



# DECUS U.S. CHAPTER SIGs NEWSLETTERS

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The Wombat

# EXAMINER

and 4GL  
Dispatch

*"Increases the Circulation of Anyone in America"*

Volume

Number 8



DTR

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## Contributions

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Submissions to this newsletter are constantly sought. A submission can be an article, a letter to the Wombat Wizard, a technical tip, or anything of interest to people using or considering the use of Datatrieve or any 4GL product. Submissions on magnetic media are preferred but almost any type will be considered.

Contributions for the newsletter can be sent to either of the following addresses:

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# CONTEXT RECOGNITION IN VAX DATATRIEVE

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## 1 OVERVIEW

This paper will describe context resolution within DATATRIEVE. It explains the impact context has on you as a DATATRIEVE user. It covers how you specify context within DATATRIEVE as well as common pitfalls in the area of DATATRIEVE context. It explores the internals of context resolution in DATATRIEVE.

## 2 WHAT IS CONTEXT?

Context is described as the set of mechanisms by which DATATRIEVE recognizes field names and identifies target records for statements. Changing the context in which a DATATRIEVE statement executes can change the statement's outcome. This is why it is important for you to understand context's impact upon DATATRIEVE statements.

Context answers questions such as "which one" and "how many". For example, assume that the statement "MODIFY EMP\_NUM" modifies employee numbers from personnel records, such as those illustrated below. We know that the EMP\_NUM field is changed, but which record is modified? How many records are modified, one or many? These are the types of questions that DATATRIEVE resolves using context.

```
-----
| Harris |.. | Jones |.. | Brown |. . . .
| 7544  |.. | 7329 |.. | 7542  |
|-----|.. |-----|.. |-----|
-----
```

```
DTR> MODIFY EMP_NUM
```

### 2.1 WHY IS CONTEXT IMPORTANT?

The following sections describe the part context plays within DATATRIEVE.

#### 2.1.1 Naming

DATATRIEVE does not require that every identifier name used within a DATATRIEVE session be unique. The following example shows that two different records can contain fields with the same name:

```
          DEFINE RECORD A USING          DEFINE RECORD B USING
          01 TOP.                          01 TOP.
----->          03 EMP_NUM PIC XX.          03 EMP_NUM PIC 999.
                   03 ADDRESS PIC X(30).;    03 SUPERVISOR PIC X(20).;
```

Both records contain EMP\_NUM fields. To which field does the following statement refer?

```
DTR> MODIFY EMP_NUM
```

Because there are two fields named EMP\_NUM, DATATRIEVE must take into account factors other than the field name when deciding which field to modify. DATATRIEVE follows a set of conventions when deciding which field to act upon. These conventions are the rules of context resolution. By understanding these rules, you will be better able to anticipate the behavior of the DATATRIEVE statements you enter.

### 2.1.2 List Fields

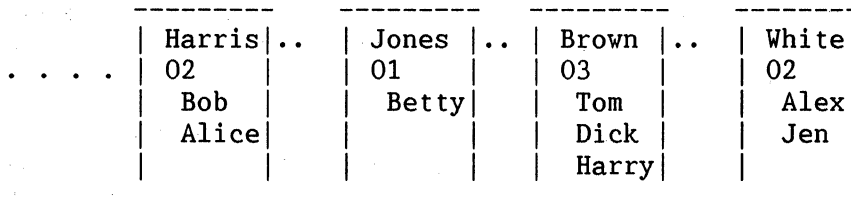
In the following FAMILY record, the field KIDS is defined with an OCCURS clause. Each FAMILY record thus contains a "LIST" of kids. This LIST can contain information pertaining to one kid up to ten kids, or the list may be empty.

```

01 FAMILY.
  : 03 NUMBER_KIDS PIC 99 EDIT STRING IS Z9.
  03 KIDS OCCURS 0 TO 10 TIMES DEPENDING ON NUMBER_KIDS.
    06 EACH KID.
      09 KID_NAME PIC X(10) QUERY_NAME IS KID. :

```

The following diagram shows that for each FAMILY record there can be a variable number of KIDS fields. The first record contains 2 KIDS the second one kid, etc.



Context resolution becomes more complex when you use list records. Where a list is involved, there are even more possible choices. Besides answering the question "which family" DATATRIEVE must also answer the question "which kid"? For example, the following PRINT statement refers to the list field KIDS.

```
DTR> PRINT ALL KIDS
```

But, each record may have more than one KIDS field. Which KIDS field should be printed? ALL occurrences of KIDS for a particular record? ALL occurrences of all KIDS for all records? We will look at these question in more detail in a later section.

### 2.1.3 Control Of DATATRIEVE Statements

If you enter a statement or sequence of statements incorrectly, DATATRIEVE may not have enough information to determine which field a name in a statement refers to. You can tell when this happens, because DATATRIEVE displays the familiar message:

```
"<...> is undefined or used out of context"
```

What happens if you do not correctly express the context of your statement, but your statement can be interpreted in another context within your DATATRIEVE session? In this case, an error message will not be produced. DATATRIEVE will execute your statement, but in a different manner than you had intended. The results can be surprising and may even change data in ways that you do not expect. This is certainly not a desirable situation. By understanding context resolution in DATATRIEVE and by specifying all context explicitly you can avoid this type of accident.

## 2.2 TYPES OF CONTEXT RECOGNITION

There are two levels of context recognition within DATATRIEVE. They are IMPLICIT context recognition and EXPLICIT context recognition. Implicit means that context is implied by the environment in which a statement is executed. Explicit means that the context for a statement is entered as part of that statement.



## 2.2.1 Implicit Context Recognition

DATATRIEVE is sometimes said to be "context-sensitive". This is because the meaning of a given DATATRIEVE statement varies depending on the environment in which it is executed. This is an important aspect of the DATATRIEVE language. It gives power and flexibility not seen in third generation programming languages.

### NOTE

In this discussion, we are not referring to the mathematical linguistic concept of context-sensitive, as it applies to classification of grammars. We use this terminology (as well as "left context" and "right context") in a more intuitive and informal way, as a method of highlighting and explaining a particular characteristic of VAX DATATRIEVE.

The following example shows how the environment set up by different DATATRIEVE commands causes the statement "PRINT XYZ" to produce different results. In the first example, a character string is printed. In the second, a number is printed. And in the last example multiple fields of different types are printed.

<pre>Context 1 (field): ===== DTR&gt;READY DOMAIN1 DTR&gt;SHOW FIELDS       :       XYZ &lt;Character string&gt;  DTR&gt;FIND DOMAIN1 DTR&gt;PRINT XYZ        XYZ  "ALF "</pre>	<pre>Context 2 (variable): ===== DTR&gt;DECLARE XYZ PIC 9V9. DTR&gt;XYZ = 3.2  DTR&gt;PRINT XYZ        XYZ        3.2</pre>
<pre>Context 3 (domain): ===== DTR&gt;READY XYZ DTR&gt;PRINT XYZ  Field1      Field2      Field3 11          abc         .01 22          def         .02 33          ghi         .03        etc.</pre>	

So you see, the output of "PRINT XYZ" can be greatly altered by the environment in which it executes. That environment is determined by the commands preceding the statement "PRINT XYZ". Implicit context recognition is at work in each of these examples.

The context-sensitive nature of DATATRIEVE has a number of implications. One is that DATATRIEVE procedures are not compiled. The previous example illustrates why this is so. Suppose "PRINT XYZ" were in a procedure. What would it mean to compile that procedure without knowing the datatype of XYZ? Without even knowing whether XYZ is the name of a domain, field or variable? The high degree of flexibility provided by DATATRIEVE limits the assumptions that can be made at compilation time.

Context sensitivity is also the reason that the distinction between "commands" and "statements" exists in DATATRIEVE. Commands set up the context in which statements execute. Because of this, restrictions exist in the way commands can be used (see the *VAX DATATRIEVE Reference Manual* for a list of commands and statements.) One restriction is that commands cannot be used within a compound statement. In the following example, the REPEAT loop is a compound statement. The READY command within the REPEAT loop is therefore illegal:

```
DTR> DECLARE XYZ LONG.  
DTR> REPEAT 5  
CON> BEGIN  
CON> PRINT XYZ  
CON> READY XYZ ! this is NOT allowed!!!  
CON> END
```

"Expected statement, encountered "READY".

If DATATRIEVE allowed commands within compound statements, the first iteration of the above REPEAT loop would print the variable XYZ, and subsequent iterations would print the entire domain of XYZ. Besides being confusing, this would create technical difficulties.

Enforcing a stable environment for a compound statement allows DATATRIEVE to make decisions about the type and size of the data being processed just once at the start of processing of that compound statement. If commands were permitted inside of compound statements, then decisions about data type and size would have to be made during each iteration of a compound statement, thereby increasing execution time.

Context sensitivity also contributes a more "English-like" feeling to the DATATRIEVE language. As in the English language, certain ambiguities can occur, but in DATATRIEVE these can be resolved through the context mechanism.

### 2.2.2 Explicit Context Recognition

There may be times when you need to override implicit context recognition in DATATRIEVE in order to get the results you desire. You do this using explicit context specification within your DATATRIEVE statements. By using explicit context specification as a general practice, you will be sure to always get the data that you intend to.

The example below shows a case where XYZ has two possible meanings. XYZ can refer to either a variable or to a field within the domain DOMAIN1. If no special direction is given, the variable XYZ will be printed.

```
DTR> READY DOMAIN1  
DTR> DECLARE XYZ PIC 9V9.  
DTR> XYZ = 3.2  
:  
DTR> PRINT XYZ  
  
XYZ  
  
3.2
```

To print the field XYZ, DATATRIEVE must be instructed to obtain the value for XYZ from DOMAIN1. This is done below using the clause "OF DOMAIN1". This is an example of explicit context recognition.

```
DTR> PRINT XYZ OF DOMAIN1
```

```
XYZ  
"ALF"
```

Other methods of explicit context recognition will be discussed in a later section.

### 3 Using DATATRIEVE Context

Context recognition (both implicit and explicit) performs two different functions within DATATRIEVE. These functions are Target Record Identification, which answers the question "how many", and Name Recognition, which answers the question "which one".

#### 3.1 Target Record Identification

Context determines which records will be the target of statements such as PRINT, MODIFY and ERASE. That is, which records are printed, modified or erased. How does DATATRIEVE identify the target records for a particular operation?

Target records for PRINT, MODIFY and ERASE statements are determined in part by the form of the statement you enter. The syntax of these statements provides three basic context specifications. Specification of context in a statement can be implicit or explicit. By implicit we mean that the target record is not specified in the statement syntax, but is implied by the environment in which the statement executes. Explicit specification means that the target record is specified in the statement syntax.

The target of a PRINT, MODIFY or ERASE may be a single record, a collection of records, or a stream of records. The syntax of a statement determines the number of records operated on. That is, the syntax may imply either single-record context or multiple-record context.

These different options are shown in the following examples:

1. IMPLICIT, SINGLE-RECORD CONTEXT

No context is specified; it is implicit. Only one record will be modified.

```
DTR> MODIFY
```

2. PARTIALLY EXPLICIT, MULTIPLE-RECORD CONTEXT

Context is expressed by the keyword "ALL" rather than by an explicit RSE (record selection expression.) A group of records will be modified.

```
DTR> ERASE ALL
```

3. EXPLICIT, MULTIPLE-RECORD CONTEXT

Context is detailed in the "OF RSE" clause. A group of records will be modified.

```
DTR> MODIFY PRICE OF YACHTS
```

Each of these categories are detailed below.

#### 3.1.1 Single-Record Context

There are different ways to specify a single-record as the target of a statement. One is by means of a "selected record". The SELECT statement identifies one target record in a collection. A record is selected by first forming a "collection" of records using the FIND statement and then choosing a particular record from that collection using the SELECT statement.

In the example below, a collection of all of the YACHTS records is formed using a FIND statement. The first record of the collection is then selected. Since a target is not explicitly specified on the PRINT statement, the selected record will be printed.

```
DTR> FIND YACHTS
DTR> SELECT
DTR> PRINT
```

Another method of specifying single-record context is the FOR loop. A FOR loop identifies individual records of a record stream, in turn.

It may seem that the FOR construct actually provides multiple-record context, because it produces a stream of records. However, there is only one target record per iteration of a FOR loop. The FOR construct allows you to work with many records at once, while dealing with each record individually. Therefore, the single-record form of a statement is used within a FOR loop to operate on the target record of the FOR loop.

In the example below, all of the records from the YACHTS domain will be printed. Notice that the single-record context form of the print statement is used within the FOR loop.

```
DTR> FOR YACHTS
CON> PRINT
```

What if two possible targets, one a selected record and one the target of a FOR loop, are available at once? Which one will be used?

If more than one record qualifies as a target record, then DATATRIEVE will always use the most recent context. In the example below, the stream of records from the domain OWNERS will be printed, rather than the selected YACHTS record.

```
DTR> FIND YACHTS
DTR> SELECT
DTR> FOR OWNERS
CON> PRINT
```

### 3.1.2 Multiple-Record Context

You can specify multiple record context in one of two ways. One way is to use the keyword "ALL", without an RSE, on the command line. When used in this way, ALL identifies all of the records in the current collection as the target of the statement.

In the example below, the FIND forms a collection containing the first two records in the domain YACHTS. The keyword ALL on the PRINT and ERASE statements specify both records in the current collection as targets. After the ERASE statement is executed, both of the records in the collection are erased. Therefore, the second PRINT does not display any records.

```
DTR> FIND FIRST 2 YACHTS
DTR> PRINT ALL
```

MANUFACTURER	MODEL	RIG	LENGTH		WEIGHT	BEAM	PRICE
			ALL	OVER			
ALBERG	37 MK II	KETCH	37		20,000	12	\$36,951
ALBIN	79	SLOOP	26		4,200	10	\$17,900

```
DTR> ERASE ALL
DTR> PRINT ALL
```

You can also specify multiple record context using the "OF RSE" clause. The "OF RSE" clause identifies a target record stream made up of records meeting the conditions set in the RSE. In the example below, the "OF YACHTS" clause on the MODIFY statement specifies that the record stream made up of all the records from the YACHTS domain will be modified. The result is that the PRICE field of every record in YACHTS is changed to 0.

```
DTR> MODIFY PRICE OF YACHTS
Enter PRICE: 0
DTR>
```

Contrast this with the single-record context produced by the FOR loop below. Each record is handled individually and you are prompted for a PRICE value for each record in the record stream. You should use extreme caution when utilizing a multiple-record context technique (such as OF RSE) to avoid inadvertently modifying all of the records in a domain at once when you actually want to modify the records individually.

```
DTR> FOR YACHTS MODIFY PRICE
Enter PRICE: 33000
Enter PRICE: 21000
      etc. (for each record)
```

### 3.2 Name Recognition

Given a statement such as:

```
PRINT PRICE
```

DATATRIEVE must determine what is meant by PRICE. Is PRICE a domain, a variable, or a field? If PRICE is a field, which domain is it from? What if more than one readied source has a PRICE field? DATATRIEVE determines the answer to these questions through the process of name recognition. DATATRIEVE uses two methods of name recognition: implicit and explicit.

#### 3.2.1 Implicit Name Recognition

DATATRIEVE keeps track of possible contexts using a stack. A stack is an internal data structure which is manipulated in such a way that the most recently added items are the first to be accessed (last on, first off.)

DATATRIEVE uses the stack to resolve context. When DATATRIEVE encounters a name in a DATATRIEVE statement, the stack is searched for that name. If the stack contains more than one entry for a particular name, the name from the most recent context will be used.

In the example below, the FIND and SELECT statements make entries on the stack. When the PRINT statement is executed, DATATRIEVE looks for a context for the name TYPE. Looking on the stack, the name TYPE is found to be a field from the selected record.

```
DTR> READY YACHTS
DTR> FIND YACHTS WITH PRICE NE 0
DTR> SELECT FIRST
DTR> PRINT TYPE
```

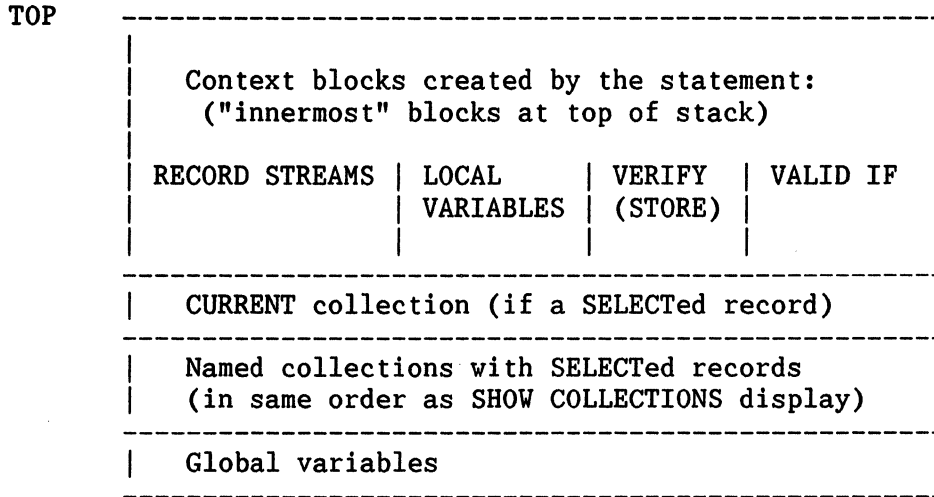
In the example below, stack entries are again made as a result of FIND and SELECT statements. A stack entry for OWNERS is also made as a result of the FOR statement. When the PRINT statement is executed, OWNERS is on top of the stack. The OWNERS record does not contain a PRICE field though. So, DATATRIEVE looks further down the stack until a reference to PRICE is found. In this case, PRICE is found in the selected YACHTS record. That single PRICE field will be printed 18 times, once for each record in OWNERS.

```

DTR> FIND YACHTS
DTR> SELECT FIRST
DTR> FOR OWNERS
CON> PRINT PRICE

```

What is the ordering on the stack? What is meant by most recent or "closest" context? The answer to these questions is generally intuitive. The diagram below outlines the arrangement of the stack. The diagram shows that the environment set up by the statement currently being executed will be considered before a selected record, a collection, or global variables.



BOTTOM

This diagram shows that context from the innermost statement is placed on top of the stack. Innermost refers to the statement which is the most nested of a group of statements. In the example below, the innermost statements are those within the compound statement under the FOR OWNERS statement. The stack diagram shows that the context from the outer FOR YACHTS loop is placed on the stack followed by the context set up by the FOR OWNERS statement. The variable INNER1 declared in the innermost statement is placed on top of the stack last.

```

DTR> FOR YACHTS
      BEGIN
      DECLARE OUTER1 PIC X(5).
      FOR OWNERS
        BEGIN
        DECLARE INNER1 PIC 999V9.
-----> INNER1 = 2.2
        END
      END

```

This is what the context stack looks like at the time of the assignment of 2.2 to INNER1:

TOP

INNER1 context OWNERS context OUTER1 context YACHTS context
CURRENT collection (if a SELECTed record)
Named collections with SELECTed records (in same order as SHOW COLLECTIONS display)
Global variables

BOTTOM

DATATRIEVE actually uses two stacks to keep track of context. The first stack, the general context stack, keeps track of possible name resolutions for most DATATRIEVE statements. The second stack, the update stack, keeps track of fields which are possible targets for updates or assignments. DATATRIEVE checks the update stack to ensure that you assign only to those fields that can accept updates, that is, a field which is part of a record which is being stored or modified, or a variable.

The table below shows that a field will be placed on the update stack if the field is named in a STORE or MODIFY statement or is part of a record named in a STORE or MODIFY statement, or if the field is a declared variable. Local variables and the targets of STOREs and MODIFYs remain on the update stack only for the duration of the statements of which they are a part.

CONTEXTS PLACED ON THE UPDATE STACK

CONTEXT TYPE	CONTEXT	SCOPE
STORE USING	TARGET OF STORE	STORE USING
MODIFY USING	TARGET OF MODIFY	MODIFY USING
LOCAL VARIABLE	VARIABLE	BEGIN-END BLOCK
GLOBAL VARIABLE	VARIABLE	ANY STATEMENT

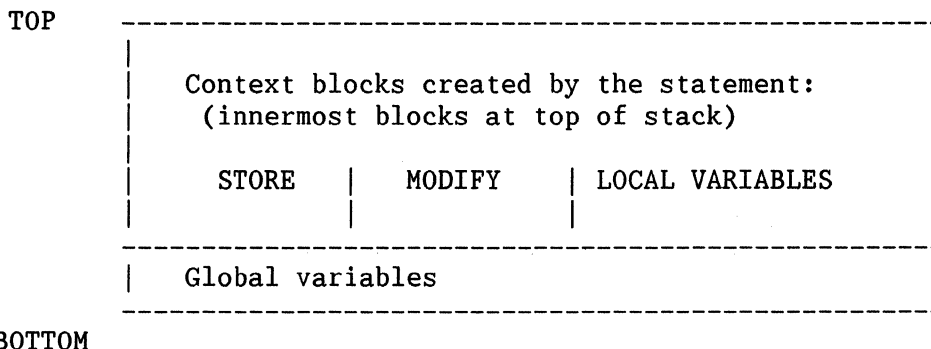
The table above shows that a source referenced in a STORE statement is placed on the update stack. The context for the source being stored is not placed on the general context stack, however. In the statement below for example, OLD\_YACHTS is placed only on the update context stack. NEW\_YACHTS is placed on the general context stack. So, even though both the source and destination records contain BOAT fields, DATATRIEVE will be able to determine the correct domain by referring to the appropriate stack.

```
DTR> FOR OLD-YACHTS
      STORE NEW-YACHTS USING BOAT = BOAT
```

You may sometimes see the general context stack referred to as the Right context stack and the update context stack referred to as the Left context stack.

The ordering rules for the update stack are basically the same as those for the general stack. The difference is that fewer entries are made on the update stack. As shown below, only variable declarations and STORE and MODIFY statements make entries on the update stack.

ORDERING OF THE UPDATE CONTEXT STACK



The example below shows the ordering of both context stacks. The state of the stacks at the time the of the STORE statement (indicated by the arrow) is shown. YACHTS is pushed onto both stacks when the FOR YACHTS MODIFY statement is executed, and will remain on both stacks until the FOR loop ends. OWNERS is pushed onto the the update stack each time the STORE statement is executed and is popped off when the store is completed. The local variable NEW\_MODEL is placed on both stacks at the time it is declared and remains until the termination of the FOR loop.

```

DTR> FOR YACHTS MODIFY USING
      BEGIN
      PRICE = PRICE * 2
      DECLARE NEW_MODEL PIC X(10).
      NEW_MODEL = *."new model"
      STORE OWNERS USING
-----> MODEL = NEW_MODEL
      END
  
```

STACK CONTENTS AT TIME OF ASSIGN

Left Context stack (Update Context stack)	Right Context Stack (General Context Stack)
OWNERS context	NEW_MODEL context
NEW_MODEL context	YACHTS context
YACHTS context	Collections (with SELECTed record)
Global variables	Global variables

3.2.2 Explicit Name Recognition

The previous section discussed how name recognition takes place automatically in DATATRIEVE. Now we will discuss how you can override DATATRIEVE's implicit name recognition by specifying the name explicitly. There are two ways of forcing name recognition. One is by using name qualification and the other is by using context variables.



### 3.2.2.1 NAME QUALIFICATION

Name qualification allows you to override the context established by DATATRIEVE's implicit name recognition. This is done by providing a fully qualified name in a DATATRIEVE statement. A fully qualified name includes a specification for the readied source (the domain name or database name), all group fields of which the field is a part, and the field name itself. A portion of the record definition for the record YACHT is shown below. If a readied domain called YACHTS references the record YACHT, then the fully qualified name for the field MODEL is: YACHTS.YACHT.boat.type.model.

```
RECORD YACHT
01 BOAT.
   03 TYPE.
       05 MANUFACTURER      PIC X(10)
           QUERY NAME BUILDER.
       05 MODEL              PIC X(10).
   03 SPECIFICATIONS
       :
```

You should use name qualification when DATATRIEVE's default implicit qualification is not what you want. For example, suppose that you want to print a list of yachts and for each yacht list all of the owners who own that type of yacht. You might try the following:

```
DTR> FOR YACHTS FOR OWNERS WITH TYPE EQ TYPE PRINT TYPE, NAME
```

This will not produce the desired results, however. The problem lies in the RSE "TYPE EQ TYPE". The intent is to find owners with TYPE equal to TYPE from YACHTS. But, since OWNERS is higher on the context stack than YACHTS, both references to TYPE in the RSE will resolve to OWNERS. You must force DATATRIEVE to resolve one of the TYPEs to YACHTS. You can do this by qualifying TYPE, as in the following example. Note that TYPE does not have to be fully qualified, just enough to determine uniqueness.

```
DTR> FOR YACHTS
      FOR OWNERS WITH TYPE EQ YACHTS.TYPE
      PRINT TYPE, NAME
```

### 3.2.2.2 Context Variables

Name qualification can be used to differentiate between fields of the same name from different domains. But what if the duplicate names are from the same domain? For example, suppose you want to print a list of builders who build boats of more than one kind of rig. This requires comparing the RIG field of one YACHTS record to the RIG field of another YACHTS record. You might try the following:

```
DTR> FOR YACHTS
CON>   FOR YACHTS WITH BUILDER EQ BUILDER AND RIG NE RIG
CON>   PRINT BUILDER, RIG, RIG
DTR>
```

The problem again is that context resolves to the inner FOR loop. So, BUILDER will be compared to BUILDER from the same record and RIG will be compared to RIG from the same record. Using the domain name will not help, because YACHTS is the domain name in both cases. So, how can you distinguish BUILDERS and RIG?

You can use context variables to distinguish names from the same domain. In the following example, the context variable A is supplied for the outer FOR loop and B for the inner FOR loop. The context variables are then used within the RSE to qualify BUILDER and RIG.

```

DTR> FOR A IN YACHTS
CON>   FOR B IN YACHTS WITH B.BUILDER EQ A.BUILDER AND
CON>     B.RIG NE A.RIG
CON>       PRINT BUILDER, A.RIG, B.RIG

```

A context variable is an artificial or "dummy" variable. A context variable can be specified as part of an RSE and is valid only for the duration of the statement containing the RSE. Use of a context variable is a form of EXPLICIT context specification.

Context variables can be useful in other situations also. Earlier we mentioned that the target of a STORE or MODIFY operation is placed only on the update context stack, not the general context stack. As a result, fields from the record that is being updated cannot be used on the right hand side of an assignment. For example, suppose you want to use previously entered values more than once, as in the example below. The statement "FIELD3 = FIELD1 + FIELD2" will cause DATATRIEVE to complain that FIELD1 is undefined. This is because FIELD1 is found only on the update stack.

```

DTR> STORE DOMANE USING
CON>   BEGIN
CON>   FIELD1 = *."Field1 value"
CON>   FIELD2 = *."Field2 value"
CON>   FIELD3 = FIELD1 + FIELD2
CON>   END
"FIELD1" is undefined or used out of context.

```

If you happen to have another selected record which contains fields named FIELD1 and FIELD2, then FIELD3 will take its value from the FIELD1 and FIELD2 values of the selected record rather than the record being stored, producing different results than you expected.

You can get around these problems by using a context variable. In the following example, using the context variable Y has the effect of establishing an entry for DOMANE on the general context stack. This allows the values just entered for FIELD1 and FIELD2 to be used as the source of an assignment statement.

```

DTR> STORE Y IN DOMANE USING
CON>   BEGIN
CON>   FIELD1 = *."Field1 value"
CON>   FIELD2 = *."Field2 value"
CON>   FIELD3 = Y.FIELD1 + Y.FIELD2
CON>   END

```

Context variables can also be used to avoid an exhaustive search on certain CROSS lookups. In the example below, BUILDER is a key for both OWNERS and YACHTS. If no context variable is used, a keyed lookup will be done on BUILDER from OWNERS. The same is true if the context variable for the second source, OWNERS (Z), is used in the RSE. If the context variable for the second source, YACHTS (Y), is used, then a keyed lookup will be done on both OWNERS and BUILDERS. The moral of this example is: when in doubt, use a context variable!

```

DTR> FIND Y IN YACHTS CROSS Z IN OWNERS OVER BUILDER WITH
      BUILDER = "ALBIN"
Performing EQL boolean on RMS key field Z.OWNERS.BUILDER
DTR> FIND Y IN YACHTS CROSS Z IN OWNERS OVER BUILDER WITH
      Z.BUILDER = "ALBIN"
Performing EQL boolean on RMS key field Z.OWNERS.BUILDER

```

```

DTR> FIND Y IN YACHTS CROSS Z IN OWNERS OVER BUILDER WITH
      Y.BUILDER = "ALBIN"
Performing EQL boolean on RMS key field Y.YACHTS.MANUFACTURER
Performing EQL boolean on RMS key field Z.OWNERS.BUILDER

```

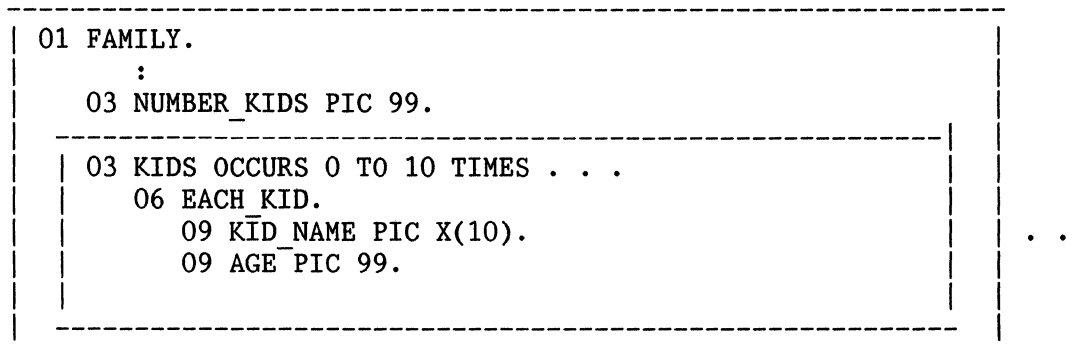
### 3.3 CONTEXT AND HIERARCHICAL FIELDS

Hierarchical fields or lists are defined with an OCCURS clause in a record or a view. As mentioned earlier, context resolution becomes more complex when you use list records. Besides identifying a target record, you must identify a particular list occurrence.

Unless otherwise stated, throughout the rest of this section "LIST" means any hierarchical field, including those defined in views.

#### 3.3.1 General Techniques

You can think of a list as a "pseudo-domain" within a domain and list items as records within that pseudo-domain. In the diagram below, the outer box represents the FAMILIES domain, and the inner box represents the pseudo-domain formed by the KIDS list within the FAMILIES domain.



You must supply context for the pseudo-domain as well as the actual domain.

Some of the techniques to aid in target record identification include:

- Use successive FIND and SELECT statements
- Use nested FOR statements
- Use the CROSS clause to "flatten" the hierarchy
- Use an inner print list specification
- Use OF RSE clauses where possible
- Use the Context Searcher (SET SEARCH)

Note that several of these techniques are also used for target record identification. This is because the techniques that are used on domains can also be applied to pseudo-domains.

#### 3.3.1.1 Using FIND/SELECT

One method of getting at records that are in the pseudo-domain is to use successive FIND and SELECT statements.

First, lets look at an example of how you might naturally phrase a query on a list field. First you find and select a record from FAMILIES and then you try to print out the fields KID\_NAME and AGE. The example below shows that the PRINT statement will fail because KID\_NAME is undefined.

```
DTR> FIND FAMILIES;SELECT  
DTR> PRINT ALL KID NAME, AGE  
"KID_NAME" is undefined or used out of context
```

Extra context must be provided to specify which item from the KIDS list is to be printed. Use an extra FIND to form a collection of "pseudo-records" from the KIDS pseudo-domain.

```
DTR> FIND FAMILIES; SELECT
DTR> FIND KIDS
DTR> PRINT ALL KID_NAME, AGE
```

KID NAME	AGE
URSULA	7
RALPH	3

### 3.3.1.2 Nested FORs

The following is an example of an unsuccessful attempt to print items from the KIDS list using a FOR loop. The statement fails because it does not specify which occurrence of the list to print.

```
DTR> FOR FAMILIES
CON>   PRINT KID_NAME, AGE
      "KID_NAME" is undefined or used out of context.
```

In much the same way that you can access a pseudo-domain using an extra FIND, you can access the pseudo-domain using an extra FOR loop. In the following example the inner FOR loop provides a record stream from the pseudo-domain, providing context for KID\_NAME and AGE. A list of kid names and ages will be printed.

```
DTR> FOR FAMILIES
CON>   FOR KIDS
CON>     PRINT KID_NAME, AGE
```

### 3.3.1.3 Using CROSS

The following is another example of a statement that does not provide context for the KIDS list.

```
DTR> PRINT MOTHER, KID_NAME, AGE OF FIRST 1 FAMILIES
      "KID_NAME" is undefined or used out of context.
```

The solution shown below is to use a CROSS clause to flatten the hierarchy. The CROSS provides a stream of records that contain fields from both the FAMILIES domain and the pseudo-domain providing context for KID\_NAME and AGE.

```
DTR> PRINT MOTHER, KID_NAME, AGE OF FIRST 1 FAMILIES CROSS KIDS
```

MOTHER	NAME	AGE
ANN	URSULA	7

### 3.3.1.4 Inner Print Lists

When accessing list fields through a PRINT statement, another option is available to you. That option is the use of the inner print list specification. The syntax of the inner print list is:

{ALL print-list OF RSE}

The print statement below does not provide context for the KIDS list.

```
DTR> PRINT MOTHER, KID_NAME, AGE OF FIRST 1 FAMILIES
"KID_NAME" is undefined or used out of context.
```

The inner print list construct provides a way to specify context for a list field. Think of an inner print list as a print statement within a print statement which is used to access a pseudo-domain. The example below shows the inner print list portion of a print statement.

```

-----
|                                     |
|   print-list                       |
|   |-----|                       | |
|   | Inner print list                |
|   | |-----|                     |
|   | | print-list                   |
|   | |-----|                     |
|   |-----|                       |
|                                     |
-----
DTR> PRINT MOTHER, ALL KID_NAME, AGE OF KIDS OF FIRST 1 FAMILIES

```

MOTHER	KID NAME	AGE
ANN	URSULA	7
	RALPH	3

This method is most useful when you want to print all of the occurrences of a list. Note the difference in results from the previous CROSS example where only the first KID was retrieved.

When using inner print lists keep in mind that if the print list starts with an inner print list, you need an additional "ALL" keyword:

```
ALL {ALL print-list OF RSE}
```

The following print statement is the same as the one in the previous example, but without the MOTHER print item. It produces a syntax error.

```
DTR> PRINT ALL KID_NAME, AGE OF KIDS OF FIRST 1 FAMILIES
Expected end of statement, encountered "OF".
```

The print statement below contains an additional ALL to properly denote the beginning of the inner print list.

```

-----
|                                     |
|   Inner print list                 |
|   |-----|                       | |
|   | |-----|                     |
|   | | print-list                   |
|   | |-----|                     |
|   |-----|                       |
|                                     |
-----
DTR> PRINT ALL ALL KID_NAME, AGE OF KIDS OF FIRST 1 FAMILIES

```

KID NAME	AGE
URSULA	7
RALPH	3



You cannot use inner print lists on anything but a PRINT statement, so what can you do? You can use successive FIND/SELECT statements, but another possibility is to use an ANY boolean.

Since the ANY boolean includes an "OF RSE" clause, it allows you to get through that extra pseudo-domain of KIDS as shown in the following FIND statement.

```

                                Boolean expression
                                -----
                                | "inner" RSE |
                                -----
DTR> FIND FAMILIES WITH ANY KIDS WITH AGE GE 5
[10 records found]

```

### 3.3.2 Report Writer Techniques

Referencing list fields in the Report Writer is more of a challenge because only a few of the techniques discussed in the previous section can be used from within the report writer. To access lists from within the report writer, you can use:

- An inner print list specification
- The Context Searcher (SET SEARCH)
- CROSS to flatten the hierarchy

The example below shows the inner print list technique being used inside of the report writer. A couple of points to note are:

- The inner print list is made up of KID\_NAME and AGE as well as a column specification.
- Use of the TOTAL function on the field AGE requires the OF RSE specification, but TOTAL of NUMBER\_KIDS does not. This is because AGE is a list field and needs additional context.

```

DTR> REPORT FAMILIES
RW> PRINT COL 1, MOTHER, COL 20, ALL KID_NAME, COL 40,
RW> AGE OF KIDS
RW> AT BOTTOM OF MOTHER PRINT TOTAL NUMBER_KIDS, TOTAL AGE OF KIDS
RW> END_REPORT

```

### 3.4 The CONTEXT SEARCHER

Another method of providing the extra context needed for list fields is the use of the CONTEXT SEARCHER. In addition, the CONTEXT SEARCHER can provide context for access through DBMS sets.

The CONTEXT SEARCHER is activated by the SET SEARCH command. The following example shows the CONTEXT SEARCHER being used to automatically create an inner print list for KIDS. The print statement below is the same one that failed in a previous example. Note that DATATRIEVE displays an informative message when context is resolved by the CONTEXT SEARCHER.

```

DTR> SET SEARCH
DTR> PRINT MOTHER, KID_NAME, AGE OF FIRST 1 FAMILIES
Not enough context. Some field names resolved by Context Searcher.

```

MOTHER	KID NAME	AGE
ANN	URSULA	7
	RALPH	3





" <...> is undefined or used out of context"

There are a number of possible causes for context problems. Here is a check list to consider:

- Check for misspellings
- Check for duplicate names, especially from other sources
- Does a referenced collection have a SELECTed record? Check the CURRENT as well as named collections.
- Is a list involved (either from OCCURS or views)? Especially in the Report Writer, you may need to use a CROSS to flatten lists, use inner print lists or the CONTEXT SEARCHER.
- Does a STORE operation need to use a context variable in order to reference just-stored values?
- For DBMS sources, does a set name need to be referenced?
- Is there a FIND inside a compound statement? This can sometimes cause unexpected results rather than an error message. In the following example, a YACHTS record will be printed even though a FIND OWNERS/SELECT was done just before the PRINT statement.

```
READY YACHTS, OWNERS
FIND ALL YACHTS
BEGIN
    FIND OWNERS ! Not supported
    SELECT      ! Not supported
    PRINT
END
```

Note: A YACHTS record is printed!

- Some query-names from records defined with RDO and CDDL are not handled correctly by DATATRIEVE. Those are CDDL records with query names containing a hyphen and RDO records containing a hyphen or lower-case letters. DATATRIEVE does not convert the hyphens and lower case letters as it should, resulting in an undefined field name. This problem will be corrected in a version of DATATRIEVE following version 4.1.

The example below illustrates this problem.

CDDL:

```
define record qph.
tmpr structure.
date1 datatype is date query_name for dtr is "quad-one".
end tmpr structure.
end qph record.
```

```
DTR> show fields
QPHD
  TMPR
  DATE1 (quad-one) <DATE>
DTR> find qphd
DTR> print all quad-one
"QUAD_ONE" is undefined or used out of context.
```

- Check that all variables referenced in a procedure are declared. Do not assume that a variable referenced in code which is branched around with a CHOICE or IF-THEN-ELSE statement does not need to be declared. Even if that code is never executed, it still must be compiled. For example:

```
DTR> X = 0
DTR> IF X = 1 THEN PRINT x + z
"Z" is undefined or used out of context.
```

- Context errors do not always result in an error message! Forgetting about implicit context can also cause unexpected data results. You would expect the example below to produce a context error message because context is not provided for KIDS. But, it turns out that there is a selected record with URSULA targeted as the KID. Remember that the general context stack also includes collections with selected records!

```
DTR> SET NO SEARCH
DTR> FOR FAMILIES PRINT KID_NAME, AGE
```

```
KID
NAME      AGE
URSULA    7
URSULA    7
URSULA    7
: (etc.)
```

- A CROSS of two collections from the same domain may give incorrect answers. To avoid this problem ready the domain twice, once with an alias and once without, and proceed as if you were dealing with two separate domains. For example:

```
DTR> READY DOM, DOM AS EXTRA
DTR> FIND COLLECTION-A IN DOM
DTR> FIND COLLECTION-B IN EXTRA
DTR> FIND A IN COLLECTION-A CROSS
      B IN COLLECTION-B
```

## 5 Summary

The outcome of a DATATRIEVE statement is affected by the context in which it executes. This makes DATATRIEVE a more powerful tool for you, because you do not have to supply every detail of execution on a DATATRIEVE statement.

Context resolution in DATATRIEVE can sometimes be confusing. If you keep in mind how DATATRIEVE handles context, as described in this paper, you can avoid confusion and make context work for you.

---

## The Story of P

Mr. R, Oldest Seagoing Service, Washington, DC 20593

---

I would like to call this article, "The Story of 'O'" but the old time sailors where I work tell me that letter has been taken. So I am going to call this "The Story of 'P'". I am a system manager/programmer/comic relief for the oldest sea-going service in the United States. My boss has a secretary that works for him as well as handling overflow tasks for other division chiefs. I'll call that secretary "P." in order to protect the innocent (and the guilty). There was a problem in the office that we could never find "P." when we needed her. She would appear to play her boss against the other people that gave her work to do. She would also take in-ordinate amounts of times to perform simple tasks. After much coun-selling with no long term improvement my boss said something had to be done. That's where I come in. I looked at what information my boss needed and saw three items, the time 'P.' left her desk, where 'P.' went, and when 'P.' returned to her desk. The record defini- tion I came up with looked like this:

```
DEFINE RECORD LOCATION_REC USING
01 LOCATION_RECORD.
    03 TIME_OUT    USAGE DATE
        EDIT_STRING IS X(20).
    03 TIME_IN     USAGE DATE
        EDIT_STRING IS X(20).
    03 DESTIN      PIC X(70).
;
```

I then went ahead and defined the domain LOCATION like this:

```
DEFINE DOMAIN LOCATION USING CDD$TOP.APA.P.LOCATION_REC
ON USER1:[APA.P]LOCATION.DAT;
```

Next I defined a file using something like the command:

```
DEFINE FILE FOR LOCATION KEY = TIME-OUT ;
```

Now I wanted to come up with two very simple procedures for 'P.' to use, one to say when she was leaving and one to use when she was back. I wanted the procedures to be "foolproof" as possible so I needed to make sure "P." could not be out to someplace without having returned from her last "adventure" and that the time was recorded automatically. Here is what I came up with:

```
DEFINE PROCEDURE LEAVE
READY LOCATION SHARED WRITE
IF COUNT OF LOCATION WITH TIME_IN = "" GT 0 THEN
BEGIN
    PRINT " "
    PRINT "  You must first log in from your last adventure !"
    PRINT "  Please type: BACK "
    PRINT " "
END ELSE
BEGIN
    STORE LOCATION USING
    BEGIN
        TIME_OUT = "NOW"
        DESTIN = *."your destination"
    END
END
END PROCEDURE
```

Now for when 'P.' returned, I needed to make sure she had first recorded her leaving and that time was recorded automatically. Here is what I came up with:

```
DEFINE PROCEDURE BACK
DECLARE TIC USAGE DATE EDIT_STRING X(20).
TIC = "now"
READY LOCATION SHARED
MODIFY IF COUNT OF LOCATION WITH TIME_IN = "" EQ 0 THEN
BEGIN
    PRINT " "
    PRINT "     You must first leave on an adventure !"
    PRINT "     Please type: LEAVE "
    PRINT " "
END ELSE
BEGIN
    MODIFY LOCATION WITH TIME_IN = "" USING
    TIME_IN = "NOW" PRINT " Logged in. Time is " | (FORMAT(TIC) USING X(20))
END
END_PROCEDURE
```

Now my boss needed some way to to tell where 'P.' was. The hard part of this was deciding what to call it. Since I think my boss had spent some time in Matamoros, Mexico, we decided to call it "DONDE" which is Spanish for "Where". Here's what I came up with:

```
DEFINE PROCEDURE DONDE
SET DICTIONARY CDD$TOP.APA.P
READY LOCATION SHARED
IF COUNT OF LOCATION WITH TIME_IN = "" EQ 0 THEN
BEGIN
    PRINT " Not logged out anywhere "
END ELSE
BEGIN
    FOR LOCATION WITH TIME_IN = ""
        PRINT TIME_OUT(-), SKIP, DESTIN(-)
END
END_PROCEDURE
```

I then set up symbols in LOGIN.COM for 'P.' and my boss. They looked like:

```
BACK ::= "'DTR32' ; :CDD$TOP.APA.P.BACK"
LEAVE ::= "'DTR32' ; :CDD$TOP.APA.P.LEAVE"
DONDE ::= "'DTR32' ; :CDD$TOP.APA.P.DONDE"
```

Datatrieve was defined as a symbol elsewhere like:

```
DTR*32 ::= $SYS$SYSTEM:DTR32411
```

This went pretty good for the first day but then my boss said he wanted to know how long each trip lasted. I told him, "I got five records out there and you are not going to destroy all my work by creating a new data file."

He replied, "How are you going to do it then ?"

I said, "Well, you could use that old favorite of Cobol programmers, Mr. REDEFINES. You and I both know that a Datatrieve date field uses the same amount of space as a quad field. So you take the date, convert it to a quad, subtract the two dates as quads, and convert the resulting value back to minutes." "A value of '1' in a quad field is also known as a clunk. But how many clunks are there in a minute?" "That's trivia and I don't know know. But I do know that 17-NOV-1858 at 00:00:00.0 is equal to '0' clunks since time for all Datatrievers starts at that date. I would suspect that if you take the date 18-NOV 1858 at 00:00:00.0 you could put that in a variable with usage quad and see what it is in clunks and then divide by twenty-four to get the number of hours and again by sixty to get the number of minutes." "And you tell me that 17-NOV-1858 at 00:00:00.0 is not trivia?"

So what I guess he did was something like this:

```
DTR> declare TIC usage date.
DTR> declare TIC usage date.
DTR> declare TOC usage quad.
DTR> TIC = "18-NOV-1858 00:00:00.00"
DTR> TOC = TIC
DTR> TOC = TOC / 24
DTR> TOC = TOC / 60
DTR> print TOC(-)

        600000000

DTR>
```

Because what I ended up with was:

```
REDEFINE RECORD LOCATION_REC USING
01 LOCATION RECORD.
    03 TIME_OUT      USAGE DATE
       EDIT_STRING IS X(20).
    03 TIME_OUT_RED REDEFINES TIME_OUT.
       05 TIME_OUT_QUAD USAGE IS QUAD.
    03 TIME_IN       USAGE DATE
       EDIT_STRING IS X(20).
    03 TIME_IN_RED  REDEFINES TIME_IN.
       05 TIME_IN_QUAD USAGE IS QUAD.
    03 DESTIN       PIC X(70).
    03 TOT_TIME COMPUTED BY (TIME_IN_QUAD - TIME_OUT_QUAD)/
       (600000000).
```

The COMPUTED BY field works quite nicely at figuring up the time away. The reports we are now getting are too hard to believe and we have decided not to share them with you. (Would you believe 'P.' was at the supply locker for 187 minutes? I thought not!)

We now are having a better time keeping track of 'P.' with the use of Datatrieve. I am happy, my boss is happy, and everyone except 'P.' is happy.

---

# Documenting and Manipulating SYSGEN Parameters using Datatrieve

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As a system manager, I have to keep track of the SYSGEN parameters on my system. I also have to keep such files as MODPARAMS.DAT up to date, and with various changes in VMS and layered products add the proper changes. Part of this process can be automated using Datatrieve.

One of the things any system manager should do is save a copy of the SYSGEN parameters. This is done as follows:

```
$ SET DEFAULT SYSS$SYSTEM
$ MC SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SET /OUTPUT = PARAMS.28JAN88
SYSGEN> SHOW /ALL
SYSGEN> EXIT
```

The output file can of course be named as you choose: I like to put on the date for reference. Also, you should occasionally make such a record doing a "SHOW /SPECIAL" in addition to "SHOW /ALL": but what I am doing here is generating a change list, and since special parameters normally should not be changed I'm not including them here. A small section of this file looks like this:

Parameters in use: Active

Parameter Name	Current	Default	Minimum	Maximum	Unit	Dynamic
-----	-----	-----	-----	-----	-----	-----
PFCDEFAULT	64	32	0	127	Pages	D
KFILSTCNT	16	4	2	255	Slots	
GBLSECTIONS	400	128	20	4095	Sections	
GBLPAGES	20500	4096	512	-1	Pages	
GBLPAGFIL	2048	1024	128	-1	Pages	
MAXPROCESSCNT	128	72	12	8192	Processes	
PROCSECTCNT	32	32	5	1024	Sections	
MINWSCNT	20	20	10	-1	Pages	
PAGFILCNT	2	2	1	63	Files	
....						

The hard part comes in looking through all of the parameters on this listing and finding the ones that are not at default values. This is where Datatrieve makes things easier. A domain can be defined to read this text file:

```
REDEFINE RECORD TPARAMS_RECORD
01 TPARAMS_REC.
!
! Read in a "Raw" text file output of parameters from SYSGEN
!
! B. Z. Lederman
!
  10 NAME PIC X(16).
  10 CURRENT PIC X(18).
  10 SUBCUR REDEFINES CURRENT.
```

```
20 FILLER PIC X(8).
20 RCUR PIC X(10).
```

```
10 DEFAULT PIC X(10).
10 MINIMUM PIC X(10).
10 MAXIMUM PIC X(10).
10 FILLER PIC X.
10 UNIT PIC X(12).
10 DYNAMIC PIC X.
```

```
;
```

```
REDEFINE DOMAIN TPARAMS USING TPARAMS_RECORD ON
SYSSYSTEM:PARAMS.28JAN88;
```

The domain definition will have to be re-defined each time the file name changes, or you can use a logical name to point to the current file.

The above definition will allow you to read in the text as text: but a lot more can be done if the numeric parameters could be manipulated as numbers. To do this, I define a matching domain with numeric fields:

```
REDEFINE RECORD PARAMS_RECORD
```

```
!
! Write out "normalized" SYSGEN parameters.
!
! B. Z. Lederman
!
```

```
01 PARAMS_REC.
```

```
10 NAME PIC X(16).
10 CURRENT USAGE LONG EDIT_STRING ZZZ,ZZZ,ZZ9.
10 DEFAULT USAGE LONG EDIT_STRING ZZZ,ZZZ,ZZ9.
10 MINIMUM USAGE LONG EDIT_STRING ZZZ,ZZZ,ZZ9.
10 MAXIMUM USAGE LONG EDIT_STRING ZZZ,ZZZ,ZZ9.
10 UNIT PIC X(12).
10 DYNAMIC PIC X.
```

```
;
```

```
REDEFINE DOMAIN PARAMS USING PARAMS_RECORD ON PARAMS.SEQ;
```

Now all I have to do is move the data from one domain to the other. Since the input is in a text file with a title, I want to eliminate the title lines: I also don't want to move over any parameters which are text rather than numbers (such as QUORUM\_DISK and SCSNODENAME):

```
REDEFINE PROCEDURE CONVERT_PARAMETERS
```

```
!
! Convert SYSGEN parameters from text to "normalized" numbers.
! TPARAMS must first be defined to read the correct file.
! Only numeric parameters are converted.
!
```

```
! B. Z. Lederman
```

```
!
```

```
READY TPARAMS
```

```
DEFINE FILE FOR PARAMS;
```

```
! remember to purge old files
```

```
READY PARAMS WRITE
```

```
!
```

```
FOR TPARAMS WITH UNIT NE "Ascii", "Unit Dynami", " "
```

```
STORE PARAMS USING PARAMS_RECORD = TPARAMS_RECORD
```

```
END_PROCEDURE
```

Note that there are two blank spaces between "Unit" and "Dynami".

Now, I can manipulate this record of my SYSGEN parameters as I please. For example, If I had multiple machines with different parameters I could define a separate domain for each machine and compare the two to see where they differ. What I am most interested in now, however, is to generate a list of commands for MODPARAMS.DAT which will restore my current system settings from the VMS default settings.

```
REDEFINE PROCEDURE PRINT_PARAMETERS
!
! Print out the normalized parameters in "ADD_" format.
! Values are current minus default.
!
! B. Z. Lederman
!
FOR PARAMS WITH CURRENT NE DEFAULT SORTED BY NAME
    PRINT "ADD_" | NAME ||| "=" |||
                                     (CURRENT - DEFAULT) ON *."TT or filespec"
END_PROCEDURE
```

The portion of the output from this procedure looks like this:

```
ADD_ACP_DINDXCACHE = 24
ADD_ACP_DIRCACHE = 118
ADD_ACP_HDRCACHE = 70
ADD_ACP_MAPCACHE = 16
ADD_ACP_QUOCACHE = -64
ADD_BALSETCNT = 63
ADD_BORROWLIM = 518
ADD_DEADLOCK_WAIT = -8
ADD_FREEGOAL = 455
ADD_FREELIM = 87
ADD_GBLPAGES = 16404
ADD_GBLPAGFIL = 1024
ADD_GBLSECTIONS = 272
```

and so on. While this file is not completely ready to use as it is (the ASCII parameters must be re-inserted, and some parameters may be better off as absolutes as, for example, ACP\_QUOCACHE which I am setting to zero as we don't use quotas), it is certainly very much easier to have Datatrieve search all of the parameters and find out which ones have changed than to have to do it all by hand. And, it saves a lot of typing to have Datatrieve output the changes in the form where they are ready to go into MODPARAMS.DAT.

It would also be possible to move the ASCII parameters into a separate file, or make the record definition a little more elaborate and have them in the same file. But there aren't many of them, and I don't change system parameters very often, so I consider the process to be sufficiently useful in it's present form.



The second paragraph on page DTR-5 should read:

-----  
A VAX Date is measured in units called "klunks." Each klunk is 100 nanoseconds long (0.1 microseconds), so there are 10,000,000 or  $10^{*7}$  klunks in a second. The VAX date is a number of klunks since a base time, and is stored in the VAX as a quadword (four 16-bit words, or 64 bits). The VAX base time (the "zero" time) is the same as the base time for the Smithsonian Astrophysical time, midnight on November 17, 1858. The VAX Date for that time is a quadword with a value of zero. For each second since that time, the quadword is incremented by 10,000,000, and each day is represented by an additional number of klunks that can be computed by the formula

$$\begin{aligned} \text{klunks/day} &= 24 \text{ hours/day} * 60 \text{ minutes/hour} * 60 \text{ seconds/minute} * 10,000,000 \text{ klunks/second} \\ &= 864,000,000,000 \end{aligned}$$

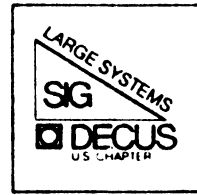
-----

The next to last paragraph on page DTR-6 should read:

-----  
In this example,  $10^{*7}$  klunks were added to a quadword, yielding a date (plus time) one second later. However, ...

See you in Cincinatti!

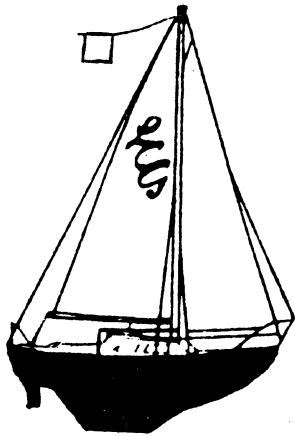




**DIGITAL EQUIPMENT COMPUTER USERS SOCIETY**

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**AT LARGE**

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The Newsletter of the Large Systems SIG

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## Contributions

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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, but magnetic tape and hard copy will be accepted.

Send your contributions to:

ARPAnet/CSnet: [ctp@sally.utexas.edu](mailto:ctp@sally.utexas.edu)  
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or if you must, use the U. S. Mails:

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## Letter from the Chairman

E. F. Berkley Shands, Washington University, St. Louis, MO

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Greetings to all! As the spring symposia in Cincinnati, Ohio will quickly be upon us, I want to take some time to highlight a few "New" activities we have planned. One night during the symposia, the Large System SIG Suite will be open for an informal gathering of *High End System Programmers and Managers*. This two hour meeting is designed to give high end/large system users a chance to meet each other and discuss common problems. If your site has high end concerns, or issues you would like to see addressed, come on by and let the steering committee know about them. Ask the other attendees if they have the same concerns. UPDATE.DAILY will have an article detailing the location and time of this gathering.

The steering committee is presenting a White Paper on VMS Accounting. The issues and basic requirements for system accounting will be discussed. The paper covers only the items to be recorded, and does not focus on the report generating mechanism. Topics such as CPU, DISK, TAPE and NETWORK accounting are detailed. If you have any ideas that should be included in this paper, or just want to see what is proposed, please come.

Are you an officer of your company? Are you a president or vice-president of your company? The Large Systems SIG Steering Committee would like to hear from you. What can DECUS do to assist your company? Would you like to have more information on DECUS and the benefits of the Symposia? Tell us!

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## White Paper

### VAX/VMS Accounting

E. F. Berkley Shands, Washington University, St. Louis, MO

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#### 1. Accounting on the VAX REV 2.1

Accounting for a commercial VAX/VMS<sup>1</sup> system must have a central philosophy by which the system works. This should be "Accuracy, Repeatability, and Completeness". All information from the accounting system must be accurate. How much CPU time did User X use? How much disk space did User SYSHOG tie up running that sort? How many pages of form type BIGBUCKS did that print job consume? If a user runs a program today, and runs the same program tomorrow, the runtimes should not differ to any extreme. Knowing the nature of timesharing, accounting to the micro-second is not practical. However, accounting accurate and repeatable is certainly within the realm of engineering. This paper concerns itself with the types of data to be collected, and suggests some possible formats for storage and management. The paper does *not* consider technical details that would change from processor to processor or release to release. Further, this paper is not designed to describe a package that would process the accounting records and produce reports. Such a task is best left to the customer to decide what information is important to present.

---

<sup>1</sup> VAX and VMS are trademarks of Digital Equipment Corporation

The accounting hooks developed today must be flexible enough to last through the 1990's into the year 2000 (or as long as VMS is supported). It is better to think about that now, than wish you had done so later; provisions should be made for extensibility. Providing a complete solution (a VMS hallmark) is the prime objective. This solution must take into account laser disks, print servers, back end disk systems, network devices, Symmetric Multi-Processor (SMP) systems, attached processors (CMP systems) etc. Further it must take into account that some sites may only want parts of the full accounting system.

## 1.1 Functional Specifications For Accounting

An accounting system must provide the "hooks" and basis for tracking system usage. This includes *all* peripherals and attached processors. Consider the possibility of an array processor being part of the system. Or consider the work performed in the HSC or even DECnet<sup>2</sup> hardware. The prime function for VMS is to collect these data items. Analyzing them and producing a report is secondary.

### 1.1.1 Classes Of Resource Usage -

Historically, system usage has been based on charging for CPU time, disk space, tape drive time, and printed/punched output. In the era of networking and SMP computers, this doesn't cover all bases. Today there is static and transient disk usage, network terminal and file access. Virtual addressing space usage as well as physical memory usage and paging are distinct but inseparable quantities. Line printers, plotters and laser output devices can have multiple forms, fonts, pens, belts and the like. Some port switching systems can bill by characters in and out. Tape drives still require operator intervention for their care and feeding. Laser based write-once-media (WORM) are appearing in the marketplace. How can all these different entities be organized to provide a minimum number of resource classes?

#### 1.1.1.1 Processor Resource -

Under this title comes the bulk of the CPU and memory domains. Virtual addressing consumes swapping and paging space. Working set management consumes physical memory. Poorly written programs stress the machine more than tightly written non-thrashing ones. Page faults drive up overhead and cause more memory accesses. Programs that have a tight (cacheable) code make less demands on the slow memory system than do the spaghetti variety.

Tracking memory references (i.e. MBOX cycle counters) provides a way for the system manager to keep track of program performance. Clearly this requires special hardware not found in the majority of the VAX line. Therefore absolute counts are not obtainable. What is needed is some machine independent metric. Perhaps the Kilo-Core-Second and the Virtual-Kilo-Core-Second? A KCS is two pages of physical memory in use for one second. A VKCS is two pages of virtual address space (P0) in use for one second. If there is a good way to account for Floating Point Accelerator (FPA) usage, it should be included. Records for each process should be kept, updated and checkpointed. For those processes that never terminate (SWAPPER, OPCOM...) the checkpointed values may be used to complete the used cycle totals.

Some sites wish to charge different rates based on the time of day. Therefore a method for flushing the entries for all active processes is required. When the "shift" changes, all counters are zeroed and processing continues without user intervention. These shift changes need to be automatic. Forcing an operator or a batch job to change the accounting shift would not be repeatable or reliable.

---

<sup>2</sup> DECnet is a trademark of Digital Equipment Corporation

### 1.1.1.2 Disk System Resource -

Xerox<sup>3</sup> and IBM<sup>4</sup> systems view two kinds of disk usage; Static and dynamic. Static usage is the familiar "What's on disk now, and who owns it?" Dynamic usage is somewhat more complex, since it deals with logged in disk use versus logged out disk usage. For example, a user wants to sort an address file. The sorting program creates a temporary file which is never closed, but chews up 1.4 million disk blocks for an hour while it runs. A static disk analysis would never see that use. A dynamic recorder would compute 1.4 Mega-blocks for 3,600 seconds and arrive at a Kilo-Byte-Disk-Second figure. Here is where completeness comes in. Clearly this amounts to using a fair chunk of system resource. To be fair, such usage would have to be recorded. However, to continue being fair, a file should not be billed for both static and dynamic charges. Therefore some clear procedure must be established as to when a charge is assessed.

A further area of concern in disk usage is that of overhead blocks and directory blocks. A file header takes up room. TOPS-10<sup>5</sup> charges for that space. TOPS-20<sup>6</sup> hides it. VMS hides it too, but records directory usage. TOPS-20 hides directory blocks, but TOPS-10 doesn't. With allocation cluster factors getting higher and higher, there is a larger percentage of the disk that is allocated but unused. Is it fair to bill on allocated space when the user has no control over the cluster factor? Is it fair to bill on used space when a user can allocate far more than is needed (to be used at the users whim)? This needs to be a site dependent decision. Collect *both*, let the user pick which one to use.

Deeper inside the disk usage issue is how to record file/disk use. The scheme of a UIC owning a file is fine for access, but what happens when a user is working on multiple projects at one time? A secure system is required to have a one to one mapping between users and usernames/UIC's. How can the standard UIC system handle multiple projects by a single user? The solution in the TOPS-10 and TOPS-20 operating systems was to assign an independent string for billing that did not reflect the owner. This string is validated for the user (and a utility looks for files that have invalid charge strings after data base changes). This keeps the user honest, and the disks clean. But what about the user that doesn't care about charges, and leaves mountains of files on disk while never touching them. If the user is paying for such storage, this may not be so terrible. In other environments this "disk hog" must be dealt with in other ways to reduce the overall impact. There should be several fields in the file header which are reserved for tracking use of that file(s). A last read date, last write date, who wrote it, who owns it, when it expires, when it was archived, when it was returned from archiving and others *must* be kept! If a file is migrated onto WORM storage, that should be recorded too. How should WORM disk usage be treated? A user cannot delete such a file once created! A further complication is SET FILE/ENTER. The physical file may reside in several directories, with one user archiving the file and another desiring no archiving. This sticky problem must be addressed outside of the scope of this paper.

### 1.1.1.3 Tape Usage -

Some large commercial sites have *thousands* of tapes in their libraries. Large IBM shops have *floors* full of tape drives. Even smaller shops often have four to six tape drives. As a resource, any tape related activity must be recorded. Tapes are operator intensive by nature. For sites that must cost recover, recording operator interactions is required.

All tape events need to be recorded; mounts and dismounts, reads and writes, rewinds and skips (controller based today, host based yesterday) and errors. These events need to be tracked on a per-tape drive and Volume ID / Reel ID basis. A charge string (the current default for the user) would be used for recording purposes. If everything needs to be recorded, don't forget the type of drive (some are faster), the density, and the time of day.

---

<sup>3</sup> Xerox is a registered trademark of Xerox Corporation

<sup>4</sup> IBM is a registered trademark of International Business Machines Corporation

<sup>5</sup> TOPS-10 is a trademark of Digital Equipment Corporation

<sup>6</sup> TOPS-20 is a trademark of Digital Equipment Corporation

#### 1.1.1.4 Operator Usage -

How do you use your operator? The system operator(s) have a tough job in a busy machine room. It was once suggested that they wear roller skates. They perform or coordinate disk and tape mounts and dismounts, printer and plotter feeding, backups (Digital<sup>7</sup> disks never crash?), shift changes and accounting updates. All of these items need to be tracked, as well as how long it took the operator to respond to the request. If the disk request didn't need operator intervention, fine. Record it anyway.

File archiving takes lots of operator effort and tape drive use (today, but maybe WORM use tomorrow). A user can create an operational nightmare by requesting files all day. Such requests should be recorded for possible charge-back.

#### 1.1.1.5 Spooling Usage -

The input and output spoolers do a fair amount of work. This includes disk and CPU and related resource consumption. Any activity done on behalf of a user should be charged to that user. Spooled line printer output files need to be charged just as regular disk files do.

The forms used, the time of day the spooler ran, the queue name (batch too), must all be recorded. Some field must be provided for the operator to add comments "Printer munched 1/2 box of form BIGBUKS" or "The plotter ran out of ink".

#### 1.1.1.6 Network Usage -

This is a very tricky area to track. Should a user be billed for using DECnet to transfer a file from a remote site? Should that user be billed for SET HOST to another site? Should a transaction processing system be billed for task to task I/O requests? How should a user be billed for dial-out DECnet access to a remote host? What about task to task within a machine or cluster? Who gets charged for the time used on the remote machine? What about routers? How do you bill for the overhead of "pass through" packets?

What is clear is that whatever information is available should be recorded. If the local site wants to treat routing work as overhead, that is a local decision. The more accurate the recording, the better the justification for adding additional equipment.

#### 1.1.2 User Features -

A user must be able to change account strings rapidly. Under security rules (government type), one user = one login name. You can't get around that by giving multiple user names. Changing sessions (with remarks) must be quick and transparent to the user. This is known as "SET ACCOUNT". The account string must be valid, and it must be usable by that user for that function. For example, a charge string may be good for disk storage but not for CPU or tape mounts. It might be good only from 09:00 until 11:00. To further complicate things, each account string may be associated with a particular scheduler class. Changing accounts may change your scheduler class setting too (Process Priority).

Every accounting entry generated by the user's actions would carry a charge string, unless another was substituted by design. The system must be capable of *mass* updates to the database of valid charge numbers. Third party retro-fits for accounting usually do not handle this mass change. The system must be able to handle thousands of charge strings (that means no linear searching too!). Utilities must be provided to find files, queues and other entities that have a particular charge identifier (valid or not). Some user will complain "Why do I have a \$20,000 charge for disk space? I only have 30 blocks in my directory!" Right, but you have 1.9 million disk blocks in queue waiting to print. The system manager friendliness of the accounting subsystem is very important!

---

<sup>7</sup> Digital is a trademark of Digital Equipment Corporation



The accounting system must checkpoint its data to protect against system crashes. The active accounting data should be written to disk at regular intervals controlled by the individual sites. This data should not be written after every action, because that would seriously impact system performance. The accounting data could be kept in an in-core queue, to be written at the specified time or when the queue became full. Consider a user program generating 1K accounting entries per minute. What would happen if each entry required disk accesses?

A user should be able to get a directory based on charge number; DIR/CHARGE=Bogus-account-51. LOGINOUT should prompt for missing charge strings at login time. ".DIR" files should have their own overriding default charge strings for files created in them like ACLs with /OPT=DEFAULT.

The hooks for a user supplied accounting record should be provided for those facilities that want to track finer detail than is normally available.

## 1.2 What Won't Work

Access Control List (ACL) identifiers should not be used as account strings. In large commercial sites, account string databases may contain 10K entries, of which 2K will change each week. Further, when an entry is deleted from RIGHTS.LIST.DAT, all that remains in the file header is %X8001BEEF. This number is very hard to correlate with the original account string.

Any system that does not provide for account to user validation. It would be best if the validation process could be user written, with a template supplied by VMS Engineering.

Several other areas reflect government regulations for security and ease of use concerns:

- 1) Grafted on accounting that requires a change of UIC to track usage.
- 2) Anything that requires multiple user IDs for a single user.
- 3) Anything not supporting shift changes on the fly.
- 4) Anything that will not provide a straight dump of the accounting database. A callable interface would suffice, since you could read records right out of the active file. The interface would need a call for "Give Me Info On The Next Record" and "Give Me The Data Of The Next Record".
- 5) Anything that does not allow the user program to validate a charge number. (i.e. a System call to validate a charge number for a user.) Spoolers should be able to validate access to charge strings like they validate file access.

## 2. Accounting Record Formats

Every record written to the accounting data file should be prefixed with information on what system wrote that record. At the very least the actual SID register data and a text string should be supplied. The text string should be at least 10 characters (node names are too short). This provides for the centralized processing of accounting data in a corporation which has a large number of networked and clustered systems. Accounting data from one system could not be interchanged with that of another. With each system identified on the accounting record, the whole networks' data could be appended to one file and processed.

In the following list, some items are redundant. This is due to the need to have *all* the needed information *in one record*. The system administrator should not have to determine by context the other items needed.

### 3. Accounting Records - Disk System

#### 3.1 File Header Items

Note: changing the file header should not cause the data to be backed up on an incremental BACKUP.

- 1) Date of last user read
- 2) Date of last user write
- 3) Date of last archive
- 4) Date of last archive restore
- 5) Name of last writer
- 6) Name of last reader
- 7) Name of owner
- 8) Charge string (from CREATE or SET FILE)
- 9) Archive reason (age, request, etc)
- 10) File status flags
- 11) UIC of owner

#### 3.2 Disk Usage Entries

##### 3.2.1 Static Snapshot -

- 1) Charge string
- 2) Owner
- 3) Allocated blocks
- 4) Used blocks
- 5) Cluster factor
- 6) Name of directory
- 7) Total blocks in directory
- 8) Overhead blocks in directory
- 9) Date/time
- 10) Volume name
- 11) Device/type (DBA0/RP07)

##### 3.2.2 Dynamic Disk Usage -

- 1) Charge string
- 2) Date/time
- 3) Owner
- 4) Kilo-Byte-Seconds of use
- 5) Name of file
- 6) Directory of file
- 7) Max blocks used
- 8) Max blocks allocated
- 9) Volume name
- 10) Device/type (DJA2/RA60)

##### 3.2.3 Disk Volume Mount/dismount -

- 1) Date/time
- 2) Charge string
- 3) user name
- 4) Requested disk
- 5) Disk drive used (type/device)
- 6) Operator response delta time
- 7) Status flags (WRITE/Success/automount)
- 8) Operator comments

### 3.3 Tape Drives

#### 3.3.1 Tape Mount -

- 1) Date/time
- 2) Charge string
- 3) User name
- 4) Requested tape VOLID/REELID
- 5) Tape drive used (type/device)
- 6) Operator response delta time
- 7) Status flags (WRITE/Success)
- 8) Operator comments
- 9) Type of tape (labeled/unlabeled)
- 10) If labeled, type of label (ASCII/EBCDIC/OTHER)

#### 3.3.2 Tape Usage -

- 1) Date/time start
- 2) Date/time stop
- 3) Charge string
- 4) User name
- 5) Reads
- 6) Writes
- 7) Rewinds/file skips
- 8) Errors
- 9) Drive/type/density
- 10) Operator comments

### 3.4 Spooler Entries

#### 3.4.1 Line Printer Usage -

- 1) Date/time
- 2) Charge string
- 3) User name
- 4) Device/type/location
- 5) Pages printed
- 6) Forms type
- 7) Ribbon type
- 8) Number of files
- 9) Number of copies
- 10) Completion date/time
- 11) Operator comments
- 12) CPU usage entry (process type)
- 13) Disk usage entry (dynamic)
- 14) Priority/queue name/entry number

#### 3.4.2 Plotter Usage -

- 1) Date/time
- 2) Charge string
- 3) User name
- 4) Device/type/location
- 5) Feet plotted/ pages plotted
- 6) Forms type
- 7) Pens type
- 8) Number of files
- 9) Number of copies
- 10) Completion date/time
- 11) Operator comments

- 12) CPU usage entry (process type)
- 13) Disk usage entry (dynamic)
- 14) Priority/queue name/entry number

#### 3.4.3 Other Spooler Types... -

- 1) Date/time
- 2) Charge string
- 3) User name
- 4) Device/type/location
- 5) Number of files
- 6) Number of copies
- 7) Completion date/time
- 8) Operator comments
- 9) CPU usage entry (process type)
- 10) Disk usage entry (dynamic)
- 11) Priority/queue name/entry number

#### 3.4.4 Attach/Detach Entries -

This entry is written each time the user "CONNECTS" or "DISCONNECTS" (ATTACH/DETACH) a process from a terminal. This is completely distinct from the PROCESS type entries. Some sites may want to charge different rates for DIAL-UP terminal vs. DECnet connections.

- 1) Date/time
- 2) Type of terminal connection (LAT/DECnet/Hardwire)
- 3) Source of connection (DECSERVER 200 CLYDE port 3 or DECnet node YAH00:: process 2065B410)
- 4) Username
- 5) Process ID
- 6) Account string active at the time
- 7) Characters sent since last Attach/Detach
- 8) Characters received since last Attach/Detach
- 9) Elapsed time port was used on Detach
- 10) Elapsed time process was detached on Attach
- 11) Port specific info (line speed, etc.)

### 3.5 System Configuration Changes

#### 3.5.1 Accounting Changes -

- 1) Shift change record
- 2) Account validation database update
- 3) Operator coverage change

#### 3.5.2 Scheduler Type Change -

- 1) Priority
- 2) Class
- 3) Round-robin
- 4) Other

#### 3.5.3 Device Status -

- 1) Disk/tape offline
- 2) Network link down
- 3) Terminal baud rate change
- 4) Terminal ADVISE/LINKING records

### 3.6 CPU Resources (at Process Termination Or Account Change)

#### 3.6.1 Memory Usage -

- 1) User name
- 2) Process name
- 3) Charge string
- 4) Physical KCS used
- 5) Virtual KCS used
- 6) Mbox cycles
- 7) Working set size
- 8) Pager traps
- 9) Date/time
- 10) Scheduler class used (% allocated, number of class)
- 11) Type of scheduling in use (prio/RR/Class)

#### 3.6.2 Processor Usage -

- 1) User name
- 2) Process name
- 3) Charge string
- 4) CPU time used (to MS)
- 5) Flags (incl/excl interrupts + overhead)
- 6) CPU SID of processor (SMP tracking)
- 7) Floating point use cycles
- 8) Vector CPU use
- 9) Time of day/date

### 3.7 Process Usage

#### 3.7.1 Resources Used -

- 1) User name
- 2) Process name
- 3) Charge string
- 4) Date/time
- 5) Node of session origin
- 6) Last node origin
- 7) This node name
- 8) Session start
- 9) Session end
- 10) Session remark
- 11) TTY I/O chars in/out
- 12) Flags (batch/network/etc)
- 13) Physical terminal name
- 14) Virtual terminal name
- 15) Kilo-Byte-Network data transmitted
- 16) CPU spent compiling
- 17) CPU spent executing
- 18) Baud rate of terminal
- 19) Number of operator requests
- 20) Spooler proxy data

### 3.8 Network Usage

Some sites may wish to charge back network usage to the specific individual or site (CPU) responsible for its use. Items include: file transfers, records transferred, virtual terminal usage, network spooling, etc. Note that each record transferred doesn't need an entry. Just that User X made 124,498,200 record transfers.

### 3.8.1 Specifics -

- 1) Time of day
- 2) Network connection (source/dest, node::object)
- 3) Volume of data transferred (bytes or Kbytes) in and out
- 4) Type of entry (open/close)
- 5) User name
- 6) Account string at host
- 7) File transfer stats
- 8) NVT stats

### 3.9 Other Concern Areas

It would be nice to be able to track usage of 3rd party hardware too. If each driver had a routine to record calls, CPU time, etc, this would allow the system manager to see what devices are consuming the systems resources. This could also be used as a hook for accounting on attached array processors, BI based funny devices, user-written pseudo devices (like PTYDRIVER/PHOTO) and the like.

A clean way to perform this would be to extend the current system calls for writing accounting entries. Since these entries would be in a user defined format, the only way to read them would be with the callable accounting file reader. If the type of record were known beforehand, a real "CPU usage" record could be written. There is no documented way of writing such an entry today.

Any change to the accounting system would force a change in the format of the system accounting file, `SYS$MANAGER:ACCOUNTNG.DAT`. Obviously this would break a large percentage of the currently available third party packages. Which would you rather have, a system that patches `SYS.EXE` and breaks at each release? Or all data collection done by VMS, and processed by your favorite third party package?

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**OFFICE  
AUTOMATION**

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## FROM THE EDITOR...

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April is here already and we're just around the corner from our Spring 1988 symposium. For those of you who are attending, this promises to be on of the OA SIG's best yet. With an exciting line-up of sessions and special activities planned by all of our new (as well as the old) volunteers.

Please make note of the article on obtaining the SIG tape. It has proved to be so popular that Roger & Co. have been swamped with blank tapes to copy.

Our feature article this month provides some help with sorting your "TO-DO" lists in Time Management. (Another great article by Trace Roth.) If you have tried or implemented some of our technical articles, we'd love to hear from you. Did they solve a specific problem you'd been having? Were the users pleased to see the new (additional) functionality? Did it get you thinking and working on other customizations or modifications?

Just a reminder, I welcome articles on DEC OA products other than ALL-IN-1. WPS/DOS is a very popular product right now, as is PC ALL-IN-1 and a host of other OA products. The ALL-IN-1 articles are wonderful, I always look forward to receiving them, but I would really like to include some articles on other OA products. Call me if you have ideas for non ALL-IN-1 articles, or send them in.

I look forward to seeing you all in Cinci!

Regards,

*Therese LeBlanc*  
OA Newsletter Editor



**— NEWS FLASH —**

OA SIG TAPE CAN NOW BE OBTAINED

FROM YOUR LOCAL USER GROUP

**Roger Bruner, Foreign Mission Board**

---

Send us your tired and your poor if you must....

But — please — send us NO MORE BLANK TAPES!

Response to the new OA SIG TAPE has been so overwhelming that the Foreign Mission Board is being forced out of the tape-duplicating business! (Just as quickly as we can process the many orders received to date, that is)

Distribution will then be taken over by the National LUG organization through its regional tape distributors. More specific information will be published by the NLC in the SIG newsletters and in DECUSCOPE in the very near future.

Look for a complete listing of the contents of the new tape in next month's newsletter.

Special thanks to those of you who submitted material to the tape. We'll all be looking forward to finding out in Cincinnati who won the competition for the best SIG TAPE SUBMISSION!

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**EXECUTIVE FORUM IN CINCINNATI:**

OA IN A MULTIVENDOR ENVIRONMENT

**Katherine Trimm, OA SIG Chair**

---

The Office Automation Special Interest Group Would Like To Invite You To Participate In: The OA Executive Forum on Office Automation.

Our topic this time will be "Office Automation in a Multivendor Environment."

The OA Executive Forum will take place Tuesday May 17th. As part of the Cincinnati Symposium our Executive Program will take place from 9:00 am through 5:00pm followed by a reception in the OA Suite in the OMNI Hotel.

We encourage you to bring managers from your organization who would benefit from seeing how other users have tackled the problem of a Multivendor office solution.

For more information and to get invitations please contact me:

Katherine "Kit" Trimm  
OA SIG Chair  
(602) 886-5563

We look forward to seeing you there!

---

## **WANTED: Session Chairs for Cincinnati Symposium**

**Lynda Peach, Mustang Energy Corp.**

---

Sign up now!!! If you've been thinking that you might like to get more involved with the OA SIG at the Cincinnati Symposium, but don't have a lot of spare time on your hands... we have just the thing. Become a VOLUNTEER session chair. It's easy and fun, you get to meet a lot of new people and feel more involved in what's going on.

*What does a session chair do?*

Session chairs welcome the group and introduce the speaker. They try to make sure that the session runs smoothly (dim lights if necessary, flip overheads perhaps, etc.), and remind everyone with a question to step up to the microphone so that the whole group can hear the question. Plus whatever little things might be needed.

*How long does it take?*

That depends on the length of the session. Choose sessions you are interested in, then be there a few minutes before the session begins to meet the speaker, find out how to pronounce their name and a little something for the introduction. That's it.

*Will I get any special instructions from DECUS?*

There is usually a short meeting on Sunday evening before the Welcoming Reception just for Session Chairs. It will give you some more specific information if you feel you need it and a little overview of "How to be a good session chair".

*It sounds great! How do I sign up?*

You can *Answer* the "Be a Session Chair in Cincinnati" Conference on OASIS.

- or -

Call/write:

Lynda Peach  
OA Session Chair Coordinator  
Mustang Energy Corp.  
1100 First Nat'l Center East  
Oklahoma City, OK 73102  
(405) 232-9471, Ext. 280

You can request specific sessions to chair. Requests will be honored on a first-come first-served basis. Requests can be made by Session Name, Session Speaker, type of session (technical, WPS-PLUS, etc.).

Help make Cincinnati the best Symposium ever! Participate!

Being a session chair is a great way to meet the speaker(s) and you're definitely guaranteed a "chair"!!!! It's easy to do and it's a vital job that must be done for every session given at Symposium.

---

# SORTING THE TO-DO LIST IN TIME MANAGEMENT

Trace Roth, O.H. Materials Corp.

---

I have written a basic program and modified the name data of several forms to display and print the To-Do list items in priority order.

The to-do records are sorted by the DCL SORT command in priority and then number order. This command sorts all of the records in ACTITEM.DAT and writes them to a sequential file, SORT.DAT, that is read by the basic program, TODO.EXE. If you look at the sort command in the TODO.COM file, you can see which bytes of the ACTITEM.DAT records are the sort keys.

The basic program takes only the to-do records from SORT.DAT and writes a file, SORT\_TODO.TMP, that is then converted into an index file, OUT\_TODO.TMP, that can be used by the scroll functions in ALL-IN-1. The basic program simply formats the to-do records and places a blank line between each priority. I have chosen to display item priority, number, status, and description. All of the files used are placed into the user's ALL-IN-1 directory by using the OAUUSER logical that is set up when ALL-IN-1 is run.

When displayed, the OUT\_TODO.TMP file is accessed directly and placed on either form DISPTD or form TMTDAC.

When printed, the SORT\_TODO.TMP file is merged with a header file so that the data records are properly labeled. The index file OUT\_TODO.TMP is not referenced in the print procedure. I have not set up anything to handle multiple page headings. I assume most users will not have more than one page of to-do items. If you have more than one page, delegate some of the to-do items or let me know how you handle multiple pages. That sounds like another item for your to-do list.

Name data changed for form TMTD in OAFORM. Changes are noted in bold. Only the modified part of name data is shown to minimize the number of pages printed.

```
;; .TYPE;;
```

```
MENU /CHOICE=CHOICE/PRE FUN='CAL INIT MONTH\ .IF #CAL SET DATE NES "" THEN GET  
  $TD DATE SAVE = #CAL SET DATE\ .IF $TD DATE SAVE NES "" AND $TD DATE SAVE NES  
  OASTM DATE THEN CAL SET DATE $TD DATE SAVE /CLEAR/DATE=DATE/USER=USER/MAIL=  
MAIL/MORE=' TMTDDE, TMTD MORE, TM /GET=MONTH3, OASTM MONTH3; MONTH4, OASTM MONTH4;  
MONTH1, OASTM MONTH1; MONTH2, OASTM MONTH2; MONTH, OASTM MONTH; MONTH5, OASTM MONTH5;  
MONTH6, OASTM MONTH6; YEAR, OASTM YEAR; CDATE, OASTM DATE; DAY, OASTM DAY; CUSER, OASTM  
OWNER; MEETIN, OASTM MEETING COUNT DISPLAY; SELECT1, $AM SELECT1; SELECT2, $AM SELECT2;  
CDAY, OASTM DAY/HARD="To-Do List"/TITLE=TITLE/POST='GET #CAL SET DATE = ""'
```

```
;; C;;
```

```
DO TMCRETD\GET $TD DATE SAVE=OASTM DATE\GET $TD NUMBER SAVE=$AM SELECT1\GET  
  $TD SEL2 SAVE=$AM SELECT2\GET #TODOFLAG=0
```

```
;; D;;
```

```
.IF $AM SELECT1 EQS "" THEN DISPLAY There is no item to delete\ \FORCE ELSE  
  FORM TODOENT/ MODE=DELETE/ ONE ENTRY/ START='T', 'TO DO LIST', $AM SELECT1\  
IFEXIT\GET $AM SELECT1=""\DISPLAY List item deleted\GET $TD DATE SAVE=OASTM  
DATE\GET $TD NUMBER SAVE=$AM SELECT1\GET $TD SEL2 SAVE=$AM SELECT2  
\GET #TODOFLAG=0
```

;;E;;

```
.IF $AM_SELECT1 EQS "" THEN DISPLAY There is no item to edit\\FORCE ELSE FORM
TODOENT /MODE=CHANGE/START=""T', 'TO DO LIST', $AM_SELECT1"/ONE ENTRY\GET
STD_DATE_SAVE=OA$TM_DATE\GET STD_NUMBER_SAVE=$AM_SELECT1\GET STD_SEL2_SAVE=
SAM_SELECT2\GET #TODOFLLAG=0
```

;;R;;

```
.IF $AM_SELECT1 EQS "" THEN DISPLAY There is no item to read\\FORCE ELSE FORM
TODOENT /MODE=INQUIRE/START=""T', 'TO DO LIST', $AM_SELECT1"/ONE ENTRY
```

Any following name data of TMTD is unchanged.

Here are the name data changes for the TMTDDE and TMTD\_PRINT forms in OAFORM.  
The changes made to these forms in this portion of the name data are the same.  
The changes are listed here in **bold**.

;;.TYPE;;

```
MENU /CHOICE=CHOICE/PRE='.IF #CAL SET DATE NES "" THEN GET STD_DATE_SAVE =
#CAL SET DATE\IF STD_DATE_SAVE NES "" AND STD_DATE_SAVE NES
OA$TM_DATE THEN CAL SET DATE STD_DATE_SAVE'/CLEAR/DATE=DATE/USER=USER/MAIL=
MAIL/MORE='TMTD, TMTD MORE, TM'/GET=CDATE, OA$TM_DATE; DAY, OA$DAY; CUSER, OA$TM
OWNER; MEETIN, OA$MEETING_COUNT DISPLAY; SELECT1, $AM_SELECT1; SELECT2, $AM_SELECT2;
CDAY, OA$TM_DAY/HARD="Display Events for To-Do List"/TITLE=TITLE
/POST='GET #CAL_SET_DATE = ""'
```

;;C;;

```
DO TMCRETD\GET STD_DATE_SAVE=OA$TM_DATE\GET STD_NUMBER_SAVE=$AM_SELECT1\GET
STD_SEL2_SAVE=$AM_SELECT2\GET #TODOFLLAG=0
```

;;D;;

```
.IF $AM_SELECT1 EQS "" THEN DISPLAY There is no item to delete\\FORCE ELSE
FORM TODOENT/MODE=DELETE/ONE ENTRY/START=""T', 'TO DO LIST', $AM_SELECT1"\
IFEXIT\GET $AM_SELECT1=""\DISPLAY List item deleted\GET STD_DATE_SAVE=OA$TM
DATE\GET STD_NUMBER_SAVE=$AM_SELECT1\GET STD_SEL2_SAVE=$AM_SELECT2
\GET #TODOFLLAG=0
```

;;E;;

```
.IF $AM_SELECT1 EQS "" THEN DISPLAY There is no item to edit\\FORCE ELSE FORM
TODOENT /MODE=CHANGE/START=""T', 'TO DO LIST', $AM_SELECT1"/ONE ENTRY\GET
STD_DATE_SAVE=OA$TM_DATE\GET STD_NUMBER_SAVE=$AM_SELECT1\GET STD_SEL2_SAVE=
SAM_SELECT2\GET #TODOFLLAG=0
```

Any following name data of TMTDDE is unchanged. See the following information  
about TMxx\_PRINT forms for an additional change to TMTD\_PRINT.  
Name Data changes for form TMTDAC in OAFORM. Changes are noted in **bold**.

;;.TYPE;;

```
MENU /CHOICE=CHOICE/CLEAR/DATE=DATE/USER=USER/MORE='TM, TMTD, TODOMORE, DISCAL'/
/PRE='CAL INIT MONTH\CAL DISP GRAPH \GET #CAL_ADVICAL="1"
```

```

\ .IF #TODOFLAG NE 1 THEN GET OA$DCL="@DISK$SYSTEM:[ALLIN1.BASIC]TODO.COM"
\ \OA$CNV_TO_SCROLL OAUSER:SORT_TODO.TMP,OAUSER:OUT_TODO.TMP\GET #TODOFLAG = 1'
/USER=USER/GET=MONTH,
OA$TM_MONTH;MONTH1,OA$TM_MONTH1;MONTH2,OA$TM_MONTH2;MONTH3,OA$TM_MONTH3;MONTH4,
OA$TM_MONTH4;MONTH5,OA$TM_MONTH5;MONTH6,OA$TM_MONTH6;YEAR,OA$TM_YEAR;CDATE,
OA$TM_DATE;DAY,OA$DAY;CUSER,OA$TM_OWNER;MEETIN,OA$MEETING_COUNT_DISPLAY;CDAY,
OA$TM_DAY;DAY1,OA$TM_DAY1;DAY2,OA$TM_DAY2;DAY3,OA$TM_DAY3;DAY4,OA$TM_DAY4;DAY5,
OA$TM_DAY5;DAY6,OA$TM_DAY6;DAY7,OA$TM_DAY7;WEEK1,OA$TM_GRAPH1;WEEK2,OA$TM
GRAPH2;WEEK3,OA$TM_GRAPH3;WEEK4,OA$TM_GRAPH4;WEEK5,OA$TM_GRAPH5;WEEK6,OA$TM
GRAPH6;WEEK7,OA$TM_GRAPH7;HEADER,OA$TM_GRAPH_TITLE/HARD="To-Do list"/TITLE=
TITLE/POST="GET #CAL_ADVICAL=''"

```

```
;;DESC;;
```

```
/SCROLL=96,OUT_TODO.TMP
```

```
;;.GOLD TAB;;
```

```
OA$SCL_SET_FIELD 96,OUT_TODO.TMP,1,,DESC\OA$SCL_NEXT_PAGE\OA$FLD_STAY
```

```
;;.GOLD BS;;
```

```
OA$SCL_SET_FIELD 96,OUT_TODO.TMP,1,,DESC\OA$SCL_PRIOR_PAGE\OA$FLD_STAY
```

```
;;.DOWN;;
```

```
CAL SET DATE +1W
```

Any following name data of TMTDAC is unchanged.

Name data changes for DISPTD in OAFORM. Changes are noted in **bold**.

```
;;.TYPE;;
```

```

ARG /CLEAR/GET=USER,OA$TM_OWNER;CDAY,OA$TM_DAY;CDATE,OA$TM_DATE/PRE='
. IF #TODOFLAG NE 1 THEN GET OA$DCL="@DISK$SYSTEM:[ALLIN1.BASIC]TODO.COM"
\ \OA$CNV_TO_SCROLL OAUSER:SORT_TODO.TMP,OAUSER:OUT_TODO.TMP\GET #TODOFLAG=1'

```

```
;;DESC;;
```

```
/SCROLL=96,OUT_TODO.TMP
```

```
;;DUMMY;;
```

```
/HARD="Press RETURN to continue"
```

```
;;.PERIOD;;
```

```
CALENDAR SET DATE +1D\FORM .
```

```
;;.UP;;
```

```

OA$SCL_SET_FIELD 96,OUT_TODO.TMP,1,,DESC
\OA$SCL_TOP\OA$SCL_UP\OA$FLD_STAY

```

```
;;.DOWN;;
```

```
OA$SCL SET FIELD 96,OUT_TODO.TMP,1,,DESC\OA$SCL_BOTTOM\OA$SCL_DOWN
\OA$FLD_STAY
```

```
;;.GOLD UP;;
```

```
OA$SCL SET FIELD 96,OUT_TODO.TMP,1,,DESC\OA$SCL_TOP\OA$FLD_STAY
```

```
;;.GOLD DOWN;;
```

```
OA$SCL SET FIELD 96,OUT_TODO.TMP,1,,DESC\OA$SCL_BOTTOM\OA$FLD_STAY
```

```
;;.GOLD T;;
```

```
OA$SCL SET FIELD 96,OUT_TODO.TMP,1,,DESC
\OA$SCL_FIRST_PAGE\OA$FLD_STAY
```

```
;;.GOLD B;;
```

```
OA$SCL SET FIELD 96,OUT_TODO.TMP,1,,DESC
\OA$SCL_LAST_PAGE\OA$FLD_STAY
```

```
;;.GOLD TAB;;
```

```
OA$SCL SET FIELD 96,OUT_TODO.TMP,1,,DESC
\OA$SCL_NEXT_PAGE\OA$FLD_STAY
```

```
;;.GOLD BS;;
```

```
OA$SCL SET FIELD 96,OUT_TODO.TMP,1,,DESC
\OA$SCL_PRIOR_PAGE\OA$FLD_STAY
```

Here are the name data changes made to all TMxx PRINT forms in OAFORM. The same change has been made to all of these forms and the change is made to the TL option. Changes are noted in **bold**. Only the TL part of the name data is shown here to save space.

```
;;TL;;
```

```
.IF #TODOFLAG NE 1 THEN GET OA$DCL="@DISK$SYSTEM:[ALLIN1.BASIC]TODO.COM"
\GET OA$DCL="COPY OA$BLP:TL_PRINT.BLP OAUSER:CALENDAR.TMP"
\GET OA$DCL="APPEND OAUSER:SORT_TODO.TMP OAUSER:CALENDAR.TMP"
\GET #TODOFLAG=1\DO TMPRINT
```

This is the OA\$BLP:TL\_PRINT.BLP file used as the header file for printing.

#### To-Do Items

Pri Num Stat Description

```
$! TODO.COM PLACED IN [ALLIN1.BASIC]
$! TRACE ROTH DECEMBER 18, 1987
$! O.H. Materials Corp.
$!
$ SET MESSAGE/NOFAC/NOIDENT/NOSEV/NOTEXT
```

```

$ SORT/KEY=(POSITION:226,SIZE:2)/KEY=(POSITION:18,SIZE:3) -
  OAUSER:ACTITEM.DAT OAUSER:SORT.DAT/SEQUENTIAL
$ SET MESSAGE/FAC/IDENT/SEV/TEXT
$ RUN DISK$SYSTEM:[ALLIN1.BASIC]TODO
$ PURGE OAUSER:SORT TODO.TMP
$ PURGE OAUSER:OUT TODO.TMP
$ PURGE OAUSER:CALENDAR.TMP
$ EXIT
1 !   TODO.BAS          PLACED IN [ALLIN1.BASIC]
  !   TRACE ROTH      DECEMBER 1, 1987
  !   O.H. Materials Corp.
  !
5  MAP (AI_REC) STRING AI_TYPE = 1,  &
    STRINGFIL1 = 17,  &
    STRINGAI_ITEM = 3,  &
    STRINGFIL2 = 63,  &
    STRINGAI_DESC = 65,  &
    STRINGFIL3 = 76,  &
    STRINGAI_PRIO = 2,  &
    STRINGAI_STATUS = 1, &
    STRINGFIL4 = 141
  !
  !   Open the sorted data file from ACTITEM.DAT
  !
10 OPEN "OAUSER:SORT.DAT" FOR INPUT AS FILE #1, &
    ORGANIZATION SEQUENTIAL VARIABLE, MAP AI_REC
  !
  !   Open output file
  !
  OPEN "OAUSER:SORT TODO.TMP" FOR OUTPUT AS FILE #2, &
    ORGANIZATION SEQUENTIAL VARIABLE, ACCESS WRITE, RECORDSIZE 80
  WHEN ERROR USE ERROR_ROUTINE
  FLAG=0
  FILL1$=" "
  FILL2$=" "
  !
  !   Until there are no more records in File #1
  !
20 UNTIL AI_TYPE = ""
    GET #1
  !
  !   See if the record is a TODO record
  !
    IF AI_TYPE = "T" THEN
  !
  !   See if the priority has changed from last record
  !   If it has, move a blank line to output
  !
      IF (AI_PRIO_LAST$ <> AI_PRIO) AND (FLAG=1) THEN
        FILL_OUT$=FILL1$+FILL2$
        MOVE TO #2, FILL_OUT$
        PUT #2
      END IF
  !
  !   Move the designated fields to output
  !
    TODO_INFO$=AI_PRIO+" "+AI_ITEM+" "+AI_STATUS+" "+AI_DESC

```

```

        MOVE TO #2, TODO_INFO$
        PUT #2
        AI_Prio_LAST$ = AI_Prio
        FLAG=1
        END IF
    NEXT
END WHEN

HANDLER ERROR_ROUTINE
    CLOSE #1
    CLOSE #2
END HANDLER
40 END

```

#### WPS ON THE VT340

WPS+ version 2.1 will not startup correctly from a VT340, unless it has been set (on the "General Set-Up" menu) to emulate a VT200 family or older terminal. The message "Unrecognized Terminal, please see your System Manager." appears on the screen, and the menus do not appear on the screen at all.

Upon investigation, the problem lies in WPSPLUS\_LOGIN.COM, and is easily fixed by adding the following line:

```

$      IF
      term_type
      .eq. 112
      THEN
      GOTO
      setup_for_VT300

```

immediately before this line:

```

$      IF term_type .eq. 111 THEN GOTO setup_for_pro

```

and the line:

```

$
      setup_for_vt300:

```

immediately before this line:

```

$
      setup_for_vt200:

```

Digital's response to this suggestion indicated that this was an unsupported mode of operation. In the past several months of operation, the only problem I've seen occurred when the VT340 Page Arrangement (on the Display Set-Up menu screen) was set to 1x72. The terminal would not scroll correctly. Setting the page arrangement to 3x24 (in dual session mode) or 6x24 (single session mode) cured the problem.

I don't expect any other 'gotchas' in using 340s this way, but Digital apparently does. It seems to me that if we all try this, we can either send in SPRs when problems do crop up, or beat on the WPS product management to properly support the 340. After all, it is absurd to Digital not to support their flagship word processing program on their flagship terminal, one year after the terminal was announced.



# PERSONAL COMPUTER SPECIAL INTEREST GROUP



## NEWSLETTER

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No submissions this month.

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No submissions this month.

## VAXmate Section

No submissions this month.

## Rainbow Section

No submissions this month.

## DECmate Section

No submissions this month.

## Catalog Updates to the PRO Public Domain Software Collection

By Gary Rice, PC SIG Newsletter Editor

Since last month, the following software has been added to the collection and/or added to the catalog.

<u>Catalog #</u>	<u>Description</u>
F81-1	This directory contains the following programs: DSP.FTN - Converts input format to output format. Currently supported formats are: BYTE REAL*4 ASCII INTEGER*2 REAL*8 RAD50 INTEGER*4 OCTAL FCB.MAC - Prints out F11ACP file control blocks (open file information) of a disk device.Updated output format from Spring '81 source. LUT.MAC - Prints out the logical unit table of a running task including open file information.Updated output format from Spring '81 source. SPQ.MAC - Prints out the spool queue OR the receive queue of ANY task. ALSO: BLKIO -- Fast Universal Fortran I/O Routines providing (very) fast Fortran block I/O to either normal or virtual arrays. CSH -- Checkpoint Space Handler and TKTN Bug Fix Here's our Checkpoint Space Handler, a tool which will show you what's on your checkpoint files

NOTES -- Larry Baker's notes on Fortran, performance, and tapes

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

F81-2 FORTRAN SYMBOLIC DEBUGGING TOOL (SDT)

ALSO:

This UIC contains the ICR FORTRAN IV Plus Symbolic debugger. It is designed for IAS, but should also work under RSX-11M if you uncomment the line which defines RSX11M in FDT.MAC. ALSO: CPL is a utility which compiles your programs in a compiler independent manner. It alleviates the headache of having to remember the syntax quirks of all the compilers on your system. CPL also aids in the maintenance of programs consisting of many modules since it compiles files based on the dates of the source and object files and maintains a user library.

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

F81-3 This directory, [307,22] contains all the programs described in a talk titled "Recovering From Disk Disasters"

1 diskette; Sources included; SOME objects; SOME task images  
MACRO, FORTRAN-77

F81-4 This directory contains a number of utilities and subroutines which are likely to be of interest to a substantial proportion of the RSX/IAS community. Complete programs:  
ADDBAD - Adds bad blocks to the bad block file (BADBLK.SYS) without requiring volume re-initialization.

AFT - Prints all of the file names on a volume modified after a specified date. This was originally written when we had a disk hardware problem and wanted to recover as many files as we could from a rather corrupted disk.

ASG - This task will reassign the logical unit numbers of a task image without requiring the user to re-taskbuild with different ASG directives in the command file.

BLK - Locates the file which has a specific physical block allocated. Useful when there is a block showing up as bad in the error log which can be removed from circulation by moving the file and running 'ADDBAD' on the block.

COMP - Compares two files on a block-by-block basis rather than the line-by-line basis used by CMP.

CPY - Copies files 63 blocks at a time for a faster transfer than PIP provides.

DAC - Sums up the disk space used by each UIC on the disk.

DELFID - Removes a file by file ID even if the file has a bad file header. This allows such files to be deleted without having to ZAP the INDEXF.SYS file manually or running DSC.

FIL - A utility which tries to reconstruct locked files.

FRG - Prints out disk space fragmentation information. This is a corrected and enhanced version of the FRG which was on the DECUS tape some time ago.

GREP - A utility for locating search patterns within a group of files. This is a much enhanced version of the GREP which appeared in an earlier DECUS tape.

PRECIS - This is an enhanced DMP-like utility which produces amore useable listing.

TRANSLATE - RT-11 supports ANSI magtape but it produces a format which isn't palatable to RSX/IAS systems. This program will convert a file transferred from an RT-11 magtape into something useful on a Files-11 system.

UNDELETE - This task will undelete a file under certain restrictions.

VOL - This allows modification of disk volume names and other characteristics.

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

- F81-5 INDEX - Is a FORTRAN cross referencing program. A FORTRAN source file processed by index will be checked for all of its variable name and label usage.  
PROFILE - the profile package is a set of two macro modules and this document that will allow the user to determine how often instruction memory locations are executed at run(crawl) time and a summary of what instructions were executed and registers and addressing modes used on both the instruction and program level.  
MAZE - This is an modification of the vt-100 maze program that appeared on the Spring 81 VAX SIG tape to run under RSX.

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

- F81-6 BURSTF bursts the subroutines, functions, programs, and block datas in a FORTRAN source file into their own individual files.

ALSO:

TRU truncates files. Though PIP will also truncate files, PIP will change the revision date on all files specified, even if they did not require truncation. This will cause an incremental backup program (such as BRU) to needlessly backup files which have not been changed.

ALSO:

The program SCHEDULE allows a system manager to schedule tasks to be run at specified times and days. For example, you may schedule a timesharing parameter be changed each weekday at 08:00, and again at 18:00 on weekdays, or that a file be printed each saturday at 20:00.

ALSO:

PROBE is a system performance measuring tool. It indicates the amount of time being spent in interrupt processing, kernel space processing, user space processing, and null time. In addition, it provides some subroutine time histogramming for an adjustable number of (FORTRAN usually) tasks by taking advantage of the exit traceback information provided by the OTS. It is intended for use on a CRT, and is presently set for a VT100.

ALSO:

UNDELETE - The function of this program is to attempt to recover a recently deleted file. ALSO: SEE is a real-time memory display which permits selective display of up to eight 'windows' anywhere in memory in word, byte or character modes on a VT-52. ALSO: This program will read a file under RSX-11M which was created by RSX-11M PIP but copied from an ASCII tape whose file was created by RT-11 PIP, and reformat the RT-11 file to RSX FILES-11 format. This works only for source code files, text files, .DOC files, any ASCII file.

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

- S85-4 This area has a newer DTC (Desk Top Calendar) from C. Garman of RCA MSR. In particular meeting scheduling and instant queries of your schedule are much easier with this than with older versions. Also the display is much faster and more readable. ALSO: Keypad Macros for AnalytiCalc

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

- S85-5 TAR(Tape Archive & Retrieval) This directory contains all files necessary to build TAR, an RSX utility to manipulate UNIX TAR floppy volumes, either in normal UNIX format or in Tektronix TNIX(8560) format. This version of TAR has been modified so that: 1. It will assemble and run correctly with the supplied version of SUPERMAC, and 2. It works with RX50 drives that are

mounted foreign (e.g., by the supplied UTIL program). It is useful for communicating with VENIX or ULTRIX systems using RX50 media since they typically do not have magtape.

ALSO:

SUPERMAC - Structured Programming Macros for MACRO-11

1 diskette; Sources included; SOME objects; Task image included  
MACRO

S85-6 Skeleton Device Drivers for RSX-11M, RSX-11M-PLUS

ALSO:

How Fast is your CPU? A set of programs which will measure CPU instruction execution speed, with test results for the PDP-11/70, PDP-11/84 and PRO-350, and a description of how the tests work. Also, a preliminary version of a speed test for the VAX.

ALSO:

TIZ - Task Image Zapper

CALC - Calculator and radix converter.

BRU - BRU command line builder.

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

S85-7 COMPOSE The COMPOSE program permits you to design and automatically generate custom character sets for the VT200 family of terminals. ALSO: LABEL.TSK - A file called LABEL.CMD;1 is created in your current UIC; if you then include the command "@LABEL" in an indirect command file, the global string symbol "\$LABEL" will be defined as the volume label of the specified disk. MAIN.CMD INDEX.CMD I'm not claiming wonderful things for these, but they're the best I could do in the middle of the night when I discovered how poorly the modules in [1,2]INDSYS.CLB worked on my system (RSX-11M+ V2.1E).

1 diskette; Sources included; SOME objects; SOME task images  
MACRO, FORTRAN-77

F86-1 APFELM - Graphical Presentation of Mandelbrot\_Set. APFELM displays in graphical form the so called Mandelbrot\_Set. With the help of a 'graphic-microscope' the complex-plane can be scanned for nice looking pictures.

ALSO:

This program converts a file of ReGIS graphics commands (as used by the VT125 and VT240 terminals) into Hewlett-Packard Graphics Language (HP-GL) (as used on the 7470A plotter), and sends them to the plotter via an HPIB interface.

1 diskette; Sources included; NO Objects, Task images included  
FORTRAN-77, MACRO

F86-2 RSX BASIC - MICHAEL REESE VERSION Reese Basic is a highly upgraded version of what used to be a DECUS library program for DOS.

4 diskettes; Sources included; SOME objects; NO task images  
MACRO

F86-3 Script is a menu-driven, command-language-level user interface. Simply put, Script reads its own DCL-like control language files and creates menus, from these and executes whatever commands are

associated with each chosen menu selection. Its target terminal device is any ANSI supporting CRT, but it will deal with hardcopy devices with some grace.

1 diskette; Sources included; Objects included; Task images included  
FORTRAN-77

F86-4 EMPIRE - War Game of the Century Empire is a strategy and tactics war game, you against the computer. It is played on a computer generated map containing land areas, sea areas, and cities. The object is to eliminate the opponent by capturing cities and destroying enemy forces. Cities, once captured, have production capability, and can produce units such as armies, fighters, destroyers, etc. for offense or defense.

ALSO:

This directory contains RENUM, a program which will renumber a Fortran program so that all statement labels in each compilation unit are numbered in ascending order.

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

F86-5 This area contains four packages which we have found useful.

VIRTUAL DISKS: This is a composite of previous VD (and VE) software, with a few additions.

CLUNK CONVERSION: We pulled a CLUNK time routine from an old article, then discovered it told time like a 2 dollar watch! This is the fixed up version.

EFN: Everyone sooner or later writes or borrows an event flag manipulator. This is ours. Works from indirect command file or TI; can set or clear ranges of flags with a single command.

KEY: Time to put those VT220 programmable keys to work! This is our program to setup the programmable keys (shifted function keys) on the VT220 terminals.

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

F86-6 This program is used to list file(s) on a VT100 family terminal. The file(s) are displayed one screen at a time for easy viewing. Various commands can be entered to change listing parameters or to position to a particular portion of the file.

2 diskettes; Sources included; SOME objects; NO task images  
MACRO

F86-7 The DIRECTORY command lists the files contained in a directory. When you use certain qualifiers with the command, additional information is displayed, along with the names of the files. The output of the DIRECTORY command depends on certain formatting qualifiers and their defaults. These qualifiers are: /COLUMNS, /DATE, /FULL, /OWNER, /PROTECTION, and /SIZE.

1 diskette; Sources included; SOME objects; NO task images  
MACRO

F86-8 The AUX program allows VT100 auxillary key definitions and command line editing ala VAX/VMS V4.x systems. The program also saves the last twenty commands which can then be recalled.

1 diskette; Sources included; SOME objects; NO task images  
MACRO

F86-9 This directory contains two papers that were to be presented at the Fall 1986 DECUS U.S. Symposium: - Introduction to the RSX, P/OS, and RT Indirect Command File Processor (RX018) - Programming in the RSX Indirect Command Language (RX019) Also included are the command files from which the examples in RX019 came. ALSO: This account contains material relevant to DATATRIEVE Plots.

ALSO:

This directory contains some transcriptions or proceedings submissions of DECUS Symposia sessions relating to DATATRIEVE.

1 diskette; NO sources; NO objects; NO task images  
RUNOFF, Indirect Cpmmand files

F86-10 QUAD.\* is an account of how to read DATATRIEVE Quadword dates in FORTRAN and other languages. QUADAS.MAC goes with this. CONSOLE.\* is a way to process the RSX consol log file with DATATRIEVE to pull out various items like batch and print jobs, logins, etc. Most of the rest of the stuff has to do with processing RSX-11M-Plus System Accounting information with DATATRIEVE, and with some FORTRAN programs (one to rectify the data, the others are for graphing the data on a PRO-3xx system).

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

MISC-4 BASPOS (file BASPOS.TSK) is essentially an RSX-11M form of the Michael Reese BASIC interpreter for a PDP-11 as contained on DECUS tape 11-SP-72. I have generated a simplified single-user modification of the RSX-11M form for the PRO-350/380 under hard disk P/OS; either v2.x or v3.x should be ok.

2 diskettes; Sources included; NO Objects; Task images included  
MACRO, FORTRAN-77

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.

In addition to this diskette based distribution, we are planning a tape distribution as well. The tape will be available after the Spring '88 symposium in the following formats: RSX BRU (1/2 " 9 track 1600 BPI and TK50); VMS BACKUP (1/2" 9 track 1600 BPI and TK50). The tape will contain EVERYTHING that we can assemble by then.

Send your diskette based contributions and/or software requests to me:

Gary Rice  
PC SIG Newsletter Editor  
McDonnell Douglas  
5555 Garden Grove Blvd.  
Westminster, CA 92683

Send your tape based contributions ONLY to:

Tom Hintz  
PRO/MAC/WORKSTATIONS Working Group Chair  
University of Florida  
IFAS Computer Network  
Bldg 120  
Gainesville, FL 32611

OR BRING THEM WITH YOU TO SPRING SYMPOSIUM IN CINCINNATI!

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

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## Correction to Article

**By Tom Hintz, PRO/MAC/Workstations Working Group Chair**

I read the article by Tony Klancar ("BIGger Disk Drives and the PRO" with great interest. However, I could not figure out why he could not determine the disk controller board rev levels from my previous article ("Hard Disks and Controller Boards for the PRO", July, 1987). After going back and reviewing my published article I found that the table had been reproduced incorrectly. Three columns of ROM values were identical. The corrected table of ROM controller chips is given below.

CONTROLLER	OLD (REV. 0)	NEW (REV. 0)	??? (REV. 0)	NEW (REV. 1)
board no.	54-15134	54-15134	54-15134	54-15134-01
ROM #1	014B2	014B2	014B2	073B2
ROM #2	013B2	013B2	013B2	072B2
ROM #3	012B2	021B2	063B2	071B2

Table 2. Numbers found on various components of hard disk controller board.

Sorry for any inconvenience. In the future I will try to review my published articles for accuracy as soon as they appear in print.

Tom Hintz

## PRO Software List Update

**Coordinated 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 March, 1988 issue of these Newsletters. The updated list reflects information that I have received as of February 20, 1988. An asterisk by an entry indicates that the item has changed or been added since the last time the list was published.



<u>DEC Software</u>	<u>List Price</u>	<u>Last Rev</u>	<u>Source of info</u>	<u>Still Avail?</u>	<u>P/OS v3 Supported?</u>
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
FORTTRAN 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/FORTTRAN-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
PRO/Toolkit COBOL-81	495	2.4	DEC	Yes	Yes
PRO/Toolkit DIBOL	495	1.7	DEC	Yes	Yes
PRO/Toolkit FORTTRAN-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

<u>DEC Software</u>	<u>List Price</u>	<u>Last Rev</u>	<u>Source of info</u>	<u>Still Avail?</u>	<u>P/OS v3 Supported?</u>
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	5.4B	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

<u>3rd Party Software (Vendor)</u>	<u>List Price</u>	<u>Rev</u>	<u>Info Source</u>	<u>Still Avail?</u>	<u>P/OS v3?</u>
D-M-DRIVER for P/OS (PROTO SYSTEMS)	295	V2/V3a	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	2.0	Vendor	Yes	Yes
PRO/Menu Manager (Wasatech Computer)	25	1.0	User	Yes	No
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	4.0L	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	2.0	Vendor	Yes	Yes
*SATURN-WP (SATURN SYSTEMS)	600	4.5	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  
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MS: K20 77/200  
Westminster, CA 92683  
(714) 952-6582

# PROgramming Quickie

By Gary Rice, PC SIG Newsletter Editor

This month's "Quickie" was born in true Shakespearean fashion: as "A Comedy of Errors". Back in the "Good-Olde-Days" of P/OS version 2, I developed an application that manipulated files by using the DCL copy program PIP.TSK. The program would build a command line and then SPAWN PIP with the command line included. This worked fine with the 80 character command line buffer that I built into the program.

With the introduction of P/OS version 3, DEC created "sub-directories" that my application then had to worry about. The 80 character command line turned out to be too short to hold the worst case situation of renaming a file from one sub-directory to another where all of the various pieces of the command were at maximum length. That is, each directory was 9 characters, each sub-directory was 9 characters, etc. NO PROBLEM, I simply extended the command line buffer in the program to the documented maximum of 255 characters.

The program began to fail with PIP syntax errors. After checking several things, I examined the command line buffer. It seemed that after the "SPAWN" call, the buffer contained only 80 characters and the 80th one was a dash ("-"), the DCL continuation indicator. Since I didn't put it there, I had to assume that the system did. After several hours of fiddling and coaxing, I decided that there was NO WAY to get PIP to accept a command longer than 80 characters from the "SPAWN" system call.

Next approach: Shorten the command line presented to PIP. The obvious choice was to set my current default to the source directory so that the command wouldn't need to reference the disk, directory or sub-directory. By taking that approach, I could get the command length down to under 80 characters in a worst case situation. Setting a new default seemed easy since there was a PRO specific call in the POSSUM Library known as PROLOG that would do it. I set up a call to PROLOG and tried it. Strange things happened. The call itself returned no errors, but my current default value ended up in Never-Never Land. After working on it for quite awhile, I gave up. The "SET DEFAULT" function of PROLOG refused to put me where I wanted to be.

Well, I STILL had the original problem, so I asked myself "How does P/OS perform a "SET DEFAULT" request?" Taking THAT approach, I discovered a nice little program that comes with the Command Language application that performs the request flawlessly. The program is LCT.TSK and it is conveniently installed for you when you activate Command Language. After a little experimentation, I figured out the proper command to send to LCT for both P/OS version 2 as well as P/OS version 3. The following subroutine shows you what I found. It assumes that LCT.TSK has been installed previously.

```
C SETDEF.FTN - This subroutine sets or restores the default directory
C
C ORIG VERS:    1.0
C
C CURR VERS:    1.0
C
C AUTHOR:       Gary Rice
C
C CREATED:      January 17, 1988
C
C REVISIONS:    None
C
C INPUTS:       CHARACTER*40 DEFALT value to establish as the new default
                directory. This MUST contain a disk AND directory
                reference.
C
C OUTPUTS:      INTEGER*2 DSW (Directive Status Word) returned by SPAWN
                (and TRALOG) - set to 1 if success
C
```

```

C NOTES:      None
C
C***** C SUBROUTINE SETDEF (DEFAULT, DSW)
C
C      INTEGER*2 FLAG, DSW, SIZE, EXST
C
C      INTEGER*4 TASK
C
C      CHARACTER*8 POSVER
C      CHARACTER*40 DEFAULT
C      CHARACTER*60 COMAND
C
C
C Begin by getting the verrsion of P/OS being used
C
C      CALL TRALOG (0,,'POS$VER',7,POSVER,8,SIZE,,DSW)
C      IF (DSW .NE. 1) RETURN ! This shouldn't happen
C      IF (POSVER(2:2) .EQ. '1') RETURN ! I didn't do it for P/OS v1.n
C
C
C Begin setting up the command to send to LCT
C
C      COMAND = ' '
C      IF (POSVER(2:2) .EQ. '2') THEN ! For P/OS v2,
C          COMAND(1:4) = 'LCT ' ! LCT is installed as ...LCT
C          COMAND(5:6) = 'K ' ! LCT expects a "K" next
C          SIZE = 6 ! Last non-blank in "COMAND"
C          CALL IRAD50 (6,'...LCT',TASK) ! Set up the SPAWN TASK variable
C      ELSE ! For P/OS v3,
C          COMAND(1:4) = 'MMV ' ! LCT is installed as ...MMV
C          COMAND(5:16) = 'SET DEFAULT ' ! MMV expects "SET DEFAULT" next
C          SIZE = 16 ! Last non-blank in "COMAND"
C          CALL IRAD50 (6,'...MMV',TASK) ! Set up the SPAWN TASK variable
C      END IF
C      I = INDEX (DEFAULT(1:),'I') ! Point to the "I" in DEFAULT
C      COMAND(SIZE+1:SIZE+I) = DEFAULT(1:I) ! Add DEFAULT to COMAND
C      SIZE = SIZE + I ! Detrmine the length of COMAND
C      FLAG = 1 ! Pick an event flag for SPAWN
C      CALL SPAWN (TASK,,FLAG,,EXST,,COMAND,SIZE,0,,DSW) ! Issue the command
C      IF (DSW .NE. 1) RETURN ! See if the command was right
C      CALL WAITFR (FLAG) ! Wait for SPAWN to finish
C      RETURN
C      END

```

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

## Digital's DEPCA

**By The Personal Computer Systems Group, Digital Equipment Corporaation Littleton, Massachusetts**

Now you can get a high-performance Ethernet/802.3 local area network controller for use in your PCs. Digital's DEPCA board brings the power of Ethernet LAN connectivity to personal computers. The DEPCA is a component

of Digital's solution to the integration of IBM PC/XT/AT personal computers into a VAX/VMS and DECnet/Ethernet computing environment.

The DEPCA controller supports the use of Digital's DECnet-DOS, VAX/VMS Services for MS-DOS and PC ALL-IN-1 software for networked PCs. The DEPCA connects directly to Ethernet and also supports Digital's mouse for use with Microsoft's MS-Windows user interface.

### Highlights

- Connects IBM PC family personal computers to Ethernet and IEEE 802.3 Local Area Networks
- ThinWire Ethernet connection is standard, conventional Ethernet connection is optionally available \* High-performance LANCE-based network controller, with 48 Kbytes of RAM for multi-buffering, handles high network traffic loads without performance degradation
- Includes Data Link layer and self-test firmware in on-card ROM
- Connection for Digital's mouse supports MS-Windows
- Available as separate option or as part of Digital's IBM PC Network Integration Packages

### High-Performance Controller Features

The DEPCA provides enhanced performance capability and operates at 10 Mb/s. Actual device speed and throughput depend on current operating system limitations, system configuration and system CPU clock speed and applications in use. The DEPCA contains 48 Kbytes of RAM memory, used primarily for buffering of network data at the high bus data rate. The personal computer's CPU is used for access to the buffer memory. The CPU is also used to execute data link and self-test firmware contained in a 16-Kbyte ROM memory located on the DEPCA module.

The DEPCA board implements all data link and physical channel level access functions to ensure maximum throughput. It provides significant network maintainability features including remote loopback of data from other stations, resident self-test diagnostics, and system identification.

The use of second generation LSI controller technology, coupled with the efficient high-speed dual-ported buffer memory, allows the DEPCA to handle high levels of network traffic without performance degradation. Multiple transmit and receive buffers and multicast address filtering contribute to the DEPCA's high performance. The DEPCA is capable of receiving bursts of several back-to-back Ethernet frames, reducing the incidence of network time-outs and retransmission of frames on a busy network. Controllers without this capability suffer performance degradation under heavy network loads.

The DEPCA board implements an asynchronous serial channel for connection to Digital's VSXXX-AA three-button mouse. This interface may be operated in an interrupt-driven environment.

### Connects to ThinWire and Conventional Ethernet

The DEPCA interfaces to the network in one of two ways. In the standard configuration, the DEPCA connects directly to the ThinWire Ethernet coaxial cable, using integral transceiver (MAU) circuitry. The second, optional, configuration uses the AUI Connector Option (DEPCA-AU) to connect to the network via a transceiver (AUI) cable (BCC06-15) and a transceiver (H4000) or Local Network Interconnect (DELNI).

The DEPCA-AA option is comprised of the DEPCA module, Owner's Manual, and a ThinWire Ethernet cable kit (BC16T-12). The DEPCA-AU option is comprised of an AUI connector assembly and a mating transceiver (AUI) cable (BCC06-15). The DEPCA module is also available in the IBM PC Network Integration Package along with a license for Digital's DECnet-DOS and PCSA/PC Client software, for use with VAX/VMS Services for MS-DOS server software.

### Interfaces Easily to the PC System Bus

The DEPCA module is an IBM PC form factor circuit card, using the 8-bit bus connector, with no "overhang" interference. The DEPCA will operate in PC and PC/XT systems with a 4.77 MHz or 8 MHz bus clock and PC/AT systems with either a 6 MHz or 8 MHz bus clock. The DEPCA utilizes 64 Kbytes of system memory address space, 16 I/O port addresses, and two interrupt vectors. The memory and I/O addresses are selectable as primary or secondary assignments, and the interrupt vectors are selectable among five possible assignments.

Selection of these assignments is provided to allow maximum flexibility in configuring systems with multiple possible IBM or third-party option cards.

### Operating Requirements

To use the DEPCA Ethernet controller in your PC, it must meet the following configuration requirements:

- IBM power supply is at least 130 W.
- 128 Kbytes of memory to run DEPCA service diagnostics; additional memory (up to 640 KB) may be required to run networked software. (Refer to the appropriate Software Product Description.)
- ROM BIOS revision date of 10-27-82 or later (IBM PC only).

### Electrical Specifications

Address assignments:	<u>Primary</u>	<u>Secondary</u>
Memory	D0000-DFFFF	E0000-EFFFF
I/O	300-30F	200-20F

Interrupt vector assignments: Available selections

Network interface controller	IRQ2, IRQ3, IRQ4, IRQ5, IRQ7
Mouse interface controller	IRQ2, IRQ3, IRQ4, IRQ5, IRQ7

Prior to installation of the DEPCA module, all potential address and interrupt vector conflicts with other option cards must be resolved. NOTE that the secondary memory address assignments cannot be used on the IBM PC/AT.

Power requirements:

DC amps drawn at +5V: 2.0 A (max) DC amps drawn at +12V: 1.35 (max) (1.0 A to power the H4000 transceiver)  
DC amps drawn at -12V: 0.05 (max) Bus loads: 2 LSTTL loads

### Physical Characteristics

Form Factor: IBM PC-bus, 8-bit connector, full length card  
Mounting Code: 1 8-bit PC-bus slot (2 when used with DEPCA-AU)  
I/O Connection Panel Inserts: 1 slot (2 when used with DEPCA-AU)

### Operating Environment

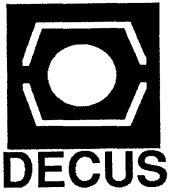
The DEPCA board will operate when installed in a personal computer system box located in the following operating environment:

Temperature (at sea level) 59 - 90 degrees F  
Relative Humidity: 8 - 80 percent (non-condensing)  
Radiated Emissions: FCC Class B

For more information on Digital's integrated personal computing solutions, contact your local Digital sales representative. An information sheet on VAX/VMS Services for MS-DOS (ED-31203-69) and an information sheet on Network Integration for the IBM-PC Family (ED-31148-69) are available from your local Digital sales office.

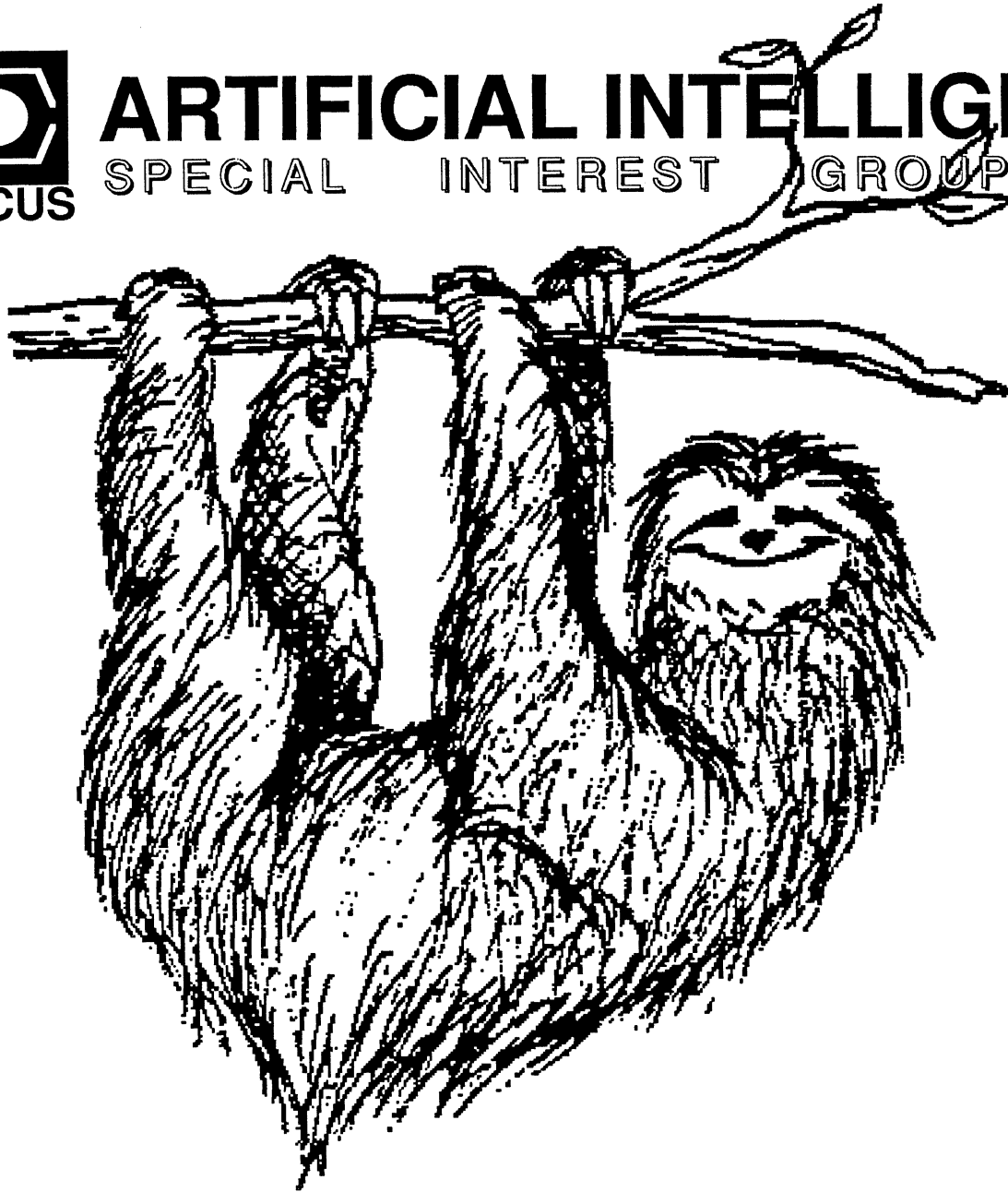
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# ARTIFICIAL INTELLIGENCE

SPECIAL INTEREST GROUP



*"Sloths are so human in appearance--  
and in some of their ways--  
that inevitably one tends to judge them  
by human standards."*

--Hermann Tirlor, A Sloth in the Family

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## (THE (LINKED LIST))

### The Newsletter of the DECUS Artificial Intelligence Special Interest Group

"... It's The Real Thing"

Vol. 3 No. 8 April 1988

#### FROM THE EDITOR:

Welcome to the first 1988 edition of the DECUS AISIG newsletter. Although this issue is devoid of late-breaking AI news, I am pleased to report that the AI SIG steering committee has resolved to improve the quality, consistency and scope of YOUR newsletter. While many of the salient features of (THE (LINKED LIST)) Version 2 are unresolved, we are considering topics such as a revised publishing schedule and the exchange of AI-related material with international DECUS publications. If you have any suggestions or ideas for the Version 2 project, please drop me a line or give me a call at work or home.

And speaking of work and home, I began the new year with a new job and a new home address. In early January, I hung up my trenchcoat and resigned from Digital Review to accept a job with Computer Information Systems, Inc., in Braintree, Mass. My new position includes some AI-related responsibilities that may form the basis for a future series of articles. In the meantime, you are cordially invited to contact me at my new business address:

Terry C. Shannon  
Technical Consultant  
Computer Information Systems, Inc.  
165 Bay State Blvd  
Braintree, MA  
(617) 848-7515

For those of you who prefer to send material to a non-business address, Chez Shannon is at:

8 Calvary Street  
Waltham, MA 02154

As always, I look forward to receiving your submissions and suggestions for (THE (LINKED LIST)).

Terry C. Shannon  
DECUS AISIG Newsletter Editor

#### SIG Notes

By Cheryl Jalbert  
DECUS AISIG Chair

There are several things brewing that I'd like to share with you. Please let me hear your opinions on them.

In April at our steering committee meeting, we will discuss (The (Linked List)) and other forms of written communication among AI SIG members. Jean-Pierre Bierdot, Chair of SIG IA (the AI SIG of France), will be attending our meeting and we expect him to participate enthusiastically in the newsletter discussion. Jean-Pierre and Alexis Santoni, Chair of the newly formed AI working group in European DECUS, have been eager to participate with us in defining what sort of newsletter will be valuable as a joint effort for all DECUS members interested in AI. What would you like to see in the way of a newsletter or other communication?

Later in April, Don Rosenthal, Art Beane, and I will be attending the French DECUS Symposium. I'll be giving a pre-symposium seminar, and we'll each be giving a session. Jean-Pierre tells me that they are planning 42 AI sessions for the three day symposium!

For our own symposium in May, we have some exciting plans. I'd like to share just a few comments.

We've been holding a Great Tool Debate on Thursday evenings. We gather several people who are specialists in one or another tools and ask them questions intended to get a debate going. This symposium, we will still have the usual debate about what characteristics are important in an AI tool, but there's a new issue that may color the debate. The vendors of AI tools are redefining the market place. As classic names in AI tools withdraw products from the market to concentrate on producing complete applications, we have to wonder what answers will take their place.

If you'll be attending the symposium please notice that the Roadmap is at 10 Monday morning following the Introduction to AI session. (We thought we'd give the novice a chance to catch some of the vocabulary. We'll be looking for comments on this scheduling approach.) The roadmap is a good way to find out what the plans for the week are and to catch last minute announcements.

Please also note that we have potentially excellent sessions scheduled all day long on Friday. Don't think of leaving early Friday! After an incredible week of sessions, maybe a pre-symposium seminar on Sunday, playing with a variety of software in the campground, talking with Digital's AI developers and researchers, staying up until all hours in the suite talking AI, and establishing those relationships that let you call someone who may have an answer when you need help, come to the suite Friday evening and celebrate with a us the conclusion of a heady experience!

If you have been wanting to participate more in the AI SIG or if you will be coming to Cincinnati on Saturday before the symposium and think that you might like to check in with us, please give me a call or write me a note to tell me so. (That's Box 381, Granville, Ohio 43023 or 614-587-0157.) We generally have a meeting on Saturday before the symposium in the suite. That way, anyone can join us who is coming in early for a PSS or for any other reason. This symposium we may have the meeting in another location and I don't want to miss any of you who are interested.

#### THE EXPERT-SHELL GAME

By Judith A. Finn

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Editor's Note: The following article is reprinted from the 23 November 1987 issue of Digital Review with the permission of the author and Ziff Communications Corp.

Skeptics are quick to point to the recent financial troubles of leading AI vendors as final proof that artificial intelligence is indeed much hype and no substance. From its inception in the 1950s, AI has been the focus of controversy and hearsay. AI has appeared to many as nothing more than pie-in-the-sky technology and has already been dismissed by some industry watchers as overpriced and inefficient.

Industry leaders, however, are by no means ready to agree with this dismissal and have altered their approach to marketing by stressing integration with existing systems and user accessibility. New and still-to-be announced products alike point towards a less restrictive and less formidable technology. Vendors are deliberately taking AI out of the laboratory and into the marketplace, while striving for the first time to tailor their products to user needs.

Market analysts perceive this change in focus as crucial. A major obstacle in AI's development has been the schism between customer needs and vendor offerings, say market analysts. Likewise, the shift from expert system shells to customized applications is a promising one, and analysts expect AI to become a leading force in software technology by 1990.

#### \*Filling In Expert Shells

Expert systems are the most visible and easily marketable aspect of artificial intelligence technology. As defined by DEC and most other vendors, an expert system is a "computer program that contains knowledge about a particular domain, and emulates the reasoning process of human experts." Los Angeles-based Inference Corp. stresses that expert systems "provide complex problem solving in areas not served by conventional computer programs."



Tools are expert system shells and are usually sold with only an inference structure and framework in place. Tool vendors claim that this allows for optimum customization, whereas critics point to the high cost of knowledge extraction, which is passed on to the user.

Relatively new on the scene are preconfigured applications or filled-in shells. These are suitable for fields that share common procedures as there is less room for customization. Applications are generally packaged to increase accessibility and remove the time-consuming process of extracting knowledge from an in-house expert.

Analysts express optimism when focusing on expert system shells and tools. Beth R. Krasnoff of Dataquest Inc., a market research firm in La Jolla, Calif., sees this as an "exciting, healthy year. People are getting practical and are no longer stressing razzle-dazzle." Krasnoff also feels that the "major shakeout" that is occurring is a healthy one.

"I see the promise of AI fulfilled in a very down-to-earth way," she said. Based on research done by Dataquest, she projects that worldwide revenues for expert system development tools will reach \$284 million by 1990.

Donald Sundue, vice president of program management at the Cambridge, Mass.-based Symbolics Inc., likewise sees the market doing well, despite the \$25.54 million loss that Symbolics posted this year. Part of the loss was attributed to the company's real estate dealings, he said.

Harvey Newquist, editor of the Scottsdale, Arizona, publication, "AI Trends," explained that the market has slowed down somewhat and is "regrouping and retrenching." Senior analyst Bill Martorelli, of New Science Associates Inc., a market research firm in South Norwalk, Connecticut, feels that expert systems are slowly "getting ready for the marketplace."

#### \*Packages, Not Shells

"The people we're dealing with don't care whether or not they're using AI," explained APEX's Luconi, "but they are concerned with what the software does." Cheryl Jalbert, Chair of the Digital Equipment Users Society (DECUS) AI Special Interest Group and analyst with JCC Consulting of Granville, Oh., concurred: "AI questions aren't of interest to the person with the problem."

There is a definite trend towards marketing applications as a total AI product. Some vendors feel that users are more likely to purchase a complete package than an empty shell. As Esther Dyson, editor of "Release 1.0," a software information newsletter in New York observed, "There are demands for applications today, not tools. Vendors are therefore spending more on applications and implementations."

Intellicorp's Kehler explained, "The market is experiencing a broadening of applications to more than expert systems." Valuable applications, he stated, were gained not only by looking at a rule base, but by interfacing knowledge representation capabilities with databases.

Martorelli of New Science Associates, however, stressed that the trend towards applications will not supplant the need for expert system shells. "Naked shell tools won't go away," he stated. "They are a part of the business." The trends emphasizing shells are present, though not overwhelming," Martorelli said. "The old stuff won't disappear."

A need for customer consulting has also arisen. Most major vendors do some form of consulting to augment their products, and special consulting firms provide their services to potential AI users as well.

Jalbert of JCC Consulting stressed that the best approach is to market solutions as opposed to tools. She and other consultants help the user decide which is the most powerful and least restrictive tool that will meet their needs, then follow through with training, further consulting, and "hand-holding if necessary." Inference Corp.'s Jacobson states that their professional services operation, which primarily does consulting, is growing at 100 percent a year and is responsible for 40 percent of their revenue.

#### \*Slow Integration Process

This shift of offering solutions in the marketplace represents a change in focus for most AI vendors. As Newquist explains, "Vendors have been technologically driven, as opposed to market driven." Howard Austin, president of Knowledge Analysis Inc. of Concord, Mass., agrees. "Some pretty obvious issues weren't caught. There was little concern for solving real market problems."

As some analysts point out, time is the key issue in assessing the success or failure of expert systems. "We're dealing with maturing technologies that are just becoming commercialized." Dataquest's Krasnoff stated. Fred Luconi, president of the Cambridge, Mass., firm Applied Expert Systems Inc. (APEX), feels that the relatively slow progress of AI is due to its complexity. "AI can be a strategic technology, which can cause changes in an organization. This process of change within organizations takes a long time."

Alexander D. Jacobson, president of Inference Corp., a Los Angeles-based firm that markets the Automated Reasoning Tool (ART), agrees that there is no reason to prematurely predict AI's downfall. "It takes business roughly ten years to assimilate a new technology. My sense is that we're right on schedule, four years down the line."

Despite these bright projections, many vendors are suffering financially. Inference is a privately held firm, for which figures are unavailable, but is widely believed to have sustained recent losses. Intellicorp, Inc. of Mountain View, Calif., the manufacturer of the Knowledge Engineering Environment (KEE), posted a net loss of approximately \$4 million for fiscal 1987.

Tom Schwartz, founder of the consulting firm Tom Schwartz Associates, also located in Mountain View, explained, "Vendors are losing money because they expected the research and development market to go on forever." The research community, according to Schwartz, is saturated. "The resulting shift entails moving expert systems out of research and development, toward management of information systems [MIS]."

Harvey Newquist also stressed the saturation of the current market. "Vendors missed the boat on mainstreaming by relying too heavily on technology."

#### \*Pleasing the Customer

The distinct movement of expert systems away from a focus on pure technology can only be beneficial to the industry. As Knowledge Analysis's Austin put it, "Pleasing customers is a standard business practice."

The science of artificial intelligence originated in university laboratories, and vendors are just now coming to grips with the necessity of competing in the marketplace. Products were not designed with the end user in mind and did not meet immediate needs. "Vendors basically said, 'this is what we have; if you don't like it, tough,'" Schwartz of Schwartz Associates observed.

Accessibility is another emerging factor that bodes well for AI. There is often a stigma attached to artificial intelligence, which is linked to its potential complexity. By making expert systems more friendly, users are more likely to incorporate AI into their systems.

JCC's Jalbert observed: "The tools that will succeed in the next five years are those aimed at the technical person, not necessarily the AI technical expert."

Christopher Locke, vice president of corporate communications at the Pittsburgh firm Intelligent Technology Group Inc. (ITG), explained that the newly formed company hired a technical staff with strong credentials but not necessarily AI expertise. "We are training our own people in AI use to prove it can be done successfully in-house." The firm was founded in April 1986 by Larry Geisel, formerly of Carnegie Group, who predicted that they will begin "the real commercialization of AI."

#### \*No System an Island

Perhaps the most important trend in establishing AI as a marketable solution is its integration with existing technology. There is a strong movement towards connectivity in the overall market, and expert system companies are finally beginning to take note. "Vendors have typically said, 'Here is an amazing technology, all you have to do is change your entire business to use it,'" ITG's Locke explained.

Intellicorp CEO Kehler also stressed the value of integration. "The key is connection. There is a need for a general-purpose link between a knowledge system and a database and for integration tools which enable users to get more utility out of existing equipment." As Symbolics's Sundue put it. "The marketplace emphasizes integration into conventional computer environments."

Julie Kaewert, spokesperson for DEC in Hudson, Mass., claims that this is not new information to Digital Equipment Corp. "We always knew it would have to be functional, and we always knew it would have to be integrated with VMS. People are just beginning to understand the potential of AI, especially when it is integrated."

Today's industry leaders feel strongly that AI is not a total solution in itself. The benefits of making AI a part of the problem-solving process are becoming increasingly evident. Rob Sagwitz, public relations coordinator at Pittsburg's GSI Transcomm, said, "Our goal is to do what our users want. We won't develop AI because it's AI, but because it's the best way to do what we need to do. Our solutions are driven: how we accomplish something is not as important as what we accomplish."

Most experts agree that ultimately, people will use AI without being aware of its presence. Expert systems will only be an "invisible part" of the software, which is used to increase efficiency.

#### \*Users Fear AI

One of the major problems facing expert system vendors is the mystique associated with artificial intelligence. It is understood that much of the early publicity surrounding AI only succeeded in frightening people away from the technology. AI was promoted as being too powerful, and many feared that machines would indeed take over the world. Dataquest's Krasnoff said that AI is still a "dirty word," and that "many companies don't even want to attach something that has anything to do with AI."

"AI and expert systems are neat words," GSI Transcomm's Sagwitz observed, "but they really don't help to sell the product. People want to read about it, but they're almost afraid of it."

One common fear is that AI will displace segments of the work force. Critics worry that AI will take jobs away from people, yet supporters insist that the primary goal is to reduce the time spent on low-level decision making. Schwartz of Schwartz Associates noted that "eighty percent of the problems can be solved with twenty percent of the solutions." He explained that 50 percent of an expert's time is usually spent on minimal diagnostic tasks. By incorporating an expert system, 40 percent of the expert's time is freed up to perform more complex reasoning.

Schwartz also stressed that workplace procedures need to be dealt with. He cited an example of expert system deployment in a GTE unionized shop. Previously, promotions and pay increases were based on productivity. With the expert system in place, new criteria based promotions on the ability to articulate how the employee functioned with the expert system.

Another reason many shy away from expert systems is the knowledge extraction process, which is described as the main bottleneck of AI. To fill in an expert system shell, a knowledge engineer must literally extract knowledge from experts in the field. This can be a long and painful process, as the human mind does not function as efficiently as a computer. Knowledge engineers often find it hard to keep up with the demand for deployed systems.

Applications are one means of relieving this tension. By designing an expert system broad enough to be applied by a range of companies with similar concerns, the need for many individual customized systems is dissipated.

However, Knowledge Analysis's Austin stressed that. "You can't get away from the need for laborious, time-consuming knowledge extraction. The mind is a recognition machine, and extracting knowledge is an anthropological process. Efforts to automate it have failed."

Yet Locke feels that the half-year-old Intelligent Technology Group has a significant handle on the knowledge acquisition process. Unannounced developments, he stated, can speed the knowledge acquisitions system tremendously.

A strong movement to bring AI to PCs has also sprung up. The goal there is to expose AI to the mass public and increase its ease and accessibility while lowering the price. As Schwartz of Schwartz Associates put it, on a PC one "could build an expert system and still think that Lisp was a speech impediment." Although PCs enable a user to construct an expert system without a broad knowledge of AI, they are not yet capable of the high-powered programming that VAX systems offer.

#### \*Combating AI Phobia

Emerging trends display a focus on integration and meeting market needs. New products, such as Technology Group's developments in the field of knowledge acquisition, show this to be a continued emphasis.

Symbolics's Sundue stated that they "expect to provide one-stop shopping for our customers." With the introduction of their new Ivory chip, a proprietary integrated circuit chip that is optimized for the rapid execution of Lisp programs, they plan to dramatically increase their presence in the AI marketplace.

"The ideal piece of software," Schwartz noted, "is one that can deal with the standard flow of problems and is smart enough to know the difference."

Future marketing strategies include tapping other software markets. "There is a much stronger market for AI abroad," Luconi, of APEX, noted. Dataquest's Krasnoff agreed and observed that users were not as AI-phobic in Europe as in the United States.

Luconi's firm feels that focusing on key or strategic accounts is crucial for financial success. APEX has recently begun commercial shipment of Client Profiling, an expert system designed for the financial services industry, which is a field many vendors have targeted. It was developed in partnership with the John Hancock Mutual Life Insurance Co. so that at the time of the product's announcement, it was already in use. APEX has also had success with a rental approach, where profits are based on volume, not installation.

Industry leaders and analysts agree that although the financial picture may not look overwhelmingly promising at present, AI will not disappear from the marketplace. "As the U.S. becomes more service-based," Inference Corp.'s Jacobson said, "AI will be necessary. Information will be turned into a commodity, an asset."

Dataquest's Krasnoff agreed. "This is definitely an industry that is only beginning to emerge," Schwartz predicted that. "Within ten years, you won't be able to get an engineering degree without knowing AI." KA's Austin summed up the importance of AI by stating, "AI is not a niche within regular computer science— it's the next computer science."

#### DENNIS O'CONNOR: THE HUMAN EXPERT BEHIND DEC'S EXPERT-SYSTEM SUCCESSES

By Terry C. Shannon

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Editor's Note: The following article is reprinted from the 23 November 1987 issue of Digital Review with the permission of the author and Ziff Communications Corp.

Editor's Note: DECUS AISIG Newsletter Editor Terry C. Shannon recently interviewed Dennis E. O'Connor, senior group manager for the Intelligent Systems Technologies Group at DEC's Corporate AI Technology Center in Marlboro, Mass. Since 1979 O'Connor has guided DEC's AI programs, including the pioneering development of XCON. With 25 years' engineering experience, he is now responsible for disseminating AI technology to universities and within DEC.

SHANNON: How did Digital get started in AI?

**O'CONNOR:** We got started when we realized that we had a problem that could not be solved through traditional computing methodologies. Sam Fuller, DEC's Vice President of Research, put me in touch with Professor John McDermott of Carnegie-Mellon University early in 1979. John and I looked at using AI technology to solve configuration problems, specifically for the newly-announced VAX family that was destined to be a major part of Digital's revenue stream through the 1980s.

Prior to the development of XCON (the eXpert CONfiguring program), Digital computer systems were configured by tech editors who manually translated customer orders into bills of material and assembly instructions. We maintained two plants where workers assembled and tested each new computer system based on the information supplied by the tech editor.

We realized that additional final assembly and test plants would be needed to handle the production of VAX systems unless we could generate accurate system configurations way up front in the order process. With [McDermott's] help, we essentially solved the configuration problem with XCON. John brought the AI expertise to the problem. As Digital's group technology manager for worldwide systems manufacturing, I provided the domain expertise.

To date, well over 100,000 system orders have been configured by XCON and a staff of 13 tech editors. Without the expertise and knowledge embodied in XCON, Digital would need an additional 600 to 700 tech editors to maintain current production levels.

**SHANNON:** What spinoffs have come from XCON?

**O'CONNOR:** The first spinoff was XSEL, an interactive front end to XCON that is used by Digital's sales force. XSEL helps generate customer quotes rapidly and accurately by ensuring that a proposed computer system is based on a valid, complete configuration. XSEL can also be directed to provide all the spatial and environmental information needed to assure a successful system installation.

Next we addressed knowledge-intensive tasks in the manufacturing and customer service portions of the production cycle. If XCON could generate accurate system configurations and XSEL could shorten the order cycle, we felt that AI technology could help schedule orders across a number of factories and streamline the distribution of finished products to customers.

The expert systems that manage these tasks have been linked together to form a VAX-based Knowledge Network that helps improve employee productivity, manufacturing efficiency and customer satisfaction. This is the basic game plan for all the work we've done since 1981. We're still working on different pieces and subsets of the Knowledge Network, especially in the engineering, customer service and installation portions of the production cycle.

**SHANNON:** Lisp and Prolog are frequently cited as AI-oriented languages, but OPS5 has received very little attention. What role do OPS5 and similar production system languages play in AI application development at Digital?

**O'CONNOR:** OPS5 has played a major role at Digital. The majority of our AI applications involve planning, building and scheduling tasks which are well suited to OPS5's rapid execution speed and forwarding-chaining inference strategy.

The programmer productivity provided by OPS5 has been extremely beneficial to us. Novice programmers can get up to speed quite rapidly and OPS5 is well suited to application prototyping.

**SHANNON:** A generally accepted heuristic among AI developers is that an expert system rule base cannot exceed 10,000 rules. What can be done to manage larger rule bases and deal with dynamic information?

**O'CONNOR:** There is no magic number or ceiling on the size of an expert system rule base. Software engineering and programmer productivity are the main issues. You have to consider the architecture and the modularity of the system you are building as well as the people who are contributing to the development effort.

With respect to system architecture, partitioning, consistency and style of input and coding are important considerations. Similarly, it is important to provide a development methodology that lets programmers work efficiently but precludes their tendency to personalize every rule they put into a system. To this end, we are developing tools that help ensure consistency and programming style.

**SHANNON:** The Knowledge Network is based on multiple, cooperative expert systems. Is this "divide-and-conquer" form of task decomposition valid for other applications?

**O'CONNOR:** Certainly. You can take almost any engineering, manufacturing or distribution application and ask "what cooperating systems can be put in place to streamline the decisionmaking process or help workers make better decisions?"

In addition, the development of cooperative applications that include both AI and traditional components helps users preserve their investments in traditional systems.

**SHANNON:** Another major obstacle to expert system implementation is knowledge acquisition, or "putting the knowledge into a box." What is DEC doing to surmount this obstacle?

**O'CONNOR:** Digital has an eight-week knowledge engineering training program that places special emphasis on problem identification and interviewing techniques. These techniques help the knowledge engineer get the appropriate information from the domain expert, which in turn makes it easier to build a knowledge-based application.

We also provide a means for domain experts and end users to send their comments and observations to the developers who are responsible for building and maintaining knowledge-based systems. User feedback can be incorporated into the next version of the application. This is a form of knowledge acquisition in that the system becomes smarter and more accurate as time goes on.

**SHANNON:** A number of successful AI applications were developed through DEC's External Research Program. Can you amplify on the program and its resulting applications?

**O'CONNOR:** We view the External Research Program as an investment in learning. The major application developed through the program is XCON. We've funded a number of additional projects, some of which were successful and some of which were not. Having a mixture of success and failure is important, for the mixed results taught us to use different techniques and to approach problems from different perspectives.

**SHANNON:** With the exception of applications such as XCON and the Knowledge Network, AI "success stories" seem to be few and far between. Do you feel that users and vendors are reluctant to discuss their successful AI applications because the underlying technology can provide a significant competitive advantage?

**O'CONNOR:** People are often reluctant to discuss AI applications that provide a competitive advantage. At the same time, many potentially successful expert systems are not deployed because developers have not figured out how to transfer these systems to the end user base in the form of viable applications.

**SHANNON:** The VAX is an extremely popular AI development and delivery platform. What are the relative advantages of dedicated symbolic processors or Lisp machines and VAX systems?

**O'CONNOR:** I think the basic question is "what style of problem are you trying to solve?" Symbolic processors are high performance Lisp engines that are well suited to researchers involved in performance testing, simulation work or other applications that demand extremely fast Lisp program execution.

We certainly focus on using VAXes to solve AI problems. We've run a number of simulations using the VAX and AI languages and so far we've been very satisfied with the results.

**SHANNON:** According to Digital AI specialist Dr. Neil Pundit, the next generation of expert systems will feature enhanced planning and problem solving capabilities, improved user interfaces and knowledge acquisition facilities. Can you speculate on the capabilities of the AI tools of the future?

**O'CONNOR:** Our customers have requested AI facilities that will boost productivity by helping users make better decisions, so you can expect that some of the items you mentioned will be available in future systems and programs.

## **VAX OPS5 VERSION 2.2 DEBUTS**

*By Terry C. Shannon*

MARLBORO, Mass.— Aiming to simplify the integration of AI capabilities into applications written in conventional VAX programming languages, Digital has unveiled an enhanced release of its OPS5 expert system development tool.

OPS5 is a rule-based production system language that is widely used for building AI applications such as Digital's internal knowledge network of cooperative expert systems.

New with VAX OPS5 version 2.2 are callable interfaces to the VAX C and VAX Ada languages, improved debugging facilities and the elimination of arbitrary restrictions on run-time programs.

According to a Digital AI spokesman, VAX OPS5 version 2.2 lets C and Ada programmers integrate OPS5 routines into their applications without having to learn how to program in OPS5. Moreover, the spokesman claimed, the new OPS5 release emphasizes consistency and ease of use.

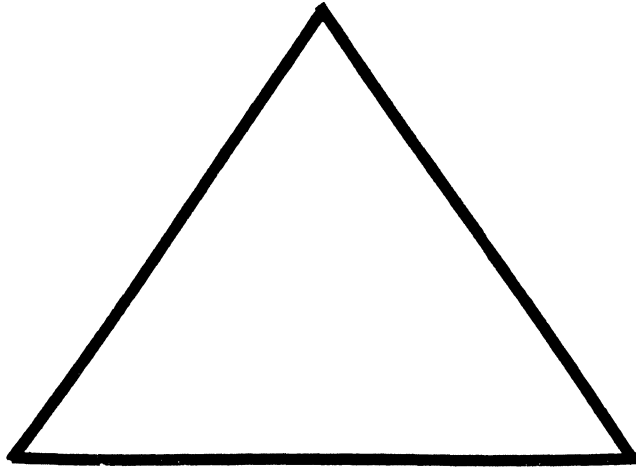
"While the VAX Calling Standard allows programmers to develop multilanguage applications, each programmer is responsible for developing and maintaining a consistent calling style. VAX OPS5 version 2.2 includes fully supported calling interfaces that improve program consistency and simplify the program development process," the spokesman said.

VAX OPS5 version 2.2 also lets users write applications that are not constrained by arbitrary program size limitations. Finally, the new release includes an improved debugging facility that lets a user independently observe an OPS5 program's working memory, conflict set and rule firings.

VAX OPS5 version 2.2 runs on the entire VAX computer family and is available for immediate delivery.



*edusig*



Computer Friends:

This introductory article will be short and to the point. Yours truly has met his fate. The score is Hong Kong flu 10 my side - 1, but we are pushing for the Gold.

-----Free Utilities----- Take a good look. There might be something worthwhile.

----- Operating Procedure--Some night when you are having trouble sleeping, take a look at this. We are trying to do it right. Ardoth Hassler has put more time on this project than anyone. Thank you for your devotion, Ardoth. The next few lines are from her.

The EDUSIG Steering Committee has worked over the last six months to bring the Operating Guidelines for the SIG up to date. The Guidelines printed here were adopted by the Steering Committee in December in Anaheim. They have subsequently been approved by the SIG Council. We have already started to "operate" under these new guidelines, though the final transition of terms for the officers is not completely decided as of this writing. The transition will be complete by the Fall 1988 Symposium in Anaheim when our first general election will be held.

#### FREE Utilities

Dr. Pete Boysen  
Iowa State University

For the past three years, we have developed numerous Digital Authoring Language (DAL) utilities which we have found useful in lesson development. We are offering them to DAL users for the cost of shipping and handling. To get your copy, send a purchase order for \$20 to:

The CLEARINGHOUSE for Academic Software  
The Computation Center  
104 Computer Science Building  
Ames, Iowa 50011

You may also request that the utility package be included at no extra charge when you order other CLEARINGHOUSE software.

Included in the utility package is:

\* A full-screen editor which lets you edit text in a text mode window within a DAL program. It uses SMGS routines.

- \* A single line editor which lets you edit a string using functions similar to those available in DCL/insert/edit mode.
- \* An index unit which displays a multi-line, multi-column index of options and lets the student select from those options.
- \* A menu unit which lets you select from a menu of options.
- \* A keychar unit which will load and display a font of function keys like RETURN, PF1 etc.
- \* A locator unit which will invoke the terminal locator and return the x,y position of the locator and last key pressed. It works for GIGI, VT241, VT340 and Rainbow Regis(it is emulated for the Rainbow).
- \* A group of units which let you control the mouse on the VT340.
- \* A group of units which support random selection without replacement.
- \* A group of string functions.
- \* A unit which presents and evaluates a matching exercise.
- \* Many more functions and units.
- \* A help library which documents all the utilities with examples and notes.
- \* A help library which briefly describes all the DAL commands.

To use the units, just reference them in your DAL program and they will be incorporated at link time. Users can access the documentation by issuing commands like

```
$ help @dalutil util editor  
or  
$ help @dalcom erase
```

Call the CLEARINGHOUSE and save yourself some time and effort!

## DECUS

### EDUCATION SPECIAL INTEREST GROUP OPERATING PROCEDURES

#### Article I NAME

1. The name of the organization is the Education Special Interest Group, EDUSIG.

#### Article II PURPOSE AND SCOPE

2. EDUSIG is established as a SPECIAL INTEREST GROUP under the operating procedures of the DECUS/US Chapter.

- a. EDUSIG is established to serve its members having a common interest as follows:

- i. Promote the interchange of information and ideas concerning the utilization of computers, computer peripheral equipment, software, and other products and services marketed or otherwise made available by Digital Equipment Corporation (Digital) as they relate to education.
- ii. Advance the art of computer usage through mutual education and exchange of ideas and information.
- iii. Establish standards and provide channels to facilitate the exchange of programs and related information among EDUSIG members.
- iv. Provide ideas for future products and feedback to Digital on equipment, software, product services, and other needs which may arise.

- b. EDUSIG encourages participation and communication with other education computing related organizations. It should establish communications with the other International Chapters of DECUS as well as organizations such as EDUCOM, ACM, ADCIS, CAUSE, AACJC, LICC, NECC and IEEE.

#### Article III MEMBERSHIP

3. Any member of the DECUS/US Chapter who expresses the interests described in Article II above is accepted as a member of EDUSIG.

## Article IV STRUCTURE

### 4. Executive Council

The administration of EDUSIG is entrusted to an Executive Council composed of six representatives, elected by EDUSIG members, and a Digital Counterpart. Members of the Executive Council of EDUSIG serve a three-year term. It is generally expected that Executive Council members will attend both symposia, EDUSIG Woods Meetings and functional area meetings.

### 5. Officers

The Executive Council will elect, at a minimum, four officers from the six elected members: Chair, Vice-Chair, Symposium Coordinator, and Communications Coordinator. Each officer must be a member of EDUSIG. Officers will serve a one year term and may succeed themselves.

#### a. Chair

The Chair is the chief executive and operating officer of EDUSIG. The responsibilities of the Chair are:

- i. To perform the normal administrative functions necessary to the accomplishment of EDUSIG goals.
- ii. To preserve the partnership between Digital and EDUSIG.
- iii. To interface with Digital and DECUS as main liaison for EDUSIG which includes regular communication with the Digital Counterpart and DECUS staff.
- iv. To appoint ad-hoc committee members as necessary.
- v. To adopt interim procedures and policies when necessary on behalf of EDUSIG as a whole.

#### b. Vice-Chair

The Vice-Chair serves in the absence of the Chair. The responsibilities of the Vice-Chair are:

- i. To ensure that an appropriate record of meetings and other EDUSIG activities is made and distributed.
- ii. To be responsible for EDUSIG elections.

iii. To perform long range planning.

c. Symposium Coordinator

The Symposium Coordinator coordinates EDUSIG's activities for DECUS symposia. The responsibilities of the Symposium Coordinator are:

- i. To serve on and represent the interests of EDUSIG to the Symposium Committee of DECUS.
- ii. To solicit input from EDUSIG members.
- iii. To solicit support for sessions from the Digital Counterpart.
- iv. To organize Symposium submissions received and prepare a Symposium schedule.
- v. To negotiate scheduling with the DECUS Symposium Committee.
- vi. To solicit persons from the EDUSIG membership for any portion of these duties as might be deemed useful and expedient to their completion.

d. Communications Coordinator

The Communications Coordinator is responsible for EDUSIG communications of all types. The responsibilities of the Communications Coordinator are:

- i. To serve on and represent the interests of EDUSIG to the Communications Committee of DECUS.
- ii. To solicit communications from the Digital counterpart.
- iii. To work with the Newsletter Editor toward the editing and publishing of an EDUSIG newsletter.
- iv. To maintain close contact with the DECUS publication staff and have primary responsibility for the production and distribution of any hard copy materials EDUSIG may produce.
- v. To be responsible for any other ways in which EDUSIG communicates with its members.
- vi. To solicit persons from the EDUSIG membership for any portion of these duties as might be deemed useful and expedient to their completion.

e. Digital Equipment Corporation Counterpart

The Digital Counterpart is appointed by Digital Equipment Corporation to serve as liaison between EDUSIG and Digital's Education Industry Marketing Organization. It is expected that the person appointed will serve so as to build an effective partnership between EDUSIG and Digital to provide for continuity of communication. A multi-year commitment is desired.

6. Steering Committee

The Steering Committee is made up of members of the Executive Council and Ad-Hoc members appointed by the Chair upon consultation with other members of the Executive Council. The Chair may appoint any number of Ad-Hoc members as the business of EDUSIG requires. Ad-Hoc members serve at the pleasure of the Chair. Such members may include those with positions such as Seminars Coordinator, Librarian, Newsletter Editor, Session Notes Editor, Courseware Coordinator, Networks Coordinator, University Coordinator, Two-Year and Four-Year College Coordinator, Secondary School Coordinator, Associate Symposium Coordinator, Session Chair Coordinator, LUG Coordinator, Product Planning Coordinator, Liaison to Other SIGS and others as deemed necessary. Ad-hoc members serve for one year and may be reappointed by the Chair with the concurrence of the Executive Council.

7. Working Groups

The Chair may, from time to time, establish such working groups as the business of EDUSIG requires.

8. LUGS

The members of EDUSIG are encouraged to associate themselves with Local User Groups (LUGs) in their area, and all such LUGs are encouraged and invited to maintain communications with the EDUSIG Steering Committee.

Article V  
ELECTIONS

9. Nominations

- a. The EDUSIG Steering Committee, at its meeting at each semi-annual Symposium shall nominate a slate of candidates to fill one position on the Executive Council. This slate will be published by the Communications Coordinator in the first EDUSIG Newsletter following the symposium. Additional nominations may be submitted to the DECUS/US Chapter Activities Manager in writing with a statement of qualifications and the signatures of ten (10) EDUSIG members. Such nominations will be accepted for thirty (30) days after the publication date of the newsletter in which the nominations are first published.
- b. Should any position have only one nominee after the close of nominations, that nominee shall be declared elected.



10. Voting will take place at the following DECUS Symposium. All EDUSIG members present at the EDUSIG Business Meeting are eligible to vote. Run off elections between the top candidates will be held if no candidate receives a simple majority.
11. The person elected to the Executive Council will take office at the end of the symposium at which s/he is elected.

#### ARTICLE VI RECALL

12. Elected members of the Executive Council may be recalled at any time by a vote of the members of EDUSIG. The procedure for recall is as follows:
  - a. A recall petition stating the name and position of the Executive Council member(s) to be recalled, accompanied by a formal statement of the reasons for which the recall is being sought, is to be submitted to the DECUS/US Activities Manager. This petition is to be signed by a minimum of ten (10) voting members of EDUSIG, one of whom must be named as spokesperson for the group seeking the recall.
  - b. During the thirty (30) days following receipt of the petition, the petition may be withdrawn by a majority of its signers.
  - c. EDUSIG members will vote on the recall petition at the next DECUS Symposium during a scheduled EDUSIG Business Meeting. An Executive Council member will be recalled if two-thirds of the EDUSIG members present vote for recall.
  - d. The recall becomes effective immediately upon notification of the results of the election.
13. Elected members of the Executive Council may be recalled because of non-participation by a two-thirds vote of the Executive Council. Recall is effective immediately.
14. Vacancies created through recall proceedings are to be filled as are all other vacancies as specified in Article VII.

#### Article VII VACANCY IN AN EDUSIG ELECTED OFFICE

15. Should any elected position of EDUSIG become vacant, it will be immediately filled by the Executive Council member-elect for that position, should such member-elect be available. Should no member-elect be available, the Executive Council will fill the vacant position by a simple majority vote of the remaining Executive Council members. The term for such an appointment is the remaining term for the vacated office.

#### Article VIII GRIEVANCES

16. If a DECUS member has a grievance against EDUSIG, that person may petition for services to the DECUS SIG Council and through the normal petition cycle up to the Board of Directors.

#### Article IX AMENDMENTS

17. Amendments to these operating procedures may be proposed by the Steering Committee or by the written petition of ten (10) voting members of EDUSIG.
18. Amendments shall be ratified by a two-thirds (2/3) majority of the Executive Council.
19. Amendments to these operating procedures shall not conflict with any provisions of the DECUS/US Chapter Bylaws or Operating Procedures.

#### Article X IMPLEMENTATION

20. These operating procedures shall take effect immediately upon approval by a simple majority vote of the Steering Committee and acceptance by the DECUS/US Board of Directors or its designee.
21. Upon approval of these procedures, the current EDUSIG Chair shall become the EDUSIG Chair until the first election according to this operating procedure.
22. The EDUSIG Chair, with the concurrence of the Executive Council, will appoint persons to fill all other Steering Committee positions.
23. The first election will be held at the Fall 1988 DECUS Symposium.

#### Article XI INTERPRETATION

24. Should any dispute arise from the interpretation of these operating procedures, a simple majority of the Executive Council shall be considered the final authority for any interpretation. As in other disputes within DECUS, the normal appeals process is used, the final authority resting in the Board of Directors.





DECUS

# GRAPHICS

# From the Editor

## Bob Hays

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This is my second issue as editor, and there's more good stuff here this month. First, a bibliography from Steven Szep of Chase Manhattan Bank from Steve's talk at the Fall Symposium on "The Fractal Factory: What Mandelbrot Hath Wrought." The bibliography failed to make it into the session notes, so here it is!

Next up, "Mechanical CAD/CAM Workstation Applications Past, Present, and Future" from a set of viewgraphs provided by Bernie Barcellos, Chad Hansen, and Robert Schneider. This is a nice general overview of the history and coming developments in CAD/CAM. The article was edited by the editor based directly upon the slides submitted.

In general, I plan to write up slides as articles when time allows rather than just photocopy the slides directly; I think articles read better than viewgraphs in most cases. However, if viewgraphs come in that contain graphic images or the submitter requests, I will put copies of viewgraphs into the newsletter as-is.

Submissions are always welcome! Please send any tips, questions, articles or ideas to Bob Hays at the address at the left. As you can expect, I prefer electronic submissions which means tape (VMSBACKUP or RSX BRU) or on-line on DCS. Hopefully, I'll gain access to a major network this year, which would make electronic submissions even easier. However, if you cannot make a submission via electrons, use paper! I type mass quantities a couple of times a month.

I'd like to end with a question: how do you, the people getting this newsletter, feel about it? If you have any ideas about this newsletter in particular or the sum of the DECUS newsletters, please mail me a note. I am particularly interested in whether this newsletter should be in the same two-column format as the other newsletters, and how graphics can be integrated into the newsletter, since that is what GAPSIG is about.

# The Fractal Factory: What Mandelbrot Hath Wrought

## Steven Szep

Chase Manhattan Bank

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## Legend

- \*\* Recommended for people new to computer graphics.
- \* Recommended for people interested in a particular area of computer graphics.
- B Basic
- F FORTRAN
- M Modula-2
- C C Programming Language
- P Pascal
- L LOGO Language

# Mechanical CAD/CAM Workstation Applications

**Bernie Barcellos**

Matra Datavision, Inc.

**Chad S. Hansen**

3M Information Systems and Data Processing

**Robert A. Schneider**

Rockwell International Corporation

## History

CAD/CAM (Computer Aided Design/Computer Aided Manufacturing) began with the development of APT in the late 1950's. Although this was an important milestone, the system was not interactive; it was instrumental, however, in proving CAM concepts. The next major development was the light pen, which enabled interaction with CRT (Cathode Ray Tube) based RADAR systems. This marked the first interactive graphics capability.

The 1960's saw many large firms develop software for internal use; some of these programs went on to become commercial products. Project "Sketchpad" at MIT was the first interactive manipulation of graphics. "Sketchpad" was demonstrated in 1963.

The first dedicated CAD/CAM vendors appeared on the market in the late 1960's with "turnkey" systems. Some of the most important were: Calma with circuit board digitizing equipment in 1968, and Computervision and Applicon mechanical design software in 1969. The 1970's and 80's saw many vendors enter the marketplace, including Matra Datavision, Intergraph, and McAuto.

## Hardware

From 1975 through 1980, CAD/CAM hardware was characterized by large main frame systems using 16-bit technology operated from dumb terminals using poor communications systems. Vendor-provided workstations were largely based on proprietary designs, and the cost of the hardware for a CAD/CAM system required transfers of funds from Fort Knox!

From 1980 to 1983, most systems were in a host-terminal environment using 32-bit technology. This period saw the introduction of high-powered, stand-alone workstations. Communications improved over this period, and hardware costs came down a lot.

The period from 1983 through 1986 saw the population of stand-alone workstations swell to 40% of the market. These stand-alone systems became more powerful, and the hardware costs finally fell below software costs in many cases. Workstation development extended to many major hardware vendors, with PC development taking a major role in the basic CAD/CAM environment.

Today, workstations comprise about 65% of all CAD/CAM/CAE systems. High and low end systems are now available. Distributed networks now allow local CPUs to work with a central processor system. UNIX-based systems are here to stay!

## Software

From 1975 to 1980, software was only available from a limited number of vendors. The systems were 2D planar with no CAE (Computer Aided Engineering) tools. As 1980 came around, 3D wire frame technology was introduced. Research and development was done in a vacuum. Users had to be imaginative and expert in using the selected CAD/CAM system. Software costs were much less than hardware charges.

Between 1980 and 1983, 3D surface technology was perfected and introduced in products. Software provided color, shaded images with multiple windows and simultaneous active views. CAM applications began to get attention. But, the systems still required a dedicated user.

Solid modelling became a reality in the period from 1983 through 1986. CAM became a major development area. New and improved algorithms for hidden line removal and multiple light sources were developed. CAE and CAM production systems appeared. Perhaps the largest area of improvement was in the user interface, which became much easier to use, which allowed occasional users to perform CAD/CAM operations fairly quickly.

Since 1986, solid modelling has become state of the art. The database for a CAD/CAM system has become the key for most advanced packages. End-to-end solutions are now available with solid modelling. Systems have become more user friendly. Software vendors are now providing software for standard hardware platforms, and the cost for software has decreased, but still exceeds the cost of hardware in most cases.

## Users

Most of the systems developed between 1975 and 1980 were used by large, government-supported contractors who didn't know the level of commitment required in this early stage of development.

From 1980 to 1983, the technology began filtering down to medium sized companies with less beta testing and experimental conditions. Drafters became the largest group of users. There were, however, not too many success stories, as gains from adding CAD systems still resulted in only slightly more than 1 to 1 returns.

Downstream benefits began accumulating from CAD/CAM/CAE use between 1983 and 1986. However, the product pool became confused due to the influx of many vendors and the PC environment. Manufacturing groups finally became involved in product development.

Since 1986, CAD/CAM/CAE has penetrated to even very small companies. Users now range from very sophisticated to very occasional. There is now a desire for UNIX-based systems.

## The Future

Look for hardware costs to continue to decline but performance to improve. PC-based workstations as we know them will play a less important part in CAD/CAM environments. UNIX will become a standard to the benefit of all users. Communications will become more transparent and faster. Windowing will be standardized to make software more portable. At the high end, stand-alone workstations will be available that allow interacting with real-time rotations of shaded images, hidden lines, and wire frame models.

Software costs will continue to decline and exceed hardware costs. More software will automatically include information for manufacturing that is transparent to users. Integration between software packages will continue to improve. Database systems will become the key to success.

Users will have workstations on their desks in the future, with the workstations accommodating all the user's needs. Casual use will diminish, and engineers will become more involved in down-stream processes. Evaluation will be done hands-on. Networks will allow any size company to share information between systems.





# HARD

# NEWS

The Newsletter of the DECUS Hardware/Micro SIG

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FROM THE EDITOR -- Carmen D. Wiseman

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DEADLINE FOR THE NEXT ISSUE: APRIL 25, 1988

You may have noticed something of an HMS newsletter drought over the past couple of months. That's because of some unexpected turbulence in the life of Yr. Obt. Svt., and not because of a shortage of material--far from it! Actually, we now have enough Hard News copy to fill the newsletter for several months to come.

When those issues appear, however, there will be a different name on the Hard News masthead. As of February 29, I became a part-time Digital Review editor and a full-time employee of Literacy Volunteers of Massachusetts (LVM), a nonprofit organization that matches functionally illiterate adults with volunteers for one-to-one tutoring in reading, writing and other basic skills. It's a wonderful and worthy cause, and I'm delighted to be a part of it.

The only glitch is that to work both a full- and a part-time job, I've had to give up a few things. One of them, I'm sorry to say, is DECUS. There are several reasons for my decision to curtail my DECUS involvement. First, I won't be able to attend the symposia because of my commitments to LVM. Second, I really don't have the time to do the newsletter any more. Finally, LVM uses (gasp!) IBM PC clones, so I'm not spending that much time with DEC equipment.

Don't worry, though--now that I've brought Hard News up to fighting weight, I'm not going to let it die. My replacement will be Gene Grygo, a capable young assistant editor at Digital Review. While I teach him the ropes, Gene will also serve as assistant editor of Hard News for a couple of issues. He'll probably take over in time for the summer issues, and you'll see him at the May

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symposium in Cincinnati in any case. Don't be shy about giving him the same kind of help and great material you've been giving me!

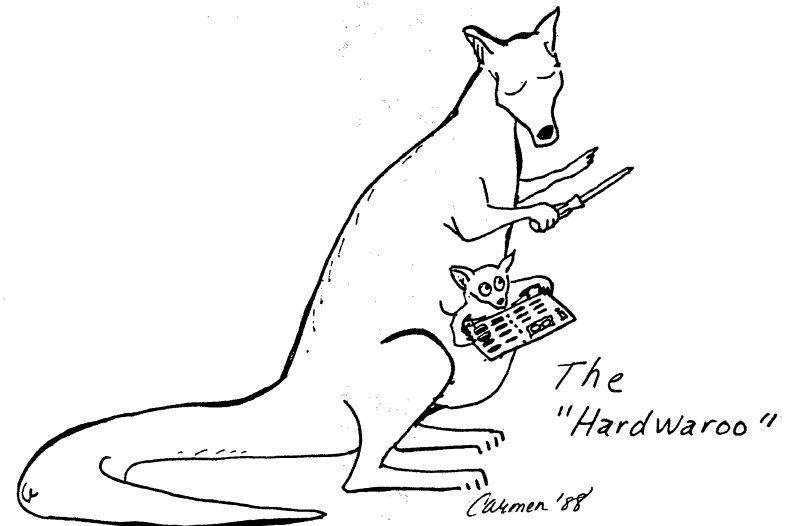
Speaking of which, wait 'til you see the goodies I've crammed into this issue of Hard News--almost all contributed by readers. Stanley Rosen has thoughtfully accumulated most of the engineering and field change orders given out at the fall 1987 symposium in Anaheim. There are some interesting nibbles 'n' bytes from Michael Lamboley and Bob Whitefield. Bill Wallace offers pertinent disk and CPU benchmark results. And Scott Taylor, who did a memory benchmarking article in last year's HMS newsletter, returns with a tutorial on disk benchmarking that might contain a few surprises. (The second installment of Scott's article provides the results of his testing, and will appear in the next issue of Hard News.)

Well, there it is. I bet you'll find at least one thing of value in this issue, so join me in extending humongous thanks to all the contributors.

If you'd like to get lavishly praised in print and also receive a free issue of Hard News and perhaps some other form of graft, take a look at the guidelines for contributors on the next page.

Until next month, happy trails!

cdw



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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 editors, Carmen Wiseman or Gene Grygo, 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 editors 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 editors via EasyLink mailbox 62960090 (be sure to say TO: Carmen Wiseman or Gene Grygo 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 (or Gene Grygo)
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 (9 a.m.-1 p.m. EST)

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FCO/ECO CORNER -- Stanley M. Rose  
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Field Change Orders from the Anaheim DECUS

Stanley M. Rose  
Vice-President, Distributed Processing Technical Support  
Bankers Trust Company  
New York, NY

NOTE

This article is a compilation of FCOs that were presented in various sessions at the 1987 Anaheim symposium. I have listed the individuals who gave the sessions. Please keep in mind that each session provided different amounts and types of information.

The following FCOs were provided by Jack Toto in session H046, "Hardware ECO Update":

KDJ11-A M8192-MK009  
upgrade to rev etch C1  
Part 21-21858-05

KA630 (MicroVAX II)  
M7606-AH upgraded to M7606-AS  
ECO M7606-ML006  
Upgrade kit #EQ-01358-02  
Fixes memory errors under Ultrix

MS630-A (MicroVAX II memory)  
M7607-AH upgraded to M7607-AS  
Fixes machine check "80" (under Ultrix?)

RQDX3  
M7555 upgraded to etch rev D1  
ECO M7555-ML003 6/86  
Fixes IRQ Detect Logic error

RQDXE (External RD Drive)  
M7513 upgrade to rev level B1  
ECO M7513-ML001 12/12/86  
Fixes corrupted data and/or loss of drive format

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Upgrade to rev level F1  
ECO M7513-ML002  
Fixes signal lines not properly terminated

DEQNA  
M7504  
ECO M7504-MK005  
Upgrade to rev level E1 (Note: Current revision is much higher.)

TQK50 M7546  
ECO M7546-SH002 4/4/86  
Upgrade to rev level B2  
Board has intermittent short circuits

ECO M7546-SH003 6/17/86  
Upgrade to rev level C1  
new EPROMs

ECO M7546-SH004  
Upgrade to rev level D1  
Fixes a problem with PDP-11 memory

ECO M7546-SH005 2/2/87  
Upgrade to rev level E1  
Replaced EPROMs

ECO M7546-SH006 8/5/87  
Upgrade to etch rev level F1  
Fixes a bus grant problem

BA23-A  
ECO BA23-A-MK003  
Upgrade to BA23-A rev C1  
Power cable replaced with higher-capacity cable

ECO BA23-A-MK004  
Upgrade to BA23-A rev D1  
Connector replaced with higher-capacity connector

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The following FCOs were provided in session N030, "Communications Hardware and ECOS," by Ed Badger, Perry Sutton and Brian Williams:

DEBNT  
All DEBNTs will be replaced with DEBNAs, rev F  
Upgrade kit #EQ-01486-01

DEBNA rev D  
To be upgraded to DEBNA, rev E  
Upgrade kit #EQ-01500-01

Notes: (1) DEBNA rev E and rev F are functionally identical, and differ only in board layout. (2) Harriet Cohen stated in session V070, "VMS Update," that the DEBNT will not be supported under VMS, effective with V4.6.

Both revisions of the DEBNA also need the following:  
New ETdriver: Part #EQ-01500-02 (Good for V4.5 and V4.6)  
New Diagnostics: Part #EQ-01500-03

DELUA  
M7521 to revision F1  
(FCO to be available in spring '88.)  
Fixes:  
(1) Self-test problem on 83XX processors  
(2) Problems with TSM/LAT/LAVC (slowdowns)

DEQNA  
M7504 to rev K4  
Problems:  
(1) Late collision may cause data to be altered on receive packet.

DEBET (LAN Bridge 100)  
Upgrade to rev E8  
Upgrade kit #EQ-01479-01  
Fixes:  
(1) Overrun of Ethernet address table in large networks.  
(2) Forwards loopback messages with wrong next address.  
(3) Supports LAN Monitor.

DEMPR  
Upgrade to rev C1  
Upgrade part #EQ-01491-01 (120volt)  
#EQ-01491-02 (240volt)  
Fixes:  
(1) Cable short brings down whole network. Revised unit segments the shorted section from the whole.

DMB32  
Upgrade of module T1012 to rev H2  
ECO to be issued in late spring  
Fixes:  
(1) Printer port performance  
(2) Receive sync characters

DMZ32

Upgrade of module M8398 to rev H1  
Upgrade kit #EQ-01457-01

Fixes:

- (1) DMA transaction timing problem
- (2) Split-speed baud rate problem
- (3) Received incorrect character problem

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The following information was supplied by Alan Schmidt in a "birds-of-a-feather" (BOF) session on PRO 380 consoles, and applies to the 85XX, 8700 and 8800 processors.

Revision 7 of the PRO console code was scheduled to go to the SDC in mid-January, with availability after the normal ramp-up time. Rev. 7 fixes most of the outstanding problems, including loss of time on a reboot.

Schmidt presented the following chart:

Diagnostic Version	Diagnostic Release Name	Console Version	
22D	22	D	
22E	22	E	
28	28	E	
29	29	F/6.0	
30	30	G/7.0	1/88
31	31	??	Q4/88

HARDWARE HINTS AND KINTS -- M. Lamboley and B. Whitefield

Warning: Soft Errors Ahead

Some time ago, Standard Memories in Irvine made an ill-advised change to its manufacturing process. This was soon discovered and corrected. None of the substandard boards ever failed, however, so Standard Memories decided not to recall them.

Unfortunately, by the time Standard Memories had deemed it was too late for a recall, people had begun to upgrade the systems into which the memories had been inserted.

The board failure rate varies widely, depending on just what kind of upgrade is putting the increased pressure on the boards. For an upgrade similar to the one we underwent, the failure rate is about 20 percent. (Our system currently operates with 12MB of

memory.)

We sent the offending boards back to Irvine for a no-charge repairs. While they were being repaired, I learned a bit more about the problem.

Standard Memories apparently didn't know about the failures until people started calling the company to describe strange errors in bit 37. By the time users had figured it out, a pattern had already established itself. People would see soft errors and call Standard Memories. There were never any crashes or actual damage, though, so Standard Memories determined that no mailing to the board owners was called for. Our site was an exception to this pattern.

Although I'm sympathetic, I'm not convinced. At least in hindsight, the company should have anticipated the potential for wasting a lot of people's time by making it appear that an upgrade was causing perfectly good boards to log errors. When there are problems, it is natural to suspect newly installed components, rather than those that have been working fine for years.

Michael Lamboley  
VAX Systems Manager  
General Research Corp.  
Santa Barbara, CA

Reinking LA100/LA210 Ribbon Cartridges

There is a relatively easy (if messy) way to reink the cartridge ribbon used by the LA100 and LA210 printers. All you need is WD-40 and the printer itself.

The cartridge contains an ink reservoir tube (at least, DEC's ribbons do) that can be refilled. Since there is usually plenty of dried ink left on the ribbon, applying WD-40 will restore it to almost new quality. The nonprinting self-test mode of the printer (which just moves the cartridge back and forth) can be used to distribute the WD-40 evenly over the ribbon.

I have reinked a single cartridge as many as five times [including the one used to print the original copy from which this item was taken--ed.], but the time required in the printer increases somewhat each time you reink.

Here's how to get your hands dirty (I use disposable gloves and lots of newspaper):

Using a small screwdriver, carefully pry open the left side of the cartridge (it's the one without the knob). Remove the ink reservoir and pull off the black cap. Spray some WD-40 into a small container. Pour the WD-40 into the top of the reservoir tube until it begins to leak from the bottom. Pour a few drops into the black cap and put it back on the tube. Place the

reservoir back in the cartridge. Be sure the felt pad on the reservoir is pressed tightly against the center of the roller by the metal spring. Snap the cartridge closed.

Place the cartridge in the LA100/LA210. If margins are set, power the printer off and on again to reset them. Place the printer in nonprinting self-test mode. On the LA100, you do this by pressing the OFF LINE and SELF TEST buttons down, and then pressing FORM FEED three times. The procedure for the LA210 should be similar.

Let the printer run for at least 30 minutes. Check the print quality periodically until it is dark enough. It is quite possible to overink a ribbon, particularly if it has never been reinked before.

By the way, while you've got the WD-40 handy, this is a good time to lubricate the carriage shafts. And no, I don't work for the company that makes WD-40!

Bob Whitefield  
Decatur, AL

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BENCHMARK BLITZ, PART I -- Scott Taylor

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EDITOR'S NOTE

An abridged version of this article appeared in a DEC-related trade publication last year. The author was dissatisfied with the way the article came out in print, and because he felt that important information had been deleted or munged, he submitted the original article to HARD NEWS. He apologizes for any incorrect, inaccurate or misleading material that appeared in the commercially published version.

Scott Taylor has put a lot of effort into benchmarking DEC-compatible disk controllers and drives from several manufacturers, and he tells it like he sees it. In this issue of HARD NEWS, he presents an overview of disk subsystem specs and how they affect benchmarking. Several short benchmarking tutorials and the results of Scott's labors will appear in the next issue. If you'd like to talk to Scott about this material, give him a call at (714) 868-1319 (desk) or (714) 868-6035 (lab).

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DISK CONTROLLERS: WHAT DO THE SPECS MEAN?  
WHICH ONES REALLY COUNT?

All else being equal, if time is money, faster is better. But it's not quite that easy when you're evaluating disk controllers.

I have evaluated ESDI disk controllers from Aviv, Sigma, Webster, Micro Technology Inc. (MTI), Dilog and Emulex. In my benchmark tests, I used Maxtor XT-8760 and CDC Wren 3 drives, along with memory boards from Andromeda and Clearpoint. In this article, I'll tell you some of the things I've learned to watch out for in assessing controller and drive performance.

Controller Specs

In reading controller specs, the tough part is knowing what counts and why one controller can be--and is--faster than another. When you truly understand what's behind the specs, you can clear up some common misconceptions resulting from clever marketing.

For instance, if you think high-performance MSCP controllers are being designed with the MicroVax II (and now the MicroVax 3500/3600) in mind and not the PDP-11, consider this: All the ESDI disk controllers I evaluated contain on-board bootstrapping

capabilities for booting 2 to 13 devices, and these bootstraps must be disabled when the controller is used with a MicroVax. (By the way, the same is true of most ST506, SMD and SCSI controllers.)

A note of caution: Many people look at a set of disk controller benchmarks and decide that the controller with the fastest benchmark time will be the fastest controller for their application. This may be true for a specific benchmark. But the number of users, the frequency of disk accesses and the amount of disk fragmentation are all factors that change from day to day and even minute to minute--and can have an overriding effect on disk performance.

#### General Assumptions

Unless otherwise mentioned, I am assuming in this article and the one to follow that operating system overhead, disk rotational latency and head-seek times that are not determined by the controller are equal for all controllers. But it is important to keep in mind that while these times are equal, they're also the major time-consuming elements (50 percent or more) in disk accessing.

Is a megabyte one million bytes or 1,024 x 1,024 bytes when you're talking about transfer rates? The same question can be asked about kilobytes. Several definitions were presented by several manufacturers. The safest way is to ask the source of the particular data sheet. For this discussion, megabytes are one million bytes and kilobytes are one thousand bytes when used as transfer rates. One kilobyte is 1,024 bytes and one megabyte is 1,024 x 1,024 bytes when used to describe capacity (i.e., memory or disk size).

#### Drive Specs

If you're looking for the fastest disk subsystem, start with the disk drive. Controllers can do a lot, but if a drive is slow, it will stay slow.

The clock rate for a drive indicates the rate at which data will be transmitted when it is actually under the head. Because of gaps between the sectors, headers, phase-lock bytes and spare sectors, the number of bytes actually being used is 80 to 85 percent of the total number of bytes per track. At 15 MHz, this comes to 1.5 to 1.6 MB/sec; at 25 MHz (SMDE drives), this is 2.5 to 2.65 MB/sec. (These figures are peak numbers that drop rapidly--below 1 MB/sec in some cases--if track seeks, bad-block replacement or head switching is involved.)

When transferring data from a disk to memory, the rotational latency will be 0 to 16.67 msec, the head seek time 10 to 30 msec (or more) per track, the controller overhead 1 to 8 msec, and the operating system overhead up to several milliseconds, depending on operating system and current operation.

Benchmarks, including the ones for this article and the next, generally eliminate the effects of such delays with the understanding that they are common to all controllers and therefore don't count. Well, they are, and they don't--at least, not until the controllers are placed in the real world where real results are expected.

In real-life situations, the dominant factors in the overall transfer rate are the rotational and head-seek latencies, which average near 23 msec for fast drives. You also need to figure in operating system overhead, which varies from about 1 msec to tens of milliseconds.

Disk drive rotational latency and head seek latency are random, a result of the last request and elapsed time since that request. Operating system overhead is constant if the same operating system and driver are used for all controllers. One block (512 bytes) of data can be transferred from disk to memory in under 300  $\mu$ sec. This leaves controller overhead as the single most significant factor in overall transfer performance that a disk controller can effect--a range of over 400 percent in the ESDI controllers I tested, but still less than 25 percent of the average time taken for a complete disk access.

#### Spiral Offsetting

Also known as track skewing, spiral offsetting is a means of allowing for disk drive head-switch and seek times. A controller takes time to switch heads on the drive, and the drive takes time when moving the head from one track to another. To avoid having to wait for the disk to rotate an entire revolution when switching or moving heads, the next track begins where the disk will be when the new head becomes active.

If a program reads a large contiguous section of a disk, head switches occur only 3 percent of the time and head seeks only 0.2 percent of the time for the CDC Wren drive (both are averages), and two-thirds of these percentages for the Maxtor drive. This is a good argument for keeping disks from fragmenting in operating systems that allow it to occur (RSX, VMS and others).

The result? Spiral offsetting, while impressive and apparent for benchmarking, will mean very little to the average application. A single request can only cause one head seek and two or three head switches (using the CDC or Maxtor drive), and only for a maximum request of 128 blocks, assuming the files are contiguous. A 128-block transfer rarely occurs, and is also a ceiling for VMS and the LSI operating systems.

Thus, head seek spiral offsetting is valid for one track seeks only and requires:

- (1) that the head-switch spiral offset be zero; or
- (2) that the seek/switch be from the last sector of the last head

to the first sector of the first head, or from a sector using one head on one track to the same number sector using the same head on the very next track. The seek/switch must be one of these alternatives, not both or either (controller-specific).

Head seeks of more than one track, or a seek with a head switch when head-switch spiral offset is not zero, will always cause a rotational position delay.

#### Controller Performance Tradeoffs

Here are some techniques that allow a controller to "cheat":

- o Storing portions of a disk in separate memory on the disk controller (called "disk cache memory")
- o Reading ahead in anticipation of the next request.
- o Processing multiple requests for transfers simultaneously and executing them in the order that requires the smallest amount of head motion and disk rotation.

In many applications a program will ask for the same data to be read from the disk more than one time during program execution. By storing or caching the data read from the disk in the controller the first time it is requested, the controller can supply the same data from its cache for each subsequent request without having to wait for the disk-drive-related delays.

The catch is that not all data will be asked for again, at least not before the controller uses the same portion of its cache to store some other section of the disk. Storing data in the cache usually takes extra time. If the desired data has been written over or flushed, the time taken to store the data is wasted.

The larger the cache or the more complex the caching algorithm, the less often this will occur. If the controller can supply the data at least one time from its cache, the extra time is well spent. Writes must eventually go to the disk lest data could be lost at system shutdown or power failure, so caching doesn't add much for writes.

"Read-ahead" assumes that if a program requests a block of data to be read from the disk, it will very likely request the next sequential block or blocks to be read at a later time. Since most of the time taken to read data from the disk involves finding it, time can be saved by combining the current read request with the next anticipated request(s). Again, if the program actually does issue several consecutive requests, performance improves; if not, the time taken to read the extra blocks could delay the next read.

When a controller has commands to execute, it can sort them in several ways: none, nearest, forward; start from the outside track working in, then jump back to the outside or elevator; or work in and then back out, changing directions only at the outer and innermost requests. "Closest" and "none" sorting could prevent a request on an outer track from being executed if usage were heavy on the middle tracks. To prevent this, a "fairness value" can be set, so that a command that has been passed over a "fair" number of times would become the highest-priority request (does not apply to "none" on some controllers).

The more requests a controller has at one time, the greater its overhead due to command sorting and cueing. This increased overhead is traded off for reduced disk drive seek and rotational delays. The result is that the optimum number of commands will be less than the maximum number a controller will allow. Controller manufacturers recommend an average value as a place to start; beyond that value, system and application-specific testing will show what number is best.

When a requested file is fragmented, what looks like a single request from the user's point of view is actually one request per file fragment. Some operating systems (e.g., RT-11 and TSX) do not issue multiple requests using DEC-supplied drivers, and do not take advantage of this option.

The number of blocks to read ahead is actually set indirectly on the boards tested. The user sets the minimum number of blocks to be read for any request. If the requested number exceeds this amount, no additional blocks are read.

#### Drive Transfer Rate and Performance

Disk drive transfer rate sets an upper limit on disk controller performance. Read tests were performed using a 10 MHz CDC WREN III drive and a 15 MHz Maxtor XT-8760 drive; write tests used the CDC drive only (the Maxtor drive had already been returned). The difference during writes for all controllers and reads for noncaching controllers was due to the transfer rate differences between the drives, 10 versus 15 megabits per second. On caching controllers, read speed was independent of the drive transfer rate if the desired data was in the controller cache. Drive capacity itself does not directly affect transfer rate, but can reduce the number of track-to-track seeks required.

Both the CDC and Maxtor drives spin at 3600 rpm. The 10 MHz CDC drive has 34 to 36 sectors per track, and the Maxtor 15 MHz drive has 51 sectors per track. As a result, on the 15 MHz drive, data passes the head 50 percent faster, or 50 percent more data passes the head in the same period of time. This translates to a 50 percent higher drive-to-controller transfer rate once the data is under the head. Latency to rotate the data to the head is the same on both drives.



Controller-to-memory direct memory access (DMA) transfer rate has little to do with overall transfer speed. For the controllers that used burst-mode DMA when block mode was not available, the overall transfer rate didn't change even though the DMA transfer rate decreased a minimum of 33 percent.

The truth about the DMA transfer rate, as applied to a disk controller, is that this variable need not affect overall transfer speed until it drops below the drive-to-controller transfer rate of 1.105 MB/sec for the 10 MHz drive and 1.566 MB/sec for the 15 MHz drive (currently the fastest available ESDI rate). New SMD drives have peak transfer rates near 3 MB/sec, making controller-to-memory DMA transfer rates an important factor for small transfers that don't require head switches or seeks.

What the DMA transfer rate did determine, however, was the amount of bus time (bandwidth) left over for the CPU and the other devices on the bus. The simplest way to measure this was to issue a request to the disk controller and then start incrementing a variable, starting at zero, until the request was complete. The ratio of results between the different controllers gave a measure DMA efficiency, with higher numbers indicating more efficient bus use by the disk controller and memory if the overall transfer time was the same.

This value is greatly CPU-dependent; therefore, all controllers were tested with the same CPU. Note: The MicroVax II is an exception due to its private memory. It can function independently of Q-Bus DMA activity, and is relatively unaffected by Q-Bus DMA transfer rate. PDP-11s, however, can support a considerably higher DMA transfer rate.

Q-Bus DIN to REPLY and REPLY to DIN times are two variables that the Q-Bus specs give as having no minimum. These times directly affect DMA transfer rate, but are dependent on the slave--in this case, memory. Based on the results of a memory comparison I did a little while ago (see Hardcopy, January 1987), I selected the two fastest memory boards, the Andromeda MM22 and the Clearpoint Q-Ram 44 (with 120-nsec DRAMS), to compare DMA transfer speeds.

Although both boards were evenly matched as seen from the CPU, the following differences were observed during block-mode DMA transfers when using three different disk controllers:

DMA Transfer Rate	Difference
3.5MB/sec	10.9%
2.5MB/sec	3.8%
>2MB/sec	no diff.

Originally, the Andromeda memory was incompatible with an FPJ11 floating-point chip problem: If a divide by zero occurs, the memory's contents can become corrupted. (This does not apply to 11/73 floating-point microcode.) Andromeda eventually sent a board

with new PROMs to correct this problem, thereby making its DMA transfer rate approximately equivalent to the Clearpoint board in some cases. Several other memory manufacturers still have not corrected the floating-point incompatibility problem. (See the March 1987 edition of the HMS newsletter for a test program.)

#### Words to the Wise

Failures do occur, even after thorough testing and burn-in. If a controller does not appear to be functioning correctly, reread the manual, make several attempts and then call for telephone technical support. Of the eight controllers I received for evaluation, one was dead on arrival, one died before testing was completed, and two were not the latest revision.

Finally, it should be pointed out that all of the disk controllers I evaluated are regularly upgraded by their manufacturers. One of the most recent upgrades was to provide 15 MHz drive compatibility. Thus, options offered by some of the controllers are not fully mature, or even operational.

Here, then, are some important questions to consider when choosing a controller:

- (1) What features are functional now?
- (2) What additional features are anticipated and when will they be available?
- (3) Are firmware or ECO upgrades included, and for how long? How much will they cost if not?

The answers to these questions will indicate if a manufacturer is concerned with producing and maintaining a high-quality, high-performance product line or just selling controllers as fast as possible. On-site technical support, same-day telephone support and 24-hour replacement policies are also very important.

BENCHMARK BLITZ, PART II -- William L. Wallace

	11/73 RM02	11/84 RM02	MV-II WREN3	VAX780 RA81	cluster VAX785 RA81
CPU Benchmark:					
Compile & link	42"	29"	9"	6"	9"
Run	8.8"	6.1"	1.6"	1.3"	.96"
Disk Benchmark:					
Compile & Link	51"	34"	10"	7"	11"
Run Random	77"	39"	32"	33"	65"
Sequential	49"	28"	24"	23"	30"
Total	126"	67"	56"	56"	95"
Overall Batch Times:					
CPU seconds					
Best	100"	83"	39"	36"	27"
Average		87"	41"	38"	31"
Maximum		101"	42"	39"	35"

Elapsed seconds					
CPU seconds					
Best	237"	144"	86"	76"	122"
Average		171"	104"	201"	344"
Maximum		241"	157"	334"	957"

MICROVAX-II TIMINGS

disk & ctrl.	Random	Sequential	total
RD53/RQDX3	59"	43"	102"
RA81/KDA50	32"	39"	71"
CDC9715/EMX-SC03	44"	36"	80"
CDC-WREN3/DILOG656	32"	24"	56"
FUJ.2361A/EMX-QD32	33"	23"	56"

ETHERNET TIMINGS

Move 20,480 blocks (RL02 size file)

systems	elapsed time	eff. rate
PDP11/73 to MICROVAX-II (RM02) (RD53)	1170 seconds	71.1 KBaud
MICROVAX-II to MICROVAX-II (RD53) (RD53)	316 seconds	265.5 KBaud

DMR11 TIMING (64 KBAUD)

Move 1,250 blocks

systems	elapsed time	eff. rate
MICROVAX-II to VAX11/780 (RD53) (RA81)	111 seconds	46.0 KBaud

ETHERNET BRIDGED OVER T1 CARRIER

Move 10,240 blocks (RL01 size file)

systems	elapsed time	eff. rate
MICROVAX-II to Clustered VAX785 (Wren-3) (RA81)	105 seconds	399 KBaud
MICROVAX-II to Clustered VAX785 (CDC9715) (RA81)	122 seconds	344 KBaud
MICROVAX-II to Clustered VAX785 (RD53) (RA81)	178 seconds	235 KBaud

ETHERNET BRIDGED OVER T1 CARRIER  
REROUTED OVER 64 KBaud DMR11

Move 10,240 blocks (RL01 size file)

systems	elapsed time	eff. rate
Clustered VAX785 to VAX11/780 (RA81) (RA81)	845 seconds	49 KBaud
Routed through MICROVAX-II		

BACKUP TIMES, MICROVAX-II

=====

(BACKUP/VER/REW/NOCRC)

disk drive	dir.	files	blocks	TK50	CIPHER-990
RD53	32	1518	81,330	44.6'	17.3'
CDC9715	391	749	144,391		42.8'
CDC9715	188	3489	92,367	64.2'	
WREN-III	18	740	53,936	27.7'	
WREN-III	31	1517	81,110		15.4'

BACKUP TIMES, MICROVAX-II

=====

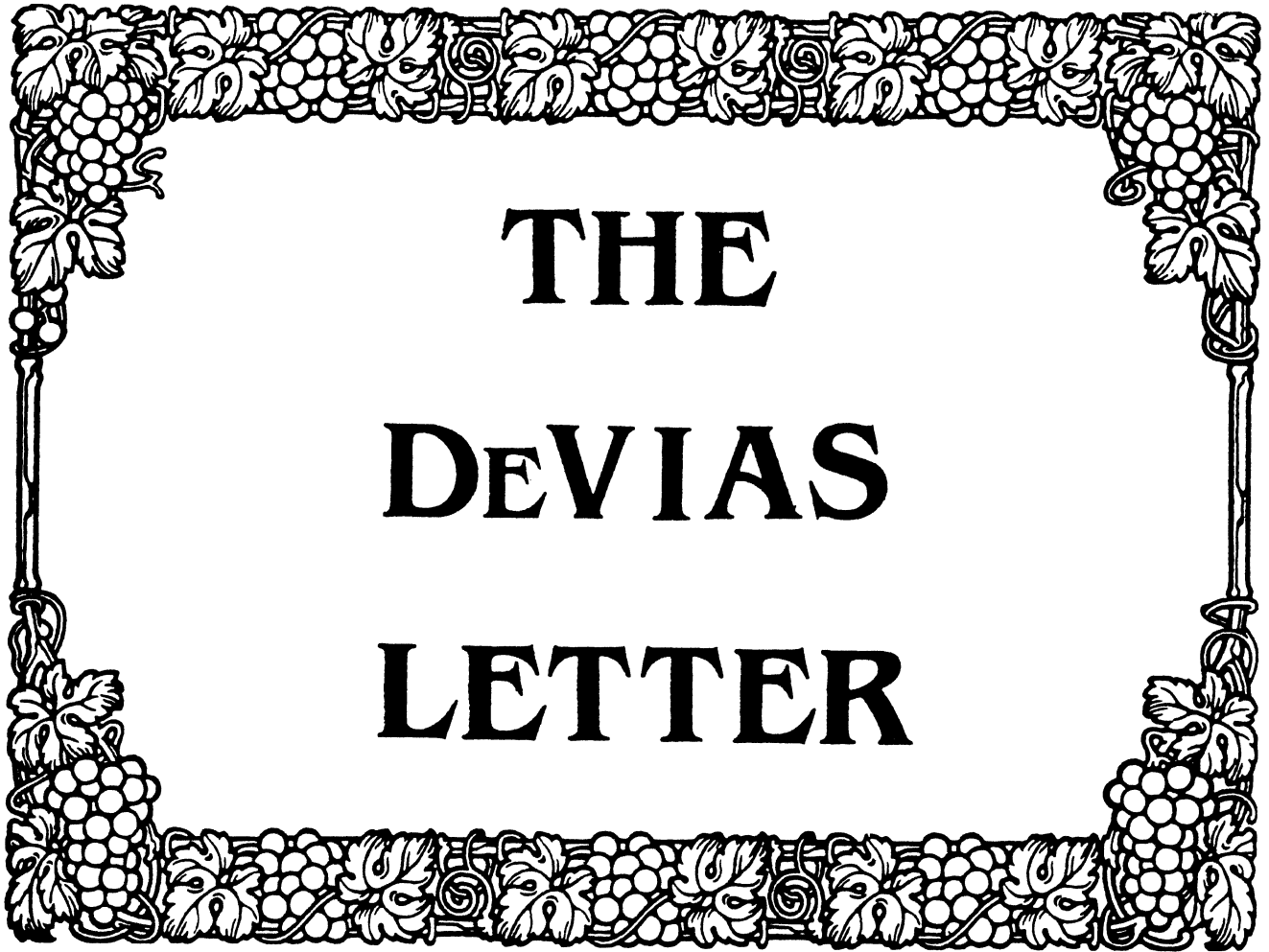
(BACKUP/VER/REW/various options)

(RD53 to TK50)

default (/CRC/BUF=3/BLOCK=8192)	52.6'
/NOCRC	38.4'
/BUF=5	62.5'
/NOCRC/BUF=5	34.1'
/NOCRC/BLOCK=32768	29.3'

(32 dir, 1518 files, 80576 blocks)

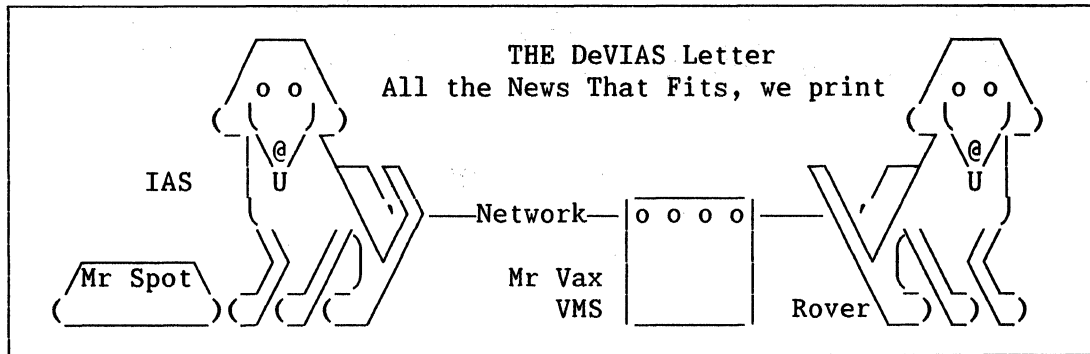




# THE DEVIAS LETTER

IAS

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CONTRIBUTION  
GUIDELINES

Contributions should be sent to:

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

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

Non machine readable sources, (SPR's etc,) should be reasonably dark to insure good photocopying. Text should be 66 lines at 6 lpi, with 4-line top margin, 5-line bottom margin, left-margin 10, right margin 74 at 10cpi. We can also accept submissions by FAX.

Contributions may be submitted on 9-track Mag-tape, (800,1600, 3200 or 6250 BPI,) DEC-tape II, DecMate floppies, or whatever. We're not fussy, we'll even accept paper tape or cards. Preferred format is DOS or BRU for tapes, Files-11 otherwise.

We have 1200 baud modems on our IAS system and our VAX, with KERMIT for electronic submission. Give the editor a call @ (312)-791-2515 (pre-

ferably later in the day,) to obtain access information, etc. Any media sent to us will be promptly returned.

If you have a problem you would like to submit to the Devias wizzard, write a letter or fill out a copy of a standard SPR and send it to the Editor at the above address. Answers to problems from members (or anyone) should also be sent to the Editor.

FROM THE  
EDITOR'S KEYBOARD

You can tell it's nearing the newsletter deadline, the LNO3 is acting up again. The fuser unit seems to be on all the time, and after several hours of power on, the unit overheats. Currently we're running on a "Turn it on when you need it" basis.

Guess what. DEC service was just here and could find nothing wrong. Their only disclaimer was that the room was too warm. (It was 76 degrees, and the LNO3 manual quotes operating temperatures of up to 90 degrees.) So much for DEC's statement in DECdirect that "You can use it in an open office...."

That same service person also told us that the ready indicator flashed during the warmup period because "There was a zener diode in the unit that had to warm up." (And if you believe that, I've got this little used PDP11/60 with RK07 drives for sale cheap.) Oh well, when it really goes down for the count, we'll move it into the computer room and then call DEC again. Anybody wonder why the third-party service market is a booming business?

A couple of issues ago, I included some disparaging remarks about RT11 coding standards, and the lack of any source code comments in our copy of the card reader handler. I was properly chastised by Milton D. Campbell, who "Leapt to the defense of the RT-11 Development Group." Milton informed me that the standard RT-11 distribution removed all comments except copyright to reduce the size of the distribution. He also "often wished for commented sources." Guess what Milt, in the earlier days of RSX11D, the teletype handler was distributed commentless on the system disk, to reduce the size of the distribution. But if one went to the full distribution magtape, one got the commented version. I don't think it would cost the RT11 group much to provide a fully commented distribution on a suitable media as an extra cost option.

Milt's closing comment, thou, was wonderful. "In any case, I imagine that all the development groups are about equal in terms of code quality, which means of course that it is not as good as you or I would do, but better than average."

Lynda Roenicke has provided an advanced look at the Spring meeting in Cincinnati. Your editor likes the new format of putting things

together rather than scattering it all over the week. Thanks for the great work Lynda.

SPRING DECUS IAS SCHEDULE
------------------------------

Tuesday is IAS day

9:00- 9:30	Opening session/roadmap
9:30-10:00	IAS Product Panel
10:00-11:00	An Autodailing Device Handler for IAS
11:00-12:00	The Internal Structures of RMS-11 Indexed Disk Files
12:00- 1:30	Files-11 ODS-1: The on-disk structure for PDP-11 systems
1:30- 2:00	The Real RSX-11D Programmers Nostalgia Quiz
2:00- 3:00	IAS User Forum
3:00- 3:30	IASSIG Planning Session

Wednesday is Working Group Day

4:00- 4:30	IAS SIG Library
4:30- 5:00	IAS+ Working Group
5:00- 5:30	RSX-11D Working Group
5:30- 6:00	AN/GYQ-21(V) Working Group

Thursday we finish up

6:30- 7:00	IAS Closing Session
------------	---------------------

TEN YEARS AGO THIS MONTH
-----------------------------

The report on the Fall 1977 Symposium in San Diego reported among other things that:

The most successful innovation was the establishment of a room set aside for informal discussions, notices and impromptu meetings. (I'm not sure when the name was adopted, but campgrounds were invented at this symposium, ed.)

THE PROGRAM OF  
THE MONTH CLUB

The tape copy facility produced TWENTY-FOUR sets of tapes for LUG representatives to take back to the LUGs. (In those days, the entire tape was assembled and all copies produced in one marathon all night session.)

Don't you wish OPE could be called from an indirect command file, or executed via a spawn directive? Often times you want to play with a location in SCOM, and you can do it, but `$$^#$$` OPE only works from the terminal, it doesn't do a GETMCR.

An interesting SPR reported that a real-time task called from a timesharing program executed under the UIC specified at task build time, rather than the UIC of the calling task. HOWEVER, if one rebuilt the task with the TKB command line "UIC=[0,0]" the task then executed under the calling task's UIC.

This month's program has been around a long time. Its CZP, CoreZaP. It works just like OPE, except that it can change a single location in SCOM for each call. Just the thing to change the line length for LP1: after you changed from 14-inch to 8&1/2-inch paper. The command format is:

And the SIG chair, Sally Shlaer, suggested that "the Multi-Tasker staff should consist of 3-6 people" and that "volunteers are needed." (Any volunteers out there? ed.)

CZP aaaaaa/nnnnnn

to change contents of location aaaaaa to nnnnnn. It also includes a verification function.

CZP aaaaaa:vvvvvv/nnnnnn

will only change the contents if the current contents are vvvvvv.

```
.TITLE      CORZAP - ZAP CORE (SCOM) ROUTINE
.IDENT      /V01/
;
; This routine operates much like the open command, but as a
; one line command. This allows its use in indirect command
; files or via spawn. The only area of memory operated upon
; is scom. The addresses must be within 100000 to 160000.
;
; command format:  czp <address>[:<verification>]/<newvalue>
;
; <address>=      The scom address of the word.
;<verification>=A verification value for current contents
;                  of that location.
;<newvalue>=      The new data value to be placed in the cell.
;
;      note:      all values are unsigned octal numbers
```



```

;
; taskbuild :      -cp/-fx/pr/-fp      task=...CZP      asg=ti:1
;
;          .mcall   gmcr$,exit$s,qiow$,dir$
;
; local data area
;
$addr: .word 0          ;the address to be modified
$vfyl: .word 0          ;optional verification value
$vflg: .word 0          ;verification flag
$val:  .word 0          ;new value for location
;
; directive parameter blocks
;
mcr:    gmcr$           ;define the get mcr DPB
out:    qiow$ io.wvb,1,1,,,<.-.,.-.,40>;define the qio dpb
outbuf= out+q.iopl     ;qio buffer address parameter
outlen= out+q.iopl+2   ;qio buffer length parameter
;
; error messages
;
syntax: .ascii /CZP - syntax error/
synlen=  .-syntax
verify: .ascii /CZP - verification error/
verlen=  .-verify
adres:  .ascii /CZP - address range error/
addlen=  .-adres
prvmes: .ascii /CZP - priviledge violation/
prvlen=  .-prvmes
        .even
;
; First get command line and check for syntax errors
;
corzap::dir$ #mcr,exit ;try for mcr buffer
        mov $dsw,r5 ;save the length in r5
        call privck ;is the caller priviledged
        bcc 10$ ;yes, continue
        ;no, priviledge violation
        mov #prvmes,outbuf ;set up the qio
        mov #prvlen,outlen ;...
        dir$ #out ;and tell him about it
        jmp exit ;and exit
10$:    mov #mcr+5,r0 ;point to char after 'czp'
        add #mcr+2,r5 ;point to end of data
        clr mcr+80. ;insure against an overrun.
        clr $vflg ;reset the verify flag
        call $cotb ;get address & convert it
        bic #1,r1 ;force to a word boundary
        mov r1,$addr ;and store it for future
        cmp r0,r5 ;have we overrun the data?
        bhis synerr ;yes - tell the user
        cmpb #'/,r2 ;terminated with a slash?
        beq 40$ ;yes - process the value field

```

```

    cmpb    #':,r2          ;no - is verification supported?
    bne     synerr         ;no - a user syntax error
    call    $cotb          ;convert the verify value
    cmp     r0,r5          ;have we overrun the data?
    bhis    synerr         ;syntax error
    cmpb    #'/,r2         ;terminator must be a slash
    bne     synerr         ;syntax error
    inc     $vflg          ;indicate verify is to be done
    mov     r1,$vfy        ;save the value
;
;     evaluate the replacement value
;
40$: call    $cotb          ;convert the value to binary
    mov     r1,$val        ;save the value
;
;     validate the address, verify old contents and update
;
    cmp     $addr,#100000  ;greater or equal to scom base?
    blo     adrerr         ;no - address range error
    cmp     $addr,#160000  ;less than apr 7? (scom top)
    bhis    adrerr         ;error if greater
    tst     $vflg          ;verify desired?
    beq     60$            ;no - continue
    cmp     $vfy,@$addr    ;compare to existing data
    beq     60$            ;it checks, continue
    mov     #verify,outbuf ;doesn't check set mess address
    mov     #verlen,outlen ; and length
    dir$    #out           ;tell the user he blew it
    br     exit            ;and exit
60$: mov     $val,@$addr    ;update the data item
exit: exit$s             ;and exit
;
;     syntax error
;
synerr: mov     #syntax,outbuf ;load message addr
    mov     #synlen,outlen  ;and its length
    dir$    #out           ;tell the user
    br     exit            ;and exit
;
;     privck check users priviledge based on the pud bits
;
;     returns: cc-clear if priviledged - set if not
;     modifies r0.
;
privck: clc                ;reset the carry flag bit
    mov     .crtsk,r0       ;get my atl address
    mov     a.ti(r0),r0     ;then get my pud address
    bitb   #ut.pr,u.tf(r0) ;is my ti priviledge bit set?
    bne    10$              ;yes - ok
    sec                    ;no - error
10$: return
;
;     adrerr address range error

```

```

;
adrerr: mov    #adres,outbuf ;setup message addr
        mov    #addlen,outlen ;and its length
        dir$   #out          ;output the message
        br     exit          ;done
        .end   corzap

```

Since this program only changes locations in SCOM, one still does not have the capability to change absolute 18 or 22 bit addresses in memory. A second program, AZP, is used to patch absolute core locations.

The above source can be changed to patch absolute core locations by making the following changes. (Also change the TKB command file to be AZP instead of CZP.)

-----  
(1) change \$addr to be a two-word buffer

```

$addr: .word 0 ;the address of the cell to be modified
$addr: .word 0,0 ;the address of the cell to be modified

```

-----  
(2) Edit four error messages so task name is AZP

```

syntax: .ascii /AZP - syntax error/
verify: .ascii /AZP - verification error/
adres: .ascii /AZP - address range error/
prvmes: .ascii /AZP - priviledge violation/

```

-----  
(3) Delete 13 lines starting at the lable 10\$:

```

10$: mov    #mcr+5,r0 ;point to 1st char after 'cor' in buffer
.
.
.
        cmpb  #' ',r2 ;no - is verification supported?
        bne  synerr ;no - a user syntax error

```

-----  
(4) Insert the following code

```

10$: mov    #mcr+6,r2 ;point to 1st char after 'azp' in buffer
      add    #mcr+2,r5 ;point to end of returned data
      mov    r5,-(sp) ;save it
      clr   mcr+80. ;insure against a buffer overrun.
      clr   $vflg ;reset the verify flag
12$:  cmpb  (r2)+, #' / ;find end of address string
      beq   15$
      cmpb  -1(r2), #' : ;could be verify also
      beq   15$
      tstb  (r2) ;end of command ?
      beq   synerr ;if so, syntax error
      br    12$ ;if not, keep looking for / or :
15$:  dec   r2 ;back up r2 to / or :
      mov   r2,r4 ;calc length of address string
      sub   #mcr+6,r4 ;for system call

```

```

mov    #mcr+6,r5      ;point r5 to start of string
mov    #$addr,r3     ;point r3 to output conversion area
call   .od2ct        ;convert to double precision octal
bic    #1,$addr+2    ;make sure word boundary
mov    (sp)+,r5      ;restore end of data flag
cmp    r2,r5         ;have we overrun the end of the data
bhis   synerr        ;yes - tell the user
mov    r2,r0         ;restore pointer for cotb calls
inc    r0            ;bump past terminator
cmpb   #'/',(r2)     ;did the field terminate with a slash ?
beq    40$           ;yes - go process the value field
cmpb   #':',(r2)    ;no - is verification supported?
bne    synerr        ;no - ??? crazy user. syntax error

```

(5) Delete the following 4 lines

```

cmp    $addr,#100000 ;greater or equal to scom base?
blo    adrerr        ;no - address range error
cmp    $addr,#160000 ;less than apr 7? (scom top)
bhis   adrerr        ;error if greater

```

(6) Replace them with the following code

```

mov    $addr+2,r1    ;low order address -> r1
mov    $addr,r0      ;high order address -> r0
ashc   #3,r0         ;shift par part of address to r1
ash    #-3,r1        ;reset lower 13 bits of address
bic    #160000,r1    ;clear bits carried from bit 15
ash    #7,r0         ;put upper address in right bits
bis    #60000,r1     ;map r1 to use par/pdr 3
mov    #77406,-(sp)  ;a 4k read/write pdr -> stack
mov    r0,-(sp)     ;new par -> stack
call   ..spd3        ;swap par/pdr 3

```

(7) edit the line:

```

cmp    $vfy,@$addr  ;compare to existing data
so that it read:
cmp    $vfy,@r1     ;compare to existing data

```

(8) edit the line:

```

60$:  mov    $val,@$addr ;update the data item
so that it reads
60$:  mov    $val,@r1   ;update the data item

```

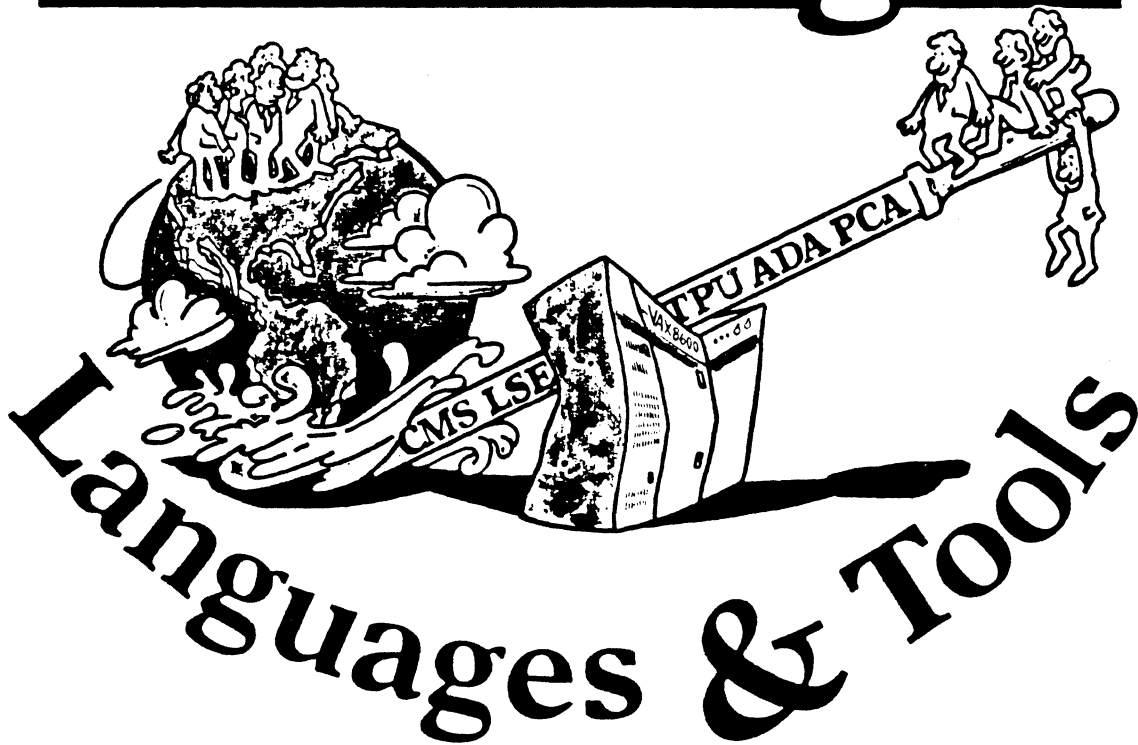
delete the following code:

```

;
adrerr: mov    #address,outbuf ;setup message addr
mov    #addlen,outlen ;and its length
dir$   #out      ;output the message
br     exit      ;done

```

# Leverage



# EDITOR'S NOTES

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I was very sad to learn, yesterday, that Bill Leroy is withdrawing from his various positions within DECUS, including both his editorship of the COBOL column usually presented here, and his position as chair of the SIG PUBS committee within DECUS. As I understand, his career advancement has necessarily caused him to reevaluate both his capability to commit to DECUS, and the value of that commitment to him and his company. We of the L & T SIG will all miss him and his considerable talents, and we wish him the best of luck in his career.

With Bill's retirement, I've lost my most successful columnist. Over the past few months, the COBOL working group has had considerable representation here in the newsletter. I'm sure other areas of interest have just as much information floating around, and just need someone to coordinate it. I would love to have regular (monthly or bimonthly) in a variety of areas. Possibilities include:

- Public Domain Tools
- Software Metrics
- ADA
- PDP-11 Languages & Tools
- Basic
- "C"
- Pascal
- Fortran
- Standards Activities
- etc ...

Do you see something there that interests you? Are you angered by something I left out? Let me know, and I'll put you in touch with the appropriate Working Group Coordinator. Together you can work up a plan to get more, and more useful, information to those who share your interests.

This issue of *Leverage* contains several items of interest. First is more regarding the ongoing discussion of the proposed Fortran 8X standard. This submission was received from France, and is by M. Metcalf of the European Organization for Nuclear Research (*Organisation Européenne Pour La Recherche Nucléaire*). It relates a series of votes taken at CERN regarding the standard. Those of you interested in Fortran should consider the results.

The second article is by Anne Duncan Smith of Digital, who has provided an excellent bibliography of material relating to Software Metrics. I think for this SIG, this may be one of the most useful types of submissions. Thank you, Anne.

Our SIG Chair, Sam Whidden, has submitted a report prepared for DECUS regarding the FY89 activities for our SIG. If you are interested in what we do, how we do it, and what our plans are, here is a good overview of what's coming up. The final submission is the latest edition of the L&T Masters Directory. This Directory supersedes all earlier versions.

Al Folsom *Leverage* Editor

## CERN USERS' VOTES ON FORTRAN 8X

M. Metcalf  
European Organization for Nuclear Research  
European Laboratory for Particle Physics

On the 13th of January an extended seminar and discussion on the draft proposed standard for a replacement of Fortran 77 was held for European high-energy physicists at CERN, Geneva, Switzerland, and was followed by a series of votes on many of the issues involved. These votes are reproduced below, and their meaning is open to various interpretations. However, a number of points are clear: the overwhelming support for BIT data type, I/O facilities for binary, octal, and hexadecimal edit descriptors, and for the principle of obsolescent and deprecated features; the support for varying length characters, significant blanks and vector-valued subscripts; and the desire to see the range facility removed. At the same time, we see a division of opinion on storage association, pointers and on whether we should get what we have quickly, or wait longer for something better. We note that the position taken by the meeting on obsolescence and deprecation is quite different to the one taken by Digital, supposedly on behalf of its users.

I will communicate the results to ANSI as part of CERN's public comment. Anyone who feels strongly on any of the issues, either for or against, may make an individual comment to:

X3 Secretariat  
CBEMA  
311 First St., N.W.  
Suite 500  
Washington, D.C. 20001-2178  
USA

preferably as soon as possible (the formal deadline is 23 February, but some latitude is allowed).

*The three votes are yes/no/abstain, where abstain also means don't care or don't know*

1. Should there be a bit data type? 45/1/5
  - A. If yes, is the proposal in Appendix F. adequate? 36/2/13
  - B. Should there be a set of BIT intrinsics if no BIT data type is introduced? 43/0/8
2. Should there be a pointer facility? 18/22/11
  - A. If yes, should it be explicit? 20/1/30
  - B. If yes, should it be strongly typed? 18/5/28
  - C. And should pointer arithmetic be allowed? /19/5/29
3. Should blanks be significant in the new source form? 29/11/11
4. Should there be I/O facilities for binary/octal/hex numbers? 47/3/1
5. Should there be provision for multi-byte characters? 15/22/14
6. Should there be a facility for varying length strings? 35/9/7
7. Should there be a facility for vector-valued subscripts? 30/10/1
8. Is the proposed language 'too big'? 10/21/20
9. Is the obsolescent and deprecated mechanism a good one (on the whole)? 37/1/13
10. Are you prepared to give up storage association in 20 - 30 years' time? 15/19/17
11. Should multiple and trailing underscores be forbidden? 21/18/12

## SOFTWARE METRICS RESOURCES

Anne Smith Duncan  
Digital Equipment Corporation

At the Spring 1987 Symposium, the L&T SIG Software Metrics Working Group met to discuss Software Metrics and our experiences. I've put together a non-inclusive list of books which discuss and relate experiences in the areas of software metrics, quality, cost estimation, and statistical quality control techniques. There is a broad range of topics and detail represented by this list. I've also included a list of periodicals and journals which frequently publish papers and articles concerning these areas.

These references are not endorsed as the most appropriate, best, or complete—it's just a list I thought would be a beginning for the individual who is interested in learning more about the areas of Software Productivity and Software Metrics. The opinions expressed in the annotations are my own.

### BOOKS

- Barry Boehm, *Software Economics*, Englewood Cliffs, NJ: Prentice-Hall, Inc, 1981

One of the early and most complete reference books available on the subject of software metrics and software development project management. Project estimating and estimation models are discussed in detail. The data reflects experiences of software development at TRW through the 1970's. Extensive bibliography, not annotated.

- Fred Brooks, *The Mythical Man-Month*, Reading MA: Addison-Wesley, 1975

A classic source on the pitfalls and myths of software development especially regarding large products.

- Chin-Kuei Cho, *Quality Programming: Developing and Testing Software with Statistical Quality Control*, New York: John Wiley and Sons, Inc, 1987

Applicable to the statistician and non-statistician, the scientific application developer and the commercial application developer, this book applies statistical quality control techniques (as developed by Deming) to software

12. Should multiple statements on a single source line be forbidden? 15/27/9
13. Should the RANGE facility be removed? 36/3/12
14. Should recursion be removed? 6/37/8
15. Should the NAMELIST facility be removed? 22/9/20
16. Should keyword and optional arguments be removed? 5/29/17
17. Should the proposal for generalised precision be replaced by another having the effect of retaining double-precision and adding double-precision complex? 10/19/22
18. Would you prefer to see the current proposal implemented with little further delay, rather than wait 2 - 3 years for new features to be introduced? 21/21/9



development. Chapter topics include Statistical Distributions for Software Quality Control, Acceptance Sampling, Modeling, Concurrent Software Design and Test Design, Software Reliability, and Software Quality and Productivity.

- S.D. Conte, H.E. Dunsmore, and V. Shen, *Software Engineering Metrics and Models*, Menlo Park, NJ: Benjamin Cummings Publishing Company, Inc., 1986

An excellent reference book for the various software metrics and models published and studied to 1986. Topics include software metrics, micro-models of effort estimation, macro-models of productivity and effort estimation, and defect models. An extensive, non-annotated bibliography is included.

- Tom DeMarco, *Controlling Software Projects: Management, Measurement, and Estimation*, New York: Yourdon Press, 1982

An easy-to-read book that addresses measurements, data collection and analysis during the entire software development process. Topics discussed include Chaos and Order in the Software Development Process (issues of control, estimating dilemma, projecting software costs, and the cost of measurement), System Models and System Metrics (specification, design, implementation, result metrics), Cost Models, and Software Quality.

- W. Edwards Deming, *Quality, Productivity, and Competitive Position* Cambridge, MA: MIT, 1982

Statistical quality control and how it can help improve competitive position. Deming is the "father" of statistical quality control and its application to industry, especially manufacturing processes. This book is a summary of his fourteen points of management; it is not a "how-to" book nor is it specifically directed to software development. It is a foundation reference in the areas of productivity and management.

- Robert B. Grady and Deborah L. Caswell, *Software Metrics: Establishing a Company-Wide Program*, Englewood Cliffs, NJ: Prentice-Hall Inc., 1987

This is a recently published description of the authors' experiences of starting and implementing a software metrics program at the Hewlett-Packard Company. The background of the metrics program, achievements through 1986, and a strategy for the future of the program are included. This is a practical book; it provides a study of a real software metrics program, and the pitfalls and problems one could encounter along the way. Includes an extensive bibliography, partially annotated.

- *Proceedings—nth International Conference on Software Engineering* [where n = 1..9], IEEE Computer Science Press.

Sponsored by IEEE and ACM as well as many other computer societies, these bi-annual conferences cover a wide range of software engineering topics, including software metrics. Nine have been held through 1986, and proceedings have been published for all of them.

- Kaoru Ishikawa, *Guide to Quality Control* Ann Arbor, MI: UNIPUB (Asian Productivity Organization), 1986

Written in 1986, this recently revised handbook is an explanation and summary of various quality control tools and techniques. Included are practice problems which provide the reader the opportunity to understand when to use a particular tool, not only how. Chapter topics include How to Collect Data, Histograms, Pareto Diagrams, Control Charts, and Sampling. Practical statistics for the non-statistician.

- Capers Jones, *Programming Productivity* New York: McGraw-Hill, 1986

Includes discussions of the problems and paradoxes of measuring software, various metrics (lines-of-code, complexity metrics, programming functions metrics, hybrid measurements), and the many factors affecting programming productivity, some of which can be measured.

- *Tutorial-Programming Productivity: Issues for the '80s* New York: IEEE, 1981

A tutorial of many papers addressing a wide range of "programming" productivity issues, including costs, quality, software metrics, and the software development lifecycle.

- Edward R. Tufte, *The Visual Display of Quantitative Information*, Cheshire, CT: Graphics Press, 1983

A lovely book which provides the history of data graphics of the last two centuries, and then a discussion of the effective presentation of data in graphic form. For an individual presenting statistics and graphic information, or for the reader of such graphs and statistics, this book is a wealth of subtle and useful ideas.

## PERIODICALS AND JOURNALS

Many journals publish articles on the subjects of productivity in software development, software metrics, and software maintenance, including:

- *ACM Sigsoft, Sftware Engineering News*
- *ACM Sigplan Notices*
- *AT&T Technical Journal*
- *Communications of the ACM*
- *Computer*
- *The Computer Journal (published by the British Computer Society)*
- *Computerworld*
- *Datamation*
- *IEEE Transactions on Engineering Management*
- *IEEE Software*
- *IBM Systems Journal*
- *IEEE Transactions on Software Engineering*
- *The Journal of Systems and Software*
- *MIS Quarterly*
- *Software—Practice and Experience*
- *System Development*

## LANGUAGES & TOOLS SIG

### FY89 ACTIVITIES OVERVIEW

Sam Whidden, Chair

January 15, 1988

The Languages & Tools SIG will continue to improve its product offerings during FY89. Existing products and projects will be strengthened and some new ones added.

#### SIG Directions

During FY88, L&T increased its emphasis on languages to match its interest in Digital's offerings of new and improved tools. Some ways of doing this have been to work closely with Digital on the balance of session offerings and to solicit user language tutorials. In FY88, L&T and the Commercial Languages SIG merged and have smoothly integrated. The commercial languages have strengthened L&T's support of languages generally, and members of the former CL SIG have contributed greatly to L&T's participation in language standards activities.

In FY89, the SIG's emphasis will expand further to stress its fundamental concern with development methodologies. L&T's statement of mission reads "To promote the interchange of information concerning maximizing software development productivity and quality through effective use of computer languages, software development tools, and software development methodologies, utilizing Digital Equipment Corporation computer equipment and software." (In fact, L&T's European counterpart is named the Languages, Tools, and Methods Special Interest Group). It is important that L&T not exist simply as a collection of individuals and groups with interests in various languages and tools, but that it have as one of its central focuses the use of those languages and tools in organized and systematic ways to construct computer applications.

#### CASE

Computer Aided Software Engineering is one discipline which increasingly emphasizes the integration of the tools and steps of system development into a coherent whole, and L&T will explore this field aggressively. Other aspects and elements of tools integration will also be given attention, and L&T has encouraged the growth of Working Groups in Configuration Management, Software Metrics, Tools Integration, Project Management, and other facets of system development.

## **PDP-11 Layered Software**

Another area of special concern to L&T is the support of PDP-11 Layered Products. L&T's Working Group in this area is chaired by the SIG's representative to the DECUS-wide PDP-11 Working Group, and special emphasis will be put on ways in which L&T can best serve the PDP-11 user during FY89.

## **Information Exchange**

A broad area of interest to L&T is the direct, individual, interactive exchange of information among users and between users and Digital developers. L&T conducts a number of feedback sessions—Q&A, Users Forum, DEC Asks the User, Wishlists, Wizards, and others, but one of the most effective ways to bring about such exchanges has been through the L&T Campground. Extensive use is made of the Campground, and, to an only slightly lesser extent, the Suite, to provide time and place for conversations between users and Digital developers. The L&T Clinic has been a multiple-hour activity conducted in the Campground during which developers (and L&T Masters) are scheduled for specific times, permitting users to deliver their problems, questions and suggestions one-on-one to those who can actually do something about them.

## **The L&T Campground and Digital Developers**

Like his predecessor, the SIG Chair has visited Digital on various occasions to describe to the developers who will attend Symposium the huge value placed by users on direct discourse with them. The developers have responded outstandingly, spending much more time in the Campground and Suite than required by their official schedules, winning praise from many sources for their accessibility and their willingness to spend time with questioners. L&T considers its Campground one of its most valuable projects.

## **The Masters Program**

The L&T Masters Program continues to identify users who are willing and able to spend telephone time answering questions on software topics. The SIG's Masters Coordinator (a former Chair of the Commercial Languages SIG) has received good reports of the assistance rendered by Masters. The program expands with new volunteers at each Symposium. The VAX SIG has expressed an interest in creating its own Masters Directory. L&T has given its full cooperation, and further efforts should see a VAX SIG Masters Program underway. The hope remains that this program will expand eventually into a DECUS-, rather than a SIG-sponsored, activity.

## **Seminars**

L&T's energetic Seminars Committee Representative has expanded the SIG's offering of pre-symposium seminars from three at the Fall '86 Symposium to seven for Spring '88, covering a wide range of subjects, and we expect this effort to continue to be successful. Our Seminars Rep is active in that committee, having taken on the job of Planning Committee Chair.

## **The SIG Tape**

Following the Fall '86 Symposium in San Francisco, L&T offered a SIG Library Tape for the first time in recent years. The SIG expects to continue to issue tapes at least once a year.

## **Sessions: Quantity and Quality**

In Nashville, L&T and CL together offered some 95 sessions. That total rose to 150 for L&T in Anaheim and to 170 for Cincinnati, necessitating a shortening of most sessions to 45 minutes to meet limitations imposed by the symposium facilities. The SIG is investigating two methods of working around these limits. Session Quality Control has become an important L&T project. Session evaluation cards are distributed at most L&T sessions and are returned at a rate of 2,000 to 3,000 per symposium. These are evaluated to identify the best and worst subjects and speakers, for continuing reference. The SIG also makes use of the Symposium Committee's Session Chair Forms as soon after Symposium as they are available. Various forms and evaluation techniques for use by L&T Steering Committee members have been tested. A Session Quality Control Coordinator has been appointed to oversee the SIG's effort to ensure that poor-quality sessions are screened out.

## **The Session BOF Experiment**

Another effort to cope with limited symposium facilities is the 'Session BOF', an idea which will not be tried until Cincinnati. If it works, the Session BOF will be pre-scheduled after certain sessions likely to need more time than the allotted 45 minutes for question and answer (the part of the session usually lost with reduced session time). Urgent questioners may go with the Speaker to this pre-scheduled BOF to complete the interchange. Whether scheduling and space constraints will permit this idea to be successful remains to be seen.

## **Working Groups**

Another important project for L&T is the development and support of Working Groups. There are presently 23 groups operating in the three L&T areas: languages, tools, and methods. L&T's policy is to include its Working Group Chairs as members of the Steering Committee both to enhance communication between the technical and administrative SIG leadership, and to ensure that Working Group Chairs see themselves, and are seen, as integral members of SIG leadership. In Anaheim, the Working Groups prepared roadmaps of L&T sessions of interest to their members, wrote statements of their missions and goals for inclusion in the L&T Information Folder, and held scheduled open Working Group meetings (these meetings were included in the SAG, permitting all attendees to be aware of them). Interest in these groups is increasing, and Digital is participating in each at levels reflecting its own degree of interest in the subject.

## **The Information Folder**

The L&T Information Folder, distributed at Symposia, serves several useful functions. It provides a vehicle for survey questionnaires by several Digital groups. It contains an L&T SIGSAG, Working Group Roadmaps and goal statements, an L&T Volunteer and Symposium Feedback Form,

The L&T Masters Directory (with Masters Volunteer Form), Rogues Gallery Photographs of both the attending Digital developers and L&T Steering Committee members, the L&T Steering Committee Roster, a schedule of Campground and Clinic availability of developers and Masters, a report by Digital on the release status of all layered software, requests from Digital for beta test sites for various software, a SIG Wishlist Questionnaire, a description of the SIG's activities, L&T Symposium Highlights, a source list of DEC-compatible software of all types, and other valuable material for the attendee. There's even an invitation to the joint AI L&T UNISIG Reception. The Folder is an excellent source of information and a reference document for the Symposium attendee.

### **The Newsletter; Session Notes**

The L&T Newsletter, Leverage, is normally published monthly as part of the combined SIG newsletters. It contains technical articles, reports of meetings, reports of standards activities, and other interesting and useful material. L&T's well-presented Session Notes are the product of an experienced Editor who sees to it that a significant proportion of L&T's sessions are represented. The newsletter, the Session Notes, and the Folder are part of L&T's effort to support information exchange in the DECUS environment, and all will receive continued SIG support during FY89.

### **Volunteers**

Volunteer development is another important part of L&T's strategy. New volunteers are needed continually to carry on the work of the SIG, to contribute to the pool of new ideas, and to provide new leadership. L&T distributes a Volunteer Form in its Folder and in the Campground. SIG 'business cards' are handed out liberally, giving the functions, names, and addresses of many SIG Steering Committee members. Badge stickers are distributed in the Campground and attractive L&T Volunteer lapel pins are given to volunteers. The Sunday night reception has become a major focus of L&T's effort to attract new members to the SIG. A Volunteers Coordinator has been appointed who will consider constructing an L&T volunteers database.

### **The SIG Suite**

Along with the Campground, the SIG Suite at Symposia provides an essential setting for informal discussion of technical issues, for planning, and for social mixing of Steering Committee members, developers, new and potential SIG members, and those generally interested in L&T's aims. It also serves for small formal meetings. L&T shares its Suite (as it does its Campground) with the AI SIG and UNISIG, an arrangement which has substantial cost saving benefits, as well as improving cross-SIG awareness. The Tri-SIG Suite is open and staffed during most of the time the Campground is closed. The Campground is staffed by official Hosts from 9 am to 5 pm on most days, and the Suite from 5 pm until midnight or later. At recent past Symposia, the Suite has been in busy use during virtually all of its open hours.

### **Standards**

L&T's participation in ANSI Standards activities has increased markedly in FY88, and will continue to grow during FY89 under the SIG's new standards coordinator, another former member

of the Commercial Languages SIG. From having only a single observer in FY87, L&T plans to sponsor membership on 6 ANSI X3 language subcommittees in FY89: Basic, Cobol, Dicol, Pascal, Fortran, and C. Three of these memberships came to L&T through CL, and three have been, or will be, established in FY88 and 89. In most of these cases, L&T has both a representative and an alternate, to ensure the continuity of attendance at committee meetings required for continued membership. These representatives act for the DECUS membership as a whole, are available to interact with the membership at Symposia, and are required to provide reports of their committee meetings for publication by the SIG and/or DECUS.

### **The Symposium Organization Meeting**

To make all these efforts possible, to coordinate them, and to make them work successfully, the L&T Steering Committee meets face to face at Symposia and at Woods Meetings. The Steering Committee holds a Symposium Organization Meeting on the Saturday afternoon preceding each Symposium. There, last minute details are settled, assignments are made or revised, new plans made and new proposals studied. When possible, the Digital Counterpart updates the Steering Committee, in non-disclosure mode, on forthcoming new software releases. Usually, between 25 and 30 of the 50 Steering Committee Members are able to attend. The SIG bears the cost of lodging for one night for those members who would otherwise be unable to attend.

### **Woods Meetings**

The SIG meets twice a year at 2-day Woods Meetings. The SIG considers these face to face meetings fundamental to its successful functioning, and normally 15 to 20 members of the Steering Committee are invited to attend. Most Woods attendees are administrative members of the Steering Committee—Officers, Product Unit Reps, and Project Leaders (such as newsletter editor, Masters Coordinator, Working Groups Coordinator, Clinic Director, etc.). The SIG's Digital Counterpart, and sometimes additional development counterparts, attend as fully participating members of the SIG. When possible, a few (2 or 3) Working Group Chairs are invited also, especially those who are new or those whose contribution is especially needed. Often, new members of the Steering Committee are first introduced to intensive SIG operations at Woods Meetings. At Woods Meetings, in-depth reviews of the previous symposium take place, as well as detailed discussions of plans for the next, of new ideas for products and services, and of special areas of concern to the SIG. The Summer Woods Meeting is held in Nashua, NH, permitting a full and direct exchange of information between the SIG and the technical and commercial language developers and managers.

### **A Continuing Effort**

The Languages & Tools SIG is a growing and involved part of DECUS. Its products and projects demand a substantial amount of volunteer time. They benefit in a major way from the interactive give and take of personal meetings, especially those removed from the pressures of Symposium. L&T expects FY89 to see a continued growth of volunteer effort and a continued testing of new ideas.

## LANGUAGES & TOOLS SIG

### MASTERS DIRECTORY

February 18, 1988

Those listed here have agreed to answer questions from users, normally by telephone, on the products or subjects listed beside their names. Expertise is generally in VMS layered software, unless otherwise noted. A State Code in braces {} follows each name to help the user locate Masters in appropriate geographical areas. Complete addresses and phone numbers appear in an alphabetical list following this directory. The alphabetical listing includes [notes] on other software in use at the Master's installation, where this information could be helpful to a user in selecting a Master and where the Master has supplied it.

The list will become fuller as time goes on. Not all L&T products are listed here, and we await volunteer Masters in all the missing areas. A few non-L&T products are mentioned to accommodate individual Masters with interests broader than L&T's. Mumps is included by special request of the Mumps SIG, as a service to Mumps users.

The expertise of these volunteer Masters overlaps; you may find it necessary to call more than one. Please remember that these Masters can provide you with brief assistance, not with long-term support. Some Masters are professional consultants who have agreed to donate their time and talent in their areas of expertise; it is not L&T's intent to provide a reference service for consultants, and any instance of unwanted commercialism should be reported to the L&T Masters Coordinator (see below). Neither L&T nor DECUS make any claim that the information you receive will necessarily be correct or complete.

Please also notify the L&T Masters Coordinator of any errors in the entries in this Directory, or if you experience real difficulty in your effort to obtain help through this list. **Please note that this list expires three months from the date appearing above. After that time, please consult a more recent issue of the Newsletter for a current list.**

If you can participate as a Master yourself, please fill out the attached Masters Program application. Submit it to the L&T Campground Host during symposium or mail it to either:

**Dena Shelton, L&T Masters Coordinator, Cullinet Software, Inc., 2860 Zanker Road, Suite 206, San Jose, CA 95134; (408)434-6636**

or

**George Scott, Assistant L&T Masters Coordinator, Computer Sciences Corporation, 304 West Route #38, P.O. Box N, Moorestown, NJ 08057; (609)234-1100**

*Languages & Tools SIG — Masters Directory*

### L&T MASTERS SUBJECT LISTING

#### •Ada

Donald E. Amby {WI}

Philip D. Brooke {MA}

William Graham {AZ}

Richard Wallace {OH}

•Ada •C •CMS •EDT •LSE •MMS •Pascal •Runoff & DSR  
•TPU

•Ada •Debug •EDT •Fortran

•Ada •CMS •Debug •Fortran •Runoff & DSR •TPU

•Ada •C •Cobol •Fortran •Pascal

#### •APL

Daniel J. Garvin {KY}

Richard Golden {IL}

Daniel P. Thompson {MA}

•APL •Basic •Fortran •Software Proj Mgr

•APL (& NON-DEC APL)

•APL

#### •Basic

Ted A. Bear {CA}

R. Alan Bruns {TX}

Joel Finkle {IL}

Daniel J. Garvin {KY}

Stephen Jackson {MN}

Noah Kaufman {MA}

Brian Lomasky {MA}

David Santistevan {CO}

Gary A. Slater {CA}

Kelvin Smith {CT}

Tom Stewart {CO}

•Basic (incl. VAX) •Basic Plus 2

•Basic

•Basic •CMS •Fortran •MMS •Pascal •Test Manager •TPU

•APL •Basic •Fortran •Software Proj Mgr

•Basic (VAX) •Basic-Plus •Basic Plus 2

•Basic •Fortran (& F77)

•Basic (VAX) •Basic Plus 2 (RSX) •FMS

•Basic (VAX)

•Basic •Software Proj Mgr

•Basic •TECO

•Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Cobol (RSTS/E, VAX)

•Dibol (RT, RSTS/E, VAX)

•Basic (VAX) •Basic Plus 2 (RSX)

•Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Eve

William Tabor {FL}

Robert van Keuren {CA}

#### •Basic-Plus

Stephen Jackson {MN}

Tom Stewart {CO}

Robert van Keuren {CA}

•Basic (VAX) •Basic-Plus •Basic Plus 2

•Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Cobol (RSTS/E, VAX)

•Dibol (RT, RSTS/E, VAX)

•Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Eve

#### •Basic Plus 2

Ted A. Bear {CA} •Basic (incl. VAX) •Basic Plus 2  
 Joel Garry {CA} •Basic Plus 2  
 Stephen Jackson {MN} •Basic (VAX) •Basic-Plus •Basic Plus 2  
 Brian Lomasky {MA} •Basic (VAX) •Basic Plus 2 (RSX) •FMS  
 Tom Stewart {CO} •Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Cobol (RSTS/E. VAX)  
 •Dibol (RT, RSTS/E, VAX)  
 William Tabor {FL} •Basic (VAX) •Basic Plus 2 (RSX)  
 Christopher Thorn {NY} •Basic Plus 2 •EDT •Kermit •Runoff & DSR  
 Robert van Keuren {CA} •Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Eve

•Bliss

M. Erik Husby {MA} •Bliss •Debug •EVE •LSE •TPU  
 Lawrence J. Kilgallen {MA} •Bliss •TECO

•C

Donald E. Amby {WI} •Ada •C •CMS •EDT •LSE •MMS •Pascal •Runoff & DSR  
 •TPU  
 Fred Avolio {MD} •C  
 Dale Hites {IL} •C •Macro  
 Lawrence J. Jones {OH} •C •EDT  
 Jim Maves {CA} •C •CMS •Debug •LSE  
 Teri McNamara {MN} •C (CP/M,First Sys,VAX) •Config Mgmt  
 Lorin M. Ricker {OR} •C (incl VAX/ELN) •Debug •Macro-32 •Pascal (incl VAX/ELN) •TeX  
 and LaTeX •TPU  
 Kenneth Robinson {NJ} •C •CMS •Debug •EVE •MMS  
 Mike Terrazas {UT} •C •Debug •EDT •Macro •SQL (Oracle)  
 Richard Wallace {OH} •Ada •C •Cobol •Fortran •Pascal

•CMS

Donald E. Amby {WI} •Ada •C •CMS •EDT •LSE •MMS •Pascal •Runoff & DSR  
 •TPU  
 Earl Cory {CA} •CMS •DCL •EDT •Fortran •LSE •Runoff & DSR  
 Joel Finkle {IL} •Basic •CMS •Fortran •MMS •Pascal •Test Manager •TPU  
 William Graham {AZ} •Ada •CMS •Debug •Fortran •Runoff & DSR •TPU  
 Jim Gursha {NY} •CMS •Debug •MMS •SCA  
 Howard Holcombe {NJ} •CMS •Fortran •MMS •Runoff & DSR  
 J.M. Ivler {CA} •CMS •Config Mgmt •DCL •EDT •Runoff & DSR  
 Mark Katz {MA} •CMS •LSE •MMS •Runoff & DSR •SCA •TECO •TPU  
 Jim Maves {CA} •C •CMS •Debug •LSE

G. Del Merritt {MA} •CMS •Config Mgmt •Emacs •Fortran •MMS  
 Joseph A. Pollizzi 3rd {MD} •CMS •MMS •SCAN  
 Kenneth Robinson {NJ} •C •CMS •Debug •EVE •MMS  
 George Scott {NJ} •CMS •Config Mgmt  
 Jay Wiley {CA} •CMS •Fortran •LSE •Test Manager  
 John Wilson {CT} •CMS •Cobol •EVE •TPU  
 Mark Woodford {IL} •CMS •MMS

•Cobol

William Jeter {FL} •Cobol  
 Scott Krusemark {OH} •Cobol •EDT •FMS •Fortran •Test Manager  
 Walter W. Leroy {GA} •Cobol  
 David K. Ream {OH} •Cobol •PL/I •SCAN  
 Kenneth Richardson {CO} •Cobol  
 Patrick Stair {AR} •Cobol •EDT •Runoff & DSR  
 Tom Stewart {CO} •Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Cobol (RSTS/E, VAX)  
 •Dibol (RT, RSTS/E, VAX)  
 Richard Wallace {OH} •Ada •C •Cobol •Fortran •Pascal  
 John Wilson {CT} •CMS •Cobol •EVE •TPU  
 Edward Woodward {CA} •Cobol

•Config Mgmt

J.M. Ivler {CA} •CMS •Config Mgmt •DCL •EDT •Runoff & DSR  
 Mark Kidwell {TX} •Config Mgmt  
 Teri McNamara {MN} •C (CP/M,First Sys,VAX) •Config Mgmt  
 G. Del Merritt {MA} •CMS •Config Mgmt •Emacs •Fortran •MMS  
 George Scott {NJ} •CMS •Config Mgmt

•DCL

Earl Cory {CA} •CMS •DCL •EDT •Fortran •LSE •Runoff & DSR  
 J.M. Ivler {CA} •CMS •Config Mgmt •DCL •EDT •Runoff & DSR

•Debug

Philip D. Brooke {MA} •Ada •Debug •EDT •Fortran  
 Jack Davis {TN} •Debug •Fortran (VMS) •LSE •Modula II  
 William Graham {AZ} •Ada •CMS •Debug •Fortran •Runoff & DSR •TPU  
 Jim Gursha {NY} •CMS •Debug •MMS •SCA  
 M. Erik Husby {MA} •Bliss •Debug •EVE •LSE •TPU

Jim Maves {CA} •C •CMS •Debug •LSE  
 Lorin M. Ricker {OR} •C (incl VAX/ELN) •Debug •Macro-32 •Pascal (incl VAX, ELN) •TeX  
 and LaTeX •TPU  
 Kenneth Robinson {NJ} •C •CMS •Debug •EVE •MMS  
 Mike Terrazas {UT} •C •Debug •EDT •Macro •SQL (Oracle)

•Dibol

Jim Ancona {NH} •Dibol  
 Rod Brayman {NY} •Dibol  
 Mark Crego {VA} •Dibol  
 Dave L. Dirks {MN} •Dibol  
 Stewart F. Flood {SC} •Dibol  
 Paul Manning {OR} •Dibol  
 Bruce L. Mebust {MN} •Dibol •TECO  
 Lyle Phillips {CA} •Dibol  
 Tom Stewart {CO} •Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Cobol (RSTS E, VAX)  
 •Dibol (RT, RSTS/E, VAX)  
 Stan Tucker {TX} •Dibol

•DSR

Ray Ontko {IN} •DSR •Pascal •TPU

•EDT

Donald E. Amby {WI} •Ada •C •CMS •EDT •LSE •MMS •Pascal •Runoff & DSR  
 •TPU  
 Al Beer {CA} •EDT •Runoff & DSR  
 Philip D. Brooke {MA} •Ada •Debug •EDT •Fortran  
 Earl Cory {CA} •CMS •DCL •EDT •Fortran •LSE •Runoff & DSR  
 J.M. Ivler {CA} •CMS •Config Mgmt •DCL •EDT •Runoff & DSR  
 Lawrence J. Jones {OH} •C •EDT  
 Scott Krusemark {OH} •Cobol •EDT •FMS •Fortran •Test Manager  
 James Meeks {TN} •EDT •EVE •TPU  
 Patrick Stair {AR} •Cobol •EDT •Runoff & DSR  
 Mike Terrazas {UT} •C •Debug •EDT •Macro •SQL (Oracle)  
 Christopher Thorn {NY} •Basic Plus 2 •EDT •Kermit •Runoff & DSR  
 Allen Watson {NJ} •EDT •EVE •Runoff & DSR •TECO •TPU •VAX Notes

•Emacs

G. Del Merritt {MA} •CMS •Config Mgmt •Emacs •Fortran •MMS

•EVE

M. Erik Husby {MA} •Bliss •Debug •EVE •LSE •TPU  
 Jef Kennedy {OH} •EVE •TPU  
 Gerald Lester {LA} •EVE •Macro •TPU  
 David Medvedeff {NY} •EVE •Fortran •TPU •VAX Notes  
 James Meeks {TN} •EDT •EVE •TPU  
 Kenneth Robinson {NJ} •C •CMS •Debug •EVE •MMS  
 Rick Stacks {AR} •EVE •Fortran •TPU  
 Dennis Thury {TX} •EVE •Pascal •TPU  
 Allen Watson {NJ} •EDT •EVE •Runoff & DSR •TECO •TPU •VAX Notes  
 John Wilson {CT} •CMS •Cobol •EVE •TPU  
 Robert van Keuren {CA} •Basic (INCL. VAX) •Basic-Plus •Basic Plus 2 •Eve

•FMS

Scott Krusemark {OH} •Cobol •EDT •FMS •Fortran •Test Manager  
 Brian Lomasky {MA} •Basic (VAX) •Basic Plus 2 (RSX) •FMS

•Focus

John Pajak {TX} •Focus (VAX)

•Forth

John Lundin Jr. {VA} •Forth (CPM,&86,MSDOS,VAX)

•Fortran

Philip D. Brooke {MA} •Ada •Debug •EDT •Fortran  
 Donna Calhoun {TN} •Fortran •Runoff & DSR  
 Earl Cory {CA} •CMS •DCL •EDT •Fortran •LSE •Runoff & DSR  
 Jack Davis {TN} •Debug •Fortran (VMS) •LSE •Modula II  
 Joel Finkle {IL} •Basic •CMS •Fortran •MMS •Pascal •Test Manager •TPU  
 Daniel J. Garvin {KY} •APL •Basic •Fortran •Software Proj Mgr  
 William Graham {AZ} •Ada •CMS •Debug •Fortran •Runoff & DSR •TPU  
 Howard Holcombe {NJ} •CMS •Fortran •MMS •Runoff & DSR  
 Noah Kaufman {MA} •Basic •Fortran (& F77)  
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 John Miano {NJ} •Fortran  
 Paul Plum {PA} •Fortran (& F77)  
 Andrew Potter {NY} •Fortran •Runoff & DSR •VAX Notes  
 Rick Stacks {AR} •EVE •Fortran •TPU  
 Lindsay Todd {NY} •Fortran •PL/I  
 Richard Wallace {OH} •Ada •C •Cobol •Fortran •Pascal  
 Jay Wiley {CA} •CMS •Fortran •LSE •Test Manager

•Kermit

Christopher Thorn {NY} •Basic Plus 2 •EDT •Kermit •Runoff & DSR

•LaTeX

Barbara Beeton {RI} •LaTeX •TeX  
 Kent McPherson {MI} •LaTeX •LSE •TeX  
 E. Wayne Sewell {TX} •LaTeX •Modula II (MS-DOS) •Pascal (incl real-time use) •TeX •Web  
 J.R. Westmoreland {UT} •LaTeX •TeX

•LSE

Donald E. Amby {WI} •Ada •C •CMS •EDT •LSE •MMS •Pascal •Runoff & DSR  
 •TPU  
 Jeff Boes {MI} •LSE •MMS •SCAN  
 Earl Cory {CA} •CMS •DCL •EDT •Fortran •LSE •Runoff & DSR  
 Jack Davis {TN} •Debug •Fortran (VMS) •LSE •Modula II  
 M. Erik Husby {MA} •Bliss •Debug •EVE •LSE •TPU  
 Mark Katz {MA} •CMS •LSE •MMS •Runoff & DSR •SCA •TECO •TPU  
 Jim Maves {CA} •C •CMS •Debug •LSE  
 Kent McPherson {MI} •LaTeX •LSE •TeX  
 Lyle Sutton {MD} •LSE •Test Manager  
 James Thompson {WA} •LSE  
 Jay Wiley {CA} •CMS •Fortran •LSE •Test Manager

•Macro

Dale Hites {IL} •C •Macro  
 Gerald Lester {LA} •EVE •Macro •TPU  
 Mike Terrazas {UT} •C •Debug •EDT •Macro •SQL (Oracle)

•Macro-32

Lorin M. Ricker {OR} •C (incl VAX/ELN) •Debug •Macro-32 •Pascal (incl VAX/ELN) •TeX and LaTeX •TPU

•MMS

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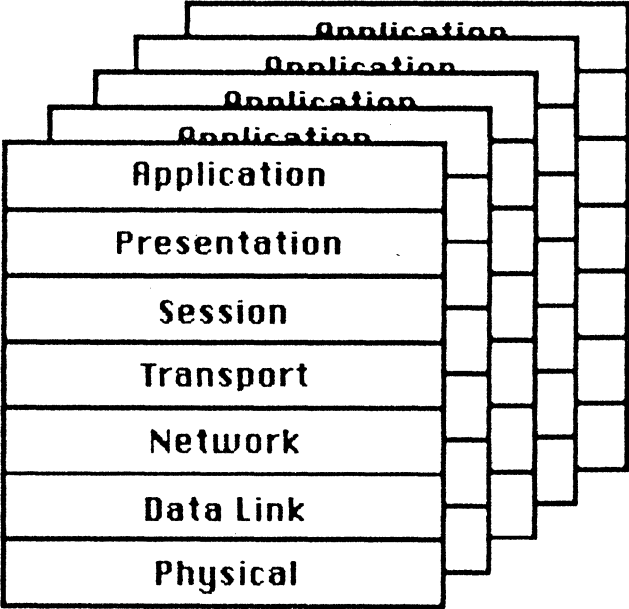
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# NETwords

The NETWORKS SIG Newsletter



## From the Editor

Its spring: that special time of rejuvenation, to come out of hibernation and rub your sleepy eyes. Its been a long cold snowy winter here in the Northeast. I've rounded up some interesting items for this spring issue.

### **BUT FIRST, A WORD FROM OUR SPONSOR.**

L. Stuart Vance, of Balcones Research Center in Austin, Texas, has graciously volunteered to coordinate a collective networks "WISH LIST". On behalf of the user community, suggestions for new utilities, desirable features, things you'd like to see work better or be easier to user, will be presented to the appropriate DEC authorities. Contact Stu if you want to help shape PHASE VI!

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### **AND NOW, BACK TO THE SHOW!**

Ah, as the chickadees dart from tree to tree, our thoughts turn to... CINCINATTI! Yes, the wheels are in motion. It takes an incredible amount of coordination and planning to pull off a smooth symposium. A potpourri of sessions and Pre-Symposium Seminars will be available through the NETWORKS SIG. As many as 80 sessions are being lined up and quite a few interesting PSS's with something for everyone. Stay tuned.

In the meantime, here's some stuff to ponder. Bill Hancock, our illustrious and prolific mentor, has some thoughts on how to prepare for the upcoming DECNET PHASE V. (I happened to catch this interesting talk at the NY Metro LUG February meeting in lower Manhattan). This will be a hot topic at the upcoming symposium, so check out the PSS offerings early as these will probably fill up early. Here's just a bit to whet your appetites!

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### **Preparing for DECnet Phase V**

- Excerpts from DECUS Metro LUG presentation by Bill Hancock, of ERI Training, NYC., February 1988.

First a little history. DEC's first generation communication product was built to sell machines. Phase II was funded by AT&T, to make customizations for AT&T. Phase III and IV had performance improvements. Phase IV was OSI-like (same layers, but different names).

Phase V was announced in December 1987 by DEC. It is re-coded and re-engineered Digital Network Architecture. It is considerably more complex than Phase IV - the code increased to 200mb from 75mb.

The implementation will take place "in pieces" over 3 years. Full backward compatibility will be maintained. However, you won't get the full benefits of Phase V new features until all Phase IV nodes on your whole network are gone. Phase IV features are maintained, but the routing algorithms are not compatible. (The new link-state algorithm is more efficient than Phase IV vector tables: you will elevate through states as you transition through protocol layers).

The initial implementation, expected sometime in 1988, will include the following items: FTAM, VTP & NVT, x4.00, MAIL-11 (enabling mail between PDP and VAX nodes), SNA Gateway access, Digital Time Service, Distributed Services (DSS): Distributed Naming Service, Distributed Queuing Service, and Distributed File Service.

The major goals of DECnet Phase V (DNA) are to conceal network operation from the user, support a wider range of applications, support a wide range of communication facilities and network topologies. It is flexible enough to handle 802 series, MAP and token ring. Maximum use of standards are made. Minimum management intervention is required, but at the same time the network is manageable (if you want it to be). Growth, migration, subsestability, high availability, ability to become highly distributed, and to allow for security, are additional goals.

Phase V is very OSI-oriented. The terminology used to describe the architecture is OSI terms, (as opposed to Phase IV). The current OSI architecture is identical to Phase V architecture through the session control layer. There will be support of DDCMP and HDLC as Data Link layer protocols. Also support for LAPB. The network layer support of connection-less and connection-mode network services using ISO internet-work protocol (IS 8473). DECnet adaptive routing is supplied by DEC's proprietary routing protocol at the same level. (OSI allows for multiple protocols at the same level). The transport layer uses the standard OSI transport protocol (IS 8073) Class 4. There is also support for Class 0 and 2.

The naming service is integral to the network architecture. Hierarchical in nature, the naming service is called a "directory" and is distributed through the network. Directory updates are synchronized by the network software and is transparent. Directories are replicated on more than one system for recovery and backup purposes. Some address translation capabilities exist.

New network management features are Network management "agents", security "agents", local and remote "directors". The new utility that will replace NCP is NCL. Communication between a director and the target node agent (as in the NCP "TELL" command) are handled by CMIP, the Common Management Information Protocol (IS 9596). This protocol augments NICE.

More complex and larger networks will be possible. The OSI addressing scheme allows 20 byte addresses, that allow you to interconnect to all kinds of networks. One more new feature is domains, in addition to areas.

#### **What Should You Do To Get Ready?**

- 1) Get any nodes in Area 1 out of it. (Area 1 will be reserved).
- 2) Learn OSI terminology.
- 3) Get ready to re-code non-transparent applications.
- 4) Prepare for phase out of all pre-Phase IV nodes as soon as possible.
- 5) To gain Phase V features, Phase IV nodes must be eliminated.
- 6) Expect a deluge of new products (more than 300 new products from DEC!)
- 7) Keep network hardware as OSI-oriented as possible.
- 8) Expect to re-code any NCP procedures in the very near future.
- 9) Network management tools will change causing network management at a site to change.
- 10) Be prepared for more complex and much larger networks made possible by 20-byte addressing.

#### **For more information:**

DECUS Cincinnati Phase V seminar will be given by Phase V developers.  
DNA Phase V General Description - EK-DNAPV-GD (Sep 1987). OSI Books:  
Computer Networks (A. Tannenbaum)  
Standards for Open Systems Interconnection (Knightson, Knowles,  
Larmouth - McGraw-Hill)  
Handbook of Computer-Communications Standards Vol 1 .  
(Stallings-Macmillan)

#### **ERI Training:**

VMS v5.0 Update Seminar  
DECnet Phase V Update Seminar

IEEE 802.3 and 802.2 standards  
CCITT Red books- I series, X series, V series  
Data Communications Standards (3 vols., H. Folts, McGraw-Hill)  
\*\*\*\*\*

## The REAL Network Definitions, by Bill Hancock

At the risk of being called flippant, I think that it is high time that communications terminology was defined in the way that we all know it truly works. Sure, you can go out and buy a \$90.00 book that tells you all about what word means what, but what the book does not tell you is what those definitions REALLY mean and how they apply to the problems of the modern day communications analyst.

Fear not, for I have saved you the problem of trying to figure it all out. In the following definitions, you will find the true meanings of many of the more popular communications and networking terms that we are faced with in our everyday computing lives.

Enjoy.

### Network - n.

(see GOSSIP) 1) a method by which confused entities are connected together to pass information around and effectively confuse other entities, 2) a group of entities that send distorted data to other entities (also see ROUTING), 3) computer to computer communication for the sole reason for management to claim "we have a network", 4) a method to confuse and amaze otherwise competent programmers and system managers, 5) (adj) to connect otherwise non-connected nervous system components ("he's over-networked; last week he tried to send a file to the Mr. Coffee."), 6) Connecting of dissimilar peripherals for mutual satisfaction and benefit (see sexual aberration).

### Packet - n.

(latin PACKETUS: to get stuffed in a small place against one's will). 1) a method by which common items are collected (see RESTAURANT SUGAR), 2) a small entity of data that will spend its short life being trounced, mangled, distorted, and then discarded. 3) something usually unintelligible to those who need to figure it out, 4) a method of data encryption. 5) (adj) to place in a small place ("Packet up your rectum!"). 6) part of a child's poem ("a tisket, a tasket, a 40 octet packet.")

### Homogeneous - adj.

1) two computers with either totally male or totally female cable connections who REALLY want to hook up with each other, 2) two packets of equal sex, parity, and can get into their own space. 3) bizarre communications behavior not explained by normal, programmed sexual response, 4) consenting networks of equal gender and not using sex changer connectors.

### Link - n.

(from the Texas LINK: a tubular sausage that is not as exciting as they would like to make you think it is) 1) a type of crane used in the construction of buildings, 2) a type of Texas sausage, 3) a method used to communicate between two computers that resembles a Texas sausage (tubular, made of grotesque left over parts of carcass, usually hard to stomach, and causer of indigestion).

### Bandwidth - n.

1) girth of a fat group of musicians.

### Broadband - n.

1) group of female mmusicians, 2) secondary way to describe bandwidth.

### Baseband - n.

1) a shabby, inferior quality communications method (see BASE), 2) of comparatively little value (e.g. base metals, baseband, etc.)



**ACK - adj.**

(from the Latin ACK: to choke, as on something distasteful) 1) sounds made by the character Bill the Cat from the comic strip "Bloom County", 2) hiccup from a remote computer acknowledging digestion and screw up of a received packet, 3) sounds usually made by the department manager at budget submission time.

**Router - n.**

1) device used to unclog stuck toilets, 2) dispatcher at a police station, 3) a device used to send communications packets to the incorrect destination.

**Guru - adj.**

(from TOMLINSON: "Good Understanding, but Relatively Useless") 1) person generally used to confuse and amaze management at exorbitant rates, 2) someone to blame when things go wrong in the project development cycle, 3) all-knower, all-seer with a severe case of myopia who tries to describe Utopia.

**Engaged Signal - n.**

1) a ring around a woman's left ring finger.

**Full duplex - adj.**

1) an abode that is divided into two halves, each of which has occupants.

**MODEM - n.**

(from the Norwegian MO: a proper name and DEM: slang for "them") 1) a sophisticated looking device used frequently by programmers and owners of personal computers to amaze friends and neighbors ("here is my MODEM. Don't you wish you had one?"), 2) a device useful for determining the temperature of the room as, if it is too hot in the room, the MODEM is the first device to fail, 3) a device useful for determining how much noise is on a communications line.

**To be continued...**

Thanks to Bill Hancock (ERI), author, and Bob Gustavson (Northeast Utilities), who passed it on to Dave Washer (UConn Health Center), who passed this on to me, who passed it on to you.



# R S T S / E



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From the Editor  
Terry Kennedy

This is a monthly newsletter, honest! It's just that sometimes Murphy gets in the way. Last month we had some real zingers - more on that later. I've collected a backlog of articles now, so I will have an 'emergency' newsletter ready to go if it is needed. Therefore, you should see us in these pages every month from now on. (Oh no, now I've done it - I wonder what will happen next month!...)

Anyway, normally I wouldn't go into what sort of computer problems I may have here, but this past month's problems affected many of you by making me miss the newsletter deadline, and also by causing me to be late sending my contribution to the Tape Copy project. Well, the tape has been sent, so you should hear more about it soon - I'll try to print the directory in the next issue or two. So, here's what happened:

I had been noticing assorted console error messages on my main 11/44 system, little things like (uStep CP) and (Halted). So, I called my field service rep (whose name and company will remain nameless). He came out with a replacement board and installed it. The new board gave the message (CP didn't start), which indicates a hung bus. Oh well, time to order another spare. Next day, the spare arrived and was installed. Things looked good, and the rep left. Meanwhile, I commenced editing the material for the tape copy project. When I returned from dinner, one of our users said the system was running very slowly. A quick look at the DISPLAY output showed over 2000 errors logged. Upon trying to log in, I was greeted with the error message '??Fatal system I/O failure'. Oh no, I thought - something is \*really\* wrong now. Called field service again, and was told 'that incident is closed - you'll have to wait till tomorrow for service'. Oh well, we closed up shop early and went home. The next day, another rep arrived with a replacement board. Changed board, got (CP didn't start) again. Rep said problem wasn't in that board, would have to pull all cards from bus and try again. I replied that that was silly, and pulled the same board from another '44 and he tried that. System ran, but wouldn't boot the disk. Rep mumbled something about a run of bad boards and left to find another one.

This went on until the original board had been replaced seven times, over a period of a week. Repeated calls to the company's corporate complaint line were answered with comments that the local branch was doing the best they could, and why was I so upset. No-one seemed to consider seven bad boards in a row an unusual occurrence. The seventh board was also defective, but I convinced the rep that ordering another one

was equally useless, and I replaced the defective switch on it. After all that was done and the rep ejected, I discovered that the failed board had wiped the format off my disk drive. A not-so-quick reformat of my 500Mb drive and a restore from my backup tapes got us back in business, except for the tape copy work in progress.

We immediately canceled our service agreement with the vendor and initiated a contract with another. As an academic institution with no 'business' users and a redundant 11/44 system, it did not have a major impact on our site. If you are a small business user, though, you should consider carefully the impact a week of no computer use would have on your business, and make appropriate contingency arrangements. These could be as simple as an agreement with another site to share systems in the event of a failure, all the way to contracting with a commercial disaster recovery firm for a dedicated system.

Since the how-to form has been removed, here is how to contact me for submissions, etc.:

Via US Mail:

Terence M. Kennedy  
St. Peter's College  
Department of Comp. Science  
2641 Kennedy Blvd.  
Jersey City, N.J. 07306  
(201) 435-1890

Via UPS, FedEx, etc.:

Terence M. Kennedy  
St. Peter's College  
Department of Comp. Science  
121 Glenwood Avenue  
Jersey City, N.J. 07306  
(201) 435-1890

You may electronically submit material by calling the RSTS SIG bulletin board system at (201) 915-9361, or you may reach me as user KENNEDY on both DCS and DECUServe, if you have access to either of those systems.

You may submit material on RX50's or RX33's (in RSTS or RT11 format), on 800, 1600, 3200, or 6250 BPI 9-track tape (in DOS, ANSI, BRU, RSTS BACKUP or VMS BACKUP format), or on PC-DOS floppies (5¼ or 3¼ inch format). If you are really desperate, I can also accept RSTS or RT11 format RL02 and RK07 disks. You may also submit hardcopy documents, but these will take longer to get into print.

---

#### Letters to the Editor

This month we have two articles from the same reader! (Hint, hint...) Paul Flaherty has supplied two routines which should be helpful to RSTS DIBOL users, and can be modified for other tasks as well.

Paul writes:

In my account is a file REQUE.COM, a DCL command file which other RSTS users may find useful. [Ed. note - this file is now in the download area (account [49,1]) on the Newsletter System.] Some sites (particularly RSTS/DIBOL sites, like us) are still locked into using the OPSER package for printer spooling for some applications. This routine, which runs under PBS control at a preset interval (or on demand for users with WACNT privilege), can eliminate the need for SPOOL to be running in most instances. (OPSER and QUEMAN still have to run, however). It takes a full queue listing (Q/L) and extracts the appropriate information to submit the print jobs to PBS.

The current restrictions are:

1. It only looks at the LP0: queue. A loop could easily be "wrapped around" this routine, however, to process queues LP0: through LP7:.
2. It does not honor the "status" of the queue entry, i.e., if the entry is on "hold", it will not be held by PBS. However, if SPOOL is not running and this routine is only used in conjunction with applications which submit print jobs to OPSER, and users only use PBS for direct submission of print jobs, it's unlikely that an entry would be "on hold".
3. If a job is submitted to OPSER with a form name that is not defined in PBSS:FORMS.SYS, it will cause problems, and entries in the queue after it will not be processed until it is removed or modified, or the form is defined in PBSS:FORMS.SYS.

The advantages are:

1. Saves memory and at least one job slot.
2. Prevents most opportunities for jobs to print on the wrong form, since only one spooler is in control of the output device.

I hope this is helpful to some newsletter readers.

- Paul

```
$ ! REQUE.COM - requeues OPSER print entries to PBS. Runs under
$ ! batch control (in which case it resubmits itself
$ ! to run an hour later ) or on
$ ! demand for a user with WREAD privilege (to insure
$ ! that the user has read access to all files to be
$ ! printed).
```

```
$ ! Author: Paul F. Flaherty, Jr.
$ ! DANIELS AND CRONIN
$ ! Three Center Plaza
$ ! Penthouse Mezzanine
$ ! Boston, Massachusetts 02108 USA
```

```
$ ! Check for WREAD privilege. If not present then exit.
```

```
$ _if f$priv("WREAD") .nes. "" then _goto PRIVS_OK
$ _write 0 "?WREAD privilege required"
$ _exit
```

```
$ ! Close the initial log, if any. Open a new log called Q.DAT, and make
$ ! it contain a full listing of the contents of LP0: queue. Initialize
$ ! a couple of integer symbols. Close Q.DAT, then reopen it for reading.
$ ! Set an simple error/warning trap.
```

```
$PRIVS_OK:
```

```
$ _close/log_file
$ _open/log_file/replace Q.DAT
$ _ccl Q/L
$ _close/log_file
$ POS = 0
$ POS1 = 0
$ _open/read 1 Q.DAT
$ _on warning then _goto ABBY_NORMAL
```

```
$ ! Read records from Q.DAT until either "IS EMPTY" or "/SE:" is found.
$ ! The former indicates nothing to do, the later indicates we've found
$ ! the first record in which we're interested.
```

```
SCHECK_FOR_NO_DATA:
```

```
$ _gosub READ_RECORD
$ POS = f$instr(1,QUE_DATA,"IS EMPTY")
$ _if POS .ne. 0 then _goto NO_MORE
$ POS = f$instr(1,QUE_DATA,"/SE:")
$ _if POS .ne. 0 then _goto GOT_ONE
$ _goto CHECK_FOR_NO_DATA
```

```
$ ! This is the main processing loop. The first time through we've already
$ ! got a record so we skip to the GOT_ONE routine, but after the first
$ ! we go through here each time. There are at least three records we
$ ! have to read for each queue entry. We are interested in entry name,
$ ! owner and form name from the first record, nothing from the second
$ ! record, and from the third and possibly succeeding records, file names,
$ ! number of copies, and the delete switch. Also, we check to see if the
$ ! file to be printed still exists, and if it doesn't we simply remov
$ ! OPSER queue entry and continue.
```

```

SMAIN_LOOP:
$ _gosub READ_RECORD
$ POS = f$instr(1,QUE_DATA,"/SE:")
$ _if POS .eq. 0 then _goto MAIN_LOOP

SGOT_ONE:
$ ENTRY = f$mid(QUE_DATA,3,POS-3)
$ POS = f$instr(1,QUE_DATA,"/FO:")
$ _if POS .eq. 0 then _goto ABBY_NORMAL
$ FORM_NAME = f$right(QUE_DATA,POS+4)
$ POS = f$instr(1,QUE_DATA,"{")
$ POS1 = f$instr(POS,QUE_DATA,"}")
$ OWNER = f$mid(QUE_DATA,POS,(POS1-POS)+1)
$ _read 1 QUE_DATA

SGET_FILE_NAMES:
$ _gosub READ_RECORD
$ QUE_DATA = f$edit(QUE_DATA,2)
$ _if QUE_DATA .eqs. "" then _goto MAIN_LOOP
$ COPIES = "1"
$ DELETE = ""
$ POS = f$instr(1,QUE_DATA,"/C:")
$ POS1 = f$instr(1,QUE_DATA,"/D")
$ _if POS1 .ne. 0 then DELETE = "/DELETE"
$ _if POS .eq. 0 then _goto DO_NAME_NOW
$ _if POS1 .ne. 0 then COPIES = f$mid(QUE_DATA,POS+3,((POS1-1)-(POS+2)))
$ _if POS1 .eq. 0 then COPIES = f$right(QUE_DATA,POS+3)

SDO_NAME_NOW:
$ _if POS .eq. 0 .and. POS1 .eq. 0 then FILE_NAME = QUE_DATA
$ _if POS1 .ne. 0 then FILE_NAME = f$left(QUE_DATA,POS1-1)
$ _if POS .ne. 0 then FILE_NAME = f$left(QUE_DATA,POS-1)
$ _if f$search(FILE_NAME) .eqs. "" then _goto FILE_NOT_FOUND
$ _print/form='FORM_NAME'/copies='COPIES'/owner='OWNER''DELETE' 'FILE_NAME'

$FILE_NOT_FOUND:
$ _ccl q/k 'ENTRY'
$ _goto GET_FILE_NAMES

$ ! Here is the subroutine where we do the actual read and reformat
$ ! of the records.

SREAD_RECORD:
$ _read/end_of_file=NO_MORE 1 QUE_DATA
$ QUE_DATA = f$edit(QUE_DATA,444)
$ _return

$ ! General error trap. Notify humans that an error occurred and append

```

RST-6

```

$ ! Q.DAT to the message. By comparing Q.DAT to the current state of the
$ ! LPO: queue, a good guess can be made as to where the error occurred
$ ! and how to recover.

```

SABBY\_NORMAL:

```

$ _on warning then _exit
$ _close/all
$ _open/write/replace 1 REQUE.ERR
$ _write 1 ""
$ _write 1 "=====> R E Q U E . C O M E R R O R L O G"
$ _write 1 "====="
$ _write 1 ""
$ _write 1 "An error or warning occurred while processing the following"
$ _write 1 "QUEUE listing in REQUE.COM. Please have the system manager"
$ _write 1 "compare this listing with the current queue to determine"
$ _write 1 "recovery procedures."
$ _write 1 ""
$ _write 1 ""
$ _close 1
$ _append Q.DAT REQUE.ERR
$ _print REQUE.ERR

$ ! If running under PBS control resubmit to run again later, close file(s),
$ ! get rid of Q.DAT, and exit.

```

SNO\_MORE:

```

$ _if f$access() .eqs. "BATCH" then _submit/after=+1HOUR PBSS:REQUE.COM
$ _close/all
$ _delete/noconfirm/nolog Q.DAT
$ _exit

```

---

In my account is a file called CNAME.MAC. [Ed. note - this file is now in the download area (account [49,1]) on the Newsletter System.] It is a Macro-11 subroutine callable from DIBOL (version 5) under RSTS/E, which allows a running DIBOL program to change its SYSTAT name. I find it particularly useful in keeping track of large programs with lots of overlaid subroutines. It may be useful to some of the other newsletter readers. Feel free to make it available.

- Paul

```

;+
;
; File CNAME.MAC
;
;-

```

RST-7

```

        .include      /SY:[1,2]COMMON.MAC/
        .title       CNAME
        .ident       /1.0.0/
        .psect      SCNAME

;+
;
;   Author: Paul F. Flaherty, Jr.
;           DANIELS & CRONIN
;           Three Center Plaza
;           Penthouse Mezzanine
;           Boston, Massachusetts 02108 USA
;           (617) 227-5570
;
;   Date:   June 29, 1987.
;
;-

;+
;
; Program description
; =====
;
; This is a MACRO-11 subroutine written in conformance with the Digital
; Equipment Corporation document entitled "Writing MACRO Subroutines for
; RSTS/E DIBOL V5.1." It is used to change the program name of a running
; job, with .FSS used to load the FIRQB with the appropriate RAD-50 characters,
; and .NAME used to do the actual change. It is called from a DIBOL program in
; the format:
;
;           | alpha record |
;   XCALL CNAME (| alpha field |)
;           | alpha literal |
;
; where the argument passed is the desired program name.
;
; Passing more or less than one argument will cause a fatal DIBOL error 6.
; Passing a null string will cause no change in the name. Only the first
; six characters of the passed argument are used.
;
;-

;+
;
; Restrictions
; =====
;
; Since we use .FSS to load the FIRQB, we cannot include things like
; dollar signs and periods in the name, e.g., a name like ..EDT won't
; work. The load of the FIRQB could, however, be recoded to handle such
; names.
;
;-

```

```

;+
;
; N.B. The same functionality is available to DIBOL programs by using the
; Digital supplied (unsupported) subroutines FSS and EXEMT located in
; LB:UNSUPP.OLB in the form:
;
;           | alpha record |
;   XCALL FSS (| alpha field |,dfield)
;           | alpha literal |
;
;           XCALL EXEMT (dfield,104044)
;
; where the alpha argument is the desired program name, as above, dfield is
; a three character decimal field for the return of any possible error code,
; and 104044 is the Octal EMT for a .NAME directive.
;
;-

;+
;
; Revision History
; =====
;
; When          Who          What
; -----
; 29-June-1987  PFFJr        Initial source
; 23-July-1987  PFFJr        Added description of the use of XCALL FSS and
;                             XCALL EXEMT to achieve the same functionality
;
;-

;
; top9=177600                ;used to clear nine high order bits
;
cname:: cmp      (r4)+, #2      ;one argument?
        beq      10$          ;yes, continue
        trap    6.+200        ;no, trap to DIBOL with fatal error 6
;
10$:   mov      #2, r1        ;argument read only, for literals
        trap    0             ;pop it off the DIBOL stack
        cmp     r0, #0        ;size gt 0?
        bgt    20$          ;yes, continue
        rts     pc           ;no, so just return to DIBOL
;
20$:   clr     r3             ;clear for use in 30$
        mov     r1, -(sp)     ;save r1
        cmp     r0, #6        ;size le 6?
        blos   30$          ;yes, continue
        mov     #6, r0       ;no, so make it 6
;
30$:   inc     r3             ;check for blanks (legal but useless)
        cmp     r3, r0        ;beyond size of argument?
;

```

```

bgt    end          ;yes, therefore it's all blanks
movb   (r1)+, r2    ;no, so check for space
bic    #top9, r2    ;clear all but 7 low order bits
cmp    r2, #40      ;is it a space?
beq    30$          ;yes, check next
mov    (sp)+, r1    ;restore r1 (location pointer)
mov    #xrb, r3     ;now clear the xrb, first point to it

40$:   clr    (r3)+   ;clear a word
      cmp    r3, #xrb+14 ;see if done
      blos  40$      ;not yet, try again
      mov    r0, xrb+xrlen ;load string length into the xrb
      mov    r0, xrb+xrbc ;ditto
      mov    r1, xrb+xrloc ;load string location into the xrb
      mov    #firqb, r0 ;now clear the firqb, first point to it

50$:   clr    (r0)+   ;clear a word
      cmp    r0, #firqb+36 ;see if done
      blos  50$      ;not yet, try again

      .fss          ;do the .fss (which loads the firqb)
      .name        ;do the name change

end:   rts    pc     ;return to DIBOL

      .end

```

---

#### Terminal Interface Tips

A frequently asked RSTS question at Symposia is "Why do we occasionally get LOGIN looping on a terminal, and how can we kill it - simply killing the job doesn't seem to help?"

There are several causes of this problem. The first is the case where a user turns off the terminal before BYE has completed typing the logoff message. The second comes from running cables longer than the specified maximum length, or from using poor-quality cables. The third possibility is marginal or defective hardware (the terminal interface in the CPU).

Because of the way the RS-232 interface works, the data line from a powered-off terminal is neither at a 0 level or a 1 level. It is at an undefined middle ground. On long cable runs, or in electrically noisy environments, this line may pick up enough noise from either the other data line in the cable or from outside noise to trigger LOGIN on the system. LOGIN then prints the user prompt, which is reflected back to the system as more noise, and the problem loops forever.

There are several ways to attack the problem. The easiest

is simply to set all terminal lines to /PERM/AUTOBAUD under RSTS V9. Since autobaud requires two carriage returns in a row to start LOGIN, it is unlikely for noisy lines to cause problems, because the noise almost never appears as valid data.

The next way is a hardware solution. Note that it will certainly void any warranty you have, and should only be approached as a last resort. From the discussion above, we saw that the problem stems from noise induced in the terminal cables. If we apply a small 'bias voltage' on the receive data lines on the terminal interface (such as a DZ11), we can prevent the noise from triggering LOGIN. We need to use a part which will put the required voltage on the input data line, but not enough to cause valid data from the terminal to be ignored. I have used 5.1K 1/8W resistors in the past with good results, soldered directly to the 1489 RS-232 receivers on the DZ11. If this means anything to you, you might want to try it. On the other hand, if this makes no sense, you shouldn't try it.

---

#### Hardware Update Bulletin

In the last issue, I reported several FCO (Field Change Order) kits for various devices. In response to your requests, here are some more FCO's for the TU80:

- o TU80 'hangs' during backup - Jan '85 - kit EQ-01323-01
- o TU80 dislikes 11/84 - Nov '85 - kit EQ-01397-01
- o TU80 cover slams - May '85 - kit EQ-01341-01

---

#### Software Update Bulletin

RSTS/E V9.5 arrived right after the February issue was sent to the printer. This release seems quite well-done and bug-free (in the sense that no new bugs crept in). Some of the long-standing bugs, such as RSTS not reading RT-11 magtapes, are still present, however. The Feb '88 RSTS/E Dispatch contains two patches for the 9.5 monitor - one enables the new file truncation feature, and the other apparently fixes a bug where RSTS was 'allergic' to certain PPN's (files could not be created in these PPN's, for example). This release also includes the source for the SHUTUP program, which has been requested by several users.

---

#### Software Problem Report (SPR) Log

Please send the newsletter editor copies of any SPR's (and Digital's answer) on RSTS/E, DECNET/E, or RSTS layered



products. We will print any that are of general interest. The reason for this is that many SPR's are answered with a patch or a notice of restriction, but due to space considerations, they are not published in the Software Dispatch. Since we're desperate for material, this should be useful information and we will print it.

The Newsletter system will be expanded in the near future to allow bulletin-board style messages to be posted for users to exchange this information, which should make it much more timely.

A problem with INIT 'losing' the status of RA-series disks was reported. If a drive starts out with the port select button out, pressing it in while at "Start timesharing?" will be ignored by INIT, and the drive remains unavailable. However, if you press it in while the system is up, the drive will become available.

When running the disk test programs in the TEST\$: account, if the account you are logged into does not exist on the disk being tested, you will get the '?Can't file file or account' error message.



**RSX**

**MULTI-TASKER**



**RSX**

The RSX Multi-Tasker

April, 1988

"CRASH - Continue with scratch media on LB0:"

Fine Realtime Commentary Since 1975

Food for Thought

"One thing I have learned in a long life: that all our science, measured against reality is primitive and childlike - and yet is the most precious thing we have."

- Albert Einstein

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The Editor's Corner

Bruce R. Mitchell

Well, shucks. Gosh golly gee whiz (Batman).

Are we having fun yet? With the release of RSX-11M-Plus Version 4, I should hope so. This should be the "all things to all hackers" release, incorporating logical names, a fully vectored Executive, support for the GIN\$ directive, ACDs, and in general so many features that it could reasonably be called "VMS-11M-Plus".

Well, all things to most hackers, at least. I still can't believe it. I thought RSTS V7 was a hog! Pretty soon we'll need a stripped version of M-Plus to replace the application platform RSX-11M used to be.

Myself, I still run M-Plus V1.0 on my 11/34. SIG curmudgeon, you know.

We got some interesting stuff this month. We got a fix for virtual disk drivers in the V4 release of M-Plus. We got notes on a secure user environment using custom CLIs. We got VMS - IAS compatibility mode. We got timer support for user written device drivers.

Opinions expressed in the editorial section of the Multi-Tasker are those of the Editor. They do not represent the official position of the RSX SIG or that of DECUS leadership in general.

(We got to run that RMS backup ... custom database deliveries ... we got to move these ... DECnet packets ... we got to format these RM03s!)

Ahem. This is a somewhat sparse issue, but still most interesting. And unusual as well; the Editor has foregone the pleasure of his monthly flame in the interest of presenting a short article on the proposed VMS - IAS compatibility field test. So why don't you read that article first?

----- Submitting Articles to the Multi-Tasker -----

Please submit machine readable media. RX01/2, RX50 and 9 channel 800/1600 BPI magtape are preferred. Almost any medium I can't read can be converted. All RSX volume formats are acceptable, but please don't send VMS Backup or ODS-2 format media.

You can also submit articles through the RSX bulletin board system at (612) 777-7664. The Editor loves you if you do so. Kermit the file in and send it via MAIL to username MULTITASKER.

Submissions which aren't machine readable may take longer to get into print. If you format your submission in RUNOFF, please set page size 58,80; left margin 10; right margin 75; and, when changing margins, use incremental changes rather than absolute. The editor thanks you for the consideration.

Send your articles and other submissions to the luxurious Multi-Tasker offices:

Bruce R. Mitchell  
Machine Intelligence and Industrial Magic  
PO Box 77  
Minnesota City, MN 55959

----- And That's The Way Things Are -----

... this month in Pool Lowbegone, where the SACK pulses are strong, the brevity of BBSY is handsome, and the number of DMA transactions is above average.

Announcing VMS - IAS Compatibility Mode

Bruce R. Mitchell  
Machine Intelligence and Industrial Magic

Well, all you 11 hackers out there who are afraid that "everybody" feels IAS and RSX have no place in the VMS world, read on. You'll be happy to know that someone is actively doing something about it.

First, some history and mutual admiration. The RSX and IAS SIGs have enjoyed the closest relationship since their separation some years back. The DeVIAS Newsletter and The Multi-Tasker editors, their respective SIG chairs and steering committees have the greatest respect and admiration for each other (since a big collective drunk two years ago).

With such commonality of interest between these two SIGs (both party a lot and both systems run on PDP-11s) it is not surprising to find that there is much cross-fertilization between the two SIGs.

A case in point is that of the new IAS SIG chair, Alan Frisbie. Alan is and has been an active and well-respected member of the RSX SIG since before the beginning. A successful, and independently wealthy, consultant to both the highest levels of Digital and the users of their equipment, his recent assumption of the IAS SIG chair office can only bode well for that SIG. We wish him the acme of success in that office, and hope that he gets his garage cleaned up real soon.

Another case is that of Sharon Johnson, until recently of the RSX SIG Steering Committee and now of the VMS SIG. Having served well and discharged her position with RSX well and honorably, Sharon now moves on to a new position in the VAX Systems SIG. It is interesting to note that leadership from RSX is always ready to assume new positions.

(What has this all to do with VMS - IAS compatibility mode, you ask? Read on. We're getting there. Have patience.)

Alan, of course, has the best of relationships with VMS as well. He enjoys writing VMS drivers, which is good; with the impending release of VMS V5.0, he will be rewriting a lot of them. In fact, Alan is now so taken with VMS, or as we RSX hackers say, "punch-drunk; loopy as a loon", that he has recently chosen to marry into that august, respected and generally overfed organization.

Literally.

- hearts and flowers, please -

Alan Frisbie, of Flying Disk Systems, and Sharon Johnson, of the University of Minnesota Division of Epidemiology, announce their intent to form a tightly coupled VMS - IAS heterogeneous cluster.

The implications of this are staggering. One can almost see the future fully debugged VMS - IAS tightly coupled cluster with lots of little RSX nodes hanging around the net. While Alan insists that no such plans are contemplated, the Editor has found that in such trial situations it is always well to be watching for unexpected new releases.

The Editor sees many such possibilities, all interesting; but chooses not to elaborate further here, having been warned several times to clean up his act.

In the best traditions of both Digital and Big Blue, this announcement is made without a firm release date. The actual field test is expected to begin sometime in the fall of 1988; updates will be published as they come in. Neither party to the agreement would comment on the expected duration of the field test period, but we hope that it will be both long and fruitful for both parties involved.

#### Bulletin Board Notes

The BBS is running reliably these days. As of late February, the number of users is approaching 100. RSX MAIL, Kermit, old issues of The Multi-Tasker and various other items are available. Conferencing is still unavailable but remains a high priority.

A Vadic 212LC modem was installed on the system in December, replacing the previous 3451P.

The system still needs hardware. Anything. The biggest needs right now are a couple 80 Mb SMD winchesters and a 2400 baud modem. But anything and everything goes, so pack up all your disused treasure and ship it off to the BBS management c/o your friendly Multi-Tasker editor at the address above.

The BBS number: 1-612-SPR-PONG / 1-612-777-7664. This line is autobaud 110 - 1200 baud. To request an account, log in with account name ACCOUNT, password REQUEST.

#### RSX Question and Answer Session DECUS Europe / Rome Symposium September 1987

Dr. Adrian Bottoms  
XDT Computer Systems

#### Top Ten Wish List Questions

1. Q: Will DEC provide a command line editor?  
A: Only place to put it is in the terminal driver which is already too big and complex to support such an enhancement. For time being use DECUS command line editor.
2. Q: On-line and in place disk compression?  
A: Some effort investigating problem but no plans for near future.
3. Q: Selective copy with BRU or PIP  
A: No effort being put in, but it's a good idea.
4. Q: Vectored executive?  
A: Already done for 11M-PLUS in V3.0. As of V4.0 most privileged utilities will also be vectored, but SAV probably never, and LOA in near future.  
  
As of V4.0 distribution philosophy will be changed. Each version and update will consist of a complete distribution kit. Old privileged tasks should run on newer execs.
5. Q: Limitation on length of MCR queue to prevent pool being lost due to rubbish input from terminals etc.  
A: Would like to see the problem better defined.
6. Q: Directory listings in alphabetic order.  
A: Use SRD. Development group uses SRD too, and it is faster than PIP.  
Aud: Want DEC supported utilities!  
A: No plans to do it.
7. Q: Want BRU /DIR to be sent to a file.  
A: No plans to do this soon. Use BRU in batch job and look at log file. Or use BRUDIR from RSX SIG tape. Or LOG off old M-Plus V1.0 kit.
8. Q: Support a general magtape file utility; VMS version of BRU?; or RSX version of BACKUP.  
A: Could use ANSI magtape support or BRU under VAX-11 RSX.  
Aud: ANSI does not support directories. It is not an adequate solution.  
A: Would like to do it but can't see enough need. Have

discussed VMS BACKUP for RSX. Won't be done for a couple of releases.

Aud: Adrian Bottoms reported he had sent a Fortran source which will read BRU tapes to Bruce Mitchell.

9. Q: Preserve creation date by default on PIP copies.  
A: PIP can be built to do this by default. BRU already preserves creation date.  
Aud: PREGEN systems have default set as no preserve. Wants it the other way around.  
A: We have to maintain compatability with previous releases.  
Aud: Provide a ZAP location that allows customers to change the default.  
A: Could do it - prefer to use logical name.
10. Q: Reserve some pool space for an abort command. Allows task to be aborted when pool is low.  
A: Problem somewhat removed with external headers since the pool no longer needs to be in pool to allow it to be aborted.  
Aud: Problem with tasks with outstanding I/O.  
A: We will NEVER NEVER NEVER support an abort of a task with outstanding I/O since there's no safe way to do it.

#### Q & A Section

1. Q: Steve Balteskonis - DEC, Germany  
What is the difference between DLX and the RSX DEUNA device driver?  
A: Has no direct experience of DEUNA driver. One difference is that the new DLX interface in DECnet supports both Ethernet standards.
2. Q: Why is there no generic DEQNA driver?  
A: DECnet group had no connection with the RSX DEUNA driver.
3. Q: What are plans from DECnet group to support DELQA and from RSX group to support a DELQA driver.  
A: DECnet will support all new devices. No answer from RSX group.
4. Q: Alan Frisbie, Flying Disk Systems, USA.  
Since there is to be no RSX-11S-Plus will it be possible to get some M-Plus features into 11S, e.g. variable length send/receive data.  
A: Official answer is no, since RSX-11M and RSX-11S are mature.
5. Q: Adrian Bottoms, XDT Computer Systems, U.K.  
Is there a known problem writing files with fixed length 1024. byte records to ANSI magtape?  
A: No known problem. Needs more information.
6. Q: Peter Moews - DEC, Germany  
Are there any plans to remove the 498. block restriction in SAV in RSX-11M/11S?  
A: No plans but there has been some talk about doing it. Does not see the need for it.  
Aud: Alan Frisbie has systems with all 256Kb full of tasks and need the extended support.  
A: Not planned for 4.3 but thinks they have done it for a particular customer. May consider it for a future release.
7. Q: Peter Korthoven - Promis, The Netherlands  
On M-Plus system crash gets PC, Error code and System error codes. What are the error codes and where are they documented?  
A: CDA manual. Try [61,10]BUGCHK.MAC.
8. Q: Jan Belgraver - Organon, The Netherlands  
In update D RSX-11M V4.2 we got DTE, but it is not documented and when I built it, it did not work. There were no build files on the kit (got them from Software Support). There was also a missing library.  
Aud: The missing library is FDVLIB.
9. Q: Hans Hamakers - BBC Brown Boveri, The Netherlands  
What is the use of the \$ERSEQ data and what does it count?  
A: Not certain but thinks it counts all hard- and software errors.  
Aud: It counts the start/stop mode for TK50 which are ignored by ELI.
10. Q: Hans Hamakers - BBC Brown Boveri, The Netherlands  
Problem with multibuffering and direct access files; last byte gets lost if record size and specified record size in OPEN are equal to 212 bytes. Sent SPR, but he had no response yet.  
A: [No understandable answer on tape]
11. Q: Jan Belgraver - Organon, The Netherlands  
When there is an error packet with an internal error, RPT reports an error and dumps internal data; does not know how to skip such a bad entry.  
A: Send an SPR with file demonstrating problem.
12. Q: Jan Belgraver - Organon, The Netherlands  
BRU64K - CONFIGURE shows mag tape device present but attempting to do a backup gets "DEVICE NOT IN SYSTEM" error.  
A: No idea what's wrong - RSX developers try to stay away from it! Would anybody object if BRU64K was dropped? (This doesn't remove BRUSYS support). Can BRUSYS replace BRU64K? (nobody in the audience depends on BRU64K).

13. Q: Peter Korthoven - Promis, The Netherlands  
Can a BOOT command be implemented from BRUSYS?  
A: Would like to. Add it to the wish list, might be suitable candidate for release in near future.
14. Q: Jan Belgraver - Organon, The Netherlands  
Wanted extended TTDRV QIOs. Asked for them in SYSGEN but didn't get them. Found have to answer "Y" to DECNET. Could it be changed to ask a direct question?  
A: Could change it. Wants to make SYSGEN less exciting!!
15. Q: Peter Korthoven - Promis, The Netherlands  
The build file for ICP allows a number of options to be changed; mentions maxima for many of these parameters but many can be exceeded.  
A: The maxima represent what SYSGEN needs. Checks in the code that used to enforce these restrictions have been removed. Allows user to tailor ICP for their own needs but may have impact on symbol space.
16. Q: Jan Belgraver - Organon, The Netherlands  
Provide ICPBLD.CMD to allow user to specify .ENABLE SUBSTITUTION as a default?  
A: Wanted to do it but got overruled.  
Aud: Provide a ZAP location.
17. Q: ?????????  
Documentation question - must cost much money to produce and check documentation. Is there any hope for better documentation? e.g. for DECnet and I/O manuals for RSX-11M/11M-PLUS.  
A: Makes great effort to document well. If you see any errors PLEASE PLEASE send an SPR. Documentation for next release of RSX-11M-PLUS has been extensively reworked. Should see some improvements. DECnet programming documentation has been improved.

Submitted on behalf of the European RSX SIG by Jan H. Belgraver, chairman.

#### Implementing Secure User Environments

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To implement a secure environment on RSX-11M-PLUS, one can use captive command procedures with slaved terminals, or write a restricted user-written command language interpreter (CLI).

A problem with captive command procedures is - what can the user do when the procedure bombs? The terminal is slaved and nothing can be entered from that terminal, until unslaved by a privileged user.

A problem with restricted CLIs is - how to implement a command you don't want entered directly, but is part of a procedure. For example, BRU is a command executed as part of a user backup procedure after the necessary MOUNT commands are issued. If the CLI passes BRU as a valid command, the user can execute it by typing it in.

This article deals with getting around the direct-entry problem so that we restrict the user, but allow command procedures to issue any commands necessary to execute the procedure, without slaving the terminal.

The GCCIS\$ (Get Command for Command Interpreter) Exec directive can return an optional information buffer. This buffer contains the name of the parent task in four bytes starting at byte 3 for FORTRAN, or offset G.CCPT for MACRO-11 relative to the base of the buffer. If this location is zero, there is no parent task for this command. Commands entered by the user at the terminal have NO parent, but commands executed as part of a INDIRECT command procedure DO have a parent task.

In the CLI, validation of commands should be done first to allow for procedures that call other procedures, such as a backup procedure that uses a mount procedure rather than MOUNTing directly. If the command is not a valid command defined for user entry then we check parentage. If there is no parent then display a firm but friendly message about typing illegal commands. If the parent is specified then pass the command to MCR or DCL, almost as is.

Many INDIRECT procedures check to see which CLI is in use before issuing a command. This is done to prefix the command with "MCR " or "DCL" as needed to allow the command to work in different CLI environments. Our CLI won't be MCR or DCL, though, so the prefix MCR will probably be added by the command procedure. That is assuming the command procedure looks like this:

```
.SETS PREFIX ""
.IF <CLI> NE "MCR" .SETS PREFIX "MCR "
'PREFIX'MOU MU0:/FOR/NOS
```

Before the command is passed to MCR, the "MCR " will have to be stripped from the command, or "DCL" if the default was DCL.

Some of the following example is copied from [USER]TMCLI.MAC supplied with RSX-11M-PLUS, and some is from a user-written CLI. This example has only two commands implemented, T and H. See the original source TMCLI.MAC or TMCLI.FTN to see how actual commands are implemented by a CLI.



(Editor's note: In the following example, some branches may need to be replaced with alternate-sense jumps depending on the size and number of the execution setup code routines.)

```

; Check for legal commands T OR H

CMP    #"T, G.CCBF(R0)      ; Is it a "T" command?
BEQ    TCMD                 ; If so, go process it

CMP    #"H , G.CCBF(R0)    ; Is it a "H" command?
BEQ    HCMD                 ; If so, go process it

; Not a valid direct command; see if a parent task exists

TST    IBUF+G.CCPT         ; Does parent task exist?
BEQ    ILLCMD              ; If not, go error out

; The command has a parent task, so give it to MCR as is.

MOV    #MCRNAM, R2         ; MCR... is task name
MOV    #CMDBUF, R4         ; Point to command buffer
MOV    #RPOI, R5          ; Point to RPOI$ dir DPB
MOVB   #RP.OEX, R.POSC(R5) ;
MOV    #CMDBUF+G.CCBF, R0  ; Load string addr in DPB
MOVB   G.CCCT(R4), R1     ; Put length in RPOI DPB

; Except if command starts with "MCR " skip the "MCR "
; NOTE: It is assumed that R0 points at an even address!

CMP    #"MC, (R0)          ; First 2 characters "MC"?
BNE    XQTCMD              ; If not, go do it now

CMP    #"R ,2(R0)         ; Second 2 chars "R "?
BNE    XQTCMD              ; If not, go do it now

; Yup it's got it so strip it from the line

ADD    #4, R0              ; Bump pointer past "MCR "
SUB    #4, R1              ; Shorten buffer by four
BR     XQTCMD              ; And go do the command

; Create TYPE command

TCMD:  <specific code goes here>
BR     XQTCMD              ; And go do the command

; Create HELP command

HCMD:  <specific code goes here>
BR     XQTCMD              ; And go do the command

```

```

; Execute pending command
XQTCMD: CALL  ISSCMD
BR      GETCMD              ; And get the next command

; Illegal command processing
ILLCMD: <necessary processing goes here>
MOV     #ERROR1, R0        ; Point at error message
CALL    ISSMSG             ; Issue the message
BR      GETCMD             ; And get the next command

```

This is just a starting point for a specific restricted CLI, a programmer should study the DEC supplied [USER]TMCLI.MAC or .FTN routines for further information.

#### Timer Support for User Written Drivers

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While presenting a talk at the Nashville Symposium on ASTs, I made the somewhat brash remark that I had "once used Kernel ASTs to implement timer support for a driver". This remark generated a number of questions and requests for more information. The result is this article, which discusses how to get internal timer services into an RSX device driver.

We'll meet kernel ASTs and bounce off a few other subjects along the way. The truth of the matter is, there's not much to putting timers in a driver, so I've thrown in more information to pad the article.

A disclaimer: This is an article about device driver and RSX internals. I assume that you are familiar with the basics. In particular, you must know what SCB, UCB, and other TLAs mean. If you've never read the "Guide to Writing an I/O Driver", you may want to file this article for future reference. On the other hand, it IS written in English and really isn't all that arcane. So, if you're just interested in a peek under the hood, read on.

There are two ways to get timers into your RSX driver. The first is called "device timeout". Device timeout is one of the services provided by RSX for all device drivers. It exists primarily to prevent a driver from hanging on a lost interrupt.

To use device timeout, simply stuff the interval in seconds into byte offset S.CTM of the unit's SCB. Normally, you do this at I/O initiation, but you can initialize or reinitialize this location at any time.

As the RSX clock interrupt service routine ticks off each second, it scans the SCBs, looking for non-zero S.CTM values. When one is found, it is decremented. If an S.CTM value reaches zero, the driver is called at its timeout entry point. Thus, the driver regains control, and can take whatever action is necessary. Part of the QIO completion code in the executive clears the S.CTM offset, to avoid spurious timeouts.

Although device timeout is useful for dealing with a hung device, this facility is not really suitable for general timing within a driver. For starters, there is only one timeout entry point, and only one timer value. This is fine for the function's intended purpose. However, for general timing, having only one timer available is a bit restrictive.

A more troublesome restriction is that the time increment is fixed at 1 second, and is not synchronized with the system clock. This means that there is a -1, +0 second slop in the timeout. For a value of n, you actually get n-1 seconds, plus however many clock ticks are left in the current second.

Why is it like that? S.CTM is a byte value, and 255 ticks let you time only up to about 4 seconds. Not good for a slow typist. Higher precision would cost cpu cycles during the SCB scan (once per second), plus more code in the Exec, plus 3 more words of pool for each SCB. So the answer is "it's simpler, smaller, and faster to do it this way, and it's accurate enough as it is."

A digression: Ever wonder why the terminal driver uses 10 second timeout increments? Some time back, there was a patch to TTDRV which turned the timeout parameter into second, rather than 10 second increments. We used it for a while, but fairly quickly went back to the standard driver, and rolled our own timeouts in the user program for short intervals.

Why? Having TTDRV accept increments down to one second was just too tempting, and we started specifying 1 second timeout for instrument or other non-human serial links. A rash of link failures resulted, because a given QIO might time out after only 1 tick due to the inherent slop in the driver timeout code.

I suspect that the RSX developers set up 10 second increments to avoid having to answer gobs of SPRs on "broken" timeout functions! Before you scream to DEC about ineffective facilities, consider that the driver timeout is an efficient mechanism of entirely satisfactory precision - for it's intended purpose.

Back to the subject at hand. The second, and much better, way to set a timer from your driver is to roll your own clock block, and insert it in the RSX clock queue. Although this sounds a bit intimidating, it is really quite simple. There is even ersatz documentation in the "RSX Guide to Writing an I/O Driver".

True, there is no mention of it in the index or table of contents, or for that matter anywhere in the main text. But the necessary data structures and system subroutine (CLINS\$) are included in the reference section. If you look closely, there is even an example in one of the sample drivers! You still have to go to the Executive sources to figure it all out, but you find lots of interesting things in there, which usually makes such a trip worthwhile.

Using the clock queue gives you many of the same timer services that are available from user state with the MRKT\$ directive. Intervals are in ticks, the precision is to -1, +0 ticks, and you can set up as many timers as you need.

Not all of the MRKT\$ features are available, however. In fact, you are dealing with the Executive routines which the MRKT\$ directive calls for you. RSX assumes that if you are tough enough to go right to the CLINS\$ routine, you don't need any hand holding.

The only increment at this level is ticks, so if you want your driver to wait for 13 hours, you need to come up with a large number (of ticks) to stuff into the clock block. You also need to be sensitive to what a tick means to the system your driver is running on. There are usually 60 ticks per second, but may be 50, especially if you drink a lot of tea. If your system has SPM, there are probably 100 ticks per second. With a KW11-P as the system clock, it could be almost anything. The right number can be picked up at run time from the Executive data area.

Although you can certainly build a clock queue entry which will set an event flag in a user task, a driver doesn't have the proper context for an event flag or an AST service routine. Instead, a special clock block is used which results in "AST-like" calls to the specified service routine in the driver when the timer expires.

"AST-like" calls sounds like it could be related to this mysterious "Kernel AST" thingy. Right. An "AST-like" service whose action routine is in the Executive or other system state code is called a Kernel AST. The routine may not really be in the kernel, although it is mapped through the kernel APRs. It will definitely NOT be a real AST! Trapping off the system stack is reserved for REALLY significant events. But Kernel AST is a descriptive name, and has sort of a nice ring to it, so that's what they're called. That, or simply KASTs.

There are several types of these creatures, all among the more obscure inhabitants in the RSX pet shop. They do the same kinds of things that "real" ASTs do in user mode: allow a process to suspend itself pending some event.

Consider the following example. When a buffered read I/O completes, the issuing task may have to be checkpointed in and mapped before the driver can copy the data to the user buffers. To do this, the I/O completion code tickles the Loader to bring the task back into memory, and posts a Kernel AST. When the task is available, the AST fires, and the suspended I/O completion code finishes. Before the AST fires, the system is doing something more useful than waiting around for the Loader - perhaps executing the Loader.

But I digress. We are interested in timer support, and one of the several types of clock queue entry will generate a Kernel AST. The driver posts the timer, then goes on about it's business. When the timer expires, the driver is re-entered.

There are several types of clock queue entry. Type 6, "Single Shot Internal System Subroutine" is the one needed. The request type identifier (6) is also defined symbolically as C.SYST. This, plus the offsets into the clock block are defined by macro CLKDFS.

To set up a timer, first allocate a clock block, by calling \$ALCLK. The clock block is carved out of system primary Pool (don't worry, it is not large), and its address is returned in R0.

The clock block is initialized, and the timer started, by system routine \$CLINS. The call to \$CLINS is set up as follows:

- R0 = Address of clock block (as returned by \$ALCLK)
- R1 = High order of interval in ticks
- R2 = Low order of interval in ticks
- R3 =
- R4 = Request type (C.SYST = 6)
- R5 = Service routine address relocated through APR 5

\$CLINS converts the interval to an absolute time by adding it to the system time of day clock and adjusting for midnight as necessary. It then copies the adjusted time, the other parameters, and driver (or caller) APR5 mapping into the clock block, and queues the block in the system clock queue.

Note that if you are in the habit of writing very large drivers which overflow into APR 6 (TTDRV does this), then among many other headaches, you must ensure that any timer service routines are mapped via APR 5.

When the timer expires, the Executive maps the driver and calls it at the specified entry point. The driver wakes up at system state, with the clock block address in R4. When the

driver finishes whatever processing is necessary to handle the timer expiration, it does a RETURN, which gives control back to the Executive.

Unlike user mode ASTs, there is no cleaning of the stack prior to return, and no ASTX\$ call needed (or allowed!). All registers MUST be preserved by the service routine. Failure to do so usually leads to sudden activity on the system crash notification device.

And that is that. Once you know how to set up the \$CLINS call, putting timers into a driver is no more difficult than using MRKT\$ with an AST routine in user state. However, you do have a bit more housekeeping to do.

The Executive does not deallocate the clock block after the driver returns. This is actually friendly behavior, as it saves the driver the trouble of allocating a new clock block for each request. Normally, one or more clock blocks will be allocated during driver initialization, and never given back, unless you plan to unload the driver. That would leave the clock block(s) orphaned, and those chunks of Pool lost forever.

By the way, I would strongly suggest NOT unloading a driver with timers posted. There's no analog to TKTN to clean up a driver. The timer WILL expire and the service routine WILL be called, whether it's there or not. If not, the consequences would be - ah - interesting.

If you must unload the driver, put in a special QIO function to tell the driver to close up shop. This would wait for any pending timers to expire, and deallocate the clock blocks. Of course, it would also necessarily cause any subsequent QIOs to be rejected out of hand.

This raises another potential caveat: there is no way, short of running down the clock queue yourself, to cancel a timer once it's been posted. Thus, you probably need a flag to tell the service routine "never mind".

Great care must be exercised within the timer service routine. Just as with user-mode ASTs, the mainline code is completely unaware that the AST routine has come and gone. It is all too easy to do something in the AST routine which damages the driver's internal context. The driver will usually share its insanity with RSX. You know the rest.

By the way, a Kernel AST provides a neat way to get a driver to do something even though NO QIO IS EVER POSTED to it! Like recursion, this is an esthetically pleasing concept with limited (though real) practical use. Its best application may be for establishing your hacker's credentials over a few brews at the local pub. Or, perhaps you have a device which simply pines away from loneliness and croaks if not tickled every so often.

The way this trick works is as follows: At the online entry point, post a clock queue entry for some convenient interval. In the KAST service routine, tickle your device or whatever, then call \$CLINS again to perpetuate the timer. Around and around it goes.

Come to think of it, this might also be a neat way to embed truly weird code in the Executive where no one will ever find it. After all, system state is system state, no matter how you get there. Simply graft your trick code and the appropriate \$CLINS calls onto some unsuspecting driver (the one running the system disk might be a good choice), and turn it loose. Just the ticket for a routine that selectively increments the saved PC of all programs running under your shop bozo's UIC. Except for BYE, of course. Amaze your friends! Befuddle your enemies! Give yourself some job security!

Enough of that. I hope that I've shown how adding timer support to your drivers is not at all difficult. No more trouble in fact than putting similar support into a user task. As with most things, once you know how, it's easy.

This article may also have piqued your interest in the remaining types of clock queue entries (one could surmise that there are at least 6 types), the other kinds of Kernel ASTs (there are several), or both. If so, haul out your trusty RSX listing, and have at it.

And by all means, let us know what you find.

#### Virtual Disk Driver Problem Fix

Editor's note: I have no record of who submitted this. The problem exists due to use of DV.MSD in the latest release, and this is the correct fix. The same fix should be applied to all other virtual disk drivers.

After installing RSX-11M-Plus V4.0 I encountered a small problem trying to BRU to a virtual disk. This letter describes the problem and a how I solved it.

I have used the virtual disk package the Spring 1983 SIG tape, UIC [370,21]. This software is Ralph Stamerjohn's original VD package for RSX-11M, modified for M-Plus by T.K. Pang and L.M. Fraser. Although their comments say this version was done for an M-Plus V2.0 field test, I have used it with V2.0 thru V3.0 Update E without the slightest problem.

This venerable VD also worked with M-Plus V4.0 with one minor exception: BRU (Ident 08.16 and later) refused to use VD devices. If I mounted a VD device Files-11 or as a foreign device and tried to BRU to it, I got either of the following messages:

```
BRU -- *FATAL* -- Device not mounted files 11 on VD0:
BRU -- *FATAL* -- Device not mounted foreign on VD0:
```

A BRU.TSK from M-Plus V3.0 Update E running on the V4.0 system allowed access to the VD device, so the problem was with BRU itself, not the operating system.

I poked around in the VD0: device data base using FCB (file control block lister) from the Fall 1983 SIG tape, UIC [300,70]. I compared the unit control block of VD0: to a UCB of a "real" disk and discovered differences in the word U.CW1 (unit characteristics word 1):

DB0:	VD0:	Value	Description
====	====	====	=====
DV.DIR	DV.DIR	10	File structured device
DV.MSD		100	Mass storage device
DV.UMD		200	User mode diagnostics supported
DV.F11	DV.F11	40000	Mountable as FILES-11 device
DV.MNT	DV.MNT	100000	Device is mountable

The decoding of the bits in U.CW1 was found in the "RSX-11M-PLUS and Micro/RSX Crash Dump Analyzer Reference Manual", page C-86 (DEC p/n AA-JS13A-TC) distributed as part of the M-Plus manual set.

I used the MCR OPEN command to set the DV.MSD bit in U.CW1 for VD0: and found that BRU worked. The conclusion was that for some mysterious reason BRU now checks the DV.MSD bit.

To make the fix permanent, I changed the device driver data base (VDTAB.MAC) to set the DV.MSD bit, and rebuilt the VD package. After that, everything was back to normal.

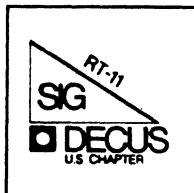
THE  
**mini-  
tasker**

DECUS

RT-11 SIG NEWSLETTER

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RT

RT-11 MINITASKER  
April, 1988

CHESHIRE ENGINEERING CORPORATION  
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Pasadena, California 91107  
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January 28, 1988

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

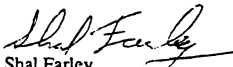
re: A postscript to my letter of 13-Jan about T<sub>E</sub>X

Dear Mr. Crowell:

If a Pascal to Modula-2 translator does not exist there may be a simpler solution than implementing one: modify Web to generate Modula-2 directly. Of course, this would require access to a system which already runs Web.

Also, Wirth claims (on the back cover of his book T<sub>E</sub>X: The Program) that "Semi-automatic translation to other languages is also feasible, because the program ... does not make extensive use of features that are peculiar to Pascal." I have not purchased or read the book yet, so I'm not sure if he meant translation of the Web sources or of the code it produces. I presume the latter because he was talking specifically of porting T<sub>E</sub>X to other machines.

Sincerely,

  
Shal Farley

From the Editor:

Another DECUS Symposium is coming up. For those of you who need to know, or need to make up your minds, or need to persuade your bosses to send you to Cincinatti, Milton Campbell has provided the abstracts of the RT-11 sessions so you can know ahead of time what to expect. Bob Walraven fills out his analysis of the RT-11 Wish List. Shal Farley has some more comments about using Tex, Web, Pascal and Modula 2.

We are celebrating the 15th anniversary of RT-11's beginnings this year. I, for one have been using RT-11 throughout that entire period (except for a brief tergiversation to RSX-11M). I'd like to put some war stories from you other old-timers in the Newsletters. So send your favorite RT-11 anecdote to:

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

## Analysis of the RT-11 Wish List Survey

### 1 INTRODUCTION

The RT-11 Wish List Survey is now over. We have collected all the data, analyzed it, presented results at the Fall DECUS Symposium, and given the results to the RT-11 Development Team. We would like to now present the results of the survey to those of you who were not able to make it the the Fall Symposium.

The purpose of the survey was to rank by importance the features the user community would like to see in RT-11, and compare those results with the ease or difficulty of implementing those features. The benefit of such a survey to Digital is that it would allow the RT-11 Development Team to understand what its user community would like to see it working on. The benefit of the survey to the RT-11 users is that it would give us a feeling of shaping the RT-11 of tomorrow.

### 2 RESPONSE

How well did the RT-11 readers respond? 56 forms were returned to us. That doesn't sound like a lot, but it may not be as bad as it seems. There are approximately 50,000 DECUS members, but only a little over 5,000 currently subscribe to the newsletter. Let's make an educated guess that 5 percent of those are active RT-11 users (actually use it to do development, not people who once used RT-11). Then we are only talking about 250 readers who might have an opinion to express. If these numbers are right, then we got better than 20 percent return. Not so bad after all.

Let's look at what this tells us in a different light. We know that Digital has sold a little over 100,000 RT-11 licenses. We don't know how many of these are still active - maybe 20,000-30,000? The problem with these numbers is that many of the currently installed RT-11 systems are not being used for development; they may be buried in a laboratory or inside a piece of equipment, and are just sitting there quietly doing their job. Furthermore, many RT-11 users are really responsible for several systems, so the actual number of active RT-11 system managers who are doing program development may only be a few thousand. Let's say the number is 2,500-5,000. Can we confirm this number in another way? Yes, we can. The number of active FORTRAN-77 users is something like 1,400. Digital has recently informed me that FORTRAN-77 and FORTRAN-IV sell in about equal numbers, so we have about 2,800 FORTRAN users. At a DECUS session a year or so ago I asked the audience what languages people use. Most use MACRO and FORTRAN, and few use anything else. So the number of active RT-11 users, computed this way is probably around 3,000 to 4,000.

If we believe these numbers, it appears that a little less than 10 percent of the active RT-11 community reads the newsletter. That is only slightly worse than the rate for the entire Digital community, which is just a little over 10 percent. But we would expect the RT-11 readership to be a little worse than average because the typical RT-11 user doesn't have as much money to spend as the typical VAX user.

The numbers above also seem to indicate that we had a slightly better than 1 percent sample of the entire RT-11 community. Although we would have liked to have seen a

larger response, we feel that the sample was large enough to be a significant representation of the views of the entire community.

### 3 SCORING

For each item on the wish list we asked the respondents to give us a score as follows:

- 4 = Very important
- 3 = Mildly important
- 2 = Mildly undesirable
- 1 = Very undesirable

Many respondents voted only on those items that they had a strong opinion about, so for each item, in addition to the distribution of 4's, 3's, 2's, and 1's, we had an additional statistic: the number of votes of all kinds for that item.

Summing over all items, there was a total of 4857 votes, which means that the typical respondent voted for (or against) a little less than half of the items. The breakdown of votes is as follows:

2178 fours  
2288 threes  
285 twos  
106 ones

That is, people were generally in favor of the items they voted on, but there was some feeling that some particular items were not desirable.

We wanted to come up with a single number that represented the relative score of an item. For lack of a better idea, we settled on using the average of the four responses, weighted by the response numbers, and normalizing so that the average of all scores was zero. In mathematical terms, we computed

$$\text{SCORE} = (N1 + N22 + N33 + N44)/(N1 + N2 + N3 + N4)$$

- average reply over all questions

where N1 is the number of 1 responses, N2 is the number of 2 responses, etc., and the average reply over all questions (not counting the non-votes) was computed to be 3.35. Computing the item scores in this way gave us a nice distribution of values such that approximately half the items had positive scores (more desirable than the average), and half the items had negative scores (less desirable than the average).

### 4 RANKING

Figure 1 shows how the scores were distributed as a function of the number of votes an item received. Notice that there is essentially no correlation between the score and the number of votes (well maybe a little tiny bit). This means that these two quantities are statistically independent. That is, they each express something unique about an item. Perhaps it is best to think of the score as being "Desirability" and the number of votes as being "Importance". Thus, an item with a high score and number of votes is not only very desirable, but also important to many respondents.

We wanted a single measure to rank the items by, where the top of the list contained the items that the respondents clearly felt should be implemented in RT-11, the middle of the list contained items that were not really important, and the bottom of the list contained the items that should not be included in RT-11. Given the way we defined the score, the items can be ranked in this way by defining

$$\text{RANK} = \text{SCORE} * \text{NUMBER OF VOTES}$$

## 5 THE DIGITAL RATING

We gave the Wish List to the RT-11 Development Team without letting them see any respondent statistics, and asked them to rank each item by the ease or difficulty with which it could be implemented in RT-11. They ranked all the items on the following scale:

- 0 = Already done or easy workaround
- 1 = Very easy
- 2 = Moderately easy
- 3 = Somewhat difficult
- 4 = Very difficult
- 5 = Irrational or Impossible
- 6 = Didn't understand request

Figure 2 shows how the scores were distributed as a function of the Digital Rating. Notice that most of the items had a Digital Rating of 1, 2, or 3. Each Digital Rating category seems to have a distribution of scores somewhat like the total distribution (approximately Gaussian about zero). That is, there does not seem to be any noticeable correlation between score and Digital Rating.

## 6 PRESENTATION OF RESULTS

For each item on the Wish List we will give the number of votes, the score, and the Digital rating. Instead of using the Wish List ordering of items, they will be presented in order of rank for each of the Digital rating values. In this way, it is hoped that you will be able to get a quicker feel for which items fared well and which didn't.

If anyone is interested in the complete raw data, please let us know and we will send it to you.

### 6.1 The items you get for free

There were only 6 items that fell into the "already done or there is a workaround" category (Digital rating of zero). Unfortunately only one of these items had a positive score. The following table lists these items in order of RANK.

Score	Votes	Item
-----	-----	----

0.11	26	VTCOM: Restore the packet size after it has been reduced (Coming in Version 5.5)
-0.06	24	Provide EMTs to mount/dismount logical disks (Available now as a special function)
-0.10	24	KED: Provide a way to go to an absolute line number (Can do <gold>7<gold><number>0 now)
-0.12	13	Provide an EMT to return address of channel IOSB (Can be done now with GTJOB + arithmetic with less monitor overhead)
-0.16	21	VTCOM: Provide a way of bypassing halving algorithm
-0.22	15	BUP: Provide /NOVERIFY switch (Coming in Version 5.5)

### 6.2 The Very Easy Items

There were 34 items that were ranked "Very easy" by Digital. Roughly half had positive scores. The following table lists these items in order of RANK.

Score	Votes	Item
0.24	44	Make IND extension ".CMD"
0.33	28	BUP: allow /DIRECTORY switch to show files within backup save set
0.20	38	Multiple learn sequences for KED
0.20	31	Lower case "Y" answers in PIP, DUP and BUP
0.17	33	LIBR switch for removing module from library
0.14	37	KMON F77 command (with switches)
0.13	25	TSX-like DISPLAY statement for command files
0.09	36	TSX-like PAUSE statement for command files
0.15	16	SYSMAC macro for easily calling FORTRAN routines
0.10	22	KED: allow section to be cleared without having to clear past buffer first
0.07	26	KED: implement BACKSPACE key like EDT
0.06	27	KED: implement SET REGION HOLD so that marked region is not lost after it is used
0.06	27	Provide DATE functions in SYSLIB
0.08	14	SIPP: Let ctrl-C abort search and verify rather than SIPP itself
0.06	17	Let command lines start with a number
0.01	25	Provide 8-bit support in XC/XL
0.01	11	MACRO: provide alternate to .PRINT to avoid conflict with SYSLIB macro
-0.02	21	Allow HEXadecimal radix in MACRO
-0.02	21	Provide terminal emulator hooks in XC/XL
-0.04	16	Allow control of READONLY PDR bits in global region directives
-0.08	15	Provide HEX support for MACRO inputs/listings
-0.24	9	Allow patch to make /G switch permanent
-0.11	25	KED: allow SET WRAP nnn
-0.22	15	MACRO: let .IF, .ENDC have option name argument similar to .MACRO, .ENDM
-0.19	19	Distribute source to FILEX
-0.29	16	Tidy up messages on BINCOM . comparisons
-0.29	18	KED: let ctrl-H mean "move to start of current line"



-0.30 19 Allow file size argument in .CLOSE  
 -0.58 13 Move memory parity support from monitor to an MP handler  
 -0.26 33 PIP: display filename BEFORE copy starts  
 -0.39 23 KED: let FILL put two spaces after full stop  
 -0.60 16 KMON: let ^Xn access jobs  
 -0.45 31 MONITOR: Allow special logical device names for command files, FRUN, SRUN, libraries  
 -1.21 22 KED: do not delete CR when cursor at end of line

### 6.3 The Moderately Easy Items

There were 83 items that were ranked "Moderately easy" by Digital. Roughly half had positive scores. The following table lists these items in order of RANK.

Score	Rank	Item
0.42	48	KED: allow startup initialization command file
0.31	35	KED: allow <gold><find> to search for special characters
0.42	22	Keep original date when copying files to magtape
0.22	35	KED: provide full VT220 support
0.23	33	IND: provide easy way to express ASCII chars
0.15	46	DIR: allow file search through multiple LDs
0.22	30	LINK: provide switch for abbreviated maps
0.24	27	MACRO: include source line numbers with errors
0.17	33	Provide TSX-like terminal logging capability
0.15	32	IND: allow KMON commands to be issued while IND has other files open
0.40	12	LINK: allow library modules to be put in high memory part of XM job
0.15	32	Provide a SEARCH utility
0.10	47	Put creation time in directory when file is made permanent
0.11	41	IND: let @filnam search for filnam.COM, then filnam.CMD
0.12	34	LINK: display size of each overlay region in map
0.22	14	SIPP: allow lower-case input with ";A"
0.09	34	When command file aborts, restore [NO]QUIET TT status and ERROR LEVELS to original values
0.08	37	SHOW: add /OUT:filename switch
0.09	32	LINK: provide way for PARTICULAR modules to be included in an overlay
0.07	40	DIR: allow alphabetically ordered directories to run horizontally instead of vertically
0.13	21	Extend date support beyond 40 years
0.13	21	Provide a FLUSH routine for FORTRAN and BASIC that forces writes of records currently in memory
0.11	24	MACRO: provide macro for including date and time of assembly in a program
0.09	27	Provide EMTs to access monitors internal conversion algorithms
0.08	30	LD: allow multiple dismounting
0.12	17	FILEX: provide interchange for MAINDEC progs.
0.10	20	Provide way for VBGEEXE run jobs to connect to an interrupt vector

0.06	27	LINK: allow each overlay region of an overlaid program to have its own /INCLUDE switch
0.09	16	MACRO: allow multiple modules in single source
0.04	33	KED: allow keystrokes to be replayed from file
0.06	17	Provide spool support for more than one device
0.05	20	VTCOM: provide transmit speed switch
0.09	9	Move most of SDX/SDSX to high memory
0.03	21	Provide full SL capability in .GTLIN
0.02	19	KED: omit non-printable chars from wrap count
0.02	16	Allow SL to be installed regardless of SYSGEN compatibility
0.02	16	Add version number compatibility to system services description
0.02	8	Provide handler macro for forwarding queue element to another handler
0.01	14	Identify SYSLIB functions that are not reentrant
0.00	20	VTCOM: allow arguments on same line as command
0.00	37	KED: allow DELWORD to delete only to next non-alphabetic character
-0.01	29	KED: allow right margin justification
-0.02	15	MACRO: provide switch to direct error messages only to printer
-0.01	32	Make all CCL switches available at DCL level for all utilities
-0.01	32	KED: allow left margin to be specified
-0.02	27	BUP: provide /[DE]COMPRESS switch
-0.03	31	IND: provide way for IND to determine which file an LD unit is associated with
-0.06	17	Make IND files compatible with RSX
-0.13	9	Provide way for handlers to create, allocate, requeue, etc. queue elements
-0.08	15	KED: provide command counters
-0.08	15	Provide virtual-to-physical address EMT
-0.08	15	SL: pass non-editing non-printable characters
-0.06	21	LINK: allow linking with common sharable libraries in permanent global regions
-0.06	28	LINK: allow specification for library path
-0.08	22	MACRO: provide macro to insert ASCII date into program
-0.08	22	BUP: provide /NOVERIFY so no verification at all is done on media
-0.14	14	LINK: provide DCL interpretation of /F, /G
-0.10	20	MACRO: allow ASCII text to be inserted into program in image mode.
-0.10	20	Provide EMT to return physical name of logical device without need to open channel to device
-0.10	20	Provide XC/XL SET option for ring buffer size
-0.18	12	Allow .READC to TT with word count of zero
-0.09	27	Provide TSX-like generalized data caching
-0.20	13	MACRO: make .MCALL .MODULE implicit
-0.08	33	DIR: add flag to indicate file is backed up
-0.11	25	KED: allow number of screen lines to be set
-0.18	18	Provide ARCHIVE utility
-0.12	30	FORMAT: provide switch for automatic INIT after formatting
-0.19	19	Add pseudo JOB impure area to the SJ monitor for compatibility with FB and XM

-0.35 11 SL: let ctrl-H swap two chars before cursor  
-0.35 11 LIBR: Allow conditionals for macro libraries  
-0.28 14 Provide EMT that returns pointers into job's impure area  
-0.29 18 LD: provide switch to suppress automatic mounting on boot  
-0.23 24 BUP: allow new output device after request to insert next volume  
-0.42 14 Allow .SAV and .REL files to use .DRSET  
-0.35 17 Provide minimal FB monitor for only 1 job  
-0.48 15 Allow complex expressions for deposit command  
-0.35 21 Provide support for "underground" job  
-0.41 18 MACRO: let ";" denote local (not listed in macro expansions) comment  
-0.18 41 Allow PRINT and TYPE to look for .TXT and .DOC extensions if .LST not found  
-0.31 26 Allow parameters with R command  
-0.43 25 Make copy/rename /WAIT switch position dependent  
-0.35 31 Provide switch to format before initialization  
-1.24 19 MACRO: allow 8 and 9 without "."

#### 6.4 The Somewhat Difficult Items

There were 62 items that were ranked "Somewhat Difficult" by Digital. Roughly two-thirds had positive scores. The following table lists these items in order of RANK.

Score	Votes	Item
-----	-----	----
0.44	34	Add support for separate I and D space
0.33	41	LINK: Include referencing module in undefined global message
0.36	35	VTCOM: allow wildcard specifications
0.28	43	Add SET xx SHOW to display handler set options
0.34	32	Map XM monitor out of user space by default
0.31	29	KED: provide 8-bit support
0.28	30	PIP: add 8-bit support for ASCII copies
0.18	43	KED: make screen scrolling more efficient
0.29	25	Document how to load foreground, system, and handler code into high memory
0.20	29	LINK: add support for ISD object records
0.10	51	RENAME: if not specified, assume device of second filename is same as first
0.25	20	.GTLIN: add completion mode
0.14	35	IND: provide way to get strings/values from user programs when they exit
0.22	21	Allow up to 6 optional parameter strings to be passed to command files (ala TSX+)
0.23	19	Support more than 256 Mb on MSCP devices
0.29	14	Provide a true multiterminal handler
0.12	32	KED: provide columnar cut and paste
0.13	29	VTCOM/TRANSF: allow command file capability
0.15	22	Remove internal TT: support from FB and XM
0.15	22	Provide handlers for DHV11 and DHO11
0.10	31	KED: provide split-screen editing

0.13 21 Add EMT to get line, but if no characters available, to return immediately with C set  
0.13 21 Add memory protection and chaining EMTs  
0.18 15 SIPP: allow string input mode  
0.11 24 Provide symbolic debugger like RSX F77 one  
0.09 25 Allow suppression of character echoing on type-ahead  
0.10 22 Pass raw command lines in chain area  
0.06 22 Support supervisor mode libraries  
0.06 22 Allow LD logical disks to be booted  
0.05 25 Put TECO on the distribution kit  
0.05 20 Add completion routine version of .GTLIN  
0.03 29 SET: allow filenames in addition to devices to be specified  
0.09 9 Allow LET to work with console handler in the same way as SL  
0.05 15 Provide single char version of .GTLIN  
0.04 18 Provide a wait mode for .PRINT to synchronize with .TTYOUT  
0.02 35 KED: provide optional journaling  
0.02 8 Provide programmed request that runs handler  
0.00 34 Provide SET options for specific FORTRAN compilers and libraries  
-0.02 12 SIPP: implement BACKSPACE key  
-0.05 10 .PRINT: add optional completion routine for interception of XON/XOFF control  
-0.05 10 Remove unnecessary information from handler block 0  
-0.02 30 Provide generalized SET interface for programs  
-0.06 14 .SCCA: add optional completion routine address for single ctrl-C  
-0.04 26 KED: allow search mask constructs in search for occurrence  
-0.10 12 KED: allow library searches for external files  
-0.06 31 KED: provide optional overstrike mode  
-0.05 44 Allow a filename to be assigned to a logical name  
-0.10 24 Add special directory wildcard operation support  
-0.25 10 .DRSET: add CMD argument  
-0.26 11 LIBR: allow /UPDATE on multi-line commands  
-0.21 14 On chained .EXIT, don't require "@" file to be at last line  
-0.13 27 Do not let monitors grow more than 10 percent  
-0.15 25 KED: provide switch for setting multiple tabs  
-0.23 17 Allow FORMAT to call user-written formatters  
-0.20 20 MACRO: Provide a reversed .IRP list mode  
-0.16 26 Allow handlers to be installed even if suffix isn't right for monitor  
-0.57 9 SPOOL: provide switch to start banner page on even or odd page number  
-0.43 12 LINK: automatically enable /G and /F switches when /FORTRAN used in COMPILE or EXECUTE  
-0.42 14 Provide EIS, FIS/FPP and CIS simulation routines  
-0.31 24 CSI: allow factoring in command line  
-0.42 30 Provide SETDATE command for changing file date  
-0.37 42 Remove backward compatible baggage from monitors for versions before V5.0

### 6.5 The Very Difficult Items

There were only 8 items that were ranked "Very Difficult" by Digital. The following table lists these items in order of RANK.

Score	Votes	Item
0.35	27	Document all storage formats used by Digital
0.18	49	Don't require filename twice on RENAME/SETDATE
0.26	28	FILEX: make it work with all current DEC formats
0.15	22	Put UCL+ on the distribution kit
-0.06	17	Include more information in .DSTATUS request
-0.13	9	Add EMT to get selected I/O packet from handler queue
-0.12	13	Add I/O status block to I/O EMT requests
-0.31	24	Provide a MAINT utility (ala MS-DOS)

### 6.6 The Irrational or Impossible Items

There were 9 items that Digital felt were either irrational or impossible. None of these items, which are listed in the following table in order of RANK, had a very high RANK.

Score	Votes	Item
0.02	24	KED: make commands consistent with VAX EDT
-0.05	10	Set RETRY=n for ALL magtape handlers
-0.21	7	Support SET TT DVORAK
-0.07	29	Provide RESET switch for hardware reset
-0.22	15	Allow SL to remain ON across a reboot
-0.14	29	Provide fully functional word processor
-0.52	18	Provide PASSWORD protection for LD files
-0.28	41	Allow files with version numbers in directories
-0.99	14	Provide protection mechanism for multi-terminal support

### 6.7 The Items Digital Did Not Understand

There were 4 items that Digital did not understand. The following table lists these items in order of RANK. Only the first item had a significant rank.

Score	Votes	Item
0.30	17	Allow sellers of RT-11 related products to put RT-11 on their distribution kits
0.04	28	Expand setup support for VT100, VT200, LA100
-0.28	28	KED: Allow escape sequences to be entered easily
-0.47	17	Allow completion routines to appear to the user as "soft interrupts"

### 7 DISCUSSION

At this point we might go into a long discussion of how to interpret the wish list results, but it is probably more constructive for you to draw your own conclusions, since we are not really sure how to interpret SOME of the results.

The important thing is that the RT-11 Development Team has these results and they are using them to determine which new features would be welcome by the RT-11 community, which would receive a lukewarm reception, and which should not be implemented.

If your favorite wish list item did not do well, maybe it was because people did not understand the significance of the item. In that case, please resubmit the item with a clearer, more detailed description.

We are going to conduct another survey during the next year, but it will be a bit different. It will be considerably shorter and will contain a lot of questions from the RT-11 Development Team and other units of Digital. If you have a suggestion for a survey item, send it to us right away.

RT-11 SESSIONS  
at  
Spring 88 DECUS Symposium  
May 16 - May 20  
Cincinnati Convention Center

Here is an overview of the RT-11 SIG-Sponsored Sessions for the DECUS Spring Symposium in Cincinnati, May 16 - May 20. The abstracts of the sessions are given here so that you can preplan your week. You can also show them to your boss to explain to the poor dear why it's important to send you to DECUS. Thanks to Milton Campbell for his hard work on the Symposium Committee and for providing this information to the newsletter.

All rooms are in the Cincinnati Convention Center.

MONDAY - May 16

Room: North 204 & 214

9:00am RT033	RT-11 SIG ROADMAP	John Rasted
9:30am RT032	RT-11 SIG BUSINESS MEETING	John Rasted
10:00am RT013	RT-11 PRODUCT PANEL	Connie Pawelczak

Room: West 252 & 253

12:30pm RT007	RT-11 TO VMS MIGRATION	Ned Rhodes
1:30pm RT011	RUNNING IN RT-11	RT-11 Engineering
2:30pm RT015	DECNET/RT-11	RT-11 Engineering
3:30pm RT003	HIGH-SPEED ETHERNET FOR TASK-TO-TASK MESSAGING BETWEEN RT-11 AND VAX/VMS	Glen Macko

TUESDAY - May 17

Room: West 252 & 253

2:00pm RT009	RT-11 RUNNING ON THE KXJ	RT-11 Engineering
3:00pm RT038	WHAT DIGITALS REAL-TIME STRATEGY SHOULD BE	Robert Walraven & panel
4:00pm RT035	RT-11 CONTROLLING WORLDS LARGEST COLOR DISPLAY	James Maloney
5:00pm RT019	RT-11 ANNIVERSARY SESSION - THE EARLY DAYS	Milton Campbell & others

WEDNESDAY - May 18

Room: West 242

1:00pm RT037	FORTRAN-77/RT PROGRAMMING STYLE	Robert Walraven
2:00pm RT018	TSX EMULATOR FOR RT-11 (OR HOW TO REALLY DO NETWORKING & MULTI-PROCESSING)	Greg Adams
3:00pm RT016	RUNNING TSX-PLUS ON A Q-BUS CO-PROCESSOR	Milton Campbell
4:00pm RT040	TSX-32 OPERATING SYSTEM DEVELOPMENT	Phillip H. Sherrod
5:00pm RT020	TSX-PLUS MAGIC	Jack Peterson & panel

RT-13

THURSDAY May 19

Room: West 242

9:00am RT002	CONFESSIONS OF AN RT-11 HANDLERHOLIC	John M. Crowell
10:00am RT006	THE EQ HANDLER: DATA ACQUISITION WITH A COPY COMMAND	William Walker

Room: North 207 & 215

12:00n RT004	ADEP: SOFTWARE FOR REAL TIME DATA ACQUISITION AND CONTROL	Ellen Bachmann & Jim Lindesmith
1:00pm RT014	RT-11 INTERRUPTS AND TRAPS	RT-11 Engineering

Room: West 242

6:00pm RT008	RT-11 PERFORMANCE REPORT AGAIN	Ned Rhodes
7:00pm RT039	STRATEGIES FOR MAKING LARGE PROGRAMS RUN UNDER RT-11 AND TSX-PLUS	Jeffrey S. Goldner

Room: North 207 & 215

8:00pm RT036	RT-11 GEMS AND NUGGETS	Ralston Barnard & others
9:00pm RT001	RT-11 USERS SPEAK OUT	John M. Crowell & RT-SIG

FRIDAY - May 20

Room: West 242

10:00am RT010	RT-11 MAGNETIC TAPE USAGE	RT-11 Engineering
11:00am RT017	RT-11 APPLICATIONS WORKSHOP	Laura DeChellis-Barry & others

Room: West 250

12:30pm RT012	RT-11 FEEDBACK SESSION	RT-11 Engineering
1:30pm RT034	RT-11 SIG SYMPOSIUM WRAP-UP	John Rasted

Sessions that may be of particular interest to RT-11 users. Of particular note are the first two, which provide an opportunity for users to influence Digital's renewed awareness of the PDP-11.

RX003	Mon 6:00p	DIGITAL MICROSYSTEMS DEVELOPMENT MEETS DECUS - OR WHAT MSD ALWAYS WANTED TO KNOW ABOUT DECUS BUT WAS AFRAID TO ASK.
RX004	Mon 4:30p	PDP-11 FUTURES - A USER'S PERSPECTIVE
H032	Wed 12:00n	MICROPDP-11 UPDATE
H041	Thu 2:00p	MICRO SYSTEMS HARDWARE PANEL
H061	Thu 5:00p	FOREIGN PERIPHERALS FORUM
H074	Fri 11:00a	HARDWARE HINTS AND KINKS
N054	Tue 9:00a	UNDERSTANDING ETHERNET
LT028	Mon 9:30p	GETTING MORE FROM PDP-11 FORTRAN-77
LT031	Mon 11:15a	PDP-11 LANGUAGES STATUS AND FUTURE DIRECTION
LT032	Thu 6:00p	PDP-11 LANGUAGES & LAYERED PRODUCTS QUESTION AND ANSWER SESSION

RT-14

SESSION ABSTRACTS

RT001 RT-11 USERS SPEAK OUT

Moderator: John M. Crowell  
Multiware, Inc.

Room: North 207 & 215 Thursday 9:00 p.m.-11:00 p.m.

Abstract:

A panel of alleged RT-11 experts conducts a program of fun, history, war stories, and technical information which is unavailable from any other source for all RT-11 users. Audience participation is encouraged and expected.

The panel is prepared to answer questions from the floor to the best of their ability. Scheduled presentations may include slide shows of historic RT-11 installations, lessons on how to knot flat ribbon cables, minimal keystroke methods of destroying your system disk, magical chants to revive down systems, and field circus approved locations on the computer which improve system performance when direct force is applied.

The highlight of the evening may be the semi-annual awards presentation for most sensitive response to a user question.

All in all, this is a fun and informative evening. The only rule is that you cannot ask a question the panel cannot answer (of course, you cannot know this until you ask the question). Proper dress is requested; costumes are optional.

RT002 CONFESSIONS OF AN RT-11 HANDLERHOLIC

Speaker: John M. Crowell Chair: Jim Lindesmith  
Multiware, Inc. Monsanto Research Corp.

Room: West 242 Thursday 9:00 a.m.-10:00 a.m.

Abstract:

"My name is Jack, and I'm a handlerholic." I confess to writing overlaid SET code. I write handlers that refuse to install for no apparent reason. Once even wrote a handler in position-dependent code (gaspi), and linked it as a .REL file so that the load-code could perform the relocation.

Along the way I've learned a few things about the "run-time" environment of RT-11 handlers (as distinguished from the I/O environment). In this session I'll share some of the nuggets of information I've gleaned about what goes on during handler installation, handler loading, and SET option execution. If time permits (and we hope it does not), I'll expound lightly upon the vagrancies of aborting I/O.

Some of the questions I hope to answer in this hour include:

1. Do I really have to overlay large SET code?
2. How do I go about it?

3. Can/should SET code change the handler in memory as well as the handler file on the disk?
4. How can my handler tell whether it's being installed by the bootstrap or as the result of an INSTALL command from KMON?
5. Who cares?
6. How can I use FETCH/LOAD code to reduce the size of my handler.

I hope that after hearing my sad confessions, no one will stumble down the same dark paths that brought me to this place.

RT003 HIGH-SPEED ETHERNET FOR TASK-TO-TASK MESSAGING BETWEEN RT-11 AND VAX/VMS

Speaker: Glen Macko Chair: Dennis Jensen  
Digital Equipment Corp. AMES Labs.

Room: West 252 & 253 Monday 3:30-4:00 p.m.

Abstract:

The availability of Ethernet drivers in the RT-11 XM monitor allows high-speed connectivity to hosts systems, especially VMS backbone CPUs. An easy-to-use message facility, known as the PAMS Message Bus has been extended to encompass the RT-11 environment in addition to previous implementations on VAX/VMS, RSX-11M and VAXELN. A review is made of the techniques utilized and performance attained when using the task-to-task interface or file transfer utilities between RT-11 and VAX/VMS.

RT004 ADEP: SOFTWARE FOR REAL TIME DATA ACQUISITION AND CONTROL

Speakers: Ellen Bachmann Chair: Bruce Sidlinger  
Monsanto Research Corp. Sindlinger Computer Corp.

Jim Lindesmith  
Monsanto Research Corp.

Room: North 207 & 215 Thursday 12:00 noon-1:00 p.m.

Abstract:

This session describes the content, use, and rationale of the Applications Development Package (ADEP). ADEP is a generalized set of software tools that aids in the efficient implementation of laboratory data acquisition and control systems. It consists of an integrated package of handlers, utilities and standards for data acquisition, control, listing and graphics.

ADEP is divided into three parts. Section I consists of the basic utilities and software to initialize data files, control the data acquisition process, acquire data and place it in a given file. The software includes an RT-11 device handler (EQ) which provides the control, sequencing and data acquisition functionality, and a set of basic support utilities. Section II provides report generating facilities, while Section III includes the basic utilities and application software for graphic output. In general, the ADEP routines are used either as is, or as the functional core of a more complex, customized system.

RT006 THE EQ HANDLER: DATA ACQUISITION WITH A COPY COMMAND  
Speaker: William Walker Chair: Nick Bourgeois  
Monsanto Research Corp. NAB Software Services, Inc.  
Room: West 242 Thursday 10:00 a.m.-11:00 a.m.

Abstract:

The Applications DEvelopment Package (ADEP) is a general set of software tools, which has been developed to aid in the efficient implementation of laboratory data acquisition and control systems. The core of this package is the "event queue" (EQ) handler which performs all control, sequencing, and data acquisition. EQ appears to programs running under RT-11 as standard, non-file-structured data device. Programs can read and write data to EQ using regular, device-independent I/O statements (FORTRAN READ's and WRITE's, for example). In most cases, an entire data acquisition/control sequence can be set up and executed using the RT-11 COPY command. The design, usage, and limitations of the EQ handler are discussed, with the emphasis on internals and structure.

A more general, applications oriented discussion of the entire ADEP package is also presented at this symposium.

RT007 RT-11 TO VMS MIGRATION  
Speaker: Ned Rhodes Chair: Jim Crapuchettes  
Software Systems Group Omnex Corp.  
Room: West 252 & 253 Monday 12:30 p.m.-1:30 p.m.

Abstract:

Many RT-11 users have the opportunity to develop code on VAX/VMS systems, but many die-hard RT-11 users are resisting because they perceive that VMS does not allow them to do the same types of things that they are used to under RT-11. This session shows RT-11 programmers how to develop programs under VMS using the concepts that were learned under RT-11. Some of the key differences and similarities between the two operating systems are shown.

RT008 RT-11 PERFORMANCE REPORT AGAIN  
Speaker: Ned Rhodes Chair: Laura DeChellis-Barry  
Software Systems Group MDB Systems, Inc.  
Room: West 242 Thursday 6:00 p.m.-7:00 p.m.

Abstract:

This is an update of the performance report that was presented in 1981. In this session, the relative performance of all the RT-11 monitors and TSX-Plus are compared and contrasted. The report should point out whether the performance of the RT-11 operating system has improved over the years or whether it has remained the same.

RT009 RT-11 RUNNING ON THE KXJ  
Speaker: RT-11 Engineering Chair: John M. Crowell  
Digital Equipment Corp. Multiware, Inc.  
Room: West 252 & 253 Tuesday 2:00 p.m.-3:00 p.m.

Abstract: Not available

RT010 RT-11 MAGNETIC TAPE USAGE  
Speaker: RT-11 Engineering Chair: Nick Bourgeois  
Digital Equipment Corp. NAB Software Services, Inc.  
Room: West 242 Friday 10:00 a.m.-11:00 a.m.

Abstract:

This talk includes a discussion of how the RT-11 operating system interfaces to various magnetic tape devices. An overview of tape handlers, tape-related SPFUNs, as well as PIP and BUP tape formats are presented.

RT011 RUNNING IN RT-11  
Speaker: RT-11 Engineering Chair: Robert Roddy  
Digital Equipment Corp. Naval Ship Research Ctr.  
Room: West 252 & 253 Monday 1:30 p.m.-2:30 p.m.

Abstract:

This presentation covers the different types of jobs that RT-11 allows and some implications of using each. File formats, job loading, memory utilization (including overlays), job priorities, context switching, and I/O restrictions are discussed. The use of VBGEXE to allow XM jobs to avoid memory constraints along with constraints attendant to using VBGEXE are included in this presentation.

RT012 RT-11 FEEDBACK SESSION  
Speaker: RT-11 Engineering Chair: Milton Campbell  
Digital Equipment Corp. Talisman Systems  
Room: West 250 Friday 12:30 p.m.-1:30 p.m.

Abstract:

In this session RT-11 Engineering reviews the customer wishlist items that accrue during the week and since the previous DECUS. Wishlist items can be deposited in the wishlist box located in the booth area next to the RT-11 Demo System or can be given to an RT-11 SIG member or a representative from RT-11 Engineering.



RT019 RT-11 ANNIVERSARY SESSION - THE EARLY DAYS

Moderator: Milton D. Campbell  
Talisman Systems

Room: West 252 & 253 Tuesday 5:00 p.m.-6:00 p.m.

Abstract:

1988 marks the fifteenth anniversary of the introduction of the RT-11 Operating System for the PDP-11. We have assembled a number of the people important in the early development of RT-11 to take a look back. This is an opportunity for all RT-11 users, current and former, to come to the "reunion" and remember what it was like when computers were used for real (-time) work. Bring your RT-11 memorabilia to show how far we have come.

RT033 RT-11 SIG ROADMAP

Speaker: John Rasted  
JTR Associates

Room: North 204 & 214 Monday 9:00 a.m.-9:30 a.m.

Abstract:

This session is designed to help the attendee obtain the most benefit from the symposium. Veteran attendees discuss the tried and true techniques that new attendees can use to make the most of the week and still survive the experience. There is a brief description of those sessions which are relevant to RT-11 users. Schedule changes and possible session repeats are also discussed. Plan to attend so you can avoid the disappointment of missing an important session.

RT020 TSX-PLUS MAGIC

Moderator: Jack Peterson  
Horizon Data Systems

Room: West 242 Wednesday 5:00 p.m.-6:00 p.m.

Abstract:

A panel of experienced TSX-PLUS users, system managers and system programmers are on hand to assist users in making more effective use of their TSX-PLUS systems. Some brief presentations of special techniques, utilities, handlers, command files, and programs may be made by panel members, but most of the session is oriented toward audience questions, problems, solutions, and wishlist items.

All TSX-PLUS users are encouraged to attend. This is your chance to get an answer to that elusive problem, to learn how others have made their systems better, and to share the knowledge you have gained while using TSX-PLUS.

RT034 RT-11 SIG SYMPOSIUM WRAP-UP

Speaker: John Rasted  
JTR Associates

Room: West 250 Friday 1:30 p.m.-2:00 p.m.

Abstract:

This is your chance to respond to the SIG and Digital presentations at the symposium and to influence future plans. The SIG is looking for input from the attendees to aid in selecting desirable sessions for the next symposium. At this session you have the opportunity to have questions answered that may have arisen during the symposium. Representatives from Digital are also present.

Topics include:

- o SIG activities;
- o RT-11 and layered products;
- o Pre-symposia Seminars; and
- o Future DECUS symposia.

RT032 RT-11 SIG BUSINESS MEETING

Speaker: John Rasted  
JTR Associates

Room: North 204 & 214 Monday 9:30 a.m.-10:00 a.m.

Abstract:

This session begins with an overview of the RT-11 Special Interest Group (SIG), followed by SIG activity at the symposium and those areas of SIG activity which are not related to the symposium. These areas include:

- o Minitasker (the SIG Newsletter);
- o SIG tape copy;
- o SIG DECUS Library activity;
- o Local User Groups (LUGs); and
- o VAX/RT.

In this session, the SIG also begins the planning for the next DECUS symposium.

RT035 RT-11 CONTROLLING WORLDS LARGEST COLOR DISPLAY

Speaker: James Maloney  
Goodyear Tire and Rubber Company

Chair: Jack Peterson  
Horizon Data Systems

Room: West 252 & 253 Tuesday 4:00 p.m.-5:00 p.m.

Abstract:

The worlds largest color display is one of the most highly recognized objects. After sunset, several ships are launched with DEC equipment on board utilizing RT-11 to control the color display mounted on the port and starboard sides of the ships. The ships are actually airships and are commonly referred to as Goodyear Blimps. This session addresses the interactive graphic hardware and software tools required to draw an



animation for the very large display sign. The airborne hardware and software required to control the Super Skytacular sign in real time are also covered in this session. Future plans include a new generation of hardware and software with a fourfold increase in resolution and 127 different colors available. In addition, the next generation of equipment will provide a significant reduction of the fixed and carry-on weights. The new sign has been designated the Spectacular Skytacular sign.

RT039 STRATEGIES FOR MAKING LARGE PROGRAMS RUN UNDER RT-11 AND TSX-PLUS  
Speaker: Jeffrey S. Goldner Chair: William Walker  
New Unit Inc. Monsanto Research Corp.  
Room: West 242 Thursday 7:00 p.m.-8:00 p.m.

Abstract:

This presentation describes techniques for making large programs fit into the limited address space available on RT-11 and TSX+ systems. Topics covered include optimizing overlays, maximizing data array sizes, linker manipulations and performance issues. Actual programs are used to illustrate what to do with programs that used to fit, as well as strategies for new applications.

RT036 RT-11 GEMS AND NUGGETS  
Moderator: Ralston Barnard  
Sandia National Laboratories

Room: North 207 & 215 Thursday 8:00 p.m.-9:00 p.m.

Abstract:

The first Gems and Nuggets at the Fall, 1987, Symposium met with critical acclaim, so the tradition continues. This is a chance for RT-11 "experts" to describe some of their tricks and time saving techniques. It is also a chance for anyone to ask the experts for suggestions on problems they may have with their systems. The session format consists of several presentations of about ten minutes each.

RT040 TSX-32 OPERATING SYSTEM DEVELOPMENT  
Speaker: Phillip H. Sherrod Chair: Ned Rhodes  
S&H Computer Systems Inc. Software Systems Group  
Room: West 242 Wednesday 4:00 p.m.-5:00 p.m.

Abstract:

TSX-32 is a re-designed and re-implemented version of the popular TSX-Plus operating system for VAX and other 32-bit processors. This session discusses the current state of development and presents a comparison of TSX-Plus features with TSX-32 features. Design decisions and methods of implementation are covered for areas such as file management, memory management, scheduling, and system generation.

RT037 FORTRAN-77/RT PROGRAMMING STYLE

Speaker: Robert Walraven Chair: Jeffrey Goldner  
Multiware, Inc. New Unit, Inc.

Room: West 242 Wednesday 1:00 p.m.-2:00 p.m.

Abstract:

Examples of good FORTRAN programming style are presented. Ample time is allowed for audience participation.

RT038 WHAT DIGITALS REAL-TIME STRATEGY SHOULD BE

Moderator: Robert Walraven  
Multiware, Inc.

Speakers: Panel of Real-time Experts

Room: West 252 & 253 Tuesday 3:00 p.m.-4:00 p.m.

Abstract:

Digital has told us what their real-time strategy is. This session is a workshop to discuss what the users think Digital's real-time strategy should be. A panel of real-time experts give brief statements on the subject, then the audience is encouraged to give their opinions.





**UNISIG**

## From the Editor

This month we are reprinting the slides from Steve Stepanek's session from Anaheim entitled "AWK PROGRAMMING LANGUAGE TUTORIAL" (U048). If you attended this session and didn't get a set of notes, here they are. If you weren't fortunate enough to attend the session (or the symposium), I think the slides are informative (though terse) on their own.

We are also starting a new feature - the *Joke of the Month* column and contest. Please see the *Joke of the Month* column for contest details.

To start the information exchange ball rolling, I have put in a *Help Wanted* piece about a project that I am currently involved in - SCCS. If you have nothing to say about SCCS, but are in a position similar to mine with another product, drop me a line. Somebody out there has probably done what you're trying to do, and might save you some hassle by sharing their wisdom.

And for those of you who don't have access to usenet news, we have reprinted a calendar of up-coming events. If you want to take a trip to, say, San Francisco, look at USENIX this year, or UniForum next year.

What do you think of re-printing symposium slides in the newsletter? Is it helpful? boring? You've had 2 issues to evaluate, so, let me know what you think. In fact, let me know what you think about anything at all. Send me your suggestions, complaints, or articles about anything ultrix/unix related.

Send all electronic correspondence to:

amdahl!cit-vax!ndc!sgf

and hardcopy/magnetic media to:

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

## Help Wanted

This newsletter should be a forum for exchanging knowledge and experience. Do you have knowledge of or experience with SCCS (the source code control system)? My shop is starting to use SCCS to control a medium-sized project. We have four programmers working on seven related software packages. These packages overlap significantly, and we'd like to reduce the amount of code that is currently duplicated in a number of directories. We also want to do all the usual SCCS things like prevent multiple copies of a file from being edited, be able to recreate a particular version of a file, etc. Most of the code has been written already. We will be using SCCS to assist us as we maintain and enhance our software. I am just now starting to set up our SCCS system, and would greatly appreciate any advice or warnings from anyone who has gone through a similar process. If you currently use SCCS, or have used it in the past, I'd like to hear about your experience. What works for you? What doesn't work for you? If you were starting over, what would you do differently? What are pitfalls to watch out for? Send any relevant information to the address in the *From the Editor* section.

UNI-1

## Calendar of Up-Coming Events (or - when can I go to Hawaii?)

Here is a combined calendar of planned conferences, workshops, and standards meetings by various organizations. It was taken from usenet news, with (greatly appreciated) assistance from Jim Livingston.

Abbreviations: U for UNIX, W for Workshop, C for Center. The sponsors of the USENIX, EUUG (the European UNIX systems Users Group), and AUUG (the Australian UNIX systems Users Group) conferences are the organizations of the same name, and the sponsor of UniForum is /usr/group. Dates and places for IEEE 1003 after Oct 1988 are tentative, and also for the 1992 UniForum.

year	mon days	conference name	(sponsor,) (hotel,) location
1988	Feb 8-11	UniForum	Infomart, Dallas, TX
1988	Feb 9-12	USENIX	Grand Kempinski, Dallas, TX
1988	Mar 14-18	IEEE 1003	Ritz-Carlton, Washington, DC
1988	Apr 11-15	EUUG	QE II Conference C, London
1988	May 3-5	U Exposition	AFUU, Palais des Congress, Paris
1988	May 12-13	Real-Time W	USENIX/IEEE, Omni Shoreham, Washington
1988	May 17-19	UNIX 88/etc.	/usr/group/cdn, Convention C, Toronto
1988	Jun 7-9	COMUNIX	/usr/group/UK, Alexandra Palace, London
1988	Jun 20-24	USENIX	Hilton, San Francisco, CA
1988	Jun 27-Jul 1	IEEE 1003	Colorado Springs, CO
1988	Jun	UNIX 88	NZSUGI, Wellington, New Zealand
1988	Jul	U Symposium	JUS, Tokyo, Japan
1988	Aug 2-4	UniForum/DC	Washington Hilton, Washington, DC
1988	Aug 29-30	U Security W	USENIX, Portland, OR
1988	Sep 13-15	AUUG	Melbourne, Australia
1988	Sep 26-27	U&Supercomputing W	USENIX, Pittsburgh, PA
1988	Oct 3-7	EUUG	Lisbon, Portugal
1988	Oct 10-14	IEEE 1003	Hawaii
1988	Oct 17-19+	ISO SC22 & WG15	Tokyo, Japan
1988	Oct 17-21	C+ + Conference	USENIX, Denver, CO
1988	Oct	UNIX Expo	New York, NY
1988	Nov 17-18	Large Installation	Syst. Adm. W II, USENIX, Monterey, CA
1988	Nov	U Symposium	JUS, Osaka, Japan
1988	Dec	Sun User Group	southern U.S.A.
1988	Dec	UNIX Fair	JUS, Tokyo, Japan
1989	Jan	IEEE 1003	Ft. Lauderdale, FL
1989	Jan 31-Feb 3	USENIX	Town and Country, San Diego, CA
1989	Feb 28-Mar 3	UniForum	Moscone Center, San Francisco, CA
1989	Apr	IEEE 1003	Minneapolis-St. Paul, MN
1989	Jun 12-16	USENIX	Hyatt Regency, Baltimore, MD
1989	Jun	IEEE 1003	Monterey, CA
1989	Oct	IEEE 1003	Brussels (or Amsterdam)
1990	Jan 23-26	USENIX	Washington, DC
1990	Jan 23-26	UniForum	Washington Hilton, Washington, DC
1990	Jan	IEEE 1003	New Orleans, LA
1990	Jun 11-15	USENIX	Marriott, Anaheim, CA
1991	Jan 22-25	USENIX	Dallas, TX
1991	Jan 22-25	UniForum	UNI-2 Infomart, Dallas, TX
1991	Jun 10-14	USENIX	Opryland, Nashville, TN
1992	Jan 21-24	UniForum (?)	Moscone Center, San Francisco CA

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## AWK program segments:

```
BEGIN { actions }

pattern { actions }

.
.
.
END { actions }
```

### Basic execution flow:

```
execute BEGIN actions;
while not EOF begin
  read input "record";
  for each pattern that is true,
    execute related actions;
end while;
execute END actions;
terminate execution;
```

AWK defines a "record" as consisting of the stream of characters up to a record separator (default is newline).

Each record is divided into "fields" according to the current input field separator (default is blanks and tabs with spanning).

## AWK PROGRAMMING LANGUAGE TUTORIAL

FALL 87 DECUS U.S. SYMPOSIUM  
UNISIG SESSION

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DECEMBER 1987

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## INTRODUCTION

AWK was designed at AT&T  
Bell Labs by:

Aho  
Weinberger  
Kernighan

Using language structures  
similar to C, it can perform  
pattern scanning to select  
records for processing.

### AWK utility:

```
awk [-Fc] 'awkprogram' [datafile ...]
```

```
awk [-Fc] -f awkprogfile [datafile ...]
```

-Fc change input field separator  
to c

AWK is a filter utility, it reads  
input "records", processes the  
data and generates output.

### Example #1

```
$ cat report.awk
#
# generate a report based on sales data
#
BEGIN {
  printf ("Part Number   Quantity   ");
  printf ("Unit Price   Amount\n\n");
}

{
  amount = $2 * $3;
  total += amount;
  printf (" %05d\t %7d\t %7.2f", $1, $2, $3);
  printf ("\t %7.2f\n", amount);
}

END {
  printf ("\n\t\t\t\t\tTotal %10.2f\n", total);
}

$ cat order
1024 5 3.75
0513 3 14.95
1208 23 0.50
0042 8 1.25

$ awk -f report.awk order
Part Number   Quantity   Unit Price   Amount
01024         5           3.75         18.75
00513         3           14.95         44.85
01208         23          0.50         11.50
00042         8           1.25         10.00

Total 85.10
```

### Example #2

```
$ who
operator console Sep 20 13:33
sgs tty20 Oct 3 11:06

$ who | egrep '^sgs'
sgs tty20 Oct 3 11:06

$ who | awk '/^sgs/'
sgs tty20 Oct 3 11:06

$ who | awk '/^sgs/ {print $2}'
tty20
```

## 2. DATA HANDLING

AWK has two data types:

1. numeric (floating point)
2. strings

Variables are automatically defined and data typed during assignment.

```
w = 1;      # w is numeric
x = "Smith"; # x is a string
```

The initial value of a variable is the null string. A null string equates to zero in an arithmetic expression.

Data conversion is automatic, based on operation being performed.

```
y = "5";      # y is a string
y = y + 2;    # y is now numeric
y = y "th";   # y is now a string
```

### Example #3

```
$ cat linenum
awk '
{
    printf("%d\t%s\n", NR, $0);
}
' $*

$ ls -l linenum
-rwxr-xr-x 1 sgs 56 Dec 4 22:29 linenum

$ linenum linenum
1      awk '
2      {
3      printf("%d\t%s\n", NR, $0);
4      }
5      ' $*
```

### Example #4

```
$ cat wc.awk
#
# simple wc
# line, word, character count
#
BEGIN {
    FALSE = 0;
    TRUE = 1;
    current = FILENAME;
}

current != FILENAME {
    printf ("%7d%7d%8d %s\n", nl, nw, nc, current);
    current = FILENAME;
    nl = nw = nc = 0;
}

{
    nl++;
    nw += NF;
    nc += length($0) + 1; # plus one for newline
}

END {
    printf ("%7d%7d%8d %s\n", nl, nw, nc, current);
}

$ awk -f wc.awk linenum /etc/motd
5      9      56 linenum
5      4      25 /etc/motd

$ cat wc.awk | awk -f wc.awk linenum - /etc/motd
5      9      56 linenum
25     70     444 -
5      4      25 /etc/motd
```

User defined variables:

A variable name consists of a sequence of letters, digits and underscores that does not start with a digit.

Input field variables:

```
$0      entire record
$1, $2, ... separate fields
```

Predefined variables:

FS	Input field separator (default is blank and tab with spanning; otherwise must be a single non-blank character without spanning; can be set by -F <code>c</code> option)
RS	Input record separator (newline)
OFS	output field separator (blank)
ORS	output record separator (newline)
NF	number of fields in current input record
NR	number of input records read
FILENAME	name of current input file (stdin denoted by "-")

UNI-5

Arrays (associative based):

Numeric subscripts:

```
hold[k++] = $0
```

String subscripts:

```
Inventory["nuts"]++
```

Expression operators:

(decreasing order of precedence)

Arithmetic:

a++	increment -- prefix or postfix
--b	decrement -- prefix or postfix
a * b	multiplication
a / b	division
a % b	remainder
a + b	addition
a - b	subtraction

Strings:

a b	concatenation
-----	---------------

UNI-6

Relational (both numeric and string values):

<code>a &lt; b</code>	less than
<code>a &lt;= b</code>	less than or equal to
<code>a &gt; b</code>	greater than
<code>a &gt;= b</code>	greater than or equal to
<code>a == b</code>	equal
<code>a != b</code>	not equal
<code>a ~ /re/</code>	match the pattern specified by the regular expression <i>re</i> against the value of <i>a</i> ; return true if match is successful
<code>a !~ /re/</code>	true if match is unsuccessful

Boolean:

<code>! a</code>	not
<code>a &amp;&amp; b</code>	and
<code>a    b</code>	or

Assignment:

<code>a = b</code>	assign b to a
<code>a += b</code>	<code>a = a + b</code>
<code>a -= b</code>	<code>a = a - b</code>
<code>a *= b</code>	<code>a = a * b</code>
<code>a /= b</code>	<code>a = a / b</code>
<code>a %= b</code>	<code>a = a % b</code>

### 3. ACTION STATEMENTS

Statements appearing in an "action" section of an AWK program are terminated by either a newline, semicolon, close brace, or "#" character.

Action statements can be blocked by the use of brace characters ("{" , "}") as in C.

The "#" character denotes the beginning of a comment. Only the newline character can be used to terminate a comment.

Output statements:

<code>print [expr], ... [dest]</code> <code>print ([expr], ...) [dest]</code>	
<code>print</code>	prints \$0, entire record
<code>print \$1, \$2</code>	prints values separated by current output field separator (OFS)
<code>print \$1 \$2</code>	prints values concatenated
<code>print \$3 &gt; "temp"</code>	direct output to file "temp"; on first print, open with write mode
<code>print \$4 &gt;&gt; "test"</code>	direct output to file "test"; on first print, open with append mode
<code>print   "sort"</code>	direct output via a pipe to specified subprocess

Built-in functions:

<code>index(s1,s2)</code>	position of string <i>s2</i> within <i>s1</i> ; 0 otherwise
<code>int(expr)</code>	truncate to integer
<code>length(s)</code>	length of string
<code>split(s,a,c)</code>	split string <i>s</i> into <i>a</i> [1],... <i>a</i> [ <i>n</i> ] based on character <i>c</i> ; if <i>c</i> is not present, use current field separator; return length of array <i>a</i>
<code>sprintf(f,...)</code>	create string according to format <i>f</i>
<code>substr(s,m,n)</code>	substring of <i>s</i> starting at position <i>m</i> with maximum length of <i>n</i>

UNI-7

#### Example #5

```
$ cat grps.awk
#
# list accounts validated to access a group
#
BEGIN {
    FS = ":";
}
$4 != "" {
    count = split($4, groups, "-");
    for (k = 1; k <= count; k++)
        printf("%s\t%s\n", $1, groups[k]);
}

$ cat /etc/group
root::0:
other::1:
bin::2:root,dasmon
sys::3:root,bin,adm
adm::4:root,dasmon
uucp::5:root
mail::6:root
dasmon::12:
```

```
$ awk -f grps.awk /etc/group
bin      root
bin      dasmon
sys      root
sys      bin
sys      adm
adm      root
adm      dasmon
uucp     root
mail     root
```

```
printf fmt, [expr], ... [dest]
printf (fmt, [expr], ...) [dest]
```

Printf formats the output according to the same rules as the format string used in a C printf function.

```
printf ("Hello, world\n")
printf ("%d\n", NR, $0)
printf ("%2fn", total) > "report"
```

Print and printf can usually open up to 10 files and pipes for output during the execution of an AWK program.

UNI-8

Conditional execution statement:

```
if (condition)
    statement1
else
    statement2
```

### Example #6

```
$ cat uniq.awk
#
# do something similar to uniq
#
{
  if (NR == 1 || $0 != prev) {
    print;
    prev = $0;
  }
}
$ cat list
try
this
this
test
file
file
file
file
$ awk -f uniq.awk list
try
this
test
file
```

### Looping statements:

**while** (*condition*)  
*statement*

**for** (*expr1* ; *expr2* ; *expr3*)  
*statement*

equivalent to:

```
expr1 ;
while (expr2) {
  statement ;
  expr3 ;
}
```

### Implied jump statements:

- exit** [*n*]      If not an END action, invoke END; if executed in END, terminate; *n* is process status returned by awk (*n* option not available in all versions of awk)
- next**            ignore remaining instructions pertaining to the current input record and continue processing after trying to read the next input record
- break**           break out of current "while" or "for" loop
- continue**        continue execution with the next iteration of current "while" or "for" loop

### 4. PATTERNS

For each successful pattern in an AWK program, a related body of actions will be executed.

An AWK pattern may consist of:

- a) a regular expression surrounded by slashes  
`/^test/`
- b) a relational expression  
`$1 == $2`  
`$1 ~ /smith/`
- c) a range consisting of two patterns separated by a comma  
`/first/,last/`

### for (*var in array*) *statement*

This version of "for" iterates through the subscript values associated with *array*. During each iteration, a subscript value will be assigned to *var*.

### Example #7

```
$ cat logons
last | awk '
#
# compute number of logons per account
#
{
  if ($1 == "") exit;
  count[$1]++;
}
END {
  for (user in count)
    printf ("%s-%s %d\n", user, count[user])
}
' | sort

$ last
sgs      tty20      Tue Mar 11 20:34   still logged i
who      tty15      Tue Mar 11 18:54 - 18:54 (00:00)
mab      tty14      Tue Mar 11 18:33 - 18:35 (00:01)
jhk      tty12      Tue Mar 11 17:51 - 17:54 (00:02)
.
.
.
sgs      tty02      Tue Mar 11 08:34 - 09:30 (00:56)
jhk      tty00      Tue Mar 11 00:12 - 00:36 (00:23)

wtmp begins Tue Mar 11 00:01

$ logons
jhk      4
mab      3
pds      4
sgs      6
who      2
```

UNI-9

### Regular expression characters:

(decreasing order of precedence)

- C**            non-special character
- \C**          quote character
- ^**            beginning of line
- \$**            end of line
- .**            any single character
- []**          any one character from the group
- [^]**         any one character not in the group
- r\***          zero or more occurrences
- r+**          one or more occurrences
- r?**          zero or one occurrences
- r1r2**        r1 followed by r2
- r1|r2**       r1 or r2
- (r)**         nesting

### Example #8

```
$ cat term.awk
/\|vt100/,/[\^]\$/ {
  print
}

$ awk -f term.awk /etc/termcap
d0|vt100|vt100-am|vt100|dec vt100:\
:cr=^M:do=^V:nl=^J:bl=^G:co#80:li#24:cl=50\E|:E[2J:\
:ls=^H:bs:am:cs=5\E[14d:ds=nd=2\E[C:up=2\E[A:\
:ce=3\E[K:cd=50\E[J:sc=^E[7m:se=^E[m:se=2\E[m:\
:sd=2\E[ln:mr=2\E[7m:mb=2\E[5m:me=2\E[m:\
:rs=^D>^E[731\E[741\E[751\E[77h\E[78h:ke=^E[211\E[>:\
:rf=^uz|^ib|^tabset|vt100:ku=^EOA:kl=^EOD:kb=^H:\
:sc=^E7:rc=^E8:cs=^E[14d:tdr:\
d1|vt100|vt100-nam|vt100 w/no am:\
:am0:sm0:tc=vt100-am:\
d1|vt100-23|vt100 for use with vt100sys:\
:li#23:ls=^E[1:23r\E[23:lh:tc=vt100-am:\
ds|vt100-w|dec vt100 132 cols 14 lines (w/o advanced video):\
:li#14:tc=vt100-w:\
dt|vt100-w|dec vt100 132 cols (w/advanced video):\
:co#132:li#24:rs=^D>^E[73h\E[751\E[78h:tc=vt100-am:\
dt|vt100-w-nam|dec vt100 132 cols (w/advanced video):\
:co#132:li#24:rs=^D>^E[73h\E[78h:vt8:tc=vt100-nam:
```

UNI-10



## 5. DEBUGGING

The best AWK programs are those that work correctly the first time!

```
$ cat bad.awk
begin {
    print "hello, world"
    exit
}

$ awk -f bad.awk
awk: syntax error near line 1
awk: bailing out near line 1
```

## REFERENCES

Aho, Kernighan, Weinberger,  
"The AWK Programming Language",  
Addison-Wesley, 1988.

## The Joke of the Month

The *Joke of the Month* will be a regular column in this newsletter. There are three requirements for joke submissions:

- humor,
- taste,
- and relevancy

The first is self-explanatory and self-defined, the second means nothing off-color, the third means computer- or unix-related. Send me your jokes, and the winning entry (or entries) will be published each month. The prize for submitting the winning joke is the satisfaction of seeing your name in print, and the knowledge that everybody in the Unisig thinks that you think you're funny.

To get things started, here's an old favorite:

Three computer salesmen are walking in the forest, when they come upon some tracks. The IBM salesman says "Those are bear tracks." The HP salesman says "Nope, those are dear tracks." The DEC salesman was hit by the train.

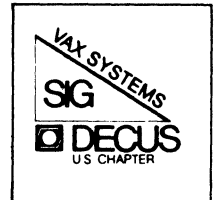


# NEWSLETTER OF THE VAX SYSTEMS SIG



*Our Mascot*

# Pageswapper



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Articles for publication in the Pageswapper can be sent (US mail only -- no "express" services please) to:

Larry Kilgallen, PAGESWAPPER Editor  
Box 81; MIT Station  
Cambridge, MA 02139-0901  
USA

Preference is given to material submitted as machine-readable text (best is Runoff source). Line length should not exceed 64 characters and the number of text lines per page should not exceed 48 (these limits are particularly important for sample commands, etc. where simple text justification will not produce a meaningful result).

Please do not submit program source, as that is better distributed on the VAX SIG tape.

Please do not submit "slides" from DECUS Symposia presentations (or other meetings) as 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 to get the content across to a wider audience than is able to attend.

Change of address, reports of non-receipt, and other circulation correspondence should be sent to:

DECUS U.S. Chapter  
Attention: Publications Department  
249 Northboro Road (BPO2)  
Marlborough, MA 01752  
USA

Only if discrepancies of the mailing system are reported can they be analyzed and corrected.

## Editor's Workfile

SIR Voting Time

April 8 is the deadline for voting on the Spring 1988 System Improvement Request ballot. Even if you are reading this on April 1, the time is short. Dial-up contributors to the Pageswapper have been participating in a debate as to the relative merits of the various SIR's, and in this issue Jonathan Pinkley summarizes that discussion for the rest of our readers who have not had a chance to get their arm twisted for this ballot.

If there is still time for you to vote, the form is in this issue, but you will have to go to the February issue for the text of SIR's (SIR voting can also be done on-line by those with Pageswapper submission accounts).

## Fastest SIR Response in History

(before the vote)

Digital Equipment Corporation  
110 Spit Brook Road  
Nashua, NH 03062-2698

12 February 1988

Larry Kilgallen, Pageswapper Editor  
Box 81, MIT Station  
Cambridge, MA 02139-0901

Dear Larry,

While reviewing the Spring 1988 SIRs published in the February edition of PAGESWAPPER, I discovered two that may not get voted into the top ten, but for which some response seems appropriate.

The first is S88-24 -- Abstract: MOUNT/FOREIGN and uninitialized tapes. I believe that symptoms described in the SIR result from known bugs in the HSC microcode. I also believe that these bugs have been or are being corrected, and that new HSC microcode releases will eliminate the observed behavior. I attempted the described operations on both a non-HSC and an HSC tape drive here and found the MOUNT/FOREIGN command to work properly in both cases. (Of course, we are running the "latest and greatest" of everything here, which also means that I am not able to reproduce the environment in which the problem is being experienced.)

It should also be noted that SIR-24 represents a bug report, and probably should be handled by means other than SIRs.

The second SIR is S88-15 -- Abstract: DCL status enhancements. To the best of my knowledge, utilities such as DIFFERENCES already return useful status information in the \$STATUS DCL variable. In the case of DIFFERENCES identical files produce a \$STATUS that equals %x006C8009, and different files produce a \$STATUS that equals %x006C8013. Personally, I would not check the exact status values, but rather note that a SUCCESS status is returned if the files are identical and an INFORMATIONAL status is returned if the files are different.

Returning useful information in \$STATUS is the expected behavior for all VMS utilities. In this respect, I believe that we are already doing that which SIR S88-15 requests. Of course there may be cases where the normal VMS standards are not being observed. I think customers who observe abnormal behavior, in the form of insufficient 'value' in \$STATUS returns, should report those problems as the bugs that they are.

Thanks,

Ralph O. Weber  
Consultant Software Engineer  
VAX/VMS Operating System Development

## Get System Performance Information Service

Frank J. Nagy  
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### Disclaimer

The information in this document is subject to change without notice and should not be construed as a commitment by the author nor, certainly, by the Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The VMS MONITOR program gathers and displays information on the performance of a VAX/VMS system. MONITOR collects much of its information from the VMS Executive by means of a special Get System Performance Information service. The calling sequence for \$GETSPI is described later in this document. \$GETSPI is not implemented as part of the VMS Executive, but as an external system service in the manner of user-written system services. As such, the \$GETSPI system service is implemented in the SPISHR.EXE shareable image found in SYS\$SHARE: on the VMS system disk. Normally, this image is installed as a protected shareable image at system startup. To use this service, your program must link to this shared image with an explicit Linker command as shown:

```
$ link myprogram,...,sys$input:/options...  
sys$share:spishr/shareable
```

to link MYPROGRAM and other object modules with the SPISHR image.

The \$GETSPI service collects performance information based on an item list similar to the item lists used by the other get-information system services, such as \$GETJPI or \$GETSYI. The item codes used by \$GETSPI are defined as constants for VAX C in a SPIDEF module for the LCLCDEF.TLB text library located in RDCS\$LIB: at Fermilab (see the appendix for a listing of these constants). Most of the item codes return a longword value which is either the current level value (such as the current amount of free nonpaged pool) or the current counter value (such as the number of system page faults). Counters are converted to rates by requesting the performance information twice, subtracting the first value from the second and dividing by the time interval between collections. The SPI\$SYSTIME item code returns the current system time in standard VMS format (quadword) and may be included in an item with other performance information items to provide a time stamp marking the time when the items in the list were collected. Other items with units of time are returned in longwords as counts of 10 millisecond clock ticks.

Several items (SPI\$DISK, SPI\$PROC and SPI\$SCS) return lists of structured information. Each list begins with a longword count which gives the number of items in the array of records which is the remainder of the list. The SPIDEF module defines struct's for VAX C for these items. The DiskRecord structure is returned by the SPI\$DISK item code for each disk device on the system. The information returned in the DiskRecord is:

- Allocation class number.
- Short form (four character) device name.
- Unit number.
- VAXCluster node name.
- Volume name.
- Count of I/O operations.
- Queue length accumulator.

The ProcRecord structure is returned by the SPI\$PROC item code for each process in the system. The information returned in the ProcRecord structure is:

- Internal process identification (PID).
- UIC of process owner.
- Process' current state.
- Process' priority.
- Process' name.
- Global page count.
- Process page count.
- Status vector from Process Control Block (PCB). Process is swapped out if PCB\$V\_RES bit is clear.
- Direct I/O count.
- Page fault count.
- Accumulated CPU time in clock ticks.
- Buffered I/O count.
- Extended PID.
- Event flag wait mask and MWAIT code.

The SCSRecord structure is returned by the SPI\$SCS item code for each node in the cluster. The information returned in the SCSRecord structure is:

- System node name.
- Count of application datagrams sent.
- Count of datagrams received.
- Count of datagrams discarded.
- Count of application messages sent.

- Count of messages received.
- Count of block Send Data's initiated.
- KBytes sent via Send Data's.
- Count of block Request Data's initiated.
- KBytes received via Request Data's.
- KBytes mapped for block transfers.
- Times connection queued awaiting send credit.
- Times connection queued awaiting buffer descriptor.

Refer to the appendix or the source of the SPIDEF include module for the exact struct field declarations.

The next section of this document is a description of the individual \$GETSPI system service and its arguments.

This service allows a process to request performance information about the system. This undocumented system service is used by the MONITOR utility and is implemented in the SPISHR.EXE shareable image found in SYS\$SHARE:. Items are requested using an item descriptor list similar to that used by the other \$GETxxx system services. An item descriptor has the format:

```
+-----+
| Item Code | Buf. Length |
+-----+
|           | Buffer Address |
+-----+
|           | Address to return length |
+-----+
```

Refer to the documentation on the Get System-Wide Information (\$GETSYI) system service for more information on the arguments to \$GETSPI (except for the item codes and the returned information).

```
status = EXE_$GETSPI( efn, csidadr, nodename, itmlst,
                    iosb, astadr, astprm )
```

status

returns as VMS condition code:

- = SS\$\_NORMAL success
- = SS\$\_NOMORENODE a wildcard operation was requested, and \$GETSPI has returned information about all available VAX nodes in the cluster. This is a success status.
- = SS\$\_NOSUCHNODE the specified VAX node does not exist or is not currently a member of the VAXcluster.
- = SS\$\_EXASTLM AST quota exceeded
- = SS\$\_ACCVIO itmlst can not be read by the calling access mode or the return buffer or return length word can not be written by the calling access mode.

= SS\$BADPARAM an invalid item identifier was supplied

**efn**  
number of the event flag to set when all of the requested data is valid. Passed by value.

**csidadr**  
cluster system identification (csid) of the VAX node about which \$GETSPI is to return performance information. The csid is a longword passed by reference. The initial value of the csid is \$-1\$ for a \$GETSPI wildcard operation for all nodes in a VAXcluster (see \$GETSYI documentation for more details). NOTE: UNUSED at the present time.

**nodename**  
name of the VAX node about which \$GETSPI is to return performance information. Passed by descriptor. NOTE: UNUSED at the present time.

**itmlst**  
list of item descriptors. Passed by reference. The list is ended by a longword of 0. Most of the item codes return a single longword value; the exceptions are noted in the list below:

- = SPI\$ACCESS Number of file accesses
- = SPI\$ACCLCK Number of Access locks
- = SPI\$ALLOC Number of file extends
- = SPI\$ARRLOCPK Arriving local packets
- = SPI\$ARRTRAPK Arriving transit packets
- = SPI\$BIGHOLE Largest block in dynamic memory

- = SPI\$BLKAST Number of blocking ASTs
- = SPI\$BLKIN Blocking ASTs queued (incoming)
- = SPI\$BLKLOC Blocking ASTs queued (local)
- = SPI\$BLKOUT Blocking ASTs queued (outgoing)
- = SPI\$BUFFUNAVAIL System buffer unavailable
- = SPI\$BUFIO Count of buffered I/Os
- = SPI\$CEF Common event flag wait
- = SPI\$COLPG Collided page wait
- = SPI\$COM Computable
- = SPI\$COMO Outswapped and computable
- = SPI\$CUR Currently executing
- = SPI\$DEPLCKPK Departing local packets
- = SPI\$DEQ Number of DEQ's
- = SPI\$DEQIN Dequeues (incoming)
- = SPI\$DEQLOC Dequeues (local)
- = SPI\$DEQOUT Dequeues (outgoing)
- = SPI\$DGDISCARD SCS application datagrams discarded
- = SPI\$DGRCVD SCS application datagrams received
- = SPI\$DGSENT SCS application datagrams sent
- = SPI\$DIRDATA\_HIT Count of Directory data cache hits
- = SPI\$DIRDATA\_HITPCNT Percent of directory data cache hits



- = SPI\$\_DIRDATA\_TRIES Count of Directory data cache attempts
- = SPI\$\_DIRDEL Directory deletes
- = SPI\$\_DIRFCB\_HITPCNT Percent of directory block cache hits
- = SPI\$\_DIRFCB\_HITS Count of Directory block cache hits
- = SPI\$\_DIRFCB\_MISS Count of Directory block cache misses
- = SPI\$\_DIRFCB\_TRIES Count of Directory block cache attempts
- = SPI\$\_DIRIN Directory operations (incoming)
- = SPI\$\_DIRINS Directory inserts
- = SPI\$\_DIRIO Count of direct I/Os
- = SPI\$\_DIRLOOK Directory lookups
- = SPI\$\_DIROUT Directory operations (outgoing)
- = SPI\$\_DISKRESPTIM Disk I/O response time
- = SPI\$\_DISKS All disk data. Returns a list which begins with a longword count of the number of disk drives and then has an array of information records (one for each disk).
- = SPI\$\_DLCKFND Number of deadlocks found
- = SPI\$\_DLCKMSGS Deadlock detection messages (in out)
- = SPI\$\_DLCKSRCH Number of deadlock searches
- = SPI\$\_DYNINUSE Dynamic memory space in use
- = SPI\$\_DZROFLTS Demand zero faults

- = SPI\$\_ENQCVT Number of ENQ's (conversions)
- = SPI\$\_ENQCVTIN Lock conversion requests (incoming)
- = SPI\$\_ENQCVTLOC Lock conversion requests (local)
- = SPI\$\_ENQCVTOUT Lock conversion requests (outgoing)
- = SPI\$\_ENQNEW Number of ENQ's (new)
- = SPI\$\_ENQNEWIN New lock requests (incoming)
- = SPI\$\_ENQNEWLOC New lock requests (local)
- = SPI\$\_ENQNEWOUT New lock requests (outgoing)
- = SPI\$\_ENQNOTQD Number of ENQ's no queued
- = SPI\$\_ENQWAIT Number of ENQ's forced to wait
- = SPI\$\_EXTHIT Count of Extent cache hits
- = SPI\$\_EXTHITPCNT Percent of extent cache hits
- = SPI\$\_EXTMISS Count of Extent cache misses
- = SPI\$\_EXT\_TRIES Count of Extent cache attempts
- = SPI\$\_FAULTS Page fault count
- = SPI\$\_FCPCACHE Number of FCP cache hits
- = SPI\$\_FCPCALLS Total FCP calls
- = SPI\$\_FCPCPU Number of CPU ticks used by FCP
- = SPI\$\_FCPCREATE Number of file creations
- = SPI\$\_FCPERASE Number of erase calls
- = SPI\$\_FCPFAULT Number of FCP page faults
- = SPI\$\_FCPHIT Number of window hits

- = SPI\$\_FCPREAD Number of disk reads by FCP
- = SPI\$\_FCPSPLIT Number of split transfers
- = SPI\$\_FCPTURN Number of window turns
- = SPI\$\_FCPWRITE Number of disk writes by FCP
- = SPI\$\_FIDHIT Count of File Id cache hits
- = SPI\$\_FIDHITPCNT Percent of file id cache hits
- = SPI\$\_FIDMISS Count of File Id cache misses
- = SPI\$\_FID\_TRIES Count of File Id cache attempts
- = SPI\$\_FILHDR\_HIT Count of File Header cache hits
- = SPI\$\_FILHDR\_HITPCNT Percent of file header cache hits
- = SPI\$\_FILHDR\_TRIES Count of File Header cache attempts
- = SPI\$\_FPG Fragmented paging wait
- = SPI\$\_FREFLTFS Faults from free page list
- = SPI\$\_FRLIST Size of free page list
- = SPI\$\_GVALFLTS Global valid page faults
- = SPI\$\_HIB Hibernating
- = SPI\$\_HIBO Outswapped and hibernating
- = SPI\$\_HOLECNT Number of blocks in dynamic memory
- = SPI\$\_HOLESUM Total available dynamic memory
- = SPI\$\_INITDEFER Transmit initially deferred
- = SPI\$\_INTERNALBUFERR Receive internal buffer error

- = SPI\$\_IOAQUELEN Accurate disk I/O queue length
- = SPI\$\_IOQUELEN Disk I/O queue length
- = SPI\$\_IRPCNT Number of IRP packets available
- = SPI\$\_IRPINUSE Number of IRP packets in use
- = SPI\$\_ISWPCNT Total inswaps
- = SPI\$\_JDEXCNT Journal device extend count
- = SPI\$\_JDFQLEN Journal device force I/O queue length
- = SPI\$\_JDNQLEN Journal device normal I/O queue length
- = SPI\$\_JDWQLEN Journal device wait IRP queue length
- = SPI\$\_JNLBUFIO Journal buffered I/Os
- = SPI\$\_JNLBUFWR Journal buffer writes
- = SPI\$\_JNLCHNLS Journal channels assigned
- = SPI\$\_JNLDIRIO Journal direct I/Os
- = SPI\$\_JNLFORFL Force writes -- flushed
- = SPI\$\_JNLFORNL Force writes -- NULL operation
- = SPI\$\_JNLIOCNT Journal I/O operation count (for disks )
- = SPI\$\_JNLJRNLS Active journals
- = SPI\$\_JNLWRTAI AI journal write operations
- = SPI\$\_JNLWRTAT AT journal write operations
- = SPI\$\_JNLWRTBI BI journal write operations
- = SPI\$\_JNLWRTFM Force modifier writes

- = SPI\$\_JNLWRTRU RU journal write operations
- = SPI\$\_JNLWRTSS Journal write ops to sec stg
- = SPI\$\_KBYTES KBytes/second
- = SPI\$\_KBYTMAPD SCS Kbytes mapped for block transfer
- = SPI\$\_KBYTREQD SCS KBytes received via request datas
- = SPI\$\_KBYTSENT SCS KBytes send via send datas
- = SPI\$\_LEF Local event flag wait
- = SPI\$\_LEFO Outswapped local event flag wait
- = SPI\$\_LOCBUFERR Receive local buffer error
- = SPI\$\_LOGNAM Logical name translations
- = SPI\$\_LRPCNT Number of LRP packets available
- = SPI\$\_LRPINUSE Number of LRP packets in use
- = SPI\$\_MBREADS Total mailbox reads
- = SPI\$\_MBWRITES Total mailbox writes
- = SPI\$\_MFYFLTS Faults from modified page list
- = SPI\$\_MKBYTES Multicast KBytes/second
- = SPI\$\_MODLIST Size of modified page list
- = SPI\$\_MPACKETS Multicast packets/second
- = SPI\$\_MPACKETSIZE Multicast packet size (bytes)
- = SPI\$\_MSGRCVD SCS application messages received
- = SPI\$\_MSGSENT SCS application messages sent

- = SPI\$\_MULTICOLL Transmit multi collisions detected
- = SPI\$\_MWAIT Misc. wait
- = SPI\$\_NUMLOCKS Total locks
- = SPI\$\_NUMRES Total resources
- = SPI\$\_OPCNT Disk I/O operation count
- = SPI\$\_OPENS Number of file opens
- = SPI\$\_OTHSTAT OBSOLETE item, returns 0
- = SPI\$\_PACKETS Ethernet packets/second
- = SPI\$\_PACKETSIZE Packets size (bytes)
- = SPI\$\_PCOMPAT Time in compatibility mode in ticks
- = SPI\$\_PEXEC Time in executive mode in ticks
- = SPI\$\_PFW Page fault wait
- = SPI\$\_PIDLE Idle time in ticks
- = SPI\$\_PINTERRUPT Time on interrupt stack in ticks
- = SPI\$\_PKERNEL Time in kernel mode in ticks
- = SPI\$\_PREADIO Physical page read I/Os
- = SPI\$\_PREADS Page reads
- = SPI\$\_PROC Process information. Returns a list which begins with a longword count of the number of processes on the system and then has an array of information records (one for each process).
- = SPI\$\_PROCS Process count for SYSTEM class
- = SPI\$\_PSUPER Time in supervisor mode in ticks

- = SPI\$\_PUSER Time in user mode in ticks
- = SPI\$\_PWRITES Page writes
- = SPI\$\_PWRITIO Physical page write I/Os
- = SPI\$\_QBDT\_CNT SCS times connection queued for buffer descriptor
- = SPI\$\_QCR\_CNT SCS times connection queued for send credit
- = SPI\$\_QUOHIT Count of Quota cache hits
- = SPI\$\_QUOHITPCNT Percent of quota cache hits
- = SPI\$\_QUOMISS Count of Quota cache misses
- = SPI\$\_QUO\_TRIES Count of Quota cache attempts
- = SPI\$\_RCVBUFFL Receiver buffer failures
- = SPI\$\_REQDATS SCS block request datas initiated
- = SPI\$\_RUFABORT Count of RU abort operations
- = SPI\$\_RUFACTIV Active recovery units
- = SPI\$\_RUFCHNLS RU journal channels
- = SPI\$\_RUFJNLS Active RU journals
- = SPI\$\_RUFMARK Count of Mark IDs written
- = SPI\$\_RUFMRKRB Count of Mark ID rollbacks
- = SPI\$\_RUFREADS RU journal reads
- = SPI\$\_RUFWRTS RU journal writes
- = SPI\$\_RUFXTNDS RU journal extends
- = SPI\$\_SCOMPAT Time in compatibility mode in ticks

- = SPI\$\_SCS All SCS information. Returns a list which begins with a longword count of the number of systems in the cluster and then has an array of information records (one for each system).
- = SPI\$\_SEXEC Time in executive mode in ticks
- = SPI\$\_SIDLE Idle time in ticks
- = SPI\$\_SINGLECOLL Transmit single collision detected
- = SPI\$\_SINTERRUPT Time on interrupt stack in ticks
- = SPI\$\_SKERNEL Time in kernel mode in ticks
- = SPI\$\_SMALLCNT Number of blocks \$<\$ 32 bytes in size
- = SPI\$\_SMALLHOLE Smallest block in dynamic memory
- = SPI\$\_SNDATS SCS block send datas initiated
- = SPI\$\_SRPCNT Number of SRP packets available
- = SPI\$\_SRPINUSE Number of SRP packets in use
- = SPI\$\_SSUPER Time in supervisor mode in ticks
- = SPI\$\_STORAGMAP\_HIT Count of Storage bitmap cache hits
- = SPI\$\_STORAGMAP\_HITPCNT Percent of storage bitmap cache hits
- = SPI\$\_STORAGMAP\_TRIES Count of Storage bitmap cache attempts
- = SPI\$\_SUSER Time in user mode in ticks
- = SPI\$\_SUSP Suspended
- = SPI\$\_SUSPO Outswapped and suspended

- = SPI\$\_SYNCHLCK Directory and file synch locks
- = SPI\$\_SYNCHWAIT Number of times XQP waited for a directory or file synch lock
- = SPI\$\_SYSFAULTS System page faults
- = SPI\$\_SYSTIME Current system time returned in a quadword in standard VMS time format
- = SPI\$\_TRCNGLS Transit congestion loss
- = SPI\$\_VOLLCK Volume synchronization locks
- = SPI\$\_VOLWAIT Number of times XQP waited for volume lock
- = SPI\$\_WRTINPROG Faults from write-in-progress
- = SPI\$\_XQPCACHEWAIT Number of times XQP had to wait for free space in a cache

iosb quadword I/O status block to receive final status. Passed by reference.

astadr AST routine to be called when all of the requested data has been supplied. Passed by reference.

astprm longword AST routine parameter. Passed by value.

Declarations of information return struct's used by the SPI\$\_DISK, SPI\$\_PROC and SPI\$\_SCS items.

```
struct DiskRecord {
    unsigned char allocclass; /* Allocation class */
    char devname[4]; /* Device name */
    unsigned short unitnum; /* Unit number */
    char nodename[8]; /* Node name */
    char volname[12]; /* Volume name */
    unsigned long optcnt; /* Operation count */
    unsigned long qcount; /* Queue length accumulator */
};

struct ProcRecord {
    unsigned long ipid; /* Internal PID */
    unsigned long uic; /* UIC */
    unsigned short state; /* State value */
    unsigned char pri; /* Priority (negative value) */
    struct {
        unsigned char count; /* Text length count */
        char text[15];
    } lname; /* Process name (counted string)
    unsigned short gpgcnt; /* Global page count */
    unsigned short ppgcnt; /* Process page count */
    unsigned long sts; /* PCB Status Vector */
    unsigned long diocnt; /* Direct I/O count */
    unsigned long pageflts; /* Page fault count */
    unsigned long cputim; /* Accumulated CPU time (in ticks)
    unsigned long biocnt; /* Buffered I/O count */
    unsigned long epid; /* Extended PID */
    unsigned long efwm; /* Event flag wait mask (for MWAI)
};
```

```
struct SCSRecord {
    char nodename[8];          /* System node name */
    unsigned long dgsgent;     /* Application datagrams sent */
    unsigned long dggrcvd;     /* Application datagrams received */
    unsigned long dgdiscard;  /* Application datagrams discarded */
    unsigned long msgsent;     /* Application messages sent */
    unsigned long msgrcvd;     /* Application messages received */
    unsigned long snddats;     /* Block send datas initiated */
    unsigned long kbytsgent;   /* KBytes send via send datas */
    unsigned long reqdats;     /* Block request datas initiated */
    unsigned long kbyterqd;    /* KBytes received via request da */
    unsigned long kbytmapd;    /* KBytes mapped for block transf */
    unsigned long qcr_cnt;     /* Times queued for send credit */
    unsigned long qbdt_cnt;    /* Times queued for buffer descri
};
```

Definitions of the item list codes:

```
/* Primary CPU: */
#define SPI$ PINTERRUPT 0X001
#define SPI$ PKERNEL 0X002
#define SPI$ PEXEC 0X003
#define SPI$ PSUPER 0X004
#define SPI$ PUSER 0X005
#define SPI$ PCOMPAT 0X006
#define SPI$ _PIDLE 0X007

/* Secondary CPU: */
#define SPI$ SINTERRUPT 0X008
#define SPI$ SKERNEL 0X009
#define SPI$ SEXEC 0X00A
#define SPI$ SSUPER 0X00B
#define SPI$ SUSER 0X00C
#define SPI$ SCOMPAT 0X00D
#define SPI$ _SIDLE 0X00E

#define SPI$ CPUBUSY 0X00F
#define SPI$ COLPG 0X010
#define SPI$ MWAIT 0X011
#define SPI$ CEF 0X012
#define SPI$ PFW 0X013
#define SPI$ LEF 0X014
#define SPI$ _LEFO 0X015
```

```
#define SPI$ HIB 0X016
#define SPI$ _HIBO 0X017
#define SPI$ _SUSP 0X018
#define SPI$ _SUSPO 0X019
#define SPI$ _FPG 0X01A
#define SPI$ _COM 0X01B
#define SPI$ _COMO 0X01C
#define SPI$ _CUR 0X01D
#define SPI$ _OTHSTAT 0X01E
#define SPI$ _PROCS 0X01F
#define SPI$ _PROC 0X020
#define SPI$ _FRLIST 0X021
#define SPI$ _MODLIST 0X022
#define SPI$ _FAULTS 0X023
#define SPI$ _PREADS 0X024
#define SPI$ _PWrites 0X025
#define SPI$ _PWRTIO 0X026
#define SPI$ _PREADIO 0X027
#define SPI$ _GVALFLTS 0X028
#define SPI$ _WRTINPROG 0X029
#define SPI$ _FREFLTS 0X02A
#define SPI$ _MFYFLTS 0X02B
#define SPI$ _DZROFLTS 0X02C
#define SPI$ _SYSFAULTS 0X02D
#define SPI$ _LRPCNT 0X02E
#define SPI$ _LRPINUSE 0X02F
#define SPI$ _IRPCNT 0X030
#define SPI$ _IRPINUSE 0X031
#define SPI$ _SRPCNT 0X032
#define SPI$ _SRPINUSE 0X033
#define SPI$ _HOLECNT 0X034
#define SPI$ _BIGHOLE 0X035
#define SPI$ _SMALLHOLE 0X036
#define SPI$ _HOLESUM 0X037
#define SPI$ _DYNINUSE 0X038
#define SPI$ _SMALLCNT 0X039
#define SPI$ _ISWPCNT 0X03A
#define SPI$ _DIRIO 0X03B
#define SPI$ _BUFIO 0X03C
#define SPI$ _MBREADS 0X03D
#define SPI$ _MBWRITES 0X03E
#define SPI$ _LOGNAM 0X03F
#define SPI$ _ACCESS 0X040
#define SPI$ _ALLOC 0X041
#define SPI$ _FCPCALLS 0X042
#define SPI$ _FCPCREATE 0X043
#define SPI$ _FCPREAD 0X044
```

```
#define SPI$FCPWRITE 0X045
#define SPI$FCPCACHE 0X046
#define SPI$VOLWAIT 0X047
#define SPI$FCPCPU 0X048
#define SPI$FCPTURN 0X049
#define SPI$FCPHIT 0X04A
#define SPI$FCPSPLIT 0X04B
#define SPI$FCPFAULT 0X04C
#define SPI$FCPERASE 0X04D
#define SPI$OPENS 0X04E
#define SPI$ENQNEW 0X04F
#define SPI$ENQCVT 0X050
#define SPI$DEQ 0X051
#define SPI$BLKAST 0X052
#define SPI$ENQWAIT 0X053
#define SPI$ENQNOTQD 0X054
#define SPI$DLCKSRCH 0X055
#define SPI$DLCKEND 0X056
#define SPI$NUMLOCKS 0X057
#define SPI$NUMRES 0X058
#define SPI$ARRLOCPK 0X059
#define SPI$DEPLCKPK 0X05A
#define SPI$ARRTRAPK 0X05B
#define SPI$TRCNGLOS 0X05C
#define SPI$RCVBUFFL 0X05D
#define SPI$JNLJRNLS 0X05E
#define SPI$JNLCHNLS 0X05F
#define SPI$JNLWRTAI 0X060
#define SPI$JNLWRTBI 0X061
#define SPI$JNLWRTAT 0X062
#define SPI$JNLWRTRU 0X063
#define SPI$JNLDIRIO 0X064
#define SPI$JNLBUFIO 0X065
#define SPI$JNLWRTSS 0X066
#define SPI$JNLFORNL 0X067
#define SPI$JNLFORFL 0X068
#define SPI$JNLBUFWR 0X069
#define SPI$JNLWRTFM 0X06A
#define SPI$RUFActiv 0X06B
#define SPI$RUFJNLS 0X06C
#define SPI$RUFCHNLS 0X06D
#define SPI$RUFWRTS 0X06E
#define SPI$RUFREADS 0X06F
#define SPI$RUFXTNDS 0X070
#define SPI$RUFMARK 0X071
#define SPI$RUFMRKRB 0X072
#define SPI$RUFABORT 0X073
```

```
#define SPI$FIDHIT 0X074
#define SPI$FID TRIES 0X075
#define SPI$FIDMISS 0X076
#define SPI$FILHDR_HIT 0X077
#define SPI$FILHDR_TRIES 0X078
#define SPI$DIRFCB_HITS 0X079
#define SPI$DIRFCB_TRIES 0X07A
#define SPI$DIRFCB_MISS 0X07B
#define SPI$DIRDATA_HIT 0X07C
#define SPI$DIRDATA_TRIES 0X07D
#define SPI$EXTHIT 0X07E
#define SPI$EXT TRIES 0X07F
#define SPI$EXTMISS 0X080
#define SPI$QUOHIT 0X081
#define SPI$QUO TRIES 0X082
#define SPI$QUOMISS 0X083
#define SPI$STORAGMAP_HIT 0X084
#define SPI$STORAGMAP_TRIES 0X085
#define SPI$DISKS 0X086
#define SPI$TOTAL LOCKS 0X087
#define SPI$ENQNEWLOC 0X088
#define SPI$ENQNEWIN 0X089
#define SPI$ENQNEWOUT 0X08A
#define SPI$ENQCVTLOC 0X08B
#define SPI$ENQCVTIN 0X08C
#define SPI$ENQCVTOUT 0X08D
#define SPI$DEQLOC 0X08E
#define SPI$DEQIN 0X08F
#define SPI$DEQOUT 0X090
#define SPI$BLKLOC 0X091
#define SPI$BLKIN 0X092
#define SPI$BLKOUT 0X093
#define SPI$DIRIN 0X094
#define SPI$DIROUT 0X095
#define SPI$DLCKMSGS 0X096
#define SPI$SCS 0X097
#define SPI$VOLLCK 0X098
#define SPI$SYNCHLCK 0X099
#define SPI$SYNCHWAIT 0X09A
#define SPI$ACCLCK 0X09B
#define SPI$XQPCACHEWAIT 0X09C
#define SPI$_SYSTEME 0X09D
```

## The SIR Lobby

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This is a short summary of comments regarding current SIRs made by various dial-up contributors on the PAGESWAPPER system. I have tried to remain objective, but I am human and I have my own opinions. The summaries are mine, and may show inadvertent bias.

This summary is from the Pageswapper SIR LOBBY Notes conference as it was on Monday, February 22, 1988. The following is the method I have used to summarize. I have arranged the replies into four categories; Yes, No, Indifferent, and Discussion. Following are my definitions of the categories:

- o Yes -- This is a vote for the SIR. I have limited this to one per person, i.e. if John Doe has left 5 replies in favor of a particular SIR, I count only one as a Yes, the others will be counted as discussion.
- o No -- This is a vote AGAINST the SIR; i.e. a negative vote. The same one vote per person as above applies.
- o Indifferent -- Not a Yes, but not a negative vote.
- o Discussion -- This is a reply that discusses previous replies or possible enhancements to the SIR for a future submission.

I have listed these in the numeric order of the SIRs. I have omitted all SIRs for which no replies have been left.

- S88-1: SCS Communications Access for Users  
1 Indifferent -- Not sure what it means, if it's for cluster compatible utilities I'm for it.

- S88-2: Better Batch Job Load Balancing  
1 Yes -- Would really be best if DEC gave us "user written job (sub-)controller".
- S88-3: Privileged Deallocation of Tapes Away from Users  
4 Discussion -- how to do it now, what is needed etc.
- S88-5: Batch Execution Queue Assignment "Filtering"  
2 Discussion -- What does it mean, should it be part of S88-2?
- S88-6: "Virtual Disk" Capability  
2 Yes -- V5 will probably break most device drivers, therefore DEC should support this. Fall 87 VAX SIG tape will have "memory" disk driver.
- S88-7: Identity Information About LAT Sessions  
1 Yes -- This needs to be done by LOGINOUT so that login failures will contain the information.  
4 Discussion -- V5.0 will have it in \$GETDVI. This doesn't solve the problem stated though.
- S88-8: Queued ALLOCATE Service  
2 Yes -- Good for shops that only have a single tape drive. Also good for shops with 10 drives.
- S88-9: Support For Simple Project Accounting  
2 Discussion -- DEC indicates security problems with the simple model in the DECUS proposal.
- S88-10: BACKUP Added Logging and Incremental Restore  
2 Discussion -- Don't BACKUP journals provide logging information?



- S88-11: DCL WRITE Without CR/LF
  - 1 Yes -- This would make the job much easier to talk to "Smart" modems, etc. !
  - 3 Discussion -- Work around with READ /PROMPT=string /TIME\_OUT=0
- S88-12: More Capabilities for VAX-11 RSX BRU
  - 4 Indifferent -- Discussion about whether this should be in the VAX SIR area. Summary: anything that is related to VAXes that might be resolved by DEC is ok; not just software, not just VMS, not just the operating system. Problem: due to the limited constituency, not likely to make top-10, and therefore the vote may be "wasted".
- S88-13: Enhanced Command Line RECALL Capabilities
  - 2 Discussion -- Want to add new features to the SIR
- S88-14: Extend DCL TABLES
  - 2 Discussion -- Want to add new features to the SIR
- S88-15: DCL Status Return Enhancements
  - 3 Discussion -- The example given already has different status return! Don't waste a vote.
  - 1 Yes -- Need this capability with stable or symbolic return codes.
- S88-18: DCL /LOG Qualifier Consistency
  - 1 No -- Not a new different qualifier; at least don't break the old ones!
- S88-19: Command for "Control Print Screen" To A File
  - 2 Discussion -- DEC doesn't plan to implement this because they already provide this with SET HOST/LOG. But the whole point is to change DEC's plans!

- 1 Indifferent -- It would be nice...
- S88-21: Mail Enhancements
  - 3 No -- Too Much Effort, Too Little Payback
  - 4 Indifferent -- Nice ideas but there are other things that are more important. Only agree with part of the SIR.
  - 3 Discussion -- How the SIR should be changed.
- S88-22: SET HOST/DTE Enhancement For More Modems
  - 1 No -- DEC provides for custom DTE dialer modules. There is a Hayes-compatible one on this system in [US197634] for general consumption. DEC should provide for their own modems, not everyone else's.
  - 1 Yes -- DEC should provide this. Also now there is DMCL (DEC Modem Command Language) for their new modems (See V4.6 release notes.)
- S88-23: Enhance SHOW PROCESS Command
  - 2 Indifferent -- Nice but... both liked the SHOW PROCESS/FILES part.
  - (jlp) The last paragraph of the SIR states "SHOW DEVICE/FILES on one drive system with many installed images provides too much output." DEC agrees with this and that is why they provided SHOW DEVICE/FILES/NOSYSTEM
  - 1 Discussion -- Shouldn't be able to show files used in a protected subsystem without privilege.
- S88-24: MOUNT/FOREIGN and Uninitialized Tapes
  - 1 Yes -- It is a pain to have to initialize tapes that are new.
  - 1 No -- It is negligent to use uninitialized tapes.

16 Discussion -- Is "MOUNT /FOREIGN /INITIALIZE /LABEL=  
/DENSITY=" what people really want?

MOUNT (and INIT) /OVERRIDE=(ACCESSIBILITY, EXPIRATION,  
OWNER IDENTIFIER, SETID) does it already. Should it be  
SPRed?

- S88-26: /BELL Qualifier for Certain DCL Commands

1 No -- Don't waste a top-10 slot for something that is  
easily done with the current system.

3 Indifferent -- Not needed, easy work-arounds  
available.

Command files use \$ bell[0,7]=7 ... \$ write sys\$output  
bell

Interactive; just type ahead a CTRL/V CTRL/G.

- S88-28: Improving VMS Define Utility

1 No -- Just not worth wasting a top-10 slot for, just  
don't use ASSIGN if you don't like the way it works.

- S88-29: "Wild Card" Capability in SYS\$GETDVI

1 Discussion -- Home grown version available from John  
Ferriby

- S88-32: Protection and Ownership Attributes of  
Directory File

This one gets the prize for the most replies.

1 Yes -- There is no way for a non-privileged user to  
find out where he has copied files to that are being  
charged to his quota. It is not possible to use  
identifiers to create a "write only" directory. If the  
person that copied the file into the directory does not  
give delete access, the person who owns the directory  
can not delete it. (jlp) This may lead to "lost"  
files, since the person could SET FILE/REMOVE to get it  
out of their directory.

5 No -- Could break existing code, the default must not  
change.

People would use this to move files into someone else's  
area to prevent being charged for it and to get around  
the quota system.

Just because another O/S has it doesn't mean it's the  
"right" way.

15 Discussion -- Discussions of several alternatives.

Alternative #1: Have a bit in the directory file  
header that will cause files to change ownership to  
that of the directory.

Alternative #2: Provide a privileged utility to let  
people change the ownership of files in their  
directories.

- S88-33: Provide A Real-Time Debugger

9 Discussion -- What does this really mean?

- S88-35: Control DECnet File Transfer Priority

2 Discussion -- Priority of what? process or decnet  
channel?

1 No -- If it means changing the NCP or NETSERVER  
process priorities.

- S88-36: Descriptive Text For Files

1 Indifferent -- capability is there via ACL

4 Yes -- It would provide a needed functionality, and  
it needs to be part of the file as opposed to being in  
a description file (ala the Norton Utilities under  
MS-DOS.)

4 Discussion -- Application ACEs are described on page  
3-18 of the System Services Reference Manual, section  
3.4.1.2. Up to 253 bytes of your choice. This could  
form the basis for the needed functionality. This was  
previously in the top-10 and DEC said that the  
underlying capability was there via the "informational

ACE" and that they would provide the DCL interface in a future release.

- S88-37: READALL Should Only Permit a File To Be Read
  - 1 Indifferent -- This should be an SPR not an SIR.
  - 2 Yes -- Yes it's a bug, but we need to let DEC know we know it's a BUG.
  - 1 Discussion -- It's a documented feature, but it should be changed.
- S88-38: Run New Images Under Old Major Versions
  - 2 No -- Would cause too many nasty side effects.
  - 5 Discussion -- Several work-arounds discussed.
- S88-40: SMG/non-SMG Screen Interaction
  - 1 Discussion -- An example
- S88-41: DECnet Copy Performance to Same Node
  - 2 No -- Causes security alarms, etc.
  - 1 Indifferent -- Only if transparent.
  - 1 Discussion -- Will be in Future Major Release.
- S88-42: Install Images Memory-Resident
  - 1 Yes -- This could help
  - 2 Indifferent -- Not needed, is the right thing being optimized?
  - 4 Discussion -- What about RAM disk, etc.
- S88-44: Multiple MACRO Modules Per Source File
  - 4 Indifferent -- Slightly pro or con

6 Discussion -- Is it better to have only a single module per source file for software tracking?

- S88-45: VAX Ada Package for VMS Run-Time Library
  - 2 Discussion -- Why only Ada? Strong type checking too!
- S88-46: Line-Number Support In TPU
  - 3 Yes -- No efficient way to do this now.
- S88-47: Eliminate Automatic Unsolicited ACE on File Creation
  - 3 Yes -- The "Magic ACE" causes too many problems.
- S88-48: Prevent Password Reuse by Users
  - 3 Yes -- This is a necessary part of password expiration.
  - 1 Indifferent -- 1984 was four years ago...
  - 10 Discussion -- Best way to implement, and how not to.
- S88-49: Suppress Login Failure "Error reading command input"
  - 1 Yes -- This is not really a login failure.
- S88-50: No File Modification Date Update on Protection Change
  - 1 No -- Will break existing method of determining if something has changed when things stop working.
  - 2 Indifferent -- The file contents haven't changed, why set the modified date?
  - 4 Discussion -- More date fields in the file header would solve the problem.

- S88-51: Protected Subsystems
  - 1 Yes
- S88-54: DECnet-VAX End-to-End Encryption
  - 1 Indifferent -- Need ability to use hardware if it exists already.
- S88-55: Support DECnet Proxy Access for SET HOST Command
  - 1 Yes -- This would eliminate one more of the remaining situations where a password has to appear in plain text.
- S88-56: Better Control Over DECnet Remote File Access
  - 1 Indifferent -- Only through special ACL's so it would be optional.
- S88-57: Enhance COPY to Copy ACL's
  - 1 No -- The ACL should be determined by the destination.
- S88-59: General Identifier as the Owner of a Process
  - 1 Yes -- This is working toward an environment without System, Owner, Group, World. It should be kept as an option.
- S88-60: Security Alarm ACE Bypass by Certain Users
  - 2 Indifferent -- Good Idea but...
  - 3 Discussion -- Security and Bypass in the same sentence?
- S88-61: Print Form Setup and Reset Modules Verbatim
  - 4 Yes -- This must be fixed!
- 1 Indifferent -- But this should be an SPR
- 4 Discussion -- But DEC ignores SPR's ...
- S88-62: BACKUP Dismount and Deallocate Tape Drives
  - 1 Yes -- but it must not be the default.
- S88-63: Bell Character to Certain BACKUP Messages
  - 1 Indifferent -- Cute but is it worth a vote?
  - 1 Yes -- This has been needed for a long time
  - 7 Discussion -- Suggestion for a generic way; SET MESSAGE /FACILITY /IDENT /SEVERITY /TEXT /TIME /BELL
- S88-64: Limit Simultaneous Interactive Logins
  - 1 Yes -- No easy way to do this.
  - 2 Indifferent -- What about something in SYLOGIN?
  - 5 Discussion -- Why MAXJOBS won't work
- S88-65: Distributed Management of UAF Parameters
  - 1 Indifferent -- Write your own using SETUAI and send it to DECUS
- S88-66: Working Set Quota/Extent Via INSTALL
  - 1 Indifferent -- Not really necessary
  - 1 Yes -- Good for All-In-One users
- S88-67: Execution Priority Via INSTALL
  - 1 Indifferent -- Incomplete specification, would this affect all types of access? Would it be absolute priority?
- S88-68: Multiple Layered Product Versions on One Machine

- 2 Yes -- Would make upgrades much smoother.
- S88-69: Stand-alone BACKUP Support On More Devices
- 2 Indifferent -- The problem is the ROMs
- 1 Yes -- Let there be ROMs
- 7 Discussion -- How it's handled on the 11/73 etc.
- S88-70: More Output File Qualifiers for BACKUP Restoration
- 1 Indifferent -- "Oh Gawd, not MORE qualifiers!!!"

## LUG News

Meeting topics for April - from respective LUG Newsletters

### St Louis Local User's Group:

Second Tuesday of every month  
at the Salad Bowl Restaurant  
3949 Lindell Boulevard

5:30 pm - social time  
6:00 pm - dinner  
7:00 pm - program

April - PDP Topics - (possibly a case history of a migration from PDP to VAX given by Ken Denson).

### MIVAXLUG:

Lawrence Institute of Technology  
Management Building, Room M336  
10-Mile Road  
Southfield, MI

6:15 Open Steering Committee meeting  
7:00 Main Meeting

April 12 - Configuring Ethernet LANs - Jim Raquepau

## A New VMS System Management Architecture

From the Fall 1987 (Anaheim) Symposium  
Session by Jim Swist, VMS Engineering  
Digital Equipment Corporation  
110 Spit Brook Road  
Nashua, NH

Transcribed by Ron Frederick  
National Institute for Petroleum and Energy Research  
Post Office Box 2128  
Bartlesville, OK 74005

Most of you were probably here for the system management talk I gave two hours ago. Then I talked more about the nuts and bolts and practicalities of the day-to-day improvements we have been doing or thinking of doing. This talk is different--I am going to talk about something called architecture.

Have you heard the definition of an architect, particularly in software terms? Well, an architect is someone who knows a thousand ways to make love, but has never been on a date. Architecture is a framework in the strictest sense. A way to think about a problem and a way to put this problem in the context of a framework it never had before. I am not describing any one thing. I am going to describe generally some thinking we have had and solicit your feedback. The next major release may have the beginning pieces of this. We want to put our system management software in over the next several years, in several major releases, not just the next one.

First, I will talk about what this problem is we are trying to solve and give a summary of the approach taken to solve this problem. Then I will present the new architecture, including a major component called a "human interface." We want to run by you a separate set of strategies for that component. Since this is a relatively short presentation, there will be time for questions and answers at the end.

What is the problem? There are a lot of professional system managers in this audience so this doesn't come as news to people. Our system management facilities are based on the original 11/780 mode. The 11/780 system management model is a derivative of the PDP-11 model--a part-time technical user who ran into the computer room twice a day, authorized the users,

backed up the tape, and was very knowledgeable. It was a part-time job. Our audience was the same type person when we went to the 780. He just continued in that direction. Today we have the so-called "desk-top data center," a breadth of range of configuration, yet we still use that same, very simple-minded, "system management model." The feedback indicates that we have strained that model at both ends.

At the high end--many of you people here are system managers of very complex configurations. The world is distributed; people are managing multiple systems. Unfortunately, there are many, many utilities and interfaces to learn. There is much repetitive work, repeating what you are doing on all the systems you deal with. We have professionals at the high end, dedicated operators, dedicated administrators, yet we don't have any special facilities for them. We basically tell everybody, "Give yourself some privileges, use the general purpose interface, and a few odd utilities."

At the low end--we are into workstations and very small systems competing with the PC-mentality, as I call it. That sounds like a derogatory term, when, in fact, it is a very good model. It comes out of the box and it works; we don't worry about system management. Yet, this low-end user is faced with the same plethora and array of system management utilities as the high-end user and essentially must learn to use them all in order to deal with a small system. There are reasons why we arrived at this situation, but a lot of it has to do with there not being internal software architecture for system management. There's nothing written down saying, "If I'm going to add a new facility to VMS, this is what to do."

Let's pick a major new category, local area VAX clusters. Local area VAX clusters have a system management component. There is nothing written down anywhere saying how I implement the system management component. What rules shall I follow? Does it become a part of some utility? Do I add some DCL commands? Do I provide SHOW commands to monitor some things? None of this stuff has been defined. Over time, whenever a new facility of system management content was added, we came up with whatever was convenient. We have a broad range of interfaces in the system management area, including DCL commands, special utilities with special syntaxes, special editors, like the ACL editor, canned command procedures like VMSINSTALL, SHUTDOWN, AUTOGEN, things like that.

There are probably four or five different interface models. We have a real problem now because of extensibility. We'd like to say "We have new audiences, and we have a new configuration we never had before." We want to deal with this situation, make help available in some easy to use, very specialized way, but there is no easy way to do so. Everything is there. There is no layering, so layering is what we really want. The distributed stuff is the other big problem to solve--the world is distributed. We have had some success in giving the illusion of a nondistributed system for end users. Our file systems and applications packages essentially make the data location and the data processing transparent. We have done a pretty good job there and our customers and applications packages have also done a good job there. We haven't done a good job in the system manager's arena, separate systems are here and things are distributed. The exact nature of that distribution has to be understood. In general, there are very few support tools for dealing with problem.

I call the other thing a consolidation problem. We really do not distinguish, at this point, between system management and end user human interfaces--the system manager's interface on the VMS is the end user interface with some privileged extensions. There is something to be said for that if the user and the system manager are the same person, but as I stated earlier, these are diverging. The system manager at the high end is a professional, not necessarily doing the same thing as an end user, and at the low end, maybe a system manager, but not by choice. These are some of the problems we are trying to solve.

We did an organizational focus first. We have a group which worries about such--the management within VMS. VMS has been around a long time, almost ten years now, and we never had a system management project per se. We had a security project, and we had the volume shadowing project. We had a DECnet project and an exec project. Any system managing all those things was invented in those projects without any coordinating body. We are not trying to do everything in this group, but we are trying to act as a clearing house and provide a place where people can come within the Digital development organization.

Say we add a piece to VMS--a new product, a new layered product, or a new optional function and here is the system management piece. What should it look like? We've never done this before. I think this is a big step in the right direction.

## Goals

There are four major pieces in the solution aside from the organizational one; we had a new internal software architecture, which I will go into. It's a three-layered architecture which solves a lot of these problems. An interim user interface called "Sysman" is a part of the next major version and initial implementation of this architecture is also provided as discussed in my previous talk. We concentrate on this question of human interfaces and how to handle multiple audiences across a broad range. There are, of course, other points in the system management area which don't fall strictly into these particular problems. We want to look here, too. The goals of the architecture follow:

### Goal - Consolidation

We want to consolidate the internal system management functions under a uniform call interface. Meaning we want to have a list of internal management functions. There will be a call for each one and a structure of the parameters for the call. The calls are very similar from function to function. We don't have such a list today. We want to treat VMS system management as a recognizable software subsystem with a defined set of boundary interfaces, conventions, and such, rather than random extensions...the general user interface. We want to provide distributed services as a standard feature, not something pasted on or, typically, something the customer adds. We want to separate form and function in recognition of the need for multiple human interfaces.

My previous statements on multiple audiences show that system management is a multiple human interface problem. The human interface onto system management functions is completely different from the high to the low end. We don't want to reinvent all the low lying components supporting those functions. The small system has to authorize the user as well as the large system. The difference is the way it looks to the user. It is presented in a very simple way with very few parameters for the low-end user. The high-end user might have all the full blown functionality of an AUTHORIZE utility with

all the privileges, switches, and options. We don't want to rewrite the underlying function to maintain a user authorization file every time we have a new requirement for user interface.

#### Goal - Documented Interface

Next, we would like to document all these interfaces in the recognition that VMS Development is certainly not omniscient in all the human interface will require in the future. There will always be special-purpose audiences. We even have groups inside Digital which are not in our group. For example, the Office and Information Systems group has an All-in-One product targeting an office/secretarial environment. Perhaps these people would like to have a system management interface specific to that audience. They should be able to look at some document and write a human interface for that audience without introducing hacks of layering onto something which was never intended to be layered on, or worse. The last goal of this architecture is to recognize there are other management architectures. The significant one we deal with daily is network management. We want to provide inter-operability of VMS management system architecture with network management architectures in it, including any other ones which come along.

#### Layers of Implementation

Now let's have a technical overview of what we have done. We divided the components dealing with technical management problems into three layers. I'll describe them from bottom to top in some detail. At the bottom we have a primitive function layer; above that layer, another layer we call integration and common services; above that, another layer we simply call the human interface, of which there are many. Subsequent slides show each layer in some detail.

#### Primitive Layer

Starting at the bottom, the primitive layer. What does that word mean? System service, RTO routines or other callable modules performing some lowest level, atomic function, for example, an ACP QIO to modify a parameter into the callable SYSGEN utility which is something we created as part of SYSTEM CHANGE, a system parameter, etc. There are many examples. Something modifying a record in the user authorization file. These are lowest level, atomic functions in the sense that they can't decompose into any functions which themselves would interest system management. In that sense they are atomic.

Many of these parameters are shared with the general user interface. Access control, various other things, not necessarily a directory creation of something to be used by system management when we create a new user. Yet the end user does directory creation all the time when creating a subdirectory. That is another characteristic. Uses of these low-level components are mixed between system management and the regular user programming interface.

Another characteristic, an implicit acknowledgment of what exists. There are different types of call interfaces. Some are system services, some are QIO functions. There are a number of different pieces in the system. We have to live with the fact that in this architecture we have a number of low-level primitives implemented over a period of time in different styles. We don't want to rewrite all this when we have a new system management architecture.

Last, the primitive layer is very notions distributive. Some of these low-level primitives, for example, operate databases on cluster-wide disks for automatic cluster-wide distribution. Some operate only on in-memory databases. Depends on what you look at. Some things are distributed and some things aren't. We have a set of low-level functions, variable in terms of distribution and in the style of call interface. How they are used between system management and non-system management programming interfaces to solve the problem of all these different low-level functions inside the system.



### Integrator Layer

The next layer up is the integrator. The integrator layer is designed to smooth out the differences of all these low-level functions and provide a single, common call interface to the human interface layer sitting on top. There is one integrator per system--this is the common control point for all system management functions. We finally have a thing inside VMS we can call a system management control point, not some random piece of code somewhere. This is nice because if we want to deal with something such as logging or various security things, there is someplace we can go. All system management functions pass through this layer. That is the first good point about it.

Another good point: integration translates the nonuniform, primitive call interface onto the uniform call interface seen by the user of the integrator. The integrator also provides the form distribution mechanics, despite what is going on at a lower level. For example, if a low-level, atomic function is not inherently cluster-wide, the call interface to the system integrator to the higher human interface is to do cluster-wide functions. The integrator does those things necessary by repeating that function on each node in the cluster so the human interface doesn't have to worry about that particular problem. I mentioned before about the architectural anchor point through which all functions pass; I'll go over that point again, just as an implementation point. The integrators talk to each other. That is how we do distribution. The call interface to the integrator is exactly the same regardless of the atomic function being implemented-- whether it is in the local system or a remote system. Implementing human interfaces which deal with distributed configurations is easily accomplished without going through tremendous gyrations. The user needn't worry about where these things are being executed.

The last point of the integrator: it is human interface independent. The call interface to the integrator is not dependent on any particular syntax or style of implementation, character cell workstation, whatever. This call interface can support multiple human interfaces in the same system. An easy-to-use interface and a more sophisticated interface can run in the same system against the same integrator. In fact, the human interface might not even be human. It could be an AI-type interface or, in the future, a type of sensing interface which figures out your thoughts about your system and then does it.

### Human Interface Layer

The top layer is the human interface layer. We have a separate strategy associated with this one. I will go into some detail as this is important. Multiple instances are possible for human interfaces, each one for a specific audience. All low-level services are provided by the integrator call interface. These human interfaces do not do any system management, low-level functions themselves. They worry about presentation, dealing with the user, user assistance, help, formatting of error messages, all those things which are very audience-specific. They don't worry about whether the fifth bit of the fourth field contains the privileges. As I said before, it doesn't have to be a human interface. It can be some kind of automatic mechanism or some other kind of layer. It is important that an architecture like this be somewhat open-ended. Do not assume the human interface is going to be the last layer. Doesn't have to be a human interface, it can be a program talking to something else. The human interface is free to aggregate or subset the lower level functions as necessary. Example, in a simpleminded user authorization scheme you might want to automatically add a proxy account, add some disk quota, create a top level directory, do all kinds of automatic things the system manager wouldn't deal with, and they all default. Those functions should be separate in a sophisticated environment because the system manager requires separate control of those things. The human interface does that kind of aggregation as necessary, as well as subsetting. It doesn't have to implement all the functions available at the integrator level. The human interface also can provide any view of the distributed system appropriate to the audience being served. You might, going back to the example of the simpleminded, low-level interface, want to hide everything that is cluster-wide in the human interface. All things are the same in a homogeneous cluster--why should the system manager worry about that. Let the human interface internally figure that out. In the more sophisticated case, you may want a human interface to provide control when dealing with individual systems.

### Human Interface Categories

I've discussed the lower levels, now let's talk a little more about human interface. "Sysman" is the first human interface under this new architecture and we would like to build new ones on it. A new terminal medium is needed for system management, particularly in larger systems. We've announced the DEC windows program. At this point that program is the target for all future work with human interface. The DEC windows program uses the X-protocol where something as inexpensive as an IBM-PC or a PC clone can run the X-server and provide a bit map interface in a system, at a cost comparable to a character cell terminal. We don't believe that reduces the cost problem any more. The need for additional real estate on a workstation screen is obvious when we manage a cluster or a complex, distributed configurations environment. To that end, we think it is a good idea since we can't do everything to minimize investment and character cell terminals in terms of system management and human interfaces.

To target the multiple audience problem, we have divided the audience: Class I, Class II, and Class III. We define three audiences, which I'll run by you in the next few slides. These are interfaces we think we need. We start from the bottom, the top in terms of capability of the person doing the system management.

#### Class I - Human Interface for Workstations

Class I is a stand-alone workstation, or a workstation loosely coupled to a network in the Ethernet, or a light area network connection. This is the PC-mentality user I mentioned before: somebody who is using a workstation to accomplish a job, a person not versed in system management and probably doesn't even want to do it. In some cases we have tools. For example, we have our RSM to do remote backup and loading of optional software. This person might be helped by some centralized network service. At this time, however, a substantial subset of the full VMS system management functions is required to deal with the management of small workstations. That is a big problem. The PC mentality is good here because we can think of this problem in a completely different way now.

#### Class II - Human Interface for the Desktop

Class II is essential to what we call a desk-top strategy. We are very high on local area VAX clusters. We think they eliminate all system management problems for end users. You boot off the common system. All system management is essentially done for you by the system manager of the boot node. We have not dealt with the system manager of the boot node. We see local areas VAX clusters being deployed in office environments. For example, half a secretary's time is spent system managing this local area VAX cluster. We've done that within Digital in a couple of test installations without much success. Most interfaces require full CI cluster knowledge. We think there is an important intermediate user audience between the workstation and the user in the full blown, large cluster manager. I'm talking about a Class II audience. We don't want to assume extensive DCL knowledge or knowledge of the VMS utilities, as I said before. Clusters are not making the progress we would like at the low end of the marketplace. The system management problem is a big, big piece of improving this progress and why we want to deal with it.

#### Class III - Human Interface for Traditional Environments

Class III is everybody else, traditional audience, a lot of people in this room. These systems have become complex enough--enough systems and enough software to manage them--that we are talking about dedicated jobs. You are also going to be talking about a multi-role environment. A typical large environment consists of security managers, operators, technical administrators, nontechnical administrators, accountants, people like that. All these roles are possible. These people are system managers. It is important that the model we produce allows the creation of multiple user interfaces. We could have an operator interface completely centered around the functions of the dedicated operator role. A technical user interface and a technical system management interface in the same site, both working as parallel human interfaces off the same set of lower level, system management architecture components. Some of this is conjecture. If you think this is really off the wall, please let me know, but this is the way we see it going. I'll go in

the reverse order this time. In the Class III area we've done the "Sysman" work for the next major release to make distributive configurations easier to manage and consolidate a few things.

#### Future Development

We think a DEC windows version of the same thing is the next important thing to do. DEC windows here are not so much for the mouse- and ease-of-use- type things of the PC mentality because we are not dealing with that kind of user. But the operator interface and the screen-use interface are essential when managing large configurations. To have a recognizable subsystem we need to continue consolidating the bits and pieces in various corners. Other major new subsystems within VMS will have a system management component. We want to make sure everything coming out in the future is architecturally compliant with this new model so we need to minimize the number of new random utilities for the system manager. We want to do something about these new specialized role interfaces. The operator interface bothers us at the moment -- the opcom request reply interface. We feel this is inadequate for the professional computer room operator

(LOST ON TAPE)

We have an advanced development project underway again. This is just advanced development, nothing necessarily is going to happen with this as a product. We have a DEC windows-based, Class II human interface for the system manager of the boot node of a local area VAX cluster which is relatively bounded and isn't mixed or interconnected. Something we can get our arms around. It's a single interface for all functions. A menu-driven, DEC windows-based thing doing nine or ten major system management functions: authorizing users, backup, restore, printing error logs, configuring satellites, configuring a controlling network, installing optional products, shut down, dealing with the queue manager, some media disk structure and maintenance management. All from one user interface. We can produce something like this. We will be able to sell people local area VAX clusters and succeed at our goal: a nonprofessional system manager who doesn't have a great deal of knowledge, in particular doesn't know DCL, and hasn't managed

the system. It's not going to be easy, but we think we can do it. The Class I human interface strategy there involves recognizing the I-don't-want-to-do-system-management syndrome. We are working on various advanced development projects to pre-install VMS and have it work coming out of the box. This kind of thing totally hides system management. Where we do have to have some, it would also probably be DEC windows based and a subset of the Class II interface.

#### Question and Answer

I think that's all; I was going to make up these big question slides for the end but I forgot. That's the end of the formal presentation. At the risk of repeating myself, this is a bunch of ideas. We've done some work in some areas, we have some advanced development in projects in other areas. I'd be interested in comments on this as opposed to the last session. I'm not telling you that you shouldn't ask certain questions, but things like the backup utility needing a new bar switch probably aren't appropriate for this presentation. I'd like to keep it at a higher level in terms of the technology.

Q: Dick Picard, Kalamazoo College. I'm delighted with your direction. I think a couple of things are likely to be common to a number of...at least college environments, if not commercial ones. Every fall we get this surge of new account creations as the new students arrive and every June old account deletion. We have this extensive DCL which is doing very nicely and obviously will need to be reworked. That doesn't bother me, but I hope you give us as much documentation as possible to study before we try to put version N up. Also, we have operators who are, in many cases, students working part time, and a very limited staff. Many of the specialized roles you project are, in fact, going to be one person. Even though you may envision this specialized role in your mind, keep a human interface consistent across all those roles. At least one of the interfaces available should be consistent.

A: Well, I think stylistic consistency...human interface is very important for the multiple roles in a given shop. I think your first question is probably the hardest problem we deal with on a day-to-day basis: how to evolve VMS, do new and better things, and not mess up existing stuff that works. We intend that the old stuff will always work. We are not going to throw anything away, but we hope people will migrate to the new stuff because it is better. I wouldn't be too concerned that suddenly things may stop working. We've tried pretty hard to not stop things in the past, not always successfully, but we tried hard.

Q: Mike Lynch, 3-M. I came a little late so forgive me if I missed this. Did you talk about AI tools in terms of tuning a performance management system as part of this whole bundle and, also, are you suggesting from the biasing of your slides that most likely we will see this thing in LAVC support before we see it in large clusters?

A: I wouldn't say you will see it anywhere before anything else. We thought this area needed work and was particularly interesting. At the moment, this is just an advanced development project which isn't necessarily going to show up anywhere. What was the other part of your question?

Q: What about performance tuning?

A: Oh, AI tools and stuff. We look at the idea as an open-ended architecture to support multiple human or non-human interfaces and make creation of those things easier. The architecture itself does not deal with those things. People are looking at that stuff from other groups though.

Q: Is it more likely to be further away than the other things you are talking about?

A: I can't make any comment on that, sorry.

Q: Lawrence MacIntyre, Martin-Marietta. I might add that I am delighted with your direction, too. We've everything from the large systems to the MicroVAXes on some scientist's desk. I would say Class I is probably going to see the most use. We have a lot of phase one, Class I at our installation and those people don't have any help. Some kind of logging facility would be nice. We have this problem with operators. They do something at night and say, "Well, I tried this and

it didn't work," and the machine will be down. We would like to capture what they did.

A: In theory, if we ever implement this, we would have a central point. We could do consistent system management auditing and not have the place in three different logs or not at all. The potential is there and is one reason the thing is designed the way it is, so we can do this. We had experimental versions of things which in fact do log all system management functions.

Q: As far as Class III, the large systems, only the distributed stuff would be really nice. The rest of it...

A: Yep, I understand.

Q: Ted Bolson, University of Washington. I thought my 750 was a PC (talk about my mentality). I want to reiterate the thing about performance tuning before I get to my question. My feeling for a long time has been that a DEC system initially performs badly so they can sell you their software tuning tool. I'd rather have a management tool do it for me and not have to integrate all kinds of extra software. Queue management definitely is a big thing to look at for your new interface, a current method of stop-start, show queue, etc, etc, needs--I can't even imagine how much...it's like you have to start over from scratch. I've got people who take longer to figure out how to stop the queue than it takes for the garbage to print out 40 pages. That's the kind of single person management...

A: A classic case of the problem I was talking about. It started out as a very simple thing and there is a mixture in that queue interface between end user function and system manager functions. They become all mashed together. That's a classic example of why we need new architecture.

Q: The most important thing is speed. It is a user interface issue because you don't want to run "Sysman" and set your environment, etc., etc., etc. By the time you have done all those things, the system has already thrown...from too much stuff all over the place.

A: Right. The system management function is legitimately run by end users in many cases and we want to support that.

Q: Jim Wheeler, Bureau of Reclamation, Sacramento. We have a distributed means of system management. Have you planned into your architecture a means whereby you can have feedback from one level of system management to another. For example, we have 730s on the site. We do a great deal of our own work, and they should, but actually I have a lot of visibility with what they do. My calling them would be more useful than their calling me, saying "Mother, may I."

A: I'm having a lot of trouble hearing you. Would you run your question by again.

Q: Have you built into the architecture a means of communicating between level 2 and level 3 automatically so a level 2 manager and a level 1 manager, or level 3 manager, can interact without having to pick up the telephone.

A: That's what's nice about having your own theoretical architecture. Yes, it is possible. Just a small matter of programming. There is a formal split in this architecture between human interface and underlying components. Yes, you can do so if that is the case.

Q: Phil Naecker, Professional Press. Back to your layering diagram, can we play, too. Can I write at all three of those layers? Do you intend that I will be able to write my own user interface? Can I add things at layer 2 and layer 3 and in some way buy in to the work you have done?

A: Good point. Having the formal call interface at the top level is more important initially. We also recognize that other people are going to create functionality which adds to VMS and has a system management component. It would be very nice if they could come into the low levels of this architecture also. This requires documenting the architecture at all three levels which is of course a much...I would have to say a much longer term goal. Very desirable.

Q: You might consider the remote portion so at least we can play the remote game with you.

Q: David Richie from Fermi Lab. The ability to decentralize certain things to a particular user managing a group or project is helpful to a large system environment. This immediately comes to mind--I would like to take all the quota stuff and say to experiment xyz, "Okay, you have got 100,000 blocks of quota. You divvy it up between your users." There are other areas where new accounts...a person joins the experiment...I'd like to say to the group manager, "Okay, within some parameters you create some kind of account." That ability would be interesting.

A: That's come to us, we've had SIRs on that in the past, too. It's called hierarchical system management group system management. We have been looking at this area and find it is a real problem.

Q: Dave Schafer, State of Texas. Are you looking at the OPER utility under TOPS-10 as a possible interface for the operator under VMS?

A: I'm not familiar with it. Are you telling me I should look at it?

Q: I'd suggest you look at it as a possible starting point.

Q: Louise Whooley, Measurex. Since this is sky-blue-type activity, I'm a naive VAX user. I just bought 15 nodes of \_\_\_\_\_ and I am going to stick 'em in all the engineer's offices. I want to plug it in, have something come up ask me a few questions, maybe something about how many queues I want or what kind of user things I want. Have it build up a nice database and plug all that stuff into all the system management tools automatically. Whatever has to run to make the system come up every time I boot it with all that information.

A: That's what we want to do to. We'd sell millions.

Q: Gary Bellum, Monsanto. I assume a normal DCL interface to all these functions will be available, which means you will be able to get around all this, or any automatic logging features, or anything like this...bypass.

A: We have upper compatibility reasons as well as sites very happy with what they are doing now. We don't want to supersede anything we have. We are not going to enhance the DCL interface because we have limited resources. We think we should put our money in advanced development over the next few years as I outlined in this presentation. That's our best guess at this point.

Q: You will be up against making assumptions and using them to make decisions. You may find that your decisions do not match users' reality, and they will hesitate to use your work.

A: Right, but I can argue on that one. We got in trouble by going too far in that direction in the past. We avoided making a decision. Every time there are two possible ways of doing things, guess what we do. A SYSGEN parameter...let the end user decide which one to use. We have done so to extreme within the system and perhaps it is time to go in the other direction. We may make a few wrong decisions here and there, but the capability of multiple human interfaces, etc., minimizes the problem. There are ways to get around it, but let's lower the choices for at least some of the new audiences. Make system managers out of everybody.

The interface should be easily customized. Come up with a basic human interface they can tweak to their heart's content and make it as they want. That, of course, is my long-term, idealistic dream--to supply a tool kit so the user can put together a system management interface for whatever audience he or she has. That would be wonderful, but also hard problem.

Q: Spencer Coskiss, from John Hancock. I agree with your direction, but aren't you potentially creating another problem? I agree with the direction if the reluctant system manager's job is easier. By forcing him to learn a lot, are you not lessening the probability of his keeping the system up and running well? Aren't you creating another problem?

A: Well, we are trying to do a good enough job to keep the system up and running despite him. We have to solve that problem.

Q: How will you facilitate this thing if you are not going to make a self-tuning system? Tuning will find bottle necks and correct them before there is a problem.

A: I think in the long term we have to, all the vendors do. You think about it. The programmer productivity problem of 1970 is now a system manager problem of the 1980s...we can't find enough system managers with enough talent to handle all the hardware out there. We have to solve the problem and so does everybody else.

Q: ..., Eastwest Center. I'm glad you addressed that issue because it is clearly the problem we face. We have two system managers--one is a junior grade, the other is standing in front of you. More products like this will enable more senior members to come to DECUS while the junior members run the shop. DEC windows implies the use of VAX stations; that makes a lot of sense from the presentation point of view. The upper limit for a number of LAVC VAX stations is 26. I wonder what your thoughts on that would be. We would have to pull one workstation away from our user base for our operator or manager.

A: We are not talking about a full-time management job. It will be shared along with other functions. If you don't want to lose a workstation, I understand.

Q: I wonder what are your thoughts on that. Are you saying losing a workstation is the cost of coming to DECUS?

A: I think it is, but...

Q: I'm Joe King, University of Wisconsin. I think you are addressing my case more than most of the people who come to the mike. I thought I would state what that case is. I'm actually a scientist who has been forced into systems management. The only way to use our workstations is to have some sort of management. We've been forced into LAVC, meaning I'm the only one who spends enough time managing them. No one else wants to. This ideal is what you are talking about and I think a lot of the audience doesn't quite see because they haven't lived in my shoes.

Q: Dwight Chandler, RealShare. You talk about our being able to write user interfaces...is there going to be a sort of fourth generation language, a FORTRAN, C thing, or what?

A: The interface at the moment is a VAX-calling, standard compatible program. You would have to call it from a program, a third generation language.

Q: Would there be an interface in it, like lexicals with DCL, that type of thing?

A: I understand that would be more of a system manager productivity thing for creating other system manager human interfaces. I understand the problem you are trying to solve. I'm not sure we have been able to put a short term effort into it. I do hear you.

Q: That second layer would probably run time-library routines.

Q: Keith Chadwick from Fermi Lab. Will there be support for the VAX cluster console interface? Or enhanced support for the VAX cluster console?

A: I hadn't thought about it. I'm dealing with architecture here, I am not interfaced to any particular product.

Q: Jeff Brunkorst, Mayo Foundation. Is your position held within the VMS group or is it a DEC strategy? I.e., I see myself in a position of managing a VAX cluster, MicroVAX stand-alone, LAVCs, Unix workstations, and PCs. Can this product or, a set of these products distributed like DECnet, fit into your architecture?

A: As a long-term goal. The interface with other architectures is important, particularly the network management architecture. In that case, of course, the integrator protocol that talks to the other integrators would be a public protocol of some kind and you could have other implementations of that. A very nice thing to do down the road.

Q: Are you working from a VMS position or is this something DEC supports? Do you see DEC supporting this overall?

A: I think probably both as long as DEC is supporting multiple architectures. We try to cooperate with that support in the VMS group. It is probably not realistic to expect something like that immediately.

Thank you very much.

VAX Performance Working Group

**INPUT/OUTPUT**

The VAX Performance Working Group is just starting and is open to suggestions for projects. We're also looking for members who can contribute their efforts to the projects.

Projects already on the agenda are:

1. Developing a list of the important performance data, along with the places the data are reported. This will result in a valuable reference for VAX performance people, and will also help us catalog important data that are missing. (For example, it seems impossible to get the I/O's on a disk broken down by workload or process. Also Monitor still does not report any data on sizes or lengths of disk I/O's, so you may have very long seeks without realizing it.)
2. Developing methods of obtaining and reporting reliable performance information on new hardware and software releases.
3. Of course, a lot of war stories and hints/tops will be traded.

If you have a suggestion or are interested in joining a project, please contact John at the address/phone below:

John T. Peterson  
Datametrics Systems Corporation  
5270 Lyngate Court  
Burke, VA 22015  
703-425-1006

A SIG Information Interchange

Mail written I/O submissions (no special form required) to:

Larry Kilgallen, PAGESWAPPER Editor  
Box 81, MIT Station  
Cambridge, MA 02139-0901  
USA

To register for on-line submission to the Pageswapper dial:

(617) 262-6830

(in the United States) using a 1200 baud modem and log in with the username PAGESWAPPER.

```

=====
Note 542.4 Diagnostics on the system disk of the u-VAX 4 of 4
"Michael A. Stams" 26 lines 13-FEB-1988 19:40
-< Installing MDM on your system disk >-
-----

```

```

Antecedent IO(s) published in:
Pageswapper Volume 8 Number 5 (December, 1986)
through
Pageswapper Volume 8 Number 6 (January, 1987)

```

> I am interested in a way to run diagnostic on a Micro-VAX from  
> the system disk (Instead of the TK-50 or floppy )

Using v1.12 of MDM I have done this two different ways.

Copy the diagnostics SYSBOOT.EXE into an alternate system root or into [SYSMAINT]DIAGBOOT.EXE.

Copy all the "loadable images" into SYSS\$SYSTEM. The diagnostic monitor has been written to load these from "bootdevice":[SYS0.SYSEX].



To boot from the alternate root:

>>>B/20000000 ! where the alternate root is SYS2

To boot from [SYSMAINT]

>>>B/10 ! as indicated in a previous reply

I have yet to try it on later 1.xx versions.

Have fun and write protect everything!

Michael A. Stams  
Boeing Aerospace Corporation  
P.O. Box 3999  
Mail Stop 31-09  
Seattle WA 98124-2499

=====  
Note 547.1 Software Development Portfolio Licenses 1 of 3  
"Harry Herman" 56 lines 25-FEB-1988 16:06  
-< New information on Software Portfolio >-  
-----

Antecedent IO(s) published in:  
Pageswapper Volume 8 Number 6 (January, 1987)

We have been looking at the Software Portfolio Licenses that Larry mentioned in the previous note. Thanks Larry, we would not have known about them if you had not published the information in the Pageswapper!

In looking at the portfolio licenses, we asked the local sales office for a current list of what products were on the portfolio, in case things had changed since 1986. We were sent a photocopy of page 9-35 of the January-March 1988 VAX Systems and Options catalog. In comparing that list with the list from the above note, I noticed that the current list did not mention VAX Notes or VAX Teamdata. I called our salesman and mentioned it to him, and asked if he could find out an 'official' answer as to whether or not Notes and Teamdata were dropped from the list. He passed me off to somebody else at the local office, and after several attempt to describe the situation to her, she said she would see what she could find out. I then asked her if she could call Mass. and get an official answer. About 1/2 hour later I got a call from somebody else who simply identified herself by name and that she was from 'DEC'. She did not say

which office. She proceeded to say that if the VAX Systems and Options catalog was wrong, they would have an addendum saying that the book was wrong, and since they had no addendum, the DECUS article MUST be wrong. When I found out she was still from the local office, and that no call had been made back to Mass. to get an official answer, I pointed out to her that an addendum can only be sent out saying something is in error if somebody has noticed the error and bothered to send out the addendum. I then asked yet again for somebody to call Mass. and get an official answer. About 2 hours later, I get a call telling me that the Systems and Options book is wrong and that the Pageswapper article is right. She also requested the product manager to send a current list of products in the portfolio, which she then forwarded to me. She then thanked me for pointing out the error, and hoped that the next VAX Systems and Options book will be corrected. Since that is the third piece of incorrect information I had found in writing (the others were in apparently outdated SPDS in the Electronic Store), I have my doubts about it being fixed anytime soon.

The only differences I see between the information in the previous note and the 'new' flier (number ED-30642-48 (c) 1987) is three additions to the RunTime Option Program Development Portfolio License (QZZDC-1P/QZZDC-JP):

VAX ACMS Remote Access Option

VAX LISP

VAX OPS-5

Note that the VAX ACMS Remote Access Option is in addition to the existing VAX ACMS RTO mentioned in the previous note, it is not replacing it. Both names are given.

Hope this information is of use to somebody else out there.

Harry Herman  
Corpane Industries  
10100 Bluegrass Parkway  
Louisville, KY 40299  
(502) 491-4433

```
=====
Note 547.2      Software Development Portfolio Licenses      2 of 3
"Bill Mayhew"   15 lines 26-FEB-1988 10:29
-< When confusion reigns, it pours! >-
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 8 Number 6 (January, 1987)

Just to make things a little more interesting...

The Program Development Portfolios are also itemized in the "Official" U.S. Price List. I have the 12/28/87 version of that in front of me (to my knowledge the newest) and it indeed lists Notes and Teamdata as part of the base portfolio. It does not list any of the other three products as part of the runtime-only portfolio.

The U.S. Price List has somewhat more standing as an "official" document than the SOC does. I, certainly, would have no compunctions about using any of the products that are listed, in the USPL, as being part of the Portfolio, if I bought the Portfolio. But I would, on the other hand, want to get some additional reassurance before I started to use a product that was not listed in the USPL, e.g. a specific letter from at least the local sales manager authorizing it, which probably still would have no particular legal basis but would "help."

Bill Mayhew  
Village Systems Workshop Inc  
PO Box 642  
Natick MA 01760  
617-237-0238

VAX-62

```
=====
Note 585.28      Anyone use defrag programs?      28 of 28
"Offline Submission" 15 lines 6-FEB-1988 22:01
-< Diskeeper cannot be as bad as you say >-
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 8 Number 9 (April, 1987)  
through  
Pageswapper Volume 9 Number 7 (February, 1988)

I have used it on line in a batch mode with no problem. I started it on a badly fragmented disk, less than 20% free space, without doing a backup/restore and it cleaned it up. Cluster disks - no problem; even the cluster-wide system disk. So far, I am a satisfied customer.

Jerry Taylor  
c/o Monsanto Chemical Company  
River Road  
Addyston, Ohio 45001

Telephone: (513) 467-2387

Date: January 26, 1988

```
=====
Note 588.1 Does BACKUP incremental restore have a problem? 1 of 1
"Bob Hassinger" 68 lines 1-FEB-1988 18:13
-< A response - problem confirmed - and in only a year!!! >-
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 8 Number 9 (April, 1987)

Update - After working the problem with CSC for some time and getting them to confirm it they told my to submitted an SPR which I did (including a request to at least confirm or deny the problem, even if they could not provide a fix right away) on February 12, 1987. It was acknowledged in a reasonable amount of time as ICA-4265.

When no response had been received by the Nashville Symposium I asked about the problem and SPR in the VAX Advanced Q&A session. The person answering for BACKUP said he had never heard of the problem or SPR but that he would be sure I got a response. (Later investigation indicates the SPR was received by the screening people at CSC on February 19th and sent on to

VAX-63

Engineering on March 4th - which they consider quite quick and only because of the previous efforts by phone confirming the problem.)

Since then I have had a number of contacts with the SPR Administration people in Maynard and customer service people in Colorado, each promising to find out what the trouble was and, in the cases when they got back to me, returning the answer that it had been sent to Engineering, they had inquired about it with no response, and there was nothing more they could do.

Now, in the last week or two when I had a conversation about other problems with the \*Atlanta\* support center and when I explained why I no longer considered submitting SPRs a viable way to get problems fixed they put me in contact with \*their\* customer assistance people (after I indicated I wanted the number for \*corporate customer assistance\* or I would just write a letter to Ken Olsen).

This time I got action! Everyone up and down the line has been calling and today (Monday) I got a call from the engineering manager for BACKUP. He says \*late Friday\* was the FIRST time he had been aware of my SPR!!! He tells me this is a problem they were aware of independent of my SPR that has been recognized for a long time and that they intended to try to fix it in the first "functional" release after V5.0. (I take it that most likely means V5.2?) The indication is that if they can they would like to fix the failure-to-delete-directories problem as well as the failure-to-free-up-space-first problem at that point.

We also had a nice chat about letting people know about the problem and available work-arounds. He indicated he thought he might let CSC know about the problem so they could "put it in their data base so users could see it". I told him about the fact DSIN has one data base and the specialists had another, larger one and the need to be sure it went in the data base the customers have access to. I also encouraged him to put it in the Dispatch for those who can not or do not look in DSIN regularly. In addition I encouraged him to document and publish in both places the work-arounds I found so that if others have the same problem they will know what to do. He agreed that those suggestions sound like good ideas that he would look into (!).

I have no idea what finally got this thing unstuck and got me some response. Everyone agrees I did everything a customer can be expected to do and more. It might be that my company has been recognized as a rather strategic account recently or it might be that DEC really is trying harder to fix the badly broken SPR process now or maybe it was just dumb luck, stumbling onto someone who bothered to actually get the wheels turning.

Bob Hassinger  
Liberty Mutual Research Center  
71 Frankland Road  
Hopkinton, MA 01748  
617-435-9061

```
=====
Note 704.14          Digi-Data Gigastore System          14 of 22
"Frank J. Nagy"      56 lines 12-FEB-1988 08:42
-< Gigastore Usage and Performance Report >-
-----
```

```
Antecedent IO(s) published in:
Pageswapper Volume 9 Number 2 (September, 1987)
through
Pageswapper Volume 9 Number 7 (February, 1988)
```

We have been using Digi-Data "Gigastore" VHS-based tape drives since the middle of November for archival storage purposes on our LAVC. The Gigastores are connected to a pair of MicroVAX-II's which are the boot and core nodes (each serves a pair of RA81s to the entire cluster).

We experienced one initial problem common to both drives -- occasionally, BACKUP would fail in the middle of a save signalling a message like "device offline or not in configuration". Digi-Data shipped us a new drive which we swapped with the most-failure-prone drive of the two. Since we have done so (a few weeks ago) we have not seen a recurrence of this failure on either drive! Both drives are functioning well enough that we are now depending upon them for our system backups. We offer no explanation for the reason that such errors have abated from the formerly less-failure-prone drive (and, indeed, the second drive as well).

We have 4 RA81s as system disk and user file store. A pair of RA81s is served by each of the core MicroVAX-II's (each equipped with a Gigastore drive). A batch job runs at 3 AM and saves a pair of RA81s onto a cassette in each Gigastore; the system manager replaces the cassettes in the morning with a fresh set. Of course, we organized operations so the RA81s saved by a particular MicroVAX are those RA81s directly connected to that MicroVAX (thus eliminating any unnecessary Ethernet overhead). Discounting the files marked /NOBACKUP, we are currently saving about 360 MB to each of the Gigastores (total of roughly 720 MB in use).

From MONITOR records made during running of these jobs, we find that the CPU utilization (on the MicroVAX-II) is in the range of 20-30%. The backups are done /NOCRC (in order to reduce loading on the MicroVAX.) We see the disk I/O rate averaging on the order of about 15 requests per second. This is in the middle of the night and the systems are otherwise idle.

All this results in an effective useable I/O bandwidth to the Gigastore of about 60-65 KBytes/sec. (Digi-Data claims -- and there is no evidence to the contrary -- that the Gigastore is capable of sustaining 120 KBytes/sec). A test, saving all 4 RA81s to a single Gigastore cassette, saved 713 Megabytes in 3 hours and 9 minutes -- an effective rate of 64 KBytes/sec.

The Gigastore is serving our basic needs even though we are a bit disappointed in the overall performance. BACKUP seems incapable of pumping data out fast enough for the Gigastore even though its usage of the CPU and disk are very modest.

The Gigastore looks like a Pertec tape drive and is connected to a Dilog controller which emulates a TS11. A modified version of the standard TS11 driver is used as some timeouts in the software had to be adjusted. This is a bit of a concern and we are wondering what experience people are having with Exabyte systems on TMSCP controllers.

Does anyone have experience with tape systems using the Exabyte drive which uses the 8 mm cassettes? The Exabyte system is claimed to run at 250 KBytes/second. What type of performance are you seeing?

Frank J. Nagy  
Fermilab  
PO Box 500 MS/220  
Batavia, IL 60510

(312)840-4935

```
=====
Note 704.15          Digi-Data Gigastore System          15 of 22
"John Osudar"              20 lines 12-FEB-1988 20:49
                        -< So far, so good >-
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 2 (September, 1987)  
through  
Pageswapper Volume 9 Number 7 (February, 1988)

Our Gigastore has been in use for about two months now. In early January, we used the Gigastore for a "production" backup for the first time -- backed up all three of our user disks (RP07, 2xRA81) and two others (RA81, RM05) with no problems. The user disks all fit onto one tape, no telling how much room to spare -- but we did these backups on a 785 using the default /CRC and /GROUP settings, and still got about 1.3Gb of real data onto the tape. (I was cautious and did a verify pass, so each backup/verify took about 4 hours.) In early February, I got really brave and did both a backup and a compress for each user disk. Total time, about 6 hours per disk; again, no problems. I found that the amount of time it takes to back up a disk depends greatly upon the degree of disk fragmentation -- e.g. our least full, but most fragmented disk took considerably longer to back up than our fullest disk. Still fit all three user disks onto a single tape. (And I haven't had to come in to work for a sixteen-hour Saturday backup marathon since December! :-) We haven't had the problems that Frank ran into. I saw one "device offline or not in configuration" message, but it occurred after the system had crashed with a tape in the Gigastore, and not at load point. Rewinding the tape fixed the problem.

John Osudar  
Argonne National Laboratory  
9700 S. Cass Ave.  
Bldg. 205 A-051  
Argonne, IL 60439-4837  
(312) 972-7505



These are the sort of questions I'm looking for answers from 8mm users: is it truly compatible with the TUDRIVER? Are you getting the full tape capacity or only a small (25%) fraction of it due to the streaming (on a MicroVAX-II, please note)?

Frank J. Nagy  
Fermilab  
PO Box 500 MS/220  
Batavia, IL 60510  
(312) 840-4935

```
=====
Note 704.21          Digi-Data Gigastore System          21 of 22
"John Osudar"           8 lines  24-FEB-1988 19:23
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 2 (September, 1987)  
through  
Pageswapper Volume 9 Number 7 (February, 1988)

I'd like to second what Frank said. Although our Gigastore has been OK (and with a 785 all to itself, it seems to get about 60% to 65% of rated capacity), if we had waited four or five months longer (i.e. until now) we'd probably go 8mm. But we're looking for an 8mm tape backup that will get full capacity (or close to it) regardless of how fast you feed it data -- our 785 can't keep up with the Gigastore, and we're likely to "upgrade" soon to a couple of 8350's, which, of course, are slower CPU's than the 785.

John Osudar  
Argonne National Laboratory  
9700 S. Cass Ave.  
Bldg. 205 A-051  
Argonne, IL 60439-4837  
(312) 972-7505

```
=====
Note 777.1          Datatrieve Plots on LXy           1 of 1
"George Bone"             6 lines  12-FEB-1988 10:35
                        -< VAXLIB HAS IT NOW! >-
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 5 (December, 1987)

There is software available on a VAXLIB tape that will do that.

Unfortunately, I can't seem to find my catalog right now, but when I do, I'll put the program name down. We have tried it (a little) and it looks like it works okay, but have had too much to do to really work on it. I'll get back to you or you can call me at (707)646-2531 between 06:30 and 17:00 west coast time, M-F.

George Bone  
Code 2301.2 Mail Stop T-11  
Mare Island Naval Shipyard  
Vallejo, CA 94592-5100  
(707) 646-2531

```
=====
Note 820.7          Foreign Disk Comments           7 of 8
"Offline Submission"      19 lines  6-FEB-1988 22:00
                        -< An Emulex Fan >-
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 6 (January, 1988)

I love my Emulex equipment. I've had Fuji Eagles running on a V-master controller emulating RP06's for over 5 years. 24/7 and no failures. The secret is the RP06 emulation. It does not use a patched driver, and I have been able to make all VMS updates, including 3.7 to 4.0 with no problems. I just bought the Emulex SMDI controller that makes other disks look like RA series. I've only had it a month, but with disks connected to an HSC50 or a KDB50 (BI bus) everything is working fine.

Jerry Taylor c/o Monsanto Chemical Company River Road Addyston,  
Ohio 45001

Telephone: (513) 467-2387

Date: January 26, 1988

```
=====
Note 820.8          Foreign Disk Comments          8 of 8
"Terry Kennedy"    34 lines    7-FEB-1988 18:54
-< If you don't mind giving up the space... >-
-----
```

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 6 (January, 1988)

> The secret is the RP06 emulation. It does not use a patched...

This is what I had with my Emulex subsystem (SC31 w/ M2351A). However, having to give up a sizable percentage of the disk capacity to make 2 RP06's was rather distressing. If you can live with the loss of space, it should be fine. Recently, I beat up on Emulex to swap my SC31 for the 'latest', a UD33, which does MSCP emulation. I discovered some interesting new problems you might like to hear about:

- o The UD33 reports garbage for controller hardware and firmware revision levels. If your OS ever starts enforcing minimum acceptable revision levels, this board will \*stop working\*.
- o Despite the fact that the board prompts you to enter a drive serial number during formatting, the number emitted to the host is a constant, \*not\* the number you supplied.
- o The board (unlike the SC31), does not come with a boot PROM. If you have a PDP-11 or a VAX 750, you'll have to order the PROM from DEC spare parts.
- o Most seriously, the board has bus loading problems. In some slots of an empty backplane, it works. In others it doesn't. Replacing the CPU's bus drive module seems to help.

On the plus side, it is a good deal faster (with the same drive) as the SC31. However, this may be due mainly to the differences between MSCP and the RP protocols, and not anything to praise Emulex about.

Terry Kennedy  
95 Mohawk Trail  
Ringwood, N.J. 07456  
(201) 435-1890

```
=====
Note 849.5 MicroVAX 2000's serial line expander "arrives" 5 of 8
"Bill Mayhew"      7 lines    2-FEB-1988 13:01
-< Conflicting information >-
-----
```

Very interesting...

the announcement info on the DHT32-AA showed up today, finally, and it says that the DHT32 is "application-compatible" with the DHV/DHQ11; and that the user can expect "approximately" the same performance on a 2000/DHT32 as on a II/DHV or II/DHQ; but that the DHT does NOT do DMA...!

Bill Mayhew  
Village Systems Workshop Inc  
PO Box 642  
Natick MA 01760  
617-237-0238

```
=====
Note 849.6 MicroVAX 2000's serial line expander "arrives" 6 of 8
"Jack Patteeuw"   20 lines    2-FEB-1988 17:40
-< 1-800-332-3366 >-
-----
```

Check the Electronic Store ! I'm almost certain that it said there that it does do DMA but no modem control was included.

By the way, DEC was showing a DHB32 16 channel async multiplexer for BI bus machines at Anaheim but no one at my local office could find out anything for me.

Turns out this board (which is functionally equivalent to a DHU11, ie. 16 RS232 ports with full modem control \*\*OR\*\* 14 DEC423 and 2 RS232 w/modem control) is designed/built by the Computer Special Service (CSS) in Digital. These guys don't do high volume stuff and I guess they didn't have all their t's crossed and I's dotted so the big boys wouldn't let them release the card yet.

By the way, DEC's marketing people are getting smarter (and we loose). The cost compared to a DHU11 is 50% more (for the same function, just different bus) but very close to what 2 DECserver 200's would cost !

Jack Patteeuw  
Ford Motor Co.  
Electrical and Electronics Division  
31630 Wyoming  
Livonia, MI 48150  
313-323-8643

=====  
Note 849.7 MicroVAX 2000's serial line expander "arrives" 7 of 8  
"Bob McCormick" 28 lines 18-FEB-1988 11:14  
-< More DHT32 and 5VAX 2000 info >-  
-----

What I know about the DHT32...

Its a small card that you stuff in the 2000 box in the cramped area where memory expansion and ethernet live. You can have the DHT 8 line multiplexer or the (program announced) sync interface, but not both.

The DHT provides 8 DECconnect style lines, through the harmonica H3104 and cable - same as with the DECserver 200/DL and appropriate DHQ11 cab kits.

You can't install a DHT in a 'old' 2000 box -- the original units did not come standard with the expansion adaptor, which is a \$1,200 option now included on ALL 2000 configurations. This box is required to cable from the interface module to the FCC certified cable bulkhead.

If you're not witty and good at mechanics I suggest you take caution when taking apart a 2000 box with the expansion adaptor. Its really tight with cables (lengths), and which screws you should/shouldn't remove!

As for DMA, don't know [didn't care, either!] But you should be aware that SYSGEN works differently with the 2000, which has no spine (bus) -- I believe the ROMs upon boot set up a structure which is read by AUTOCONFIGURE/ALL ... You'll notice this when you don't have your TK50Z or external disk connected, and try to connect after boot time (sorry, charlie!)

Its a neat little box!

BOB MCCORMICK  
39 FORGE ST  
FEEDING HILLS MA 01030

=====  
Note 866.52 VMS 4.7 is here! 52 of 65  
"Larry Kilgallen" 0 lines 29-JAN-1988 14:12  
-< VMS V4.7 Microfiche arrived in Boston today >-  
-----

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 8 (March, 1988)

Larry Kilgallen  
Box 81, MIT Station  
Cambridge, MA 02139-0901

=====  
Note 876.1 Anyone with experience with MOBIUS? 1 of 1  
"Lisa Pokel" 57 lines 18-FEB-1988 08:27  
-< Some notes on Mobius vs. RAF >-  
-----

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 8 (March, 1988)

I have used both Mobius & RAF on an IBM PC/AT connected to a VAX 11/750 (asynchronous @9600). My notes are over a year old so note that I am referring to V2.0 (Mobius) and V1.6 (RAF).

Neither is real speedy on file transfers going asynchronous. It is kind of like running off of floppies. Both are handy for mapping DOS directory structures to VMS structures, although they each handle that differently. RAF maps subdirectories as subdirectories; to get at subs with Mobius you must define them as a disk drive (you can define up to 26 drives and this can be done in a startup command file when you start up the host process on the VAX). Both require a process to be running on the VAX to enable file transfers from the PC; one bug that existed with RAF was if the VAX server was not running and you tried to access one of the pseudo-drives it would hang the PC. RAF did seem faster on file transfers to the host.



RAF's VT100 emulator was better than the one with Mobius; you don't have to keep hitting CTRL-W to refresh in EDT. It wasn't perfect; one downside is that if you have any printer port programs those escape sequences were totally ignored and the file would display on your screen. Mobius does turn on the printer, but as I recall it did something weird like double space everything (this is one area that I have found A LOT of VT100 emulators fall short; not a biggie, I suppose, but still an annoyance if you are used to generating listings off of your terminal).

More notes (in no particular order):

- RAF created text files on the VAX that are readable from DCL (under Mobius you must TEXTIFY them to 7 bit).

- RAF supports up to 16 drives (vs. 26 for MOB) and you can't redefine A-C (which can be a problem for some old programs insisting on files from the floppies).

- RAF is copy-protected (MOB isn't).

- RAF did not have color support, although I believe the new version does.

- Disconnect from the RAF server was kludgy (hitting 6 CTRL-C's vs. a QUIT command under MOB).

- MOB has a mechanism for setting the micro's clock (synching you with the VAX).

- MOB has disk logging capability (RAF didn't).

- Both programs are TSR's; MOB has a NOMOBIUS program to deinstall it but RAF did not provide that feature. Of course if you have a stack management program for the PC you can do it yourself.

The main plus that I noted with RAF was the VAX directory mapping (you can even do a TREE/F on the VAX and can also CD up and down). I found Mobius handy for creating command files to backup software that I was developing on the PC to the correct VAX directories; obvious the same could be accomplished with RAF. I purchased Mobius although I am still keeping tabs on RAF (I have noted that 1-2 terminal emulation packages have now claimed that they work with RAF which would be a way around some of the VT100 shortcomings). I hope this is of some help.

Lisa Pokel  
AM Multigraphics  
1800 W Central Road  
Mount Prospect IL 60056

=====  
Note 882.11 Diarrhea of the Modem and SET HOST/DTE 11 of 18  
"Terry Kennedy" 15 lines 19-FEB-1988 18:36  
-< Use SET TERMINAL/PERMANENT/XON >-  
-----

> What seems to be really happening is that the port gets an XOFF  
> (control-S), but never receives an XON (control-Q). The  
> solution I tried at first was to use a program I wrote some time  
> ago that did a \$FORCEX (force exit) on the process. That got  
> the process freed up, but the port was still in a wait state.

If you're running VMS 4.x (presumably you are), you can use the undocumented, unsupported command:

SET TERMINAL/PERMANENT/XON ddcu:

which fakes the driver into thinking that a ^Q has come in, which should unwedge the port. You do need some privilege or other to issue the command, as the /PERMANENT part is required.

Terry Kennedy  
95 Mohawk Trail  
Ringwood, N.J. 07456  
(201) 435-1890

=====  
Note 885.5 VAX DEBUG V4.6-9 Bug on VAX 8550 Processors 5 of 6  
"Bill Mayhew" 12 lines 2-FEB-1988 13:13  
-----

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Re: .1 (exam/ascii bug)

Got a reply on DSIN, within about 4 work days of logging the call, confirming that this is a known problem that will be "fixed in the proverbial next release of DEBUG."

Stupidly, I did not ask what the relationship was between the next release of DEBUG and the next release of VMS.

The reply was signed by one of DSIN's busier software support specialists, as follows:

Regards,

<NO MORE TEXT>

I did not report, and have no info on, the bug in .0 however.

Bill Mayhew  
Village Systems Workshop Inc  
PO Box 642  
Natick MA 01760  
617-237-0238

=====  
Note 885.6 VAX DEBUG V4.6-9 Bug on VAX 8550 Processors 6 of 6  
"Kevin Angley" 2 lines 3-FEB-1988 10:59  
-< DEBUG 4.7 >-  
-----

Antecedent IO(s) published in:  
Pageswapper Volume 9 Number 8 (March, 1988)

There is a patch to DEBUG for version 4.7, but the only bug they claim to fix is control-Y handling.

Kevin Angley  
3301 Terminal Drive  
Raleigh, NC 27604  
(919) 890-1416

=====  
Note 886.0 Privileged queues? 13 replies  
"Terry Kennedy" 19 lines 22-JAN-1988 23:44  
-----

Is there an easy way to disallow entry of print jobs to a particular queue? I've tried to discover this in the documentation, but have had no luck. Here is what I have tried/thought about:

- 1) ACL on the queue manager workfile - no good as it applies to ALL queues.
- 2) ACL on physical output device - no good as jobs could still be entered but not executed. Also may have problems because might check the print symbiont's access rather than the submitters.

RSTS has the ability to require the user to have a particular privilege to create entries in a queue. I thought VMS might have something similar, but it appears not to from my look at the manuals. I'm sure I'm missing something simple and obvious, though...

Terry Kennedy  
95 Mohawk Trail  
Ringwood, N.J. 07456  
(201) 435-1890

=====  
Note 886.5 Privileged queues? 5 of 13  
"Chris Erskine" 2 lines 5-FEB-1988 07:32  
-< This is what compilers are for >-  
-----

You could roll your own print command which does the checking first, set UIC and then put file in the queue.

Chris Erskine  
23 S Holcomb  
Clarkston, MI 48016  
(313) 524-8836

```
=====
Note 886.6          Privileged queues?          6 of 13
"Terry Kennedy"    39 lines  5-FEB-1988 22:58
-< Arrrrrgggggghhhhhh! Flames ahead! >-
-----
```

> This is what compilers are for

No, this is what operating systems are for! I am unsure what (besides a 32-bit virtual address space, which wasn't the operating system's doing after all) the bloat of VMS does for me.

> You could roll your own print command which does the checking first, set UIC and then put file in the queue.

1) Several problems - first, whatever I do has to work for ALL users without breaking such things as existing .COM files (such as VMSINSTAL). It has to prevent users from using the 'real' system print command (remember, that was the original request?). Next, it has to be simple, yet work on several releases of VMS at several sites.

2) One would expect this sort of functionality from an advanced operating system like VMS. I will have to put this on my list of 'reasons I'd rather not deal with VMS, which currently reads as follows (in part):

- o \*NO\* group account management facility to speak of. As an example, on RSTS you can give a faculty member the GACNT privilege, and they can create/delete multiple accounts with a single, simple DCL command.
- o \*NO\* functional session logging facility. Again, RSTS has it. Yes, I know about SET HOST 0/LOG and @TT:, but both have serious limitations.
- o A truly brain-dead print/batch services implementation. There are too many examples to list, but my original question is a good case.

I'm really not trying to ram RSTS down your throats as a shining example. It's just that coming from a cramped 16-bit 32K environment to a VAX, one expects things to get better, or at least stay the same. Sure, all of this could be addressed by suitable programming the point is that it shouldn't have to be!

Terry Kennedy  
95 Mohawk Trail  
Ringwood, N.J. 07456  
(201) 435-1890

```
=====
Note 886.7          Privileged queues?          7 of 13
"Larry Kilgallen"  27 lines  6-FEB-1988 01:08
-< How did VMS get that way? >-
-----
```

Terry is certainly right in saying that is what operating systems are for. There are deficiencies. That is what DECUS is for -- to lobby DEC to fix it.

On the other hand, DECUS is also for sharing ideas on how to surmount existing obstacles, and I would not want to discourage that sort of interchange to keep things going while DEC gets their act together.

Now, how did VMS get that way? Coming from TOPS-10, I was horrified to see what passed for Batch/Print in VMS V1. Terry, if you think what is available today is deficient, you should have seen it when...

But enough of that. How did a company which know how to do better manage to start off with such a pathetic Batch/Print system? Folklore has it that when somebody at DEC said "32-bit" there were raised clenched fists from RSTS developers saying "16-bits forever", and even at DECUS symposia there are T-shirts that say "36-bits forever". So VMS came out looking like RSX.

I hope we will all be wiser when someone from DEC in the future heralds our future by whispering "57.5 bits", or whatever totally unnecessary proposal might be brought up as a purported successor to what will no doubt by then be a perfect VMS environment.

Larry Kilgallen  
Box 81, MIT Station

Cambridge, MA 02139-0901

```
=====
Note 886.8          Privileged queues?          8 of 13
"Terry Kennedy"    60 lines    6-FEB-1988 03:34
-< Watch out - this is a long one! >-
-----
```

Well, I have this idea...

Back when you were using your favorite 16-bit DEC operating system, chances are there was a good deal of similarity between your use of the system and XYZ's use of the same operating system at their site. DEC encouraged a wide variety of PDP-11 operating systems, each targeted at a particular area. Sure, some are no longer around, and others may have changed focus, but the statement still holds.

Now, with the VAX, DEC has generated a 'standard' environment in VMS, targeted to appeal to a wide variety of user types. The problem is, this makes certain system area inefficient or just plain unusable for some users. These users justly vote improvements to these items on the SIR. However, the parts of the system which are just \*slightly\* a pain in the %^& to \*all\* the users don't make it up to the top, because most of the users have something more important to vote on.

This is compounded by the legions of DEC people coding for VMS. Trying to find the right person to ask a question of is becoming more and more impossible ["technical Q&A", anyone?]. At least in the 16-bit area, where there are fewer people involved, you can actually find someone to answer your question (and possibly implement a fix). As an example, I asked for a feature in RSTS to keep the terminal when a user autobauds at LOGIN time [See, there \*are\* things I admire in VMS!]. Total time from my suggestion to the feature appearing in an official release: less than 6 months. To contrast this, I asked VMS development about a VMS LOGINOUT bug, where if user A dials in, gets to the Username: prompt, types ^S, and hangs up, the next user to dial in on the same port is greeted with dead air. The closest I came to an answer was a comment that "we cannot address this problem as some users may depend on this feature." Depend on something being unpredictable and broken? Give me a break! [This came from a developer at Nashville, not an SPR answer. Apparently some of the really stupid answers \*do\* come from developers!]

VAX-82

I have a suggestion, but I don't think it will ever happen due to inertia (mainly DEC's). There are three ways changes (other than bug fixes) are planned for a product:

- 1) Loud, vocal request from the users (SIR, etc.)
- 2) By implementing DEC's strategic plans for the product.
- 3) Ideas added by the developers

Now, I'm not saying that developer's ideas aren't valid, or that they should be ignored. I also know that some amount of 'fun' is necessary to keep talented programmers around. However, if the developers paid more attention to 1, then they might find that 2 would follow along naturally. Perhaps we could vote on the developer's items before they are actually implemented in the system.

Terry Kennedy  
95 Mohawk Trail  
Ringwood, N.J. 07456  
(201) 435-1890

```
=====
Note 886.9          Privileged queues?          9 of 13
"Larry Kilgallen" 88 lines    6-FEB-1988 09:51
-< Improving Feature Addition Responsiveness >-
-----
```

The point about narrow-purpose operating systems having the capability to be more responsive to change is certainly a good one. I think it points up the need for considerable improvement in the SIR/SPR handling area. Let me list a few things I consider necessary for this:

1. DEC must get their SPR act together.

Given the time it takes to get a wrong answer to a serious bug, does anyone \*really\* believe that suggestion SPR's have a chance? If they do have a chance, then let's get some better responses to suggestion SPR's. The current ones all seem to have been written by a lawyer. It is possible to not be bland and still not commit the corporation. Let's get some \*feedback\*, such as "All the developers think it's

VAX-83

a neat idea, but time doesn't permit us to put it in for at least 3 minor versions.", "We have problems doing this because of the security impact" (that is the answer they gave about simple project accounting, indicating they had a more complicated way in mind but that it will take longer).

It is not like it will take tremendous effort to compose these answer -- typically they already exist. If you ask Keith Walls at a Symposium why Backup does not do X, he really knows the answer, does a quick mental calculation, and can give a good approximation as to the chances of it happening in the foreseeable future.

The problem is, how does DEC internally provide these quality answers and still leave Keith time to code. That is a subject too long for inclusion in this topic, but it is critical.

Now this will not directly address sheer inertia matters, such as the release cycle time, but few ideas are that startling. Terry, somebody else may have previously thought of a bell on autobaud for RSTS but not been in a position to put it into the proper channel. If a reasonable (not the current) pipeline delay were there starting with the "first" time a given suggestion were made, it would still be a tremendous improvement.

2. DECUS needs to refine its feedback mechanisms

A few of the VMS developers on Friday night in Anaheim said they have a problem with not having enough background on \*why\* a particular SIR has reached the Top 10. Knowing that people want timestamps in their batch log just gives them a chance to implement a point-feature without an overall design. If they want timestamps because TOPS-10 had them, that is important information because perhaps there is something else in the TOPS-10 batch area they need to consider. If, on the other hand, the votes for timestamps were because some branch of the Federal government is requiring it for their in-house VAX machines, then \*that\* is important to know so that DEC can get a copy of that Federal regulation to learn what the \*next\* SIR down the pike will be. Not that they would necessarily go

off and implement number 2 immediately (especially if it would slow down number 1), but at least they would be able to schedule number 2 to coincide with when somebody was changing that part of VMS anyway.

The major reason the developers expressed for needing more information about SIRs, however, was that DEC may be working on some feature (which they want to keep secret until release) which could benefit from better understanding of how people use computers in the field. To understand \*why\* people want feature X helps DEC to better integrate the features.

I am afraid we will never reach the point where my marvelous suggestions will be implemented in VMS in less than six months. My unique ideas, however, so often provoke developer responses that "yes, we have heard that from a lot of people", that I would be resigned to be happy if they made it in 9 months after the "first" person suggested the idea to DEC. It would be disappointing, however, to never be able to think of a capability which was missing.

Larry Kilgallen  
Box 81, MIT Station  
Cambridge, MA 02139-0901

```
=====
Note 886.10                Privileged queues?                10 of 13
"JEFF KILLEEN"              22 lines                6-FEB-1988 13:37
-< CUTLER'S BABY >-
```

> But enough of that. How did a company which know how to do  
> better manage to start off with such a pathetic Batch/Print  
> system? Folklore has it that when somebody at DEC said "32-bit"  
> there were raised clenched fists from RSTS developers saying  
> "16-bits forever", and even at DECUS symposia there are T-shirts  
> that say "36-bits forever". So VMS came out looking like RSX.

No! - the truth is VMS is David N.#Cutler's baby - and the project team was a closed group. That is the Cutler of RSX-18 and RSX-11 fame - and Cutler only seems to know how to write one type of O/S. Rumor has it you pick up an RSX-18 system service manual you feel like you are reading VMS system service calls. Mark Bramhall, the senior RSTS architect, left RSTS for VMS

right after VMS V1 and found a very bad case of not invented here think. Peter Conklin was part of the original VMS team. Peter was from the 10/20 world.

I like Terry am going through the pain of moving from the RSTS world to the VMS world. The VMS kernel is a better architected system then RSTS however the user friendly polish on the utilities is poor when compared to RSTS.

JEFF KILLEEN  
31 HOPEDALE ST.  
HOPEDALE, MA. 01747  
617-478-8098

=====  
Note 886.11 Privileged queues? 11 of 13  
"Seton Droppers, PBS, (703)739-5100" 27 lines 6-FEB-1988 13:51  
-< VMS: Use != Design? >-  
-----

I got the impression, when I first learned VMS (2.x) that VAX/VMS was considered a follow on to the 11 series (11/7xx, looks a lot like 11/xx, after all), and NOT a mainframe system, and not something to replace the 10s, 20s, and TOPS with. I even seem to remember that a lot of people got real upset when DEC canned the 10s,20s and TOPS.

It appears that the original VMS was never designed for what it is currently being used for, and never meant to be used with as BIG a system as it now can be. This feeling was reinforced at Nashville where one of the futures speakers noted that the whole concept of VMS and crashes was going to have to be redone since it was designed when no one could envision a physical address space bigger than eight mega-bytes. That VMS can do all that it can is amazing to me.

(Oh yes, I certainly think some of the VMS/DCL commands make a lot more sense than some of the RSTS commands I used - COPY makes a lot more sense to me than PIP... but then RSTS may have changed since V6)

Seton R. Droppers  
Public Broadcasting Service  
1320 Braddock Place  
Alexandria, VA 22314  
(703)739-5100

=====  
Note 888.3 Another SPR classic 3 of 4  
"Kevin Angley" 23 lines 29-JAN-1988 13:53  
-< Every lock that ain't locked when no one's around >-  
-----

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I asked that my SPR be elevated so that I could get a more intelligent response, and I did... "Bob" called and said that GETDVI works fine, even on a cluster, except for a few things (as we suspected, of course).

The particular problem that I was having was that the status of a volume shadow member was coming back as copy complete when in fact other nodes thought the shadow copy was still in progress (when viewed by GETDVI). So, subsequent mount attempts failed. This, it seems, is really the same problem that GETDVI's opinion of mount status isn't correct with respect to whether other nodes have completed a dismount or not.

So that makes sense. But it still doesn't solve the real bug that GETDVI ought to be consistent across a cluster with respect to cluster devices - just like SHO DEVICES is - but of course it is obvious that DEC's command to sho device information would not use the system service for getting device information.

Enroute to looking up how SHOW DEVICE worked .. I discovered that defining logicals SHOW\$DEBUG and SHOW\$DEBUG\_LCKBUF gave an interesting display for show devices.

Kevin Angley  
3301 Terminal Drive  
Raleigh, NC 27604  
(919) 890-1416

=====  
Note 888.4                    Another SPR classic                    4 of 4  
"Alan B. Hunt"                    9 lines                    5-FEB-1988 13:10  
                  -< Problem with tape drives too. >-

-----  
                  Antecedent IO(s) published in:  
                  Pageswapper Volume 9 Number 8 (March, 1988)

I SPR'ed this during VMS V4.1/4.2 days because I wanted to use F\$GETDVI to determine if a tape drive was allocated in a cluster. Turns out it tells you only if it is allocated on the same machine. However, SHOW DEVICE MU will tell you which machine.

They said it wasn't a bug but enough complaints had been received that they were looking at changing it but no promises. To me this is a bad bug and a real headache. Their idea of bugs and ours seem to differ radically at times.

ALAN B. HUNT  
26803 BERG RD. #301  
SOUTHFIELD, MI 48034

=====  
Note 898.2                    ANY INGRES USERS OUT THERE???                    2 of 2  
"Bob Huckins"                    10 lines                    11-FEB-1988 18:26  
                  -< Not personally, but... >-

-----  
I don't use Ingres personally, but our company (Nuclear Data) does sell several products based on it. It has lots of good capability, but from what I can tell, some of the 4th-GL functionality is overstated. The people developing our products almost always had to write a program to do what they wanted, due to either performance or functionality considerations. Supposedly, gobs of development time was saved in forms and journaling development.

There is a very active Ingres users group, sponsored by RTI. If you ask your local RTI representative, they will put you on the mailing list.

Bob Huckins  
Nuclear Data Instrumentation Div.  
Golf & Meacham Rds.

Schaumburg, IL 60196  
312-884-3659

=====  
Note 900.0                    Asynch DECnet on MicroVAX 2000                    9 replies  
"Thomas P. Berk"                    5 lines                    9-FEB-1988 15:14  
-----

I've been trying to set up asynchronous DECnet between a 750 and a MicroVAX 2000. I haven't been having much luck. I've been working with DEC, and they suspect some problem in the RS423 serial communications on the MicroVAX 2000. Has anybody out there had any luck setting up asynchronous DECnet using a MicroVAX 2000?

Thomas P. Berk  
Inter-Tel Incorporated  
6505 W Chandler Blvd  
Chandler, AZ 85226  
602-961-9000

=====  
Note 900.1                    Asynch DECnet on MicroVAX 2000                    1 of 9  
"Jonathan M. Prigot"                    10 lines                    10-FEB-1988 10:22  
                  -< VS2000 <--> 8250 >-

-----  
Before I babble on too much, what are the symptoms?

I'm not exactly sure how much good this will do, but we use async DECnet between a VAXstation 2000 and our 8250. We 'borrowed' the DECnet components from the 8250, and run it over the RS232 port on the VS 2000. One sneaky thing that bit us is having to specify TRANSMIT PASSWORD (on the 2000) and RECEIVE PASSWORD (on the 8250) before things cranked up (circuits went from ON-STARTING to ON). (Sneaky, because I don't remember this being enforced with earlier versions of VMS V4.x).

Jonathan M. Prigot  
W.R. Grace & Company  
55 Hayden Avenue  
Lexington, MA 02173  
617-861-6600 x2148

```
=====
Note 900.2      Asynch DECnet on MicroVAX 2000      2 of 9
"Bill Mayhew"      16 lines 10-FEB-1988 21:13
  -< More success, may not be totally germane >-
-----
```

We, too, run async DECnet between a VAXstation 2000 and, in our case, a 785. Dynamic async DECnet, in fact. Same caveat re: transmit and receive passwords.

Possibly our success, and .1's, may not be relevant to .0 since we're both using the RS232 port, not the DEC423 port that .0 is trying.

I do, however, have a second (static) async circuit set up between my VS2000 and a MicroPDP-11/73 running DECnet/RSX. In this case, I'm using the VS2000's "printer" port, thru an H8571 9-pin-to-DEC423 converter, through a DECconnect cable, thru a DEC423-to-male-RS232 converter, thru a BC22D null modem cable, to the PDP. No problems except that we've had some strong static discharges in the immediate vicinity of the BC22D shut down the circuit (actually they typically halt or crash the 11/73, which makes the 2000 think the circuit went down).

Bill Mayhew  
Village Systems Workshop Inc  
PO Box 642  
Natick MA 01760  
617-237-0238

```
=====
Note 900.3      Asynch DECnet on MicroVAX 2000      3 of 9
"Thomas P. Berk"  10 lines 11-FEB-1988 09:31
  -< More details >-
-----
```

Everything seems to go pretty well until we actually try to bring up the circuit. It seems do come up momentarily, and then aborts because of a line error (I don't recall the exact error). I have specified the receive and transmit passwords on both machines, and it appears to be getting past that stage.

From what I've heard so far, it sounds like the problem has to do with the 423 ports on the MicroVAX. DEC has been pretty sluggish in responding, so my guess is that the problem is real.

Thomas P. Berk  
Inter-Tel Incorporated  
6505 W Chandler Blvd  
Chandler, AZ 85226  
602-961-9000

```
=====
Note 900.9      Asynch DECnet on MicroVAX 2000      9 of 9
"Thomas P. Berk"  20 lines 21-FEB-1988 12:00
  -< ...but I swear it didn't work... >-
-----
```

DEC actually came out to my site to investigate the problem a couple of days ago. They were armed with a data scope, and they even brought a couple of extra people along to observe.

Believe it or not, when I actually went to set up the situation so that they could set up their scope, the damned thing went and worked perfectly. Of course, as long as things worked, there was no point in hooking up their fancy equipment. Needless to say, I felt more than a little foolish.

I'm reasonably sure that I did everything exactly the same, so all I can say is that there must be some borderline conditions (phase of the moon, sun spots, etc.) that make it fail sometimes. DEC still has a couple of sites reporting a similar problem.

It turns out that since we're going to be using modem communications, we'll be using the one RS232 port anyway, and it works flawlessly.

Thomas P. Berk  
Inter-Tel Incorporated  
6505 W Chandler Blvd  
Chandler, AZ 85226  
602-961-9000



=====  
Note 902.0 TA78/TU78X problems..... 5 replies  
"Robert Gerber" 10 lines 11-FEB-1988 10:02  
=====

Does anyone know of any problems with the new circuitry that DEC is putting in some of the TU/TA78's in the field. DEC upgraded our TA78 and put a 'TU78X' sticker on it.

We are having intermittent machine checks on our 8600 when using the upgraded tape drive (They may not be related...but you never know.....)

The TA78 is connected to an HSC50. Our other systems (785,8700) seem to have no problem with the drive.)

Robert Gerber  
Gillette Co  
Tech Services Dept 4U-3  
1 Gillette Park  
Boston, MA 02106  
617/463-3636

=====  
Note 902.2 TA78/TU78X problems..... 2 of 5  
"Dale E. Coy (505) 667-3270" 8 lines 11-FEB-1988 23:09  
-< No way >-  
=====

I can't see any way that a TA-78 hanging on an HSC-50 could cause machine checks in anything past the HSC-50 (and probably not that, either). Even if they changed the "firmware" in the HSC (and I haven't heard about that), the connection between the HSC and the rest of the "nodes" is essentially a software connection. Maybe system crashes, but if you're truly seeing machine checks I don't think it could be the TA-78X.

DALE E. COY  
LOS ALAMOS NATIONAL LAB  
PO BOX 1663, MS J957  
LOS ALAMOS, NM 87545  
505-667-3270

=====  
Note 902.4 TA78/TU78X problems..... 4 of 5  
"Brian Tillman, Smiths Industries." 9 lines 15-FEB-1988 16:18  
-< A TA79 by any other name... >-  
=====

RE: < Note 902.3 by NODE::US178326 "GREG P. SCHULZ" >

-< TA78 or TA79 >-

> Ask your field service representative but the upgrade may be a  
> part of the upgrade to the TA79 less the name..

The field changes made to a TA78 do not make it a TA79, although some of the changes are incorporated into the TA79. There is more to the TA79 than just the FCOs.

Brian Tillman  
Lear Siegler, Inc.  
4141 Eastern Ave. MS121  
Grand Rapids, MI 49518-8727  
(616)241-8425

=====  
Note 910.0 Western Data Comm - Vadic 4224 4 replies  
"Brian Tillman, Smiths Industries." 3 lines 19-FEB-1988 11:28  
=====

Has anyone out there used Western Data Comm line guards with Vadic 4224e modems for dialback security? If so, do they seem reliable to you?

Brian Tillman  
Lear Siegler, Inc.  
4141 Eastern Ave. MS121  
Grand Rapids, MI 49518-8727  
(616)241-8425

=====  
Note 910.1           Western Data Comm - Vadic 4224           1 of 4  
"Rytis T. Balciunas"           10 lines 20-FEB-1988 10:09  
      -< Vadic does not work with Western Datacomm >-  
-----

We use Western Datacomm 424 modems with Western Datacomm Lineguard 3060 dial-back security system and Western Datacomm 1801 dialer in a Racal-Vadic 1600 chassis. Racal-Vadic modems DO NOT work with the Western Datacomm dialer....Found this gem out two years ago... Other than that, the system is solid as a rock for us - NO FAILURES TWO YEARS. Works out really nice for restricting phone access to our VAXen...

RYTIS T. BALCIUNAS  
CALGON CARBON CORPORATION  
PO BOX 717  
PITTSBURGH PA 15230-0717  
(412)787-6784

=====  
Note 910.2           Western Data Comm - Vadic 4224           2 of 4  
"Chris Erskine"                2 lines 22-FEB-1988 08:06  
      -< Vadic DOES work >-  
-----

We have the 306x systems with Racal-Vadic modems installed at several locations and have not had problems.

Chris Erskine  
23 S Holcomb  
Clarkston, MI 48016  
(313) 524-8836

=====  
Note 910.3           Western Data Comm - Vadic 4224           3 of 4  
"Brian Tillman, Smiths Industries." 13 lines 22-FEB-1988 11:07  
      -< It DOES work, but... >-  
-----

RE: < Note 910.1 by NODE::US198418 "Rytis T. Balciunas" >

-< Vadic does not work with Western Datacomm >-

> We use Western Datacomm 424 modems with Western Datacomm  
> Lineguard 3060 dial-back security system and Western Datacomm  
> 1801 dialer in a Racal-Vadic 1600 chassis. Racal-Vadic modems  
> DO NOT work with the Western Datacomm dialer....

But they DO work. Ours work, but there seems to be a problem in the lineguard that only allow two numbers to be entered at the moment. I spoke with someone else, too, who has this setup that works as expected. Ours is just a lemon, apparently, which we are going to get the dealer to replace.

Brian Tillman  
Lear Siegler, Inc.  
4141 Eastern Ave. MS121  
Grand Rapids, MI 49518-8727  
(616)241-8425

=====  
Note 910.4           Western Data Comm - Vadic 4224           4 of 4  
"Rytis T. Balciunas"           3 lines 25-FEB-1988 07:48  
      -< 2 cents' worth >-  
-----

My, how things have changed in two years --- Western Datacomm people were the ones that finally admitted to us that the Vadics did not work at the time (late 1985)....

RYTIS T. BALCIUNAS  
CALGON CARBON CORPORATION  
PO BOX 717  
PITTSBURGH PA 15230-0717  
(412)787-6784



```
=====
Note 911.6      VT100 Emulators for the Mac      6 of 8
"GREG P. SCHULZ"      13 lines  23-FEB-1988 18:34
      -< MORE ON THE MAC... >-
-----
```

In addition to the previous capabilities of MAC240, you also have the capability with additional software from White Pine to translate and display regis. I have already displayed sixel files on my MAC and am currently working on displaying MACpaint type files on my VT240 at work. Also trying to print MACpaint files on a LN03.

MAC240 is a driver based emulator (Don't hold your breath but LAT may be in the future...) meaning that new drivers (Serial, etc.) may be used for communicating. MAC240 also works with TSSNET for those who need DECnet capability.

GREG P. SCHULZ  
BURLINGTON NORTHERN RR  
ISS LOC 3  
176 E 5TH STT  
ST. PAUL, MN 55164  
612 298-7344

```
=====
Note 913.0      Looking for Exabyte 8mm users      4 replies
"KEVIN J. KUREK"      49 lines  23-FEB-1988 15:15
-----
```

How many of you have tried the 8mm 2.3 Gb drive from Exabyte? What has been your experience with the drive? I would like to get your feedback?

Recently, I purchased one of these drives from a value added reseller. The drive was easy to install and took less than 30 minutes on a VAX 11/780. The drive works great. It truly holds 2.3Gbytes. To prove this I successfully backed up 5 RA81s that were 95+% full to the drive.

Performance of the drive has proven to be adequate for my environment. I have seen transfer rates between 70 and 90 Kbytes/sec. I did expect higher transfer rates, but since backup is done during the night I really do not care how long it takes. My test showed that initializing (INIT dev: vol\_name:)

a tape on the average takes 2.25 minutes. Mounting (MOUNT/FOR dev:) an initialized tape took approximately 33 seconds (it takes 30 sec. to get the drive spinning). And the BACKUP/IMAGE of an RA81 took approximately 1.25 hours. The backup command used did have CRC turned on and used the default buffer count. The disk was very fragmented and contains many small files. (average block size is 35).

One of my initial concerns about the drive was media reliability and data integrity. After reading several articles about the drive I discovered that the drive employs both ECC and Reed Solomon error checking. This gives the drive a non-recoverable error rate of less than on bit in  $10^{13}$ , or about the same as the rates for a Winchester disk. Thus, I am no longer as concerned about data integrity. I am still concerned about media reliability.

The only problem that I have had so far is the reliability of the drive itself. The first drive I received lasted only 2 days before breaking while the 2nd drive lasted 2 weeks before breaking. I am currently on my 3rd drive and have had it for about 5 weeks without a problem. Considering that SONY makes 90% of the drive I believe that it is just coincidental.

Lastly, I have found one major difference between an Exabyte drive and a Digi-data VHS drive. It is my understanding that whenever the VHS drive must stop and start that approximately 1 Mbyte of tape space is lost. On the other hand this transition on the 8mm tape only loses 8 Kbytes of tape space.

KEVIN J. KUREK  
GIDDINGS & LEWIS ELECTRONICS  
666 S. MILITARY RD.  
P.O. BOX 1658  
FOND DU LAC, WI 54936-1658  
(414)929-4713

=====

Note 913.1	Looking for Exabyte 8mm users	1 of 4
"Bob Huckins"	3 lines 25-FEB-1988 18:41	

-< Maybe not coincidental... >-

-----

Re your comment about Sony: if you look at the Consumer Reports reviews of VCRs, Sony has one of the worst reliability records. Maybe you'd have had better luck if Magnavox made the drive!

Bob Huckins  
Nuclear Data Instrumentation Div.  
Golf & Meacham Rds.  
Schaumburg, IL 60196  
312-884-3659

=====

Note 913.2	Looking for Exabyte 8mm users	2 of 4
"Terry Kennedy"	12 lines 26-FEB-1988 00:30	

-< Put the 'It's a Sony' sticker on the garbage can... >-

-----

Sony seems to be good at developing technology, but bad at mass-manufacturing it. After about 10 assorted pieces of gear from Sony, I have given up on them. Every single piece of equipment developed severe mechanical problems soon after purchase (in some cases, instantly thereafter).

Also, their service facilities do not 'repair' equipment - they sit on it until you call and complain, and then charge you for a supposed repair when you pick it up. [Note- the above was determined by putting colored screw sealer on all the case screws - when the item was returned, all the seals were intact...]

Terry Kennedy  
95 Mohawk Trail  
Ringwood, N.J. 07456  
(201) 435-1890

=====

Note 913.3	Looking for Exabyte 8mm users	3 of 4
"Bill Mayhew"	9 lines 26-FEB-1988 10:34	

-< This ain't the Sony User's Society, but... >-

-----

I have had nothing but good luck with Sony equipment including 2 of their VCRs, one of which did need new heads after two years of two-hour-a-day (minimum) use, but so what.

The local Sony authorized repair facility also did a very good job on fixing it, particularly after I tried to fix it myself first {VERY embarrassed grimace...}. The reason I tried to do it myself is that the local repair facilities were all backed up for four weeks, minimum.

There is a market out there for DECservice on VCRs, methinks.

Bill Mayhew  
Village Systems Workshop Inc  
PO Box 642  
Natick MA 01760  
617-237-0238

=====

Note 913.4	Looking for Exabyte 8mm users	4 of 4
"Terry Kennedy"	8 lines 27-FEB-1988 20:07	

-< A distinction >-

-----

> The local Sony authorized repair facility...

As opposed to a "Sony factory service center"? If so, you dealt with some non-Sony people who were trained and approved by Sony to fix Sony equipment. Yes, they seem much better than "real" Sony service, but I wouldn't bet on them fixing 8mm backup equipment where Sony only makes part of the mechanism.

Terry Kennedy  
95 Mohawk Trail  
Ringwood, N.J. 07456  
(201) 435-1890

=====  
Note 920.0            My kingdom for a password...            2 replies  
"Michael R. Pizolato"            28 lines 26-FEB-1988 13:58  
-----

I am planning to implement an electronic signature system for documents. What I want to be able to do is prompt the user for his password (with no echo and a verification, of course) and verify the password against his UAF record.

There is nothing in the system services or RTL manuals about this. I called Colorado, and they told me this was probably intentional, but they weren't sure why. The only reason I could think of is that good data encryption algorithms require a key for decryption so that even if you know the algorithm you can't decrypt the data without the key. Since there is no key used for the encryption of passwords, knowing the password encryption algorithm could allow someone to decrypt the password.

One problem: the encryption algorithm is in the VMS microfiche! Does this mean all our systems are vulnerable to attack? Lawd, I hope not! But, if knowing the algorithm as presented in the fiche is not enough to allow decrypting of passwords, why can't there be a system service to allow suitably privileged users to do password verification?

Anyway, since DEC doesn't supply such a routine, does anyone out there know where can get my hands on one? I'm not fluent in MACRO or BLISS, so I don't want to try to reverse engineer the routine in the fiche (and that may not be legal).

Michael R. Pizolato  
AT&T Technology Systems  
Dept. 323610  
555 Union Blvd.  
Allentown, PA 18103  
215/439-5500

=====  
Note 920.1            My kingdom for a password...            1 of 2  
"John Osudar"            27 lines 26-FEB-1988 16:45  
-----

The password encryption algorithm used in VMS is supposed to be "one-way", i.e. you can encrypt the original password to get the encrypted result, but you can't take the encrypted password and arrive at the original password. VMS checks passwords by encrypting the password being tested, and comparing the result against the encrypted valid password. Thus, having the encryption routine published in the fiche doesn't present a "significant" risk. (Of course, you COULD write a program that tests every possible password by encrypting it using the algorithm, and comparing the result against the valid encrypted password. Having the routine in the fiche makes this easier, but I can't imagine wanting to spend the effort required to do this, if a system mandates reasonable minimum password lengths.) Having the encryption routine available for general use seems to make sense -- you could then use it to password-protect your own software in a manner similar to VMS. Why it's not available is unclear, but keep in mind that a lot of other useful routines that VMS calls all over the place (e.g. LIB\$FID\_TO\_NAME) aren't available in any library, and are undocumented except in the fiche. (Some of them may make it into V5.0 as documented and supported library routines, however.) Legal or not, a lot of people have copied useful subroutines out of the fiche and used them for their own software. (Actually, I don't see why it would be illegal as long as you stay within the restrictions that are placed on other DEC subroutines linked into your own code.) As I recall, the routine in question is not all that long (a couple of pages?) so typing it in shouldn't be too horrible -- but it is a shame that you have to do it at all.

John Osudar  
Argonne National Laboratory  
9700 S. Cass Ave.  
Bldg. 205 A-051  
Argonne, IL 60439-4837  
(312) 972-7505

```
=====
Note 920.2           My kingdom for a password...           2 of 2
"Dale E. Coy (505) 667-3270"           12 lines 26-FEB-1988 22:20
  -< DEC Provides It - you just have to know where! >-
-----
```

Get out your copy of the VMS4.7 distribution tape. Unpack the  
save-set, and look at:

VMS\$CHECK-DIGITAL-ACCOUNTS.COM and VMS\$SECUREPWD.EXE

This is used to check if passwords on an account are easily  
guessable (is the FIELD password MAINTENANCE?), but could be  
simply modified to do exactly what you want.

It's not left behind by VMSINSTAL, but since it comes on the  
distribution it must be legal to have/use/modify it.

DALE E. COY  
LOS ALAMOS NATIONAL LAB  
PO BOX 1663, MS J957  
LOS ALAMOS, NM 87545  
505-667-3270





RT-11 DUCM/DYC GRAF11 DEL DIR PLOT-10 IMAGE LIBED FSTATS MS/DOS TIC-TAC-TOE QIX VAX-LIB-DATMAN/VAX EDTPlus SPICE2 TREEDUPL LISPEX MCLS TYPE PLUS MINC DISK USE FRAG EDTEX PORT LOCATOR TECO CHPLOT NANNY DIR11-W WATCHDOG INACTIVE ACCOUNTS IMGSPICE ICE TEX EDITOR VAX-LIB-4 GRAPHIC UTILITIES SETAUX.ARC STATPK FIGURE KERMIT Distribution TENBACKU JUICER VTEDIT 2022 VAX-LIB-3 VISTA EDITOR MTU TDE RSTSOPEN DRAWTREE WATCHDOG PRM-1 SMARTMAILER TEN SPELL DECPoint of Sale JUICER PARALLEL Library V2 RTMULTI and Addo SMARTMAILER for RSTS/E CU FILTRA Spring 86 RT-11 SIG CP/M KERMIT S Invasion for PRO Bonner La SPLICE RUNOFF VAX-LIB-3 VAX-LIB-2 IMAGE SPELL TURBOCOM FNDFIL PC-8088 Collection #10 VT20 TOOLKIT PLATOOLS SMARTMAILER DEPROC LaTeX KERMIT-11 FANCY FONTS XMIT CU ReGis to HPG CED International RUNITOFF JP5-JP6 FODT PASCAL-OS/8 ANISMT WPSIM PARALLEL LIBRARY DECSYSTEM-20 SIG Spring 85 CAMERA DELPHIN HACK BIBENTRY APFELN DIGITIZING Acid Docume Generator VAX-LIB-2 AMAR-10 AMAR-20 DATMAN/VAX IMAGE RT-11 DUCM/DYC GRAF11 DEL DIR PLOT-10 IMAGE LIBED FSTATS MS/DOS TIC-TAC-TOE QIX VAX-LIB-5 DATMAN/VAX EDTPlus SPICE2 TREEDUPL LISPEX MCLS TYPE PLUS AMAR-20 DISK USE FRAG EDTEX PORT LOCATOR TECO CHPLOT NANNY DIR11-W WATCHDOG INACTIVE ACCOUNTS IMGSPICE ICE TEXT EDITOR VAX-LIB-4 GRAPHIC UTILITIE SETAUX.ARC STATPK FIGURE KERMIT Distribution TENBACKUP JUICER VTEDIT 2022 VAX-LIB-3 VIST EDITOR MTU TDE RSTSOPEN DRAWTREE WATCHDOG PRM-11 SMARTMAILER TEN SPELL DECPoint of Sa JUICER PARALLEL Library V2 RTMULTI and Addons SMARTMAILER for RSTS/E CU FILTRA Spring 86 RT-1 SIG CP/M KERMIT S Invasion for PRO Bonner Labs APFELN RUNOFF VAX-LIB-3 VAX-LIB-2 IMAGE SPEL TURBOCOM FNDFIL PC-8088 Collection #10 VT200 TOOLKIT PLATOOLS SMARTMAILER DEPROC LaTeX KERMIT-11 FANCY FONTS XMIT CU ReGis to HPG CED International RUNITOFF JP5-JP6 FODT PASCAL-OS/ ANISMT TECO WPSIM DECSYSTEM-20 SIG Spring 85 CAMERA DELPHIN HACK BIBENTRY APFELN KERMI S DIGITIZING Acid Document Generator VAX-LIB-2 AMAR-10 AMAR-20 DATMAN/VAX IMAGE VT200 TOOLKI COMPRO EVENTS PC8088 Collection #9 TECO Cher Tree Workstation Bookings System EXPORT Data Inputt Generator CMSBROWSE PERSONNEL INVENTOR MS/DOS COMMS Selection Electronic Grade Book CP/ KERMIT LaTeX JUICER SPELL PORTACALC DPRINT DUNGEON MINC BUDGET BUG CALC C Langua System DPROC "DEP" DECENC DECmate II OS/278 DIAL DTC GAMMA-11 GDADL LISP for RSX-11 MEM KERMIT S VAX-LIB-6 SPICE 3A6 VT200 TOOLKIT RUNNOFF SPLICE SPY:RSX TCOPY SPELL VT-200 COMPR EVENTS CMSBROWSE UNDELETE DIAL BLOCKER SCAN CODER BITMAP DTC/PC ADDRESS BOO LaserWriter PORTACALC SPICE 3A6 PRO/Smart Mailer CBASIC2 Accts JP5-JP6 Payable/Receivable McGraw-Hi Payroll SEDT: EDT/WPS Screen CLNDRS:A Calendar Program INDEX AKCOUNT CORPHONE E-Systems Grab Ba RGT RDG PLTXSMB ICON DEVICES DATATRIEVE Library Collection CMSBROWSE EXPERT FPaint IMAG DBMS/Spreadsheet for MS/DOS AMAR-10 AMAR-20 RDIR/SQMAP PC-8088 Collection #11 UP TIME REPORTE RT-11 DUCM/DYC GRAF11 DEL DIR PLOT-10 IMAGE LIBED FSTATS MS/DOS TIC-TAC-TOE QIX VAX-LIB-DATMAN/VAX EDTPlus SPICE2 TREEDUPL LISPEX MCLS TYPE PLUS EXPORT DISK USE FRAG EDTEX PORT LOCATOR TECO CHPLOT NANNY DIR11-W WATCHDOG INACTIVE ACCOUNTS IMGSPICE ICE TEX EDITOR VAX-LIB-4 GRAPHIC UTILITIES SETAUX.ARC STATPK FIGURE KERMIT Distribution TENBACKU JUICER VTEDIT 2022 VAX-LIB-3 VISTA EDITOR MTU TDE RSTSOPEN DRAWTREE WATCHDOG PRM-1 SMARTMAILER TEN SPELL DECPoint of Sale JUICER PARALLEL Library V2 RTMULTI and Addo SMARTMAILER for RSTS/E CU GRAPHKIT FILTRA Spring 86 RT-11 SIG CP/M KERMIT S Invasion for PR Bonner Labs RUNOFF VAX-LIB-3 VAX-LIB-2 IMAGE SPELL TURBOCOM FNDFIL PC-8088 Collection #10 VT2 TOOLKIT PLATOOLS SMARTMAILER DEPROC LaTeX KERMIT-11 FANCY FONTS XMIT MEMO ReGis to HPG CED International RUNITOFF JP5-JP6 FODT PASCAL-OS/8 ANISMT CODER WPSIM DECSYSTEM-20 SIG Sprin 85 CAMERA DELPHIN HACK BIBENTRY APFELN REPORTER DIGITIZING Acid Document Generator VAX-LIB-AMAR-10 AMAR-20 DATMAN/VAX IMAGE VT200 TOOLKIT COMPRO EVENTS PC8088 Collection #9 TECO Cher Tree Workstation Bookings System EXPORT Data Inputter Generator CMSBROWSE PERSONNEL INVENTOR NS/DOS COMMS Selection Electronic Grade Book CP/M KERMIT LaTeX JUICER SPELL PORTACALC DPRIN DUNGEON MINC BUDGET BUG CALC C Language System DPROC "DEP" DECENC DECmate II OS/278 DIA DTC GAMMA-11 GDADL LISP for RSX-11 MEMO PORTACALC VAX-LIB-6 SPICE 3A6 VT200 TOOLKI RUNNOFF SPLICE SPY:RSX TCOPY SPELL VT-200 COMPRO EVENTS CMSBROWSE UNDELETE DIA BLOCKER SCAN CODER BITMAP DTC/PC ADDRESS BOOK LaserWriter PORTACALC SPICE 3A6 PRO/Sma Mailer CBASIC2 Accts TREEDUPL Payable/Receivable McGraw-Hi Payroll SEDT: EDT/WPS Screen CLNDRS: Calendar Program INDEX AKCOUNT CORPHONE E-Systems Grab Ba RGT RDG PLTXSMB ICON DEVIC DATATRIEVE Library Collection CMSBROWSE EXPERT FPaint IMAGE DBMS/Spreadsheet for MS/DOS AMAR-1 AMAR-20 RDIR/SQMAP PC-8088 Collection #11 UP TIME REPORTER RT-11 DUCM/DYC GRAF11 DEL DIR PLO 10 IMAGE LIBED FSTATS MS/DOS TIC-TAC-TOE QIX VAX-LIB-5 DATMAN/VAX SPICE2 RT-11 DUCM/DYC G



# DECUS

## Program Library

# SOFTWARE ABSTRACTS

"A Solution with a Future"

LIB

## DECUS PROGRAM LIBRARY

### NEW LIBRARY PROGRAMS AVAILABLE FOR THE VAX/VMS FAMILY OF COMPUTERS

**DECUS No:** V-SP-67 **Title:** The LIMS/SM Utilities Collection  
**Version:** 1, November 1987

**Submitted by:** Digital Equipment Corporation

**Operating System:** VAX/VMS **Source Language:** VAX BASIC,  
VAX FORTRAN **Keywords:** Utilities - VMS

**Abstract:** The LIMS/SM Utilities Collection consists of:

#### AUDIT\_\_REPORT

This process will create a comprehensive and easily-read audit report for a LIMS/SM database. The audit report will track results, changes to those results, and will report all "Reason for Change" text strings.

The process requires that a series of program be run. The source code for each of those programs is provided. Command files for building necessary programs, and for properly running those programs are also provided.

#### DIGITAL EQUIPMENT CORPORATION\_\_LOGO

This process allows the LIMS/SM user community to remove or alter the Digital Equipment Corporation logo at the top of each of their LIMS/SM screens.

Detailed step-by-step instructions, as well as all necessary programs (source code), command files, and template files are provided.

#### SAMPTY

This process will produce a usefully detailed report of tests and other associated data for any sample type on a LIMS/SM database. SCREEN\_\_TAILORING  
This process allows the LIMS/SM user community to replace original LIMS/SM screen terminology with site-specific terms.

Detailed step-by-step instructions, as well as all necessary programs (source code), and command files are provided.

**Media (Service Charge Code):** 600' Magnetic Tape (MC) **Format:** VMS/BACKUP

**DECUS No:** V-SP-69 **Title:** AMIGA Utilities Collection 2 **Version:** 1, January 1988

**Author:** Various

**Submitted by:** Glenn C. Everhart, Ph.D.

**Operating System:** AMIGA DOS, VAX/VMS V4.5 **Source Language:** BASIC, C, FORTRAN 77, MACRO-32, VAX FORTRAN **Keywords:** Data Base Management, Graphics, Spreadsheet, Utilities - VMS

**Abstract:** AMIGA Utilities Collection 2 contains a large collection of utilities and programs for the AMIGA 32 bit computer. The Amiga is an inexpensive machine well suited to be used as a powerful graphics workstation in a Digital Equipment Corporation host environment, with multitasking, large address space, windows, graphics, color, and more. Programs providing VT102 and VT640 emulation, as well as some graphics terminal emu-

lators, with several protocols, are provided. Also present are various public domain utilities including editors, 2D and 3D CAD systems, drawing packages, languages, spreadsheets, and more.

This package contains items introduced for Amiga PD consumption since the "AMIGA Utilities Collection 1". DECUS Program No. V-SP-68, tape became available. Numerous source programs make these programs valuable even on non-Amiga computer configurations.

Because many of the files are in .ARC form, the VMSSWEEP utility is provided to allow for examination of these archives online on a VAX running VMS.

Complete sources not included.

**Media (Service Charge Code):** 2400' Magnetic Tape (PC) **Format:** VMS/BACKUP, TK50 Tape Cartridge (TC) **Format:** VMS/BACKUP

**DECUS No:** VAX-295 **Title:** LASER\_\_PRINT **Version:** 2.0, December 1987

**Submitted by:** Steven MacNeil, Access Research Corporation

**Operating System:** VAX/VMS V4.4 **Source Language:** DCL, TPU, VAX BASIC **Hardware Required:** Hewlett Packard LaserJets, Font Cartridges, Downloadable Fonts **Keywords:** Hewlett Packard

**Abstract:** Laser Print is a series of software programs: ALOFF, EASYFORM and one command procedure, LPRINT2, that allows text files created on the VAX to be printed to an Hewlett Packard LaserJet, Hewlett Packard LaserJet Plus, or Hewlett Packard LaserJet 2000; using such features as Bolding, Italics, SubScript, SuperScript, Underline and font cartridges and downloaded soft fonts.

ALOFF provides the functionality of Bolding, Underline, etc. by converting special characters in a users text file to correct Hewlett Packard escape codes that produce the desired text output. EASYFORM provides the line drawing capability by using pre-defined characters for single or double lines and boxes. Within the editor the user draws boxes using the pre-defined characters and then runs EASYFORM to convert these characters to special Hewlett Packard LaserJet line drawing characters. Gant and PERT charts, even Flowcharts, can be created using EASYFORM. Special defined symbols are included for the Gant and PERT charts, and pre-defined arrow symbols are provided for the Flowcharts.

Output of all text files to the Hewlett Packard LaserJet's is handled by the command procedure LPRINT2, which prompts for paper orientation, forms, margins and either Compressed or Elite character output.

Help text files for LPRINT2, EASYFORM and ALOFF are provided. Source code is also provided.

Also included with LaserPrint are Hewlett Packard escape settings in text files for inclusion into SYSDEVCTL.TLB to utilize all the capabilities of the Hewlett Packard series of LaserJet printers and all the definitions of the different forms and numbers the LPRINT2 command procedure uses.

Also included are some revised EVEPlus TPU procedures that will assist you in using the line drawing features of EASYFORM. This enhances the ease and usefulness of using the EASYFORM program provided. LPRINT2 can be run from the command prompt or within EVE: the TPU procedure that allows this is also provided.

**Media (Service Charge Code):** 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

**DECUS No:** VAX-297 **Title:** ReGIS to HPGL Conversion Program **Version:** 2.J, December 1987

**Submitted by:** Dr. N.S. Houl, Racial Research Ltd., Reading, Berkshire, England RG2 OSB

**Operating System:** VAX/VMS V4.5 **Source Language:** DCL, VAX FORTRAN **Memory Required:** 36KB **Software Required:** FORTRAN run-time system **Keywords:** Graphics, Hewlett Packard, ReGIS

**Abstract:** This program converts a file of ReGIS graphics commands, as used by the VT125 and VT240 terminals, into Hewlett-Packard Graphics Language (HP-GL), as used on the 7580B plotter. It sends them to a file or directly to the plotter, which may be connected "in-line" with the terminal. Other plotters which accept HP-GL may be accommodated by slight changes to the initialization sequences. All ReGIS commands are parsed, but only a subset (sufficient for line graphs with labelling, and including macrographs) is sent to the plotter. The resulting graphs may be scaled to fit the paper, or specified explicitly as A1, A2, etc., or in mm. The program is designed to facilitate the addition of extra ReGIS commands.

**Restrictions:** Not all ReGIS commands are interpreted, although all are accepted.

**Media (Service Charge Code):** 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

**DECUS No:** VAX-298 **Title:** Indexf **Version:** 1.0, December 1987

**Submitted by:** Rick Orr, The Jonathan Corp., Norfolk, VA

**Operating System:** MicroVMS V4.5, VAX/VMS V4.5 **Source Language:** C, MACRO-32 **Memory Required:** 204KB **Keywords:** File Management

**Abstract:** Index contains the source, object, and executable for a program that is used to format file headers and report on amount and sizes of retrieval pointers. The file header can be found by one of four ways. It can be found by entering the filespec, or the logical block number (good for how to find the file associated with the lbn in errorlog), or the file id., or a filespec to be used in a search. The outputs are either a formatted output to the terminal screen or a report listing the file name and how many retrieval pointers and file headers associated with the file(s). Also the program will give a count of split I/O's for the CPU since last boot. The program is easy to use and is self explanatory.

**Notes:** Use of internal data structures restricts program to Operating System V4.X level.

**Restrictions:** Normal VMS File Protections.

Documentation not available.

**Media (Service Charge Code):** 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

**DECUS No:** VAX-299 **Title:** GLOBALS - Utility to List Global Sections **Version:** 01.21, December 1987

**Submitted by:** Ya'akov N. Miles, TRIUMF, UBC, Vancouver, Canada

**Operating System:** MicroVMS V4.5, VAX/VMS V4.5 **Source Language:** MACRO-32 **Keywords:** System Management - VMS, Utilities - VMS

**Abstract:** This program lists the SYSTEM and GROUP global sections which are installed in a VAX/VMS version 4.5 system. This program lists the names, sizes, and owners of SYSTEM and GROUP global sections, with a short summary of the page and group global statistics. This program is self-documenting, and requires the user or image to have CMEXEC privileges. Critical sections of code run in EXECUTIVE mode, whereby the VAX/VMS executive data base can be examined, but not modified. Therefore, this program should not be able to compromise the VAX/VMS system integrity.

**Notes:** Linked with SYSS\$STEM:SYS.STB system globals and may be version dependent. User must have CMEXEC privilege (or Image must have CMEXEC privilege). Data examined in EXECUTIVE mode without locking down data structures.

**Media (Service Charge Code):** 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

**DECUS No:** VAX-300 **Title:** JMU Bulletin Board **Version:** 2.1, November 1987

**Submitted by:** Michael O'Neill, James Madison University, Harrisonburg, VA

**Operating System:** VAX/VMS V4.6 **Source Language:** VAX-11 FORTRAN **Software Required:** FMS **Keywords:** Bulletin Board

**Abstract:** The JMU Bulletin Board/Conferencing System is a FMS based menu driven system that utilizes the return and cursor keys for command selection. It is designed to allow novice users to easily use it for viewing notices without forcing them to become familiar with its advanced features.

Among its features are: - Tracking of last notice read in each category.

- A menu driven user interface.
- Integral access to the EDT text editor.
- Context sensitive HELP system.
- Selective category omission on a per user basis.
- Automatic insertion of notice owner's userid.
- Direct access to the VMS mail utility while viewing a notice.
- A reply option for posting a response to a notice while it is being viewed.
- A backup option that allows the viewing of previously viewed notices.
- An output option that allows you to output a copy of a notice to a file, line printer (SYSS\$PRINT), or a printer connected to your terminal or PC.
- Support for multiple bulletin boards.
- Chaining of notice replies.
- Multi-level conferencing support.
- File upload and download support.

Notes: Operating System VAX/VMS V4.X or higher is required.

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VMS/BACKUP

DECUS No: VAX-301 Title: DVIOUT - DVI Output Driver  
Version: 1.0, December 1987

Submitted by: Scott Campbell, PAR Government Systems Corporation

Operating System: VAX/VMS V4.5 Source Language: C, MACRO-32 Memory Required: 2MB Software Required: TeX, METAFONT, and associated utilities Hardware Required: Laser printer or graphics output device. Symbiont requires Apple LaserWriter. Keywords: Conversions, Graphics

Abstract: DVIOUT is a program for converting DVI files produced by TeX for use by specific output devices, including laser printers and high resolution graphics devices. Features include:

- Support for multiple output devices. The currently supported devices include the Apple LaserWriter (and PostScript in general), and the Tektronix 4014. An untested IMAGEN driver is also included. Additional output devices can be supported by providing a few low-level routines to perform the basic device output functions.
- Inclusion of Tektronix 4010/4014 and MacPaint graphics files in the formatted output. The output resulting from the graphics file interpretation can be scaled, translated and rotated (in any of four orientations).
- Line, arc, point and filled polygon graphics operations.
- Automatic top and bottom page markings.
- Command line options for page selection and collating order.
- Landscape page orientation and various paper sizes.
- Support for PostScript native fonts.
- Support for right-to-left text within left-to-right text.
- Pixel, packed or generic font pixel files.

Also included is a print symbiont designed to control the Apple LaserWriter printer. Features include:

- Capability to drive up to four LaserWriters simultaneously.
- All PostScript-generated output is printed at the end of job.
- Detection of errors and machine problems from the LaserWriter.
- Generation of flag, trailer and burst pages.
- Inclusion of modules from the device control library.
- Notification to the print operator of special form required and/or manual feed options, and of machine problems.

A utility program is also provided that will allow the font metric information for the LaserWriter fonts to be obtained.

Notes: Operating System VAX/VMS V4.4 or later is required.

Assoc. Documentation: Descriptions of PXL, PK, GF and DVI file formats (with TeX distribution).

Restrictions: Print symbiont requires READALL, TMPMBX, ALLSPOOL and SHARE privileges.

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VMS/BACKUP

DECUS No: VAX-303 Title: GO Version: January 1988

Submitted by: Dale D. Lutes, Cessna Aircraft Company, Wichita, KS

Operating System: MicroVMS V4.6, RSX-11M V4.2C Source Language: PASCAL from DECUS, Program No. 11-346 Software Required: PASCAL Compiler, DECUS Program No. 11-346 (however object modules are supplied) Hardware Required: VT100 Series Terminal or compatible Keywords: Games

Abstract: GO is a variation of the Oriental game Go-Moku. The object of the game is rather like that of Tic-Tac-Toe. Players take turns placing their markers on a 20 X 40 playing board in an attempt to get five markers in a row.

The game is written in VAX PASCAL and uses the SMG\$ routines from the VMS Run Time Library for terminal I/O. The original version was written in DECUS PASCAL (DECUS Program No. 11-346) on a PDP-11/70 running RSX-11M. The PDP version is also included in this submission.

The algorithm that GO uses to select a counter move mimics my own style of play (but with no lookahead) in a rather brute-force manner. Any improvements to the counter move algorithm or to the user interface (especially the PDP version) are welcome.

If rebuilding the program is necessary, command files for both the VAX and PDP versions are supplied. PDP-11 users will require DECUS Program No. 11-346. The submitter welcomes any questions or comments.

Documentation not available.

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VMS/BACKUP

DECUS No: VAX-304 Title: DISPLAY\_\_OPEN\_\_FILES  
Version: January 1988

Submitted by: Rick Orr, The Jonathan Corporation, Norfolk, VA

Operating System: MicroVMS V4.2 through V4.6, VAX/VMS V4.2 through V4.6 Source Language: MACRO-32, VAX FORTRAN Keywords: File Management, Utilities - VMS

Abstract: DISPLAY\_\_OPEN\_\_FILES uses the system service GETFWA (Get File Work Area) to display all files open to the image or open to the process for all process/images running on the system or for specific ones based on pid number.

The GETFWA system service is written like the VMS system service GETJPI. The GETFWA system service will retrieve information about the files open to the process/image based on the item list supplied to it. The service does this by accessing impure data areas (PIOSGW\_\_IIOIMPA/PIOSGW\_\_PIOIMPA) located in P1 address space. The user of this program will need the proper privileges to use this program for access to other processes P1 address space. For more information on GETFWA please read GETFWA.TXT which describes the call in more detail.

DISPLAY\_\_OPEN\_\_FILES will retrieve the following information and display it to the screen:

- The user name
- The file name
- The current key buffer value for index files.
- The high block number
- The EOF block number

Notes: Program has crashed system. Some debugging has occurred, but please use the program at your own risk.

Restrictions: Must have privileges to access other processes. Need a MAKBUF size of 2500 bytes minimum.

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VMS/BACKUP

DECUS No: VAX-305 Title: ADAM Text Editor Version: 1.0, December 1987

Submitted by: A. Ragosta & L. Jurgeleit, US Army ARTA, MS: 219-3, Moffett Field, CA

Operating System: VAX/VMS V4.5 Source Language: MACRO-32, TPU, VAX FORTRAN Software Required: TPU Keywords: Editors, Tools - Software Development

Abstract: ADAM is a powerful text editor based on EVE, the Extensible VAX Editor from Digital Equipment Corporation. Major changes have been made to EVE to increase power, flexibility and scope. The ADAM editor has a built in "FRED" dialect which may be entered by invoking the editor with the FRED command or editing a FORTRAN source code. FRED has special modifications useful for editing FORTRAN files.

All of the source code except the portions of EVE that are still used is included (EVE is protected by Digital Equipment Corporation copyright notices, but should be available in the SYSS\$LIBRARY directory of all licensed sites).

Notes: VAX/VMS Operating System V4.3 or later is required.

Complete sources not included.

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VMS/BACKUP

DECUS No: VAX-306 Title: BLOCK\_\_CHARACTERS Version: 1, January 1988

Submitted by: James H. Norman, Las Cruces, NM

Operating System: VAX/VMS V4.6 Source Language: VAX FORTRAN Memory Required: 1KB Keywords: Tools - Applications Development

Abstract: The BLCHAR subroutine will write large block characters to a print file or a line printer. Each block character area is seven columns wide and nine rows high. Each block character is five columns wide and seven rows high. Up to eighteen block characters may be printed on each call to BLCHAR. Two blank lines are output after a group of block characters are written. This subroutine is useful for writing header pages on reports and data listings. It will handle any ASCII character from BLANK (octal 40) through UNDERSCORE (octal 137).

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VAX/ANSI

DECUS No: VAX-308 Title: REMOTE CONTROL WIZZARD  
Version: 1.0, December 1987

Submitted by: Edward Tusch, Philips Bauelementewerk, Ebentalerstrabe 140, Austria, A-9020

Operating System: VAX/VMS V4.5 Source Language: VAX BASIC Memory Required: 205KB Keywords: System Management - VMS

Abstract: This program has the following functionality: . File-controlled setting of the Digital Equipment Corporation server characteristics.

- Demos of software packages without any human interaction.
- Help VAX-newcomers or people with fingertroubles without having to walk to their terminal.
- Execute a complete batch-controlled shutdown and reboot.
- Reduce operator time when frequently executing jobs with long response times on the system.
- Any job, which (because of VMS) until now could be done only interactively, do it procedure controlled with FORCE --> no limits to your fantasy.

Complete description, sources, examples and templates included.

Notes: This program is a revision of the program called "FORCE" written by Dan Cook which appeared on DECUS Program No. V-SP-52. Some bugs fixed and file control interface added.

Restrictions: Be careful to whom you offer FORCE on your machine.

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VMS/BACKUP

DECUS No: VAX-309 Title: CLOC Version: 2M, January 1988

Submitted by: Alan Reed, University of Birmingham, Computer Ctr., Birmingham, England B15 2TT

Operating System: VAX/VMS V3 Source Language: FORTRAN IV Memory Required: 83KB Keywords: Text Formatting

Abstract: CLOC is a program which allows one to examine natural language text. It currently includes the production of sorted vocabulary lists, word indexes, concordances, automatic discovery of collocations, and searches for phrases. It has been designed for ease of use by people with little or no computer experience, and has been used by Humanities students both for teaching and research.

Media (Service Charge Code): 600' Magnetic Tape (MA)  
Format: VAX/ANSI

DECUS No: VAX-311 Title: LSE-PLUS: Language Sensitive Editor Extensions Version: 2.3, January 1988

Submitted by: David Spencer, Foundation Health Plan, Sacramento, CA

Operating System: Micro/VMS V4.4 and later, VAX/VMS V4.4 and later Source Language: VAX BASIC, VAXTPU Software Required: VAX Language Sensitive Editor, V2.0 or later Keywords: Editors, Utilities - VMS

Abstract: LSE-PLUS is a series of additional routines and procedures coded in VAXTPU to extend the functionality of the

"out of the box" Language Sensitive Editor. LSE-PLUS gives the user all the standard LSE functions, plus GOLD-key keystroke sequences for:

- Additional screen editing commands, such as:
  - Swap characters, words, lines.
  - Toggle screen width.
  - Clear message window.

- Change text to all upper/lower case.
- Advance paragraph.
- Insert/find file mark.

**On-Screen multi-buffer management:**

- Jump into buffer.
- Jump directly to main buffer.
- Jump to previous buffer.
- Write out buffer.
- Create empty buffer.
- Delete buffer.

**DIRECTORY SCAN built in!**

- DECUS Program No. VAX-228, SCAN, A Directory Scan utility for VMS, integrated into editor, making multi-file editing a breeze. View your directory in a buffer, hit a key and the file under the cursor is brought into an editing buffer, plus a lot more!

**Other features:**

- Easy to use learn mode.
- Toggle between view-tabs mode.
- Read in a file by name.
- Spawn a sub-process.

Users familiar with the EDT-PLUS extensions found in my article published in "DEC Professional", will feel at home. All of the EDT-PLUS features have been added to LSE-PLUS.

This package is a must for "power users" of LSE. It also includes a large body of examples of structured coding in TPU. If you have the Language Sensitive Editor, you will want to be able to extend it. LSE-PLUS shows you how plus gives you a great place to start.

Notes: Operating System VAX/VMS V4.4 or later is required. Operating System Micro/VMS V4.4 or later is required.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-312 Title: EDT-PLUS: EDT Editor Extensions Version: 3.0, January 1988

Submitted by: David Spencer, Foundation Health Plan, Sacramento, CA

Operating System: Micro/VMS V4.2 and later, VAX/VMS V4.2 and later Keywords: Editors, File Management, Utilities - VMS

Abstract: EDT-PLUS is a series of EDT initializer and help files that extend the ease of text editing of the VAX/VMS EDT editor. The EDT-PLUS distribution has initializer files for both normal EDT keypad and a WPS editor keypad, as well as these additional GOLD-key keystroke features:

**Buffer management keys:**

- Show list of buffers.
- Write buffer to file.
- Read file to buffer.
- Create a buffer.
- Delete a buffer.
- Select buffer to edit.
- Jump directly to main buffer.
- Jump to previous buffer.

**Text editing keys:**

- Swap character, word, line, paragraph.
- Toggle screen width.
- Insert/find file mark.

- Change text to all upper/lower case.
- Advance paragraph.
- Simple save and exit.
- Abort edit with verify.

This is the EDT environment originally described in my articles published in "DEC Professional". It includes all the initializer files as well as COMPLETE on-line help for all normal and EDT-PLUS editing keys. Many people have typed this package in by hand; this is the original with comments and help already done and tested for you. Any "power user" of EDT will want this package to improve their productivity today.

Notes: Operating System VAX/VMS V4.2 and later is required. Operating System MicroVMS V4.2 and later is required.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-314 Title: VAX Capacity Management Tool Version: 3.0, December 1987

Submitted by: Digital Equipment Corporation

Operating System: VAX/VMS V4.3 - V4.6 Source Language: MACRO-32, VAX BASIC Memory Required: 102KB Software Required: VAX RETOS if hardcopy graphs to spooled sixel printers is required. Hardware Required: VT240 Terminal, VT330 Terminal or VT340 Terminal Keywords: System Management - VMS

Abstract: This system is designed as a tool for use by those people responsible for capacity management of a VAX or VAXcluster. It is not necessary to have VMS internal knowledge or system management knowledge to make use of this package. It is mainly designed for medium or large scale VAX installations.

This package collects statistics on the utilization of CPU, memory and disk devices on the monitored VAX or VAXcluster. It also collects information on the CPU response of the machine and the number of processes executing. In addition to the VAX wide and VAXcluster wide information collected, this package also collects information for each UIC group. If your VAX system is arranged with each application in a separate UIC group then this allows the total system utilization to be broken down by application.

The information collected can be displayed in a graphic form on VT240, VT330 or VT340 terminals. The capacity manager uses an interactive display program that has a DCL-like command syntax. The user can display histograms or frequency diagrams with hourly, daily or monthly information. The UIC group statistics can be added or subtracted from system wide statistics so graphic answers to questions like, "What will happen to the system if I take that application off?", can be seen.

Hardcopy output to printers that handle ReGIS is possible. If the Digital Equipment Corporation product RETOS is available, output to printers like the LA100 that support sixel graphics can be performed.

A machine uptime subsystem is included which records VAX uptime accurate to five minutes. These statistics can be reported between date ranges, hour ranges and weekends can be either included or excluded from the calculation.

Complete user documentation, help text and installation documentation is included on the media.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-315 Title: Language Sensitive Editor Template for RUNOFF Version: 1.3, October 1987

Submitted by: Bart Z. Lederman

Operating System: VAX/VMS V4.6, V4.7 Source Language: LSE Software Required: LSE V2.0 or V2.1 Keywords: Editors, RUNOFF

Abstract: Language Sensitive Editor for FORTRAN contains a RUNOFF template. This template simplifies the production of documents in RUNOFF by making RUNOFF commands available within the editor, and allowing the user to enter abbreviations and have the editor expand them to the full command, with any parameters in the correct place.

This software does not by itself explain what RUNOFF is. A RUNOFF manual should be supplied with the operating system. However, the template does make it easier for new users to become familiar with RUNOFF.

Although a compiled environment file is included, you may wish to recompile from the source. Instructions on doing this, and setting up your default environment to include the new instructions, are in sections 6.3 and 7.2 of the manual, "Guide to VAX Language-Sensitive Editor and VAX Source Code Analyzer", August 1987.

The RUNOFF template currently looks for language help in the system help directory. You will have to create a help library by doing the following command:

```
LIBRARY/CREATE/HELP RNO.HLB RNO.HLP
```

and put the library into SYS\$HELP.

The RUNOFF template is fairly comprehensive, and should contain all of the commands in DSR as supplied with VMS; the help file is less so, and could really use some more help text.

This software also includes an LSE template for LSE. This template is a crude one, but was enough to greatly simplify the task of creating the RUNOFF template.

Notes: The language (RUNOFF) help file does not have help for every RUNOFF command.

Media (Service Charge Code): One RX50 Diskette (JA) Format: VAX/ANSI, 600' Magnetic Tape (MA) Format: VAX/ANSI

DECUS No: VAX-316 Title: VAXWindow Version: 1.00, January 1988

Submitted by: Andre Baskin, SysCon Corporation, Williamsburg, VA

Operating System: VAX/VMS V4.3, V4.5 Source Language: C Hardware Required: CRT Terminal Keywords: Utilities - VMS

Abstract: VAXWindow is an implementation of a windowing system under VMS. Using VAXWindow, one is able to create windows which allow sections of multiple virtual screens of output data to be displayed on one physical screen. The number of windows is limited by the number of subprocesses which the process is allowed to create. Commands exist which allow the user to manipulate existing windows and create new windows.

VAXWindow is able to execute any DCL command which does not require a terminal for output (i.e. is able to send output to a mailbox).

Notes: Operating system VAX/VMS V4.0 or later is required for SMGS.

Restrictions: Executing process must be able to create a sub-process.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VAX/ANSI

### NEW LIBRARY PROGRAMS AVAILABLE FOR THE PDP-11 COMPUTER FAMILY

DECUS No: 11-899 Title: FDC: Floppy Diskette Copy Version: 1, December 1987

Submitted by: K.F. Uhland, Scientific Micro Systems (SMS), Mountain View, CA

Operating System: RSX-11M V4.2B Source Language: MACRO-11 Memory Required: 32KW Keywords: Utilities - RSX-11

Abstract: This program reads a floppy diskette, creating an image file of it on the hard disk. The image file can then be used to recreate on a blank floppy an exact copy of the original diskette. The program is independent of floppy size (8", 5 1/4", etc.), capacity (number of logical blocks), format (RX01, RX02, RX03, RX50, RX33, etc.), file structure (ODS-1, ODS-2, DOS, RT-11, etc.), or the actual data on the diskette. Any floppy that can be read by the device driver, disk controller, and disk drive can be copied by FDC. In fact, an image file can be created of just about any random access device, provided space exists on the hard disk. Media to be copied are assumed to be free of hardware detectable errors.

Notes: Operating systems RSX-11M V4.0 and RSX-11M-PLUS V3.0 or higher is required. May also run on earlier versions of these operating systems.

Restrictions: Author's system uses full function executive, full duplex terminal driver; program may not run if less is available.

Media (Service Charge Code): One RX01 Diskette (KA) Format: FILES-11, 600' Magnetic Tape (MA) Format: FILES-11

DECUS No: 11-900 Title: FND - A Global Disk Utility Version: 1.0, December 1987

Submitted by: Richard Neitzel, Golden, CO

Operating System: RSX-11M V4.2 Source Language: FORTRAN 77, MACRO-11 Keywords: System Management - RSX-11, Utilities - RSX-11

Abstract: RSX users normally cannot use wildcard specifications to access different disks from one command line. FND allows the user to either specify a single class of devices (example, all DL drives) or by default use all drives. The system device structures are searched for mounted FILES-11 drives, matching the specified device name if supplied. Any legal PIP command is then performed on that disk. FND understands virtual disks, RAM disks, root-sysgen loaded disks, etc. FND is especially suited for the user with many directories scattered across disks and for system manager.

Media (Service Charge Code): One RX01 Diskette (KA) Format: FILES-11, 600' Magnetic Tape (MA) Format: FILES-11

**NEW LIBRARY PROGRAMS AVAILABLE  
FOR THE  
PROFESSIONAL-300 SERIES OF COMPUTERS**

**DECUS No:** PRO-171 **Title:** DSKDIR: Diskette Directory Utility **Version:** 1, December 1987

**Submitted by:** Michael Catania, Michael Catania Enterprises, Glen Cove, NY

**Operating System:** P/OS V3.0 **Source Language:** FORTRAN **77 Memory Required:** 77KW **Keywords:** Utilities - P/OS

**Abstract:** The DSKDIR utility is used to store information about your diskettes in an orderly fashion.

If you have more than fifty diskettes with your personal files on them, then this utility is for you. You can sort through the information by volume, file or extension.

There are two versions of the DSKDIR utility, one uses the P/OS Menu Facility, the other does not. You can also install the package from the toolkit (installation command files are supplied).

Both versions were developed under P/OS V3.0, but they should work for earlier versions, although no guarantees are implied.

**Media (Service Charge Code):** One RX50 Diskette (JA) Format: P/OS

**DECUS No:** PRO-172 **Title:** SIDE: Development Improvements for the PRO **Version:** 3.1, December 1987

**Submitted by:** Rolf T. Wilden, Philips Gmbhforschungslaborachen, 5100 Aachen, Federal Republic of Germany

**Operating System:** P/OS V3.1 **Source Language:** FORTRAN **77, MACRO-11 Memory Required:** 512KB **Software Required:** Native Toolkit, PRTIL, FORTRAN **Keywords:** Software Development

**Abstract:** Program development on the PRO is well supported, but a time consuming task. The main reasons for this situation are slow compilers, cluster libraries and the sophisticated task-builder. To change this situation takes very little effort. A faster FORTRAN compiler, the FTB, and a SYSLIB.OLB containing all modules for a certain field of applications (laboratory automation) can change the situation. This distribution contains all the tools to speed up your program development activities in the field of laboratory automation.

**Media (Service Charge Code):** Two RX50 Diskettes (JB) **Format:** FILES-11

**NEW LIBRARY PROGRAMS AVAILABLE  
FOR THE RAINBOW FAMILY OF COMPUTERS**

**DECUS No:** RB-129 **Title:** KRAMDEN Utilities **Version:** December 1987

**Submitted by:** Bryan Higgins, DHB Associates, Berkeley, CA

**Operating System:** MS/DOS **Source Language:** C **Keywords:** Utilities - MS/DOS

**Abstract:** The KRAMDEN Utilities are a set of programs for the Digital

Equipment Corporation Rainbow 100 running Operating System MS/DOS V2.0 or higher. Some of the functions include:

- File utilities, including alternatives to DIR, COPY, RENAME, and DEL.
- A file backup utility.
- A command editor which allows recall, edit and re-execution of previously typed DOS commands.
- A listing paginator for printers.
- A program which simplifies date and time settings when booting.
- Clock programs.

**Notes:** Operating System MS/DOS V2.0 or greater is required.

Sources not included.

**Media (Service Charge Code):** One RX50 Diskette (JA) **Format:** MS/DOS

**NEW UNIX SOFTWARE**

**DECUS No:** UX-102 **Title:** KIC2 **Version:** 2, October 1983

**Submitted by:** University of California at Berkeley, through Digital Equipment Corp.

**Operating System:** ULTRIX/UNIX **Source Language:** C **Keywords:** Artwork Editor, Graphics, Utilities - ULTRIX

**Abstract:** KIC2 is an interactive, two-dimensional, color graphics editor intended primarily for the mask level design of integrated circuits. KIC2 has been designed as a powerful, inexpensive, user-friendly graphics editor that will run on most low to medium performance graphics terminals. Data that is generated by KIC2 can be represented by an intermediate graphic description language, such as CIF (Caltech Intermediate Form) or Calma STREAM, which permits the data to be easily transported to other layout systems. Also, the geometric database used by KIC2 can be used to interface to other tools, such as a layout rules checking program.

**Notes:** This program was developed by the Computer-Aided Design Group, Department of Electrical Engineering and Computer Sciences, University of California-Berkeley.

**Restrictions:** U.S. Government export regulations prohibit the distribution of this program outside of the United States without the appropriate export license. UNIX V4.2, V4.3 or ULTRIX V1.1 is required.

**Media (Service Charge Code):** User's Manual (ED), 600' Magnetic Tape (MA) **Format:** TAR

**DECUS No:** UX-SP-101 **Title:** OCT Tools **Version:** 1, March 1987

**Submitted by:** University of California at Berkeley, through Digital Equipment Corp.

**Operating System:** ULTRIX/UNIX **Source Language:** C **Memory Required:** 40MB **Keywords:** Libraries - ULTRIX

**Abstract:** The OCT Tools are a collection of libraries which together form an integrated system for VLSI design. The system also includes tools for multi-level logic synthesis, standard-cell placement and routing, custom cell design, and a variety of utility programs for manipulating symbolic and geometric design

data. All tools are integrated with the OCT VLSI data manager and the VEM graphic user interface.

The ordering information for the manuals is as follows:

- . Order UX-SP-101 (EC) for the BDSYN-BDSIM User's Guide Manual
- . Order UX-SP-101 (ED) for the Berkeley CAD Tools User's Manual

**Notes:** Operating system ULTRIX V2.0 is required. This program was developed by the Computer-Aided Design Group, Department of Electrical Engineering and Computer Sciences, University of California-Berkeley.

**Restrictions:** U.S. Government export regulations prohibit the distribution of this program outside the United States without the appropriate export licenses.

**Media (Service Charge Code):** User's Manual (EC), User's Manual (ED), 2400' Magnetic Tape (PC) **Format:** TAR, TK50 Tape Cartridge (TC) **Format:** TAR

**REVISIONS TO LIBRARY PROGRAMS**

**DECUS No:** V-SP-53 **Title:** KERMIT Distribution **Version:** January 1988

**Author:** Various

**Submitted by:** Glenn C. Everhart, Ph.D.

**Operating System:** CP/M, IAS, MS/DOS, OS/278, OS/78, P/OS, RSTS/E, RSX-11M, RSX-11M-PLUS, RT, TOPS-10, TOPS-20, VMS **Source Language:** ALGOL, BLISS-16, BLISS-32, BLISS-36, C, FORTRAN 77, FORTRAN IV, FORTRAN IV-PLUS, MACRO-10, MACRO-11, MACRO-32, PASCAL, VAX-11 BASIC, VAX-11 FORTRAN **Keywords:** Data Communications, KERMIT

**Abstract:** This TWO tape collection contains a VMS Backup distribution made from a KERMIT distribution from Columbia University dated January 14, 1988. The TWO tape collection contains all KERMITs known to Columbia as of that date plus a large amount of documentation.

The Columbia distribution is on five (5) reels of tape. To reduce costs, the distribution has been placed on TWO (2) reels of tape for DECUS, in VMS/BACKUP format at 1600 BPI. Because the distribution has grown too large for a single reel, compression was not attempted. All KERMITs are here as distributed by Columbia University. The new MS/DOS KERMIT (V2.3), a new universal IBM Mainframe KERMIT, and an update to C KERMIT are present on this collection as recent additions. Complete KERMIT documentation and booting instructions are on the tape. No paper documentation is needed. Files beginning with AA\* should be looked at first for an overview of what's here.

**Changes and Improvements:** Later versions of many KERMIT implementations.

**Media (Service Charge Code):** 2400' Magnetic Tapes (PB) **Format:** VMS/BACKUP, TK50 Tape Cartridge (TC) **Format:** VMS/BACKUP

**DECUS No:** V-SP-59 **Title:** DATATRIEVE/4GL SIG Library **Collection Version:** February 1988

**Author:** Members of the DTR/4GL SIG

**Submitted by:** Bart Z. Lederman, WU World Communications

**Operating System:** P/OS V2.0, RSX-11M, RSX-11M-PLUS V2.1, VAX/VMS V4.5 - V4.7 **Source Language:** C, DATATRIEVE, FORTRAN 77, MACRO-11, MACRO-32, VAX FORTRAN **Software Required:** Some portions use MACRO-32 or FORTRAN; most require only DATATRIEVE. **Keywords:** DATATRIEVE, Plotting, System Accounting - VMS, System Management - VMS

**Abstract:** This is a combined effort by the DATATRIEVE/Fourth Generation Languages SIG to produce a library of items related to or using DATATRIEVE. (\*\* Indicates new material for Fall 1987 through February 1988).

[ACCOUNTING] Programs to convert System Accounting and PSI Accounting data to a normalized form readable by DTR (and other languages) with record definitions.

\*\*Enhanced to include login failures and image accounting. Also has a procedure to measure terminal usage (an Erlang traffic study on terminal sessions).

[ALL-IN-1] Contains DTR definitions to work ALL-IN-1 logging and data files. The document database also works with WPS-PLUS/VMS. \*\*Contains some revisions and improvements for Fall 1987.

[CORPHONE] DTR replacement for the ALL-IN-1 corporate phone directory which also works quite well on its own.

[FUNCTIONS] User defined functions including SPAWN and FN\$STR\_LENGTH plus DTR procedures for cata-logging, defining, and generating functions. \*\*Some new functions for Fall 1987.

[NEWSLETTERS] Machine readable past issues of the "Wombat Examiner" newsletter.

[PLOTS] Additional PLOTS and articles on adding your own plots.

[RECALL] Use SMG to give you command line recall while using DTR plus DAB definitions in "C", MACRO-32.

[RSX\_ACCOUNTING] Process RSX-11M-PLUS system accounting with DTR also RSX console logs, and a routine for all PDP-11's to convert DTR (and VMS) DATE types to/from ASCII outside of DTR.

[SESSIONS] Transcriptions of some symposia sessions.

[SYSMGR] \*\*DTR definitions for Disk Quotas, SYSUAF, rightslist, network proxy logins, etc. Plus a method of processing an INSTALL/LIST/FULL listing to find out which are the most used images, shared images, etc. Procedures to record the login history of users on a system and terminal/line usage. (Also a FORTRAN program to do this if you don't have DTR).

**Changes and Improvements:** Improved VMS System Accounting and improved ALL-IN-1 definitions.

Restrictions: Some portions of the collection are VMS specific and will not operate on PDP-11's.

Media (Service Charge Code): 600' Magnetic Tape (MC) Format: VMS/BACKUP

DECUS No: VAX-66 Title: NANNY Version: V2.4, January 1988

Submitted by: Daniel Zirin, ZAR Limited, Pasadena, CA

Operating System: MicroVMS V4.1, V4.3, V4.5, VAX/VMS V4.1, V4.3 - V4.6 Source Language: VAX FORTRAN Memory Required: 128KB Keywords: System Management - VMS, Utilities - VMS

Abstract: Intended for VAX/VMS system managers, Nanny a detached system process, gives your VAX the attention needed to survive the harshest user environment. Able to manage memory, monitor disks and queues, schedule processes to avoid CPU hogs, seek and destroy idle users, and send wake-up calls, NANNY can be instructed to be strict or lax with your VAX using parameter files that may be dynamically changed anytime after startup. Why settle for a "Watchdog" when the best system managers hire a proper English Nanny. Remember: "A VAX without a Nanny is like a child without a mother." Sad but true.

Notes: Requires many VMS privileges.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP, or order VAX-LIB-2

DECUS No: VAX-129 Title: FORTRAN Programming Tools Version: III.3, December 1987

Submitted by: A. Ragosta & L. Jurgeleit, US Army ARTA, MS 219-3, Moffett Field, CA

Operating System: VAX/VMS V4.5 Source Language: DCL, FORTRAN 77, MACRO-32, TPU Memory Required: Varies Keywords: Debugging, System Management - VMS, Tools - Software Development

Abstract: The FORTRAN Programming Tools are a series of tools used to support the development and maintenance of FORTRAN source codes. Included are a debugging aid, source code maintenance aids, print utilities, a CPU time monitoring program, a NAMELIST-like package, a general purpose filter, a text editor, and a library of useful, well-documented routines. These tools assist in reducing development time and encouraging high quality programs. Although intended for FORTRAN users, some of the tools can be used on data files or other programming languages.

Changes and Improvements: Bug fixes, efficiency improvements, new library routines.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP, or order VAX-LIB-4

DECUS No: VAX-150 Title: EVEPlus Version: May 1987

Author: Terry Dow

Operating System: VAX/VMS V4.4 Source Language: VAX/TPU Software Required: EVE, TPU Keywords: Tools - Applications Development, Utilities - VMS

Abstract: This is an upgrade to the EVEPlus package that will extend the already powerful EVE editor based upon operating system VAX/VMS V4.X TPU (Text Processing Utility). EVEPlus provides a number of new commands to EVE, but more importantly it serves as a superb example of how to customize EVE much in the same way the EDTINLEDT file customized the EDT editor. This specific addition adds a few new commands and also initiates a standard keyboard command assignment that should make it easier to move from one VMS system to another. Due to EVE's nature, refining and extending EVEPlus and the proposed keyboard is highly desirable, yet a forum such as DECUS is needed to distribute 'the keyboard'.

An internal SHIFT HELP buffer is created while the keyboard definitions are being made so that it is easy to see the new assignments by hitting the SHIFT HELP key. A forward delete character is available on keypad 6, placing the character in a separate area than the INSERT HERE buffer. The separate area is restored by hitting SHIFT INSERT. "Delete word" deletes from the current position to the end/beginning of word and is kept in the same place as the forward delete character is saved. A ruler is quickly inserted into text to aid in counting characters and/or adjusting column alignments. Three profiles are defined: Text, FORTRAN, and PASCAL. (others are easily added) so that rulers, margins, etc., are changed together. For example, FORTRAN sets the right margin to 72 and the ruler is prefixed with a C so if it is left in by accident it is treated as a comment. A

"transpose last two characters command" is added to help with my typing impediment. Setting left and right margins is easier by letting it default to the current column the cursor is in. Writing out files while remaining in the editor is easier by letting it default to the buffer's file name, also making it easy to update the currently edited file without exiting. A page command is added to make it easy to jump to the next form feed. When going to a line number or marker EVEPlus remembers the last one that was referred to.

Notes: Operating system VAX/VMS V4.0 or later is required along with TPU, (Text Processing Utility).

Changes and Improvements: This is an upgrade to the EVEPlus package.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP, or order VAX-LIB-4

DECUS No: VAX-234 Title: FED: A FORTRAN Editor Version: 4.0, February 1988

Submitted by: Ronald L. Williams, Southwest Research Institute, San Antonio, TX

Operating System: MicroVMS V4.6, VAX/VMS V4.6 Source Language: TPU, VAX FORTRAN Software Required: FORTRAN Hardware Required: VT100 or VT200 Series Terminal Keywords: Editors

Abstract: FED is an editor written specifically to create and edit FORTRAN source code. It features user definable text segments, auto-continuation at column 72, a comment mode and several other features which make entering FORTRAN code easier. Additionally, FED allows the user to compile source code without leaving FED. FED was written using TPU and bears some relation to EVE.

This version adds a Hewlett Packard type calculator, moves the text segment feature from a FORTRAN program to a TPU procedure making it much faster. The Hewlett Packard calculator is handled with a CALLUSER routine written in FORTRAN. Text segments are editable while using FED, allowing them to be defined on the fly. A number of procedures have been cleaned up and streamlined. The Goto Line function now has relative as well as absolute moves. A function, "Where", has been added which indicates the current line and column number. The ability to remove trailing blanks when writing out buffers is also a new feature.

Changes and Improvements: Adds a Hewlett Packard type calculator, moves the text segment feature from a FORTRAN program to a TPU procedure.

Media (Service Charge Code): User's Manual (EA), 600' Magnetic Tape (MA) Format: VAX/ANSI, or order VAX-LIB-7

DECUS No: VAX-252 Title: KEYPADS Version: November 1987

Submitted by: Ronald William Burke, Westinghouse Electric Corporation, Baltimore, MD

Operating System: MicroVMS V4.X, VAX/VMS V4.X Source Language: DCL Keywords: Tools - Applications Development

Abstract: The program KEYPADS graphically displays the contents of a keypad. The keypad state name refers to which keypad state you wish to output the keypad settings. If omitted or given no value, then the current keypad state is assumed. If you use an \* in this field, then the legend keypad (which outputs the name of every key in the keypad) will be output instead.

The keypad portion symbol refers to which portions of your keypad are to be displayed. If omitted or given no value, then the entire keypad is assumed. If you use a { or } (or the default |) in this field, then either the left and/or right halves of the keypad are output to you. The left part of the keypad has the arrow keys, the E keys, and the F keys. The right part of the keypad is the traditional VT100 series keypad (the PF keys, the KP keys, etc.).

Changes and Improvements: More supporting routines and documentation included.

Media (Service Charge Code): 600' Magnetic Tape (MA) Format: VMS/BACKUP

DECUS No: VAX-256 Title: DM/SD/WPE/COLORS Version: December 1987

Submitted by: Dale E. Coy, Los Alamos National Laboratory, Los Alamos, NM

Operating System: VAX/VMS V4.6 Source Language: DCL, FORTRAN 77, MACRO-32, TPU, VAX FORTRAN Hardware Required: DM&SD needs VT52 or ANSI-compliant or Digital Equipment Corporation terminal. WPE needs VT1XX or VT2XX compliant terminal. COLORS needs ReGIS compliant color terminal (VT241/VT340). Keywords: Editors, Terminal Handler, Terminal Management

Abstract: This submission contains three sub-directories:

- . DM&SD (Directory Manager and Set Default)
- . WPE (Word-Processing-Like Editor)
- . COLORS (VT241/VT340 Colors Management)

DM (Directory Manager V7.2A) is a utility which allows you to more easily manage, clean up, and otherwise work with your files and directory structure. DM is particularly useful if you have large numbers of files or sub-directories and is helpful in encouraging users to clean up their directories (by making it easy to do so). It is invaluable for sorting through the DECUS SIG tapes after they have been loaded. DM displays the files in your current directory (or your directory tree). With one or two keystrokes you can do most major DCL commands: delete, copy, purge, print, edit, view, rename, etc. The keystrokes are ALL-IN-1 like. Your favorite editor may be used from DM. The SMG\$ interface is used for terminal independence and efficiency. Full on-line help and extensive documentation are provided.

SD (Set Default V4.3A) is a utility which shortens the commands for SET DEFAULT and SHOW DEFAULT and expands the capabilities of the SET DEFAULT command. In addition to less typing, SD provides convenient movement between directories, a "stack" of 20 directories, an interactive display of your directory tree, and much more. SD is implemented in FORTRAN for speed, and uses the SMG\$ screen interface. Full on-line help and extensive documentation are provided.

WPE (Word-Processing-Like Editor V2.4) WPE is almost a full implementation of WPS-PLUS (TM) for editing ASCII files. WPE is an extremely powerful text editor. In addition to full-feature editing, searching, replacing, etc., WPE provides two-window editing, the most useful features of EVEPlus, and several other extensions. Included are some Language Sensitive features for editing .COM files. A "read-only" option, called MORE, is an outstanding replacement for the TYPE command. It's easy to "get started" with WPE, but a large set of advanced features are available to the curious user. Full on-line help and extensive documentation are provided. An additional advantage of WPE is that the user who uses WPS-PLUS has essentially the same keyboard interface to WPE (avoids having to remember several editors).

Features include:

- . All of WPS-PLUS that is reasonable (full function editing).
- . Two-window editing.
- . Multiple files.
- . Bookmarks.
- . Insert and examine special characters.
- . Print files with special characters.
- . Fix up files by removing CR/LF.
- . Automatic tailoring for .COM, .HLP, .FOR, and .TPU files.
- . Read-only interface (called MORE).

WPE is written in VAXTPU and built on EVE, so it's inherently extendable. DM, SD, and WPE work well together, or separately.

COLORS (Colors Management V4.1) is a suite of programs for managing and setting "default" colors for ReGIS color terminals. Having a VT241, VT-340 (or other color ReGIS terminal) is much more fun if you use color combinations other than red, blue, green. These programs make it easy for the user to control his/her terminal colors. A side effect is the provision of a

"system default" set of pleasant colors.

- . CO Gets any user some set of colors.
- . OCO Used if terminal is garbaged - fixes terminal and restores colors.
- . NCO Gets a new set of random, contrasting colors.
- . CCO Gets a new set of random, complementary colors.
- . SCO Gets a new set of random, similar (soft) colors.
- . PCO Lists 64 choices and lets the user pick a color.
- . XCO An interactive/visual user chooser.

These programs are lots of fun (if you have a VT-241 or VT-34C terminal), and the PCO and XCO programs have a nice user interface.

The submitter welcomes comments, suggestions, etc. Bug fix requests will also be considered.

**Notes:** If operating system VAX/VMS V4.4 or less is used, a FORTRAN Compiler is required after modifying the source code of DM and SD. Full documentation is provided for all of the programs, in .TXT, .WPL (for WPS PLUS), and .LN03 (very fancy) forms. Two memory cartridges are required to print the .LN03 files.

**Changes and Improvements:** All programs now recognize VT-300 terminals. In particular, the Colors programs have been extensively modified for the VT-340 terminal. It is possible to disable dynamic highlighting for DM and SD, for faster execution (useful on slow, dial-up lines). Other feature enhancements and minor bug fixes.

**Media (Service Charge Code):** 600' Magnetic Tape (MA)  
**Format:** VMS/BACKUP

**DECUS No:** VAX-286 **Title:** VIEW **Version:** 5.0, December 1987

**Submitted by:** C.J. Chapman, Philips Defence Systems, Crawley, Sussex, England

**Operating System:** MicroVMS V4.6, VAX/VMS V4.6 **Source Language:** MACRO-32 **Memory Required:** 13.8KB **Virtual Allocation Hardware Required:** VT200 Series terminal **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.

**Changes and Improvements:** Process Alternate facility.

**Media (Service Charge Code):** 600' Magnetic Tape (MA)  
**Format:** VMS/BACKUP

**DECUS No:** VAX-304 **Title:** DISPLAY\_\_OPEN\_\_FILES **Version:** 2, February 1988

**Submitted by:** Rick Orr, The Jonathan Corporation, Norfolk, VA **Operating System:** MicroVMS V4.5, VAX/VMS V4.5 **Source Language:** MACRO-32, VAX FORTRAN **Keywords:** File Management, Utilities - VMS

**Abstract:** DISPLAY\_\_OPEN\_\_FILES uses the system service GETFWA (Get File Work Area) to display all files open to the image or open to the process for all process/images running on the system or for specific ones based on pid number.

The GETFWA system service is written like the VMS system service GETJPL. The GETFWA system service will retrieve information about the files open to the process/image based on the item list supplied to it. The service does this by accessing impure data areas (PIO\$GW\_\_HOIMPA/PIO\$GW\_\_PIOIMPA) located in P1 address space. The user of this program will need the proper privileges to use this program for access to other processes P1 address space. For more information on GETFWA please read GETFWA.TXT which describes the call in more detail.

DISPLAY\_\_OPEN\_\_FILES will retrieve the following information and display it to the screen:

- . The user name
- . The file name
- . The current key buffer value for index files
- . The global hit count
- . The global miss count

A description of the files follows:

- .DISPLAY\_\_OPEN\_\_FILES.FOR. .OBJ, .EXE FORTRAN program that is linked with the sharable image JONATHAN\_\_USSDISP.
- .JONATHAN\_\_USSDISP.MAR, .OBJ, .EXE GETFWA entry point.
- .USSLNK.COM Command procedure used to link and install JONATHAN\_\_USSDISP.
- .USSINSTALL.COM Command procedure used to install JONATHAN\_\_USSDISP.
- .SYSMAC.COM Command procedure to compile the JONATHAN\_\_USSDISP program.
- .GETFWA.TXT Description of the GETFWA system service.

**Notes:** Operating System MicroVMS V4.X or higher is required. Operating System VAX/VMS V4.X or higher is required. The program uses hard coded data structures offsets.

**Changes and Improvements:** Fixed bug which would cause system to crash if user key length buffer was smaller than actual size of key. Changed output to terminal.

**Media (Service Charge Code):** 600' Magnetic Tape (MA) **Format:** VMS/BACKUP, or order VAX-LIB-8

**DECUS No:** 11-845 **Title:** RDIR/SQMAP/OVRLAY & Utilities **Version:** December 1987

**Submitted by:** H. Reints, AKZO PHARMA NED. B.V., Dept. SDA UC-232, 5340 BH OSS, Netherlands

**Operating System:** RT-11 V5.4, TSX-PLUS V6.2 **Source Language:** FORTRAN IV, MACRO-11 **Memory Required:** 28KW **Software Required:** FORTRAN IV compiler, MACRO-11 **Keywords:** Utilities - RT-11

**Abstract:** OVRLAY is the long desired generator of good and consistent compact RT-11 overlay structures. It reads the object files and then provides detailed structure information, such as an object file cref. and tree structure, a listing of overlay restrictions, and it provides two different algorithms to generate overlay structures.

RDIR is a program that generates ASCII formatted dumps of the directory segments of an RT-11 volume. This can be very useful to search through directory segments after a crash. It is much easier than DUMP, because of the formatted output. RDIR performs several directory operations such as creating or deleting directory segments without initializing the volume, skipping a corrupted segment, deleting a named file, patching a directory segment, splitting/ merging files, and many other options.

SQMAP is a program to squeeze load maps of overlaid FORTRAN programs into a readable format removing all globals with dollars or periods, leaving only your own subroutine names and the segment sizes. It also produces a one page plot of the overlaid memory usage and an optional cref. SQMAP is very useful in combination with OVRLAY.

**Other utilities included:**

- . CALCUL VT100 calculator program.
- . CLOCK Real-time VT100-clock program.
- . DISASM SAV file disassembler.
- . GONLIB Goniometric library, used by CALCUL.
- . HRLIB General purpose library, used by many of the utilities.
- . HRMAC Useful macro library.
- . INCLUD FORTRAN-IV pre-processor to update COMMON areas.
- . SEARCH Keyword search utility.
- . UCL User Command Language for RT-11 V5 or later.

**Changes and Improvements:** Improved functionality of RDIR new utility: OVRLAY, to generate RT-11 overlay structures.

**Assoc. Documentation:** RT-11 Documentation Kit

**Media (Service Charge Code):** Two RX50 Diskettes (JB) **Format:** RT-11

**DECUS No:** 11-490 **Title:** TSXLIB: A FORTRAN Callable Library Implementation of EMTs for TSX-PLUