I seem to recall seeing something like that on our problem list.

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Q. John Chambers, Naval Avionics Center. I'm here asking this question on behalf of a manager at our site who is unable to be there. They're running a 785 stand alone system on a version 4.5, got their system disk on an RM05, they cart the system disk over to RA81, the DUA's magically become DUB's, nobody seems to know why. They put it back on the RM05, they magically become DUA's again. By the way we have third party maintenance and they're pointing the software and when we call software they're pointing to the hardware.

A. I had the same problem. I was trying to convert a CI cluster to a couple of boot members for an LAVC, we're not sure why the VMS decides when you try to boot up the UDA that it wants to make that device blink, because we had the same thing we had been booting out through the CI and they had been coming saying, "B" correctly. There is the upper byte of R5, if you put a 1 in there it make it controller A, if you put a 0 in the upper byte it will determine it itself. If you put a 1 in there it will make it controller A or if you make a two it will make D and so on. So, that will fix your problem.

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Q. Mark ????, ?????, Denver. I have an LAVC with twenty nodes running VMS 4.6, all nodes are running queue manager using the same JBC ???? dot to the ???, the same job queue file, when one of the nodes shuts down using regular shut down, in about fifty percent cases the whole job queue system, ???? for the whole. When the node comes back, immediately when it gets the connection to the other nodes, the job queue systems magically restart itself. I assume originally that the shut process doesn't give queue manager time enough to do all the clean up and that the it kills the queue manager before finishes up, so I went into my systems, not my...???? shut down procedure, stopped the queue manager, explicitly gave it two minutes to wait before...shut down to continue, the situation seems to be approximately the same about fifty percent of time I get the job queue system host.

The solution is to go boot that node immediately back or boot another node immediately and try it again, shutting down, but my users don't like transitions too much.

A. I'm not sure I understood all of your question. Are you saying this problem occurs when one of the nodes in the cluster goes down.

Q. Then the node is regularly shut down with the remove under a node option.

A. Okay. I think I'd like to talk to you afterwards. I would like to make a comment, however, on the case where a node in the cluster exits and in which case the connection manager notifies all the job controllers that a node has gone away and they all attempt to access the queue file to clean up the queue's for the node that just went down and this level of redundancy, especially in a local area cluster where you may, you know, have twenty nodes becomes a very time consuming and expensive operation. In 4.7 we have modified this algorithm to make it much much faster, but that's not addressing your problem but I just wanted to make that comment since it was....

Q. Is there a hope that the ???? let it wait five minutes that it will fix the program?

A. Possibly. It depends upon the number of queues, the number of jobs in the queues managed by the node that you are shutting down to determine how that might take. A stop to manager operation can take quite a long time if there are lots of jobs that have to be dealt with in those queues. Where lots may be, you know, fifty or hundred something of that order.

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Q. Stan Rhodes from Bankers Trust. This is in a lighter vein, prompted by the fact that we're coming into Leap Year. I would like to see a republication of the SPR, a very thorough SPR that was read about two, maybe it's two or three years ago at this point, explaining the reason that VMS handles Leap Year the way it does out about 800 years. It was a, it was very funny and I'd like to see it submitted to the page swapper which it never was. I think everyone would appreciate seeing that.

A. Okay, thanks. Thanks for the comment. We'll have to see if we can dig up a copy of that. I know which SPR you're talking about.

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Q. My names Larry Fulgalone, as a side comment, I certainly understand that corporate committee working on how to distribute security patches may be important, but I'm dismayed that the proposed interim procedure entirely cuts out those who are paying monthly for software self maintenance. My question has to do with a problem where I got egg on my face in a mixed vendor situation by saying, security oh, sure VMS can do security. The people wanted to let the communications department set parameters on all the terminal lines willy/nilly for political reasons and I thought that the way I set permanent parameters on a terminal is by giving myself logical IO or physical IO privilege and I knew that device protections instead of having categories of read, write, execute and delete, had categories of read, write, to logical and physical, so it seemed reasonable to me that if I protected a given device giving a particular group of communications people logical and physical access to that device in the protection then they would be able to set the characteristics on the terminal using the SET TERMINAL/PERMANENT command. I found out that this does not work. Apparently the SET TERMINAL/PERMANENT code specifically checks for the privilege rather than calling the check PRO system service to check for the protection. Is there any particular reason why this is done that way?

A. Larry, I think the answer is no. There's no particular reason. A lot of these things have been added on as VMS has grown and we haven't always had the time to go back and

make everything consistent. I'd consider that a loose end that we ought to look at.

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Q. Dennis Costello, Cornell University. I'll apologize if this is the wrong forum, but I haven't the faintest idea where else to bring it up and nobody on the [exhibit] floor wanted to touch it. You have a lot of interesting text processing, things like RUNOFF and TeX and so on at your disposal, all of which will generate change bars, please use them for the SPD's. The documentation people said that it was the individual product mangers that had to make that decision and I claim that that is corporate wide and I know who to tell it to.

A. We'll go back, we'll talk to SPD administration, we use them internally, we know they're helpful, we'll see what we can do.

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Q. Phil Knecker. Dynamic asynchronous DECnet between V 4.5 and V 4.6 systems, I've been doing it in 4.5 and earlier systems for a very long time connecting to, oh, probably connect to a dozen different systems from my VAXstation and it works fine, after you get through all of the, every single thing that you have of course to get the net circuit up, but I... connecting to a 4.6 system just a couple of weeks ago, the circuit came up finally, but routing updates never occurred and I could never see his node from mine. I was up/down to him. I established the original connection and did the switch on his SET TERMINAL/switch on his node to get the connection back. Eventually the circuit did come up, but I never got routing connections, any idea?

A. Yeah, that's the second time in this DECUS that I've heard that. Now, I know in 4.7 there's some patches for some the async DECnet. So, I'm going to go back and look to make sure that we understand what that problem is. It sounds, at least, two sources that it should be fairly easy to be reproducible. So, we'll get back and see if it's in 4.7, I'm pretty sure there are some changes there.

Q. As an interim patch that we've made work you can set the routing broadcast timer on the 4.6 node to a reasonably short time, like maybe a minute, and then after a minute it will blow out the routing data and everything will come up. It's like ten minutes normally.

A. Another thing I heard someone say, the other person who complained about this, was just alter any parameter on the circuit, alter costs, okay...

Q. Right. I tried both of those things. I set the routing update timer from 600 which is the twelfth down to sixty, didn't do it. I tried various things that I thought would cause a routing update to occur and those didn't do it either. As in a site, I've since connected to another 4.6 system successfully. So, I'm not sure it's a 4.5 versus 4.6 problem either.

A. We'll keep that in mind when we're looking at it.

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Q. Steve ????, Wizard Software again. We're having a situation where we need to dismount a disk, here or there, on multi disks systems and forget to deinstall an image that's on the disk, when the disk comes up as mounted, disk mount on a SHOW DEV D, we then go in an deinstall the image and the disk doesn't finish its disk mount. Is that a bug or are we doing something wrong?

A. Okay, we'll have to take that back. I mean, certainly that should work from what you've said. I don't see that you're doing anything wrong. So, we'll have to look and see what's happening there.

Q. Ken Brown, Aptech Systems. I recently had an opportunity or reason to prevent AUTO CONFIGURE from configuring the first UDA50 on a VAXcluster and it configured anyway. I put in an explicit SYSGEN AUTO CONFIGURE/EXCLUDE=PUA in the SYCON-FIG.COM, but before it got there the disk had already configured. Is there a way? We weren't booting from it, we were not booting from it.

A. I'm sorry I missed the very beginning of the question. What, okay, what kind of machine is it and what are you booting on.

Q. I believe it was a 780, we were booting off an HSC. It was not booting off that UDA. It was an RA80, I think on there.

A. Yes. We think that what's happening to you is that the configure process who's job it is to find new DSA disk controllers is finding...is finding your UDA and believe that the configure process is independent of how you have auto configured the system. That is having done the....having told the AUTO CONFIGURE ALL not to configure the particular device does not tell that same information to the configure process and it will wait or find it and that's what you're seeing.

Q. Well, I put a write line, you know, essentially a write to sys output in SYCONFIG.COM and the disk watching the lights on the UDA50 it had already initialized before I got the write line, significantly before. Now I can cause a UDA50 to be excluded if it's the second one on a non cluster and I'm not sure which of those factors is the factor here.

A. Which one can you exclude in the non cluster case?

Q. The second UDA50. The problem was the first UDA50 on a cluster, on this node of a cluster. It was a local, wasn't served.

A. We'll take that back and look at it.

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Q. Andy Taylor, Texas Instruments. About an hour or so ago a gentleman stood up here and talked about a problem he was having where he's disk quota is becoming full. I would like to propose a variation on that theme. I have my allocated disk quotas going to 0. Also, on random IDs.

A. What version of VMS have you witnessed this under?

Q. What part, what version of VMS....

A. What version of VMS do we see the problem in? As far as I know we see this in 4.5 onwards.

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Q. Pete ????, Dow Chemical, I'll try to ask this question the previous, the hardware question and they said maybe it's your guys problem. I'm interested in if there is anyway to take asynchronous DECnet, route it to a sync line, back out the sync line and go back in asynchronous. The reason this is important a lot of corporate networks have wonderful syncs line for the IBM boys and we'd like to hide asynchronous DECnet underneath it. We've tried some protocol converters to go async async and it always seems to royally screw up DECnet, anyway around it that anybody knows?

A. We heard your question in the hardware....at least two consulted and we don't know of

any way to do that.

Q. I want to go async to sync, up back at another sync modem and go back into async. There are async to sync and sync to async converters, it's just DECnet seems to get thoroughly mangled. You can use these things for example, asynchronous terminals work just fine through them, DECnet gets mangled though.

A. Yeah, off hand I have no idea why. I mean, I'm sure what's happening is something to do with the DDCMP protocol, but at this point I don't really know and I could take it back and find out.

A. No. What you're really try to do is essentially run two data link protocols, one within the other and because of the nature of the DDCMP protocol it makes certain sets of assumptions that you're going to violate. The same sort of problems have when you try to run async DECnet over broad band networks, over.....

Q. Excuse me we do run asynchronous DECnet over broad band quite successfully. Why would it care about the sync line though, I mean, it's another ???? mux. It doesn't care about the packets.

A. When you're going over the stat, if you're going over any stat mux where async DECnet doesn't own every bit of the band with the network you're going to run into various problems. It will run sometimes for a few seconds, sometimes it won't run at all.

Q. Is that true if you even ran async through a stat mux, at synch.....

A. That would be depending on the nature of the stat mux, the same problem would occur.

Q. Boy, we had that working successfully, okay.

---

Q. Dell Merritt, The Analytic Sciences Corp. I have an 8200 running VMS 4.6, this is a back up and to you driver question because I also have it talking to TU81 plus. I noticed that my privileged users can use backup effectively all the time, non privileged users cannot. I called CSC to ask them about this, I was told that it was a 4.4 bug that was remedied in 4.5 and slipped back in in 4.6 and they said please call back later a couple of weeks from now when we think we might have a patch and I haven't had a chance to call them back. So, right now I've installed backup with ISO, I've also had to install in crypt share so it would work. Is there a patch out there now or what should I do?

A. The history, the effects are right, the history is wrong. It wasn't a problem that slipped in and slipped out again or slipped out and back in again. The problem was introduced in 4.6. As we speak the problem should have been solved. When I get back I'll make sure that it's distributed to CSC. You should be able to get the patch sometime next week or the week after I would imagine from CSC. I apologize for the inconvenience over it.

# An Idle Process Killer, Chainsaw Massacre Style

**G. Beau Williamson, Rockwell International, Telecommunications Division, Richardson, TX**

*Another chapter in the debate over*
*the pros and cons of Capital Punishment*
*for VAX computer processes*

A few years back, I took over the job of System Manager for a large VAX Cluster with over 600 user accounts. This particular VAXcluster is located in the building next to one of Rockwell's major corporate IBM computing centers. Since this IBM facility is such a major Rockwell computing center, the Corporate Computer Auditors tend to make regular trips to this center to check up on things.

## We're Computer Auditors And We're Here To Help You

As an indirect result of the close proximity of my VAX facility and the big IBM computer center, our corporate computer auditors seem to regularly "drop by" for a quick audit. (Since they just happened to be in the area checking on the big IBM center anyway.)

I spent some time with these auditors and proudly explained all of the wonderful security features of VMS such as "Breakin Detection", "Access Control Lists" and a few others. However, they were not to be impressed and politely pointed out that my VAX system was not up to snuff since VMS did not automatically logoff idle terminals as per Corporate Computing Policy umpty-ump dash something or other. They then proceeded to write up this audit item in their report and informed me that "You really must do something about this".

## VAX SIG's "Wheel of Autologout Programs" Game

I decided that all of this was really no big deal as I had seen some submissions on the VAX SIG tape for autologout programs. In fact, when I scanned the tapes, I found *so many* autologout programs on the SIG Tapes that I couldn't make up my mind which one to use. Finally, I just sort of closed my eyes and figuratively spun the VAX SIG "Wheel of Autologout Programs" and picked one. Unfortunately, VMS V4.0 had just been put on our Cluster and all of the autologout programs had been written for V3.7 of VMS. This meant I was going to have to do some rewriting to make things work correctly.

## What's In A Name

Keep in mind that I was short on time so I had to carefully allocate the little time available to the more important aspects of writing this program. Therefore, I spent about 80% of the available time on the number one priority — coming up with a name for the program.

You've got to understand that I didn't want some wimpy sounding name for this program. I believe that it is important that computer users maintain a certain amount of fear and respect for their Computer System (and System Manager). Just think, how would you respond if you received a message on your terminal that looked something like this:

```
%FROOFIE-W-IDLE, You are about to be logged out by ''Froofie The Watchdog''!
```

Doesn't exactly strike fear and terror into a user's heart, does it? No, I didn't think so. The problem was to find a really good name that, when mentioned in casual conversation to a user, would trigger a conditioned reflex manifesting itself in an overpowering urge to run madly about the room searching for a VT220 on which to type the word "LOGOUT"! This is referred to by Computer Psychologist as the "Pavlovian Method" of terminal security.

Several names were tried initially but none seem to be quite the ticket. I quickly came up with the name "PROCESS_POLICE" and just as quickly dismissed it as too trite. I kind of liked the name "DETACHED_DEATH" but discarded it as a bit too heavy handed. I had recently seen the movie "Friday the Thirteenth" and began to think that if I bought a Hockey Mask and wore it to work for about two weeks and then simply named the program "JASON", I could just about achieve the desired result. This idea was also discarded as I didn't have the two weeks necessary to establish the behavior modification of the users that I desired by wearing the Hockey Mask to work.

I finally decided that the name "SECURITY" had a nice official ring to it with enough hint of authority to keep the users in line. Since by now I was nearly out of time, I spent the remaining 20% of the time rapidly coding the changes to about 45% of the original program. After a couple of quick checks, I put "SECURITY" online and went on to other more interesting System Manager tasks such as fiddling with SYSGEN parameters that I knew nothing about in order to see what affect they had on the system.

For a while, life at my VAX facility was uneventful. I had, via trial-and-error, identified some of those pesky SYSGEN parameters that shouldn't be fiddled with (I don't recommend setting QUANTUM down to 2!) and SECURITY seemed to be working quite fine. Oh, I did have to explain to those users that liked to login early in the morning and just leave their terminal logged in, that they could no longer do that. Other than that, life as System Manager was uneventful. *That is until the day* SECURITY *flipped out!*

**Security Goes Schizophrenic**

It happened at mid-morning when the computers are at their peak usage in terms of the number of users logged on. I was working in my office at the time when there arose a great hue and cry from the applications programmers in the open bay area just outside my office door. I heard someone yelling, *"Security is logging everyone off! Security is logging everyone off!"* This was followed by the appearance of a wide-eyed application programmer at my door who looked as if he had just seen a ghost. "Did you know that Security is logging everyone off?", he inquired in such a way that I thought if I were to reply "Yes, I know", he would have just responded "Oh, Ok" and returned to his desk. However, I could tell from the other frenzied yells coming from over his shoulder that this was *one* problem that I had better not put off until tomorrow.

I went to the first terminal in the bay area that was being used by one of the applications programmers. Sure enough, a series of messages from Security of the form

```
SECURITY --- You will be logged out in 20 mins.  Idle for 10 mins.

SECURITY --- You will be logged out in 15 mins.  Idle for 15 mins.

SECURITY --- You will be logged out in 10 mins.  Idle for 20 mins.
```

were appearing in rapid, count-down succession on the programmer's terminal at an interval of about 2 seconds. Not only that, no amount of typing seemed to deter Security from its inevitable outcome of killing the programmer's process. In the end, in less time that it has taken you to read this paragraph, Security killed the programmer's process and logged him off. All of

this time, I had a vivid mental image of some of our less knowledgeable users, who thinking that they were not working fast enough to keep the computer happy, were madly typing as fast as they could in a forlorn attempt at staving off Security; all to no avail. Not only had Security killed the programmer's process, it was now apparent that it was on a frenzied "killing" spree from which it seemed, no interactive process could escape.

I logged in as fast as I could as SYSTEM in an attempt to stop this mass murder! Unfortunately, I was too late. By the time I could get logged in, Security had completed its grizzly job and had left no interactive process alive. A quick SHOW SYSTEM confirmed this fact but it also showed something else very strange, *Security was no where to be seen*!

After some investigating as to what happened to Security, I came up empty handed. No one had any privileges to stop Security but myself and the day operator. He said he too was unable to get logged on before Security had finished hosing down the system. This left me with only one possible solution as to where Security went after committing mass processcide.

## AAI – Accidental Artificial Intelligence

Evidently, I had accidentally embedded some small kernel of Artificial Intelligence in Security when I made all of those changes. (Which is a pretty good trick considering I never got around to taking LISP programming in College.) I figured that this AI kernel must have grown into some small degree of a "sense of right and wrong" because after going on its shooting spree, Security must have realized that it had done something "very wrong" and being overcome with guilt, turned the gun on itself!

Then I began to think that it was possible that it wasn't a sense of "right and wrong" at all that caused Security to kill itself. I may have given myself too much credit for accidentally giving my program a sense of morality. It was just possible that my program was a heartless killer with no feelings for its fellow process. I must admit to some degree of responsibility for Security's actions as its foster parent (remember I re-wrote about 45% of the code). You know you do your best to bring programs up right in today's VAX architecture. But, sooner or later you have to "detach" them and when you do there are no guarantees that they won't someday break your heart.

Finally, I had to face the fact that my Security program might not have had any feelings of remorse what-so-ever and simply realized that it was surrounded and didn't have a chance to escape. Maybe it had vowed never to be taken "alive" and to subsequently be sentenced to Life in "Process Prison". (This consists of being Swapped-out to a tiny Swap File on an unused disk; after which, the disk's Unit Plug is pulled and thrown away.) In any case, we will never know what last thoughts went through Security's P0 space on that fateful day.

## Post Mortem Of A Privileged Process

After the excitement died down over all the users getting logged out by Security, I begin the process of a post mortem on Security. Since I was unable to get logged on in time to do anything while Security was running and since the exit status in the accounting file didn't show anything to indicate what the root of Security's antisocial behavior was, I had to resort to the age old method of program debugging — read the program listings and "out think" the computer.

I began to go over the listings very carefully and everything seemed to be in order. "Hmmm", I thought to myself as I scanned the listings, "here's where SYS$GETJBI is called over and over to get data on processes; here's were processes that have been idle are detected and here's where idle processes are warned via a message output by a call to SYS$QIOW." "Yep, everything sure looks OK, so what the heck is ...", Then it hit me, "What a minute, QIO and *WAIT*, could that be it?" Slowly the problem began to take shape and I formulated a scenario that after some further research I felt to be the cause of the problem.

## A Scenario for Disaster

Here's what happened. Security had run just fine for several days until some user had typed the <Hold-Screen> key and then walked away from the terminal. After the appropriate amount of delay, Security attempted to issue the first warning message to this now idle process. Unfortunately, the I/O was unable to complete since the <Hold-Screen> was still in effect. Now Security was hung until someone type the <Hold-Screen> key on that terminal again. This wouldn't have been a catastrophic error had Security's rescheduling algorithm been correct (a section of the code I hadn't bothered to modify, I might add in my own defense). It turns out that the original program used an *absolute* time computation to schedule the next wakeup time for the program by simply adding a fixed time interval to the last scheduled wakeup time.

Now I could postulate the scenario that led up to the disaster. Like I said, it all started when a user typed the <Hold-Screen> key and then went to get coffee. Security soon attempted to warn the terminal and then hung in the SYS$QIOW. About an hour later, the user returned from the extended coffee break and typed the <Hold-Screen> key again in order to start a short "work-break". Security then completed the I/O to the terminal and rescheduled itself to run again *at an absolute time that had come and gone nearly an hour ago!* The result was that Security went into hibernation and immediately woke up again. Thinking that some reasonable interval had passed (we use 5 minute intervals), Security looked around and saw that virtually *all* interactive processes had been idle during the last time interval and proceeded to warn every process on the system.

Once again Security computed the absolute time of the next wakeup (which was still nearly an hour in the past) and put itself into hibernation once more only to be awakened immediately. This repeated itself on and on until the final climax resulting in Security coming to the erroneous conclusion that *everybody* had been idle for the prescribed time period and should therefore be killed.

## Epilogue

A new version of Security is now running on my system. I changed the SYS$QIOW to a non-waiting form of SYS$BRKTHRU in order to "write through" anything pending on the user's terminal and to not wait around for the I/O to complete. I also changed the rescheduling algorithm to compute the next wakeup interval using delta times.

Security has now become the respected idle terminal policeman that I originally had in mind. The users have become used to his warning messages and actually logoff when they are not using the terminal. The new version has been stable for so long that I no longer worry about Security becoming deranged and causing the process carnage that his predecessor did. In fact, I now have the time to get back to fiddling with a couple of other SYSGEN parameters that I never had time to mess with before. Hmmm, I wonder what happens when you set LGI_PWD_TMO down to 1 second.

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# DECUS PROGRAM LIBRARY

Corrections to programs that have been announced through this report.

DECUS No. VAX-328, Title: SCOPY:
. WITHDRAWN    VAX-328 has been withdrawn from the Library as requested by the author. DECUS No. VAX-329, Title: SVIEW/SCOPY replaces VAX-328.

                   VAX-329 is announced as being available in this report.

## NEW LIBRARY PROGRAMS AVAILABLE FOR THE VAX/VMS FAMILY OF COMPUTERS

DECUS No: VAX-318 Title: Micro-FLX Version: 1.2, February 1988

Submitted by: Trevor Taylor, Microcomputer Technology ,Chatswood, NSW, Australia 2067

Operating System: MicroVMS V4.4 - 4.6, VAX/VMS V4.6 Source Language: C, VAX FORTRAN Hardware Required: RX33 or RX50 Floppy Diskette Drive Keywords: Data Communications , Utilities - VMS

Abstract: Micro-FLX is a file transfer program designed to allow VAX users to read and write CP/M and MS/DOS floppies. It handles RX50 diskettes in either CP/M or MS/DOS format from a Rainbow or RX33 diskettes in MS/DOS format from a VAXmate. Floppies can be mounted in an appropriate disk drive on either a VAX or a MicroVAX, and files can then be copied to and from them using commands similar to DCL. There is also built-in help.

Release notes are distributed with each order.

Sources not included.

Media (Service Charge Code): One RX50 Diskette (JA) Format: VMS/BACKUP, 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-329 Title: SVIEW/SCOPY Version: 1.0, March 1988

Submitted by: John T.Carroll III, Columbus, IN

Operating System: MicroVMS V4.6 Source Language: VAX FORTRAN Hardware Required: VT200, VT 300 Terminals Keywords: FORTRAN, Graphics, ReGIS

Abstract: SVIEW is a FORTRAN program that displays screen images saved by the SCOPY subroutine on Digital Equipment Corporation's VT200 and VT300 series graphics terminals. Once invoked, SVIEW prompts the user for commands to READ a plot file, VIEW a screen image, PLOT a screen image, and EXIT the program.

SCOPY is a FORTRAN subroutine that transfers images displayed on Digital Equipment Corporations's VT200 and VT300 series graphics terminals to a plot file. The transfer is accomplished by initiating a remote screen copy and redirecting the screen image from the printer port to the host. The resulting plot file can be printed on any one of Digital Equipment Corporation's graphics printers or rapidly redisplayed at the terminal using the SVIEW program.

Media (Service Charge Code): One RX50 Diskette (JA) Format: VAX/ANSI, 600' Magnetic Tape (MA) Format: VAX/ANSI

DECUS No: VAX-330 Title: VTCALC Version: 1.0, April 1988

Submitted by: Michael Chamsay

Operating System: VAX/VMS Source Language: VAX BASIC Hardware Required: VT100 or VT220 Terminal Keywords: Calculators

Abstract: VTCALC is an easy to use, simple calculator program that does basic calculations. All input is done via the keypad and arrow keys which are diagrammed on the screen using the line drawing character set . Like many simple calculators it has one memory cell which is displayed on the screen and updated whenever the store key is pressed. This program was developed and tested on a VT220 look alike in VT100 mode. One of the future enhance-ments will be to include scientific functions such as trigonometic, and log functions.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VAX/ANSI

DECUS No: VAX-332 Title: Menu Branch Version: 1.1, April 1988

Submitted by: Bob Bruhin, Advanta, Building Five, Horsham, PA

Operating System: VAX/VMS V4.7 Source Language: MACRO-32 Memory Required: 25.6KB Keywords: Menu Control, Tools - Applications Development

Abstract: This tool takes the form of a MACRO-32 pro-gram which can replace the display and selection por-tions of a captive menu command procedure. Using this tool, captive menus are still DCL command procedures (like at most installations). However, the burden of cod-ing the routines to display the menu, accept a user selec-tion and execute the appropriate DCL code to perform the selected action is removed from the designer of the menu. The menu program can perform all these actions from within the command procedure.

The menu program may be considered a multi-way DCL

branch statement. The command procedure calls the menu program using the DCL RUN command. A menu description is included in-line in the command pro-cedure, following the activation of the menu program.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-333 Title: VT100KEYS Version: 1, March 1988

Submitted by: Ronald William Burke, Westinghouse Electric Corporation, Baltimore, MD

Operating System: Micro/VMS V4.X, VAX/VMS V4.X Source Language: DCL, VAX FORTRAN Keywords: Terminal Handler

Abstract: VT100KEYS shows users how to use the key-pad on a VT100 terminal. It allows you to lock or unlock terminal or console from unauthorized access. It includes a pair of DCL commands (LOCK.COM and CLOCK-.COM) which approximate VT100KEY's locking cap-abilities on terminals and consoles.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-334 Title: LASER_FORMAT Ver-sion: 2, April 1988

Submitted by: Dr. David W. Burgess, RAF Institute Of Aviation Medicine, Farnborough, Hants, England, GN14 6SZ

Operating System: MicroVMS V4.7, VAX/VMS V4.6 Source Language: VAX FORTRAN Hardware Required: Postscript Laser Printer Keywords: Text Formatting

Abstract: LASER-FORMAT is a file interpreter to mod-ify either Bonner RUNOFF, WPS, or Normal text lis-tings for output on a PostScript Laser printer. Command files exits to catch files for listing from a directory [LASER] for automatic printing on a laser print queue. Using escape codes additional postscript commands can be added to the files to produce pretty output of desk top publishing quality. Codes exist for full support of the technical character set in WPS. Wordstar files can also be printed on this package over DECnet.

The package contains three demonstration manuals for output either as a straight text file, a RUNOFF file or via WPS-PLUS if this program is available.

Package also contains an updated version of DECUS Program No. VAX-212, "PLOT_IT and SPELL: Inter-active Dicionary", a Graph plotting program.

Media (Service Charge Code): Five RX50 Diskettes (JE) Format: VMS/BACKUP, 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-335 Title: DBAG - Data Base System Version: 1.0, January 1988

Submitted by: Luis Arriaga Da Cunita, Laboratorio Nacional De Engenharia Civil, 1799 Lisboa Codex, Por-tugal

Operating System: VAX/VMS V3.4 - V4.6 Source Lan-guage: VAX FORTRAN Memory Required: 1MB Key-words: Data Base Management

Abstract: DBAG is a relational database system, im-plemented for VAX/VMS, similar in functionality and interactive interface, to the commercial product DBASE III. Some commands are actually the same, so users familiar with that popular package should "feel at home" with little effort.

The editor of records (and commands) departs from a WordStar-like approach and emulates VAX's EDT thus again saving extra learning effort.

The system also provides a complete library of, sub-routines, FORTRAN 77 callable, for those who heed/ want to write their own program to handle the database.

Media (Service Charge Code): 2400' Magnetic Tape (PA) Format: VMS/BACKUP

DECUS No: VAX-336 Title: FTX Version: 4.5, April 1988

Submitted by: C.J. Chapman, Philips Defence Systems MEL, Crawley, Sussex, England, RH10 2PZ

Operating System: MicroVMS V4.7, VAX/VMS V4.5 Source Language: MACRO-32 Memory Required: 60KB Virtual Allocation Keywords: System Management - VMS, Utilities - VMS

Abstract: FTX - Foreign Tape Extension utility is a sys-tems management tool that enables ASCII or EBCDIC data files to be written ,or read from magnetic tape using any combination of block and record format. The utility uses VMS command definition language.

Features include:

. Automatic tape mount and dismount with no unload.

. Forward tape mark skipping before read begins.
. Full wild card file processing.
. Record padding and stripping.
. Read while spooling option.
. Data I/O CHECKING.*

Release notes are distributed with each order.

Notes: Operating System VMS V4.0 or later is required.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

## NEW LIBRARY PROGRAMS AVAILABLE
## FOR THE
## PDP-11 COMPUTER FAMILY

**DECUS No:** 11-901 **Title:** TIDY DIRECTORY PRO-GRAM **Version:** January 1988

**Submitted by:** Sanjay Dasgupta, Gas Authority of India Ltd., New Delhi, India, 110021

**Operating System:** RSX-11M-PLUS V2.1 **Source Language:** FORTRAN 77, MACRO-11 **Memory Required:** 40KB **Software Required:** Device independent cursor positioning option of full duplex terminal driver(RSX Sysgen option). **Hardware Required:** VT100 Compatible Terminal **Keywords:** Utilities - RSX-11

**Abstract:** The TIDY DIRECTORY PROGRAM (TDP) is a screen-based utility that helps you to keep your directory tidy. TDP shows you summary information about your files, calling attention to those that exist in multiple versions, and provides single-key-stroke purging and deleting capability. You can also examine the contents of any file before deciding to purge or delete it. All these functions are available from within TDP, and you never have to use PIP, TYPE, DELETE, PURGE, or PRINT.

TDP presents summaries grouped by file type, so you are always aware of the file groups in your directory. At the author's installation every user who uses TDP has invariably found (and deleted), groups of files whose existence they would not have otherwise known. This is particularly true of active users who always examine directories by selective wildcarding.

Because TDP exploits VT100 video features and the applications key-pad, the file directory is never more than a few key strokes away from a file-contents display, and PURGING and DELETING tools. This makes it a particularly effective and fast way of hacking away the dead wood from your directory.

**Restrictions:** The RSX operating system must be sysgened with the device independent cursor positioning option.

Documentation available in hardcopy only. Complete sources not included.

**Media (Service Charge Code):** User's Manual (EA), One RX01 Diskette (KA) **Format:** FILES-11, 600' Magnetic Tape (MA) **Format:** FILES-11

## REVISIONS TO LIBRARY PROGRAMS

**DECUS No:** VAX-286 **Title:** VIEW **Version:** 5.1, March 1988

**Submitted by:** C.J. Chapman, Philips Defence Systems MEL, Crawley, Sussex, England, RH10 2PZ

**Operating System:** MicroVMS V4.7, VAX/VMS V4.6 **Source Language:** MACRO-32 **Memory Required:** 13.8KB Virtual Allocation **Keywords:** System Management - VMS

**Abstract:** The VIEW utility is a system management tool that enables the Systems Manager to obtain information on system processes or user processes. VIEW is very useful for taking a snapshot look at your system to establish what images are currently executing. VIEW executes on Digital Equipment Corporation VT200 Series terminals continuously displaying the following information:
User Name or Process Name, Image Name, Process Id.
. Login Time, Uic, Process State/Type, CPU Min/Sec.
. Base Priority, Current Priority, Working Set Size.
. Image Activation Count, Disk I/O, Buffered I/O.
. Page Faults, VMS Release, Balance Set, Node Name.
. Idle Time and Uptime since boot time, Date Time.
. Process alternate, device, directory and terminal.

VT220 Terminal Keypad Functions:

. Process User or Process Name     (Select)
. Increase Interval Time           (Up__Arrow)
. Decrease Interval Time           (Down__Arrow)
. Increase Page Number             (Next__Screen)
. Decrease Page Number             (Previous__Screen)
. Clear Page                       (Do)
. Enable/Disable Highlight         (Find)
. Process Alternate                (Select)
. Highlight Process                (Up/Down__Arrow)
. Delete Process                   (Remove)
. Increase Base Priority           (Right__Arrow)
. Decrease Base Priority           (Left__Arrow)
. To Exit type Ctrl__y, Ctrl__c or (F6).

To continuously VIEW Balance set, Idleup, and Date Time, use the following procedure:

. Decrease Interval Time to zero.
. Clear Page using the (Do) key.

Release Notes are distributed with each order.

**Notes:** Operating system VAX/VMS V4 or later is required.

**Changes and Improvements:** Minor code changes.

**Media (Service Charge Code):** 600' Magnetic Tape (MA) **Format:** VMS/BACKUP, or order VAX-LIB-8


**DECUS No:** 11-462 **Title:** TERM.FOR **Version:** 5.1, April 1988

**Submitted by:** Richard Desper, U.S. Army Materials Technology Lab., Watertown, MA

**Operating System:** RT-11 V5.0 **Source Language:** FORTRAN IV **Memory Required:** 56KB **Software Required:** RT-11 Sysgened for Multi-terminal support. **Hardware Required:** DLV-11J Quad Serial Interface **Keywords:** Data Communications, Emulators

**Abstract:** TERM is written in FORTRAN to convert a PDP-11/23 with a DLV-11J Quad Serial Interface into a smart terminal. The program allows the PDP-11/23 console terminal to converse with a remote computer. Disk files on the PDP-11/23 may be accessed as either sources or sinks for ASCII data files. File transfer is limited to ASCII files and is not automatically checked for errors, but is quite reliable at speeds up to 2400 baud. (A second speed limitation is that the remote computer baud rate must be slower than the PDP-11/23 console terminal rate, 9600 baud at this installation.)TERM is sufficiently transparent to the user to allow editing operations on the remote computer, e.g. VAX/VMS EDT using VT100 or VT200 terminal support. For possible use with a remote VAX, a VMS file TERM.COM is also provided to facilitate file transfer. Further details are in the file TERM.DOC and as comments in TERM.FOR.

**Notes:** Operating system RT-11 V5.0 or higher is required.

**Changes and Improvements:** Control Z from either the terminal or the remote host stops all file transfer.

**Restrictions:** Console terminal baud rate must be faster than

"Modem" (connected to remote host) baud rate.

**Media (Service Charge Code):** One RX01 Diskette (KA) **Format:** RT-11, 600' Magnetic Tape (MA) **Format:** RT-11
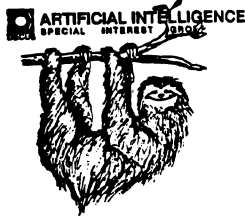
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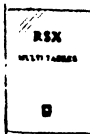


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## SUBMITTING ARTICLES TO HARD NEWS
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The purpose of HARD NEWS, the HMS SIG newsletter, is to serve as a forum to share information related to DEC hardware with the members of the SIG. As such, the existence of the newsletter is entirely dependent on your contributions. If you have an HHK item, a better or safer way to do something, product news, a tutorial article of general interest, etc., we would like to publish it in the newsletter. We hope that HARD NEWS will be published at least six times a year.

You can submit material to the editor, Carmen Wiseman, or to the HMS SIG chair, Bill Walker. We can accept submissions in a wide variety of formats:

o   Items can be sent to the editor on VMS-format RX50s, TK50 cartridges, or IBM PC format 5 1/4" floppies. The SIG chair prefers RT-11 floppies but can handle any reasonable media.

o   Hard copy, like cash, is always acceptable. Camera-ready copy will save us a lot of typing, but we don't insist on it. You can also use the Hardware Submission Form in the "Questionnaires" section of the combined SIGs Newsletters.

o   Those of you with access to DCS can send things to WALKER or WISEMAN. DCS is usually checked on a daily basis.

o   You can reach the SIG chair on CompuServe as "Bill Walker 71066,24" or via EasyLink mailbox 62752448 or MCI Mail account 333-1675. You can reach the editor via EasyLink mailbox 62960090 (be sure to say ATTN: or TO: Carmen Wiseman somewhere in the body of the message).

If you have anything to submit, send it! If it is a mess, but we can read it, we will get it into the newsletter somehow. Finally, if you have any questions about submitting material, call one of us. The telephone numbers are listed below.

Contributions can be sent to:

| | | |
|---|---|---|
| William K. Walker | | Carmen D. Wiseman |
| Monsanto Research Corp. | OR | Digital Review |
| P.O. Box 32   A-152 | ▬▬ | Prudential Tower, Suite 1390 |
| Miamisburg, OH   45342 | | 800 Boylston Street |
| (513) 865-3557      (work) | | Boston, MA   02199 |
| (513) 426-7094/0344 (home) | | (617) 375-4361 (work) |

# Ask the WOMBAT WIZARD
## Submission Form

To submit a problem to the WIZARD, please fill out the form below and send it to:

> WW Editor, Philip A. Naecker
> Consulting Software Engineer
> 3011 North Mount Curve Avenue
> Altadena, CA 91001
> USA

Name:_____ DECUS Membership No. _____

Affiliation:_____

Address:_____

_____

_____

Telephone Number:_____

Statement of Problem:_____

_____

_____

_____

_____

_____

Please following the following guidelines when submitting support material:

1. If you are trying to demonstrate a method or a concept, please simplify the procedures, records, and other information to the shortest form possible.

2. Annotate your attachments. Simple comments or hand-written notes ("Everything worked until I added this statement.") go a long way toward identifying the problem.

3. Keep an exact copy of what you send. And number the pages on both copies. But send everything that is related to your question, even remotely.

4. If you would like a direct response or would like your materials returned, please don't forget to include a stamped, self-addressed envelope large enough to hold the materials you send.

QU

DATATRIEVE/4GL SIG
Product Improvement Request Submission Form

Submittor:                          DECUS Membership Number:
Address:                            Firm:


Phone:                              Product or Products:
_____

How to write a PIR

A PIR should be directed at a specific product or group of
products. Be sure to give the full name of the product(s) and
version numbers if applicable.  Describe the functionality you
would like to see in as complete terms as possible. Don't assume
that the PIR editors or software developers know how it is done
in some other software product - state specifically how you want
the software to function. Provide justification of your request
and give an example of its use. If you can, suggest a possible
implementation of your request.
_____
Abstract:  (Please limit to one or two short sentences.)


_____
Description and Examples:  (Use additional pages as necessary.)









[Put my name and address on reverse side, thus:]


                    PIR Editor, Philip A. Naecker
                    Consulting Software Engineer
                    3011 North Mount Curve Avenue
                    Altadena, CA  91001
                    USA

HARDWARE SUBMISSION FORM -- A SIG INFORMATION INTERCHANGE

Message

Contact
Name

Address

Telephone

Type of equipment

SUBMIT ANY TYPE OF HARDWARE PROBLEMS AND/OR FIXES.

SEND TO:

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                               Boston, MA  02199

# MASTERS APPLICATION

**Name:** _____ **Title** _____

**Company:** _____

**Address:** _____

_____

_____ **Phone:** ( ) _____

**Network Address:** _____ **Date:** _____

The Languages & Tools SIG has established the designation "LANGUAGES AND TOOLS MASTER", to be applied to selected, qualified people willing to share their expertise in various subjects with others. Masters are people who are knowledgeable enough in one or more languages or tools to be comfortable answering questions about them. The qualifications of an L&T Master are: expertise in a specific area, a willingness to have his/her name published as a Master, and a willingness to volunteer services in different ways. Each product may have several Masters, and there is an overall Masters Coordinator who is a member of the L&T Steering Committee.

Masters are asked to serve other users (and, under some circumstances, DEC), as a resource on products within their competence. In addition to being listed in the L&T Masters Directory (published in the newsletter) as available for occasional telephone consultation, Masters may act as 'Doctors' at Symposium Clinics, present Symposium sessions on the products of interest to them, field test products, interact with DEC product managers when appropriate, or act as a reference for a product for Digital salespeople. Especially on mature products, the SIG is anxious for knowledgeable users to offer product tutorial sessions at Symposia, and Masters can be of great help here. At Symposia, Masters will wear an identifying button bearing the legend "Ask Me About....." and the name of the language or tool in which he/she specializes.

If you'd like to serve as an L&T Master, please mark the products on which you are willing to answer questions with an **"M"** (for Master). Please mark any other products running at your site with an **"A"** (for "also running") to provide users with a broader picture of your facilities. (Although not an L&T product, Mumps is included here at the request of the Mumps SIG as a service to Mumps users). You may request removal of your name from the Masters Directory at any time, although you may continue to be listed for a month or two, because of publication lead times.

**I am qualified to act as an L&T Master for the following products:**  ☐ Mumps

| | | | | | |
|---|---|---|---|---|---|
| ☐ Debug | ☐ Bliss | ☐ CMS | ☐ TPU | ☐ C | ☐ Test Manager |
| ☐ Pascal | ☐ Basic | ☐ MMS | ☐ EVE | ☐ Ada[1] | ☐ Runoff & DSR |
| ☐ Fortran | ☐ Cobol | ☐ LSE | ☐ EDT | ☐ APL | ☐ TEX & LATEX |
| ☐ Document | ☐ Dibol | ☐ SCA | ☐ TECO | ☐ RPG | ☐ Cobol Generator |
| ☐ VAX Notes | ☐ Emacs | ☐ PCA | ☐ PL/1 | ☐ Scan | ☐ Software Project Mgr |

Briefly describe your experience with those you checked. _____

_____

_____

_____

How long have you held your present position? _____

Are you able to attend at least one symposium each year? _____

Users are encouraged to seek assistance with products by calling appropriate Masters listed in the Directory. As a Master, your name and telephone number will be published in the Masters Directory, and users will call on you for limited help from time to time. Please check, below, any additional activities you might do:

☐ Field-test new versions of your product at your work site.

☐ Provide feedback on the product when needed by its DEC product manager.

☐ Act as a reference for the product at the request of Digital Sales or Marketing people.

**Mail to: Dena Shelton, L&T SIG Masters Coordinator, Cullinet Software, Inc., 2860 Zanker Road, Suite 206, San Jose, CA 95134.**

QU-7

[1] Ada is a trademark of the DoD

# Languages & Tools SIG

# WISHLIST QUESTIONNAIRE

Name: _____ Title _____

Company: _____

Address: _____

_____

_____ Phone: ( ) _____

Network Address: _____ Date: _____

The Languages & Tools SIG is principally concerned with the DEC and public domain software products listed below. If your request directly involves one of these products, please check which one (if you have more than one request, please use a separate form for each):

| ☐ Debug | ☐ Bliss | ☐ CMS | ☐ TPU | ☐ C | ☐ Test Manager |
| ☐ Pascal | ☐ Basic | ☐ MMS | ☐ EVE | ☐ Ada[1] | ☐ Runoff & DSR |
| ☐ Fortran | ☐ Cobol | ☐ LSE | ☐ EDT | ☐ APL | ☐ TEX & LATEX |
| ☐ Document | ☐ Dibol | ☐ SCA | ☐ TECO | ☐ RPG | ☐ Cobol Generator |
| ☐ VAX Notes | ☐ Emacs | ☐ PCA | ☐ PL/I | ☐ Scan | ☐ Software Project Mgr |

If your request or suggestion doesn't relate to one of the products listed above, check which one of the following Language & Tools SIG topics it concerns:

| ☐ Newsletter | ☐ Symposium Sessions | ☐ Pre-Symposium Seminars |
| ☐ Masters Program | ☐ Working Group Activities | ☐ Session Notes |
| ☐ Information Folder | ☐ SIG Tape | ☐ DECUS Store Item |
| ☐ Other L&T SIG topic: _____ | | |

Wish List Request—brief description: _____

_____

_____

_____

Complete description—please explain your request thoroughly; don't assume we know details of other products or services; give examples. _____

_____

_____

_____

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**Mail to: Shava Nerad, L&T Wishlist Coordinator, MIT, 77 Mass Ave. W91-219A, Cambridge, MA 02139; (617)253-7438**

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# DATAGRAM

DATAGRAMs are short messages, comments, requests, or answers that are published in NETwords. Please fill in the sections below and send the DATAGRAM to:

JUDI MANDL
UCONN HEALTH CENTER
263 FARMINGTON AVENUE, BLDG. #19
FARMINGTON, CT 06032

**Title:** _____

**Message:** _____

_____

_____

_____

_____

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_____  _____

**Your Name:** _____
**Address:** _____
_____
**Telephone:** _____

**If this is a reply to a previous DATAGRAM, what #?** __

**Signature:** _____ **Date:** ____

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FARMINGTON, CT 06032

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**Fold Here**

# RT-11 WISH LIST SURVEY

Name (optional) _____

Address (optional) _____

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_____

DECUS Number (optional) ------------------------------------------------

| | | | | |
|---|---|---|---|---|
| 1.1 ___ | 3.1 ___ | 3.7u ___ | 3.13a ___ | 5.1b ___ |
| 1.2 ___ | 3.2a ___ | 3.7v ___ | 3.13b ___ | 5.2a ___ |
| 1.3 ___ | 3.2b ___ | 3.7w ___ | 3.13c ___ | 5.2b ___ |
| 1.4 ___ | 3.2c ___ | 3.7x ___ | 3.13d ___ | 6.1 ___ |
| 1.5 ___ | 3.2d ___ | 3.7y ___ | 3.14 ___ | 6.2a ___ |
| 1.6 ___ | 3.2e ___ | 3.7z ___ | 3.15 ___ | 6.2b ___ |
| 1.7a ___ | 3.3a ___ | 3.7aa ___ | 3.16 ___ | 6.2c ___ |
| 1.7b ___ | 3.3b ___ | 3.7bb ___ | 3.17a ___ | 6.2d ___ |
| 1.8 ___ | 3.3c ___ | 3.7cc ___ | 3.17b ___ | 6.3 ___ |
| 1.9a ___ | 3.3d ___ | 3.7dd ___ | 3.17c ___ | 6.4a ___ |
| 1.9b ___ | 3.4a ___ | 3.7ee ___ | 3.17d ___ | 6.4b ___ |
| 1.9c ___ | 3.4b ___ | 3.8a ___ | 3.17e ___ | 6.4c ___ |
| 1.9d ___ | 3.4c ___ | 3.8b ___ | 3.17f ___ | 6.4d ___ |
| 1.10 ___ | 3.5a ___ | 3.8c ___ | 3.18 ___ | 6.5 ___ |
| 1.11 ___ | 3.5b ___ | 3.9a ___ | 3.19a ___ | 6.6a ___ |
| 1.12 ___ | 3.6a ___ | 3.9b ___ | 3.19b ___ | 6.6b ___ |
| 1.13 ___ | 3.6b ___ | 3.9c ___ | 3.19c ___ | 6.6c ___ |
| 1.14 ___ | 3.6c ___ | 3.9d ___ | 4.1 ___ | 6.6d ___ |
| 2.1 ___ | 3.6d ___ | 3.9e ___ | 4.2a ___ | 6.7 ___ |
| 2.2 ___ | 3.6e ___ | 3.9f ___ | 4.2b ___ | 6.8a ___ |
| 2.3 ___ | 3.6f ___ | 3.9g ___ | 4.3 ___ | 6.8b ___ |
| 2.4 ___ | 3.6g ___ | 3.9h ___ | 4.4a ___ | 6.8c ___ |
| 2.5 ___ | 3.7a ___ | 3.9i ___ | 4.4b ___ | 6.8d ___ |
| 2.6 ___ | 3.7b ___ | 3.9j ___ | 4.5a ___ | 6.8e ___ |
| 2.7 ___ | 3.7c ___ | 3.9k ___ | 4.5b ___ | 7. ___ |
| 2.8 ___ | 3.7d ___ | 3.10a ___ | 4.6 ___ | 8. ___ |
| 2.9 ___ | 3.7e ___ | 3.10b ___ | 4.7a ___ | 9.1 ___ |
| 2.10 ___ | 3.7f ___ | 3.10c ___ | 4.7b ___ | 9.2a ___ |
| 2.11 ___ | 3.7g ___ | 3.10d ___ | 4.7c ___ | 9.2b ___ |
| 2.12 ___ | 3.7h ___ | 3.10e ___ | 4.7d ___ | 9.3a ___ |
| 2.13 ___ | 3.7i ___ | 3.10f ___ | 4.7e ___ | 9.3b ___ |
| 2.14 ___ | 3.7j ___ | 3.10g ___ | 4.7f ___ | 10.1 ___ |
| 2.15 ___ | 3.7k ___ | 3.10h ___ | 4.7g ___ | 10.2 ___ |
| 2.16 ___ | 3.7l ___ | 3.10i ___ | 4.7h ___ | 10.3 ___ |
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**S&M-1**

S&M

# DECUS U.S. CHAPTER
# APPLICATION FOR MEMBERSHIP

☐ New Membership  ☐ Update to current membership profile      Current DECUS Member.# ___ ___ ___ ___ ___ ___

**Please provide a complete mailing address, include zip code in accordance with postal regulations for your locality.**

**Are you an employee of Digital Equipment Corporation?** ☐ YES ☐ NO

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## How Did You Learn About DECUS? Please Check Applicable Item.

| | | |
|---|---|---|
| 1 ☐ ANOTHER DECUS MEMBER | 4 ☐ DIGITAL SALES | 13 ☐ LOCAL USERS GROUP |
| 2 ☐ SYMPOSIA | 5 ☐ HARDWARE PACKAGE | 14 ☐ SPECIAL INTEREST GROUP |
| 8 ☐ DECUS CHAPTER OFFICE | 6 ☐ SOFTWARE PACKAGE | 7 ☐ SOFTWARE DISPATCH (Digital Newsletter) |
| 10 ☐ DIGITAL STORE | 12 ☐ ADVERTISING | |

**Do you wish to be included in mailings conducted by Digital (for marketing purposes etc.?)** ☐ Permission
☐ Refusal

**Type Of Digital Hardware Used: Please Check Those Applicable To You.**

| | | | |
|---|---|---|---|
| 20 ☐ DECMATE | 52 ☐ LSI-11 | 21 ☐ PROFESSIONAL | 5 ☐ WPS-8 |
| 82 ☐ DECSYSTEM-10 | 3 ☐ PDP-8 FAMILY | 22 ☐ RAINBOW | 51 ☐ WPS-11 |
| 83 ☐ DECSYSTEM-20 | 50 ☐ PDP-11 FAMILY | 54 ☐ VAX FAMILY | |

**Major Operating Systems? Languages Used: Please Check Those Applicable To You.**

| | | | | |
|---|---|---|---|---|
| 1 ☐ ADA | 26 ☐ CORAL-66 | 47 ☐ FOCAL | 67 ☐ OS/8 | 109 ☐ RT-11 |
| 2 ☐ ALGOL | 28 ☐ COS | 48 ☐ FORTRAN | 68 ☐ PASCAL | 97 ☐ TECO |
| 5 ☐ APL | 34 ☐ DATATRIEVE | 51 ☐ GAMMA | 72 ☐ PL-11 | 70 ☐ TOPS-10 |
| 7 ☐ BASIC | 35 ☐ DBMS | 110 ☐ IAS | 92 ☐ RPG | 71 ☐ TOPS-20 |
| 17 ☐ BLISS | 38 ☐ DECNET | 53 ☐ IQL | 81 ☐ RSTS/E | 111 ☐ ULTRIX/UNIX |
| 19 ☐ C | 43 ☐ DIBOL | 58 ☐ MACRO | 83 ☐ RSX | 104 ☐ VMS |
| 22 ☐ COBOL | 45 ☐ DOS-11 | 65 ☐ MUMPS | 91 ☐ RMS | 107 ☐ WPS-8 |

## Type Of Business (Environment)/Computer Applications
Please Check That Which Best Describes Your Business/Application.

| | | |
|---|---|---|
| 21 ☐ ACCOUNTANCY | 1 ☐ EDUCATION/PRIMARY | 23 ☐ NUMERICAL CONTROL |
| 7 ☐ BANK | 2 ☐ EDUCATION/SECONDARY | 68 ☐ OEM-COMMERCIAL |
| 64 ☐ BUSINESS/COMMERCIAL | 61 ☐ EDUCATION-TECHNOLOGY | 78 ☐ OEM-TECHNICAL |
| 74 ☐ BUSINESS/INFORMATION SYSTEMS | 3 ☐ EDUCATION/UNIVERSITY | 56 ☐ PHYSICAL SCIENCES |
| 57 ☐ CHEMISTRY | 67 ☐ ENGINEERING | 20 ☐ RESEARCH/DEVELOPMENT |
| 54 ☐ CLINICAL LABORATORY | 65 ☐ FINANCE/ACCOUNTING | 10 ☐ RETAIL |
| 63 ☐ COMPUTATION | 77 ☐ GOVERNMENT | 73 ☐ SOFTWARE DEVELOPMENT |
| 11 ☐ CONSUMER ELECTRONICS | 75 ☐ GRAPHICS | 53 ☐ TELECOMMUNICATIONS |
| 18 ☐ CONSULTANT | 4 ☐ HOSPITAL | 19 ☐ TELEPHONE/UTILITIES |
| 72 ☐ DATA ACQUISITION | 62 ☐ INDUSTRIAL | 51 ☐ TIMESHARING |
| 52 ☐ DATA COMMUNICATIONS | 55 ☐ LABORATORY/SCIENTIFIC | 80 ☐ TRAINING/INSTRUCTION |
| 13 ☐ DATA PROCESSING SERVICES | 14 ☐ LIBRARY | 66 ☐ TYPESETTING/PUBLICATION |
| 71 ☐ DATA REDUCTION | 58 ☐ LIFE SCIENCES | |
| 17 ☐ DIGITAL EMPLOYEE-ENGINEERING | 70 ☐ MANUFACTURING | |
| 15 ☐ DIGITAL EMPLOYEE-MARKETING | 79 ☐ MARKETING | |
| 16 ☐ DIGITAL EMPLOYEE-SERVICE GROUP | 59 ☐ MEDICAL RESEARCH | |
| 60 ☐ EDUCATIONAL ADMINISTRATION | 6 ☐ MILITARY INSTALLATION | |

## Special Interest Groups (SIGs) Enrollment
I Wish To Participate In The Following DECUS U. S. Chapter Special Interest Groups.

| | | |
|---|---|---|
| 3 ☐ ARTIFICIAL INTELLIGENCE | 11 ☐ HARDWARE AND MICRO | 36 ☐ PERSONAL COMPUTER |
| 7 ☐ BUSINESS APPLICATIONS | 35 ☐ IAS | 18 ☐ RSTS/E |
| 2 ☐ COMMERCIAL LANGUAGES | 27 ☐ LARGE SYSTEMS | 17 ☐ RSX |
| 6 ☐ DATA MGMT. SYSTEMS | 16 ☐ L & T | 19 ☐ RT-11 |
| 31 ☐ DAARC (LABS) | 14 ☐ MUMPS | 32 ☐ SITE MGMT. & TRNG |
| 5 ☐ DATATRIEVE/4 GL | 15 ☐ NETWORKS | 21 ☐ UNISIG |
| 8 ☐ EDUSIG | 34 ☐ OFFICE AUTOMATION | 26 ☐ VAX |
| 10 ☐ GRAPHICS APPLICATIONS | | |

## Job Title/Position - Please Check:

| | |
|---|---|
| 1 ☐ CORPORATE STAFF | 101 ☐ CORPORATE DIRECTOR OF DP/MIS |
| 2 ☐ DIVISION OR DEPARTMENT STAFF | 102 ☐ ADMINISTRATIVE ASSISTANT |
| 3 ☐ SYSTEMS ANALYSIS | 103 ☐ TECHNICAL ASSISTANT |
| 4 ☐ APPLICATIONS PROGRAMMING | 104 ☐ SERVICES COORDINATOR |
| 5 ☐ SYSTEMS ANALYSIS/PROGRAMMING | 105 ☐ MANAGER |
| 6 ☐ OPERATING SYSTEM PROGRAMMING | 106 ☐ ANALYST |
| 7 ☐ DATABASE ADMINISTRATION | 107 ☐ PROGRAMMER |
| 8 ☐ DATA COMMUNICATIONS/TELECOMMUNICATIONS | 108 ☐ DATABASE MANAGER |
| 9 ☐ COMPUTER OPERATIONS | 109 ☐ DATABASE ADMINISTRATOR |
| 10 ☐ PRODUCTION CONTROL | 110 ☐ MANAGER OF DP OPERATIONS |

Citizen of The United States of America? ☐ YES ☐ NO Country:_____

Signature:_____ Date:_____

**Forward To:**  DECUS U. S. Chapter
Digital Equipment Computer Users Society
Membership Processing Group
219 Boston Post Road, BP02
Marlboro, MA 01752-1850
Phone: (617)480-3418
DTN: 8-296-3418

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| | | |
|---|---|---|
| DATATRIEVE | PDP-11 | RT-11 |
| DDCMP | P/OS | RX02 (et. al) |
| DEC | Q-bus | UDA50 |
| DECmate | RALLY | UNIBUS |
| DECnet | Rdb | VAXsim |
| DECUS | ReGIS | VAXstation |
| IAS (et. al) | RMS-11 | VAX/VMS |
| LN03 | RSTS/E | VMS |
| MicroVAX | RSX | VT-50 (et. al) |
| MicroVAX 1 (et. al) | RSX-11M-PLUS | WPS |
| MicroVMS | RT | WPS-PLUS |

**DECUS**

## STATUS CHANGE

Please notify us immediately to guarantee continuing receipt of DECUS literature. Allow up to six weeks for change to take effect.

(    ) Change of Address
(    ) Please Delete My Membership Record
      (I Do Not Wish To Remain A Member)

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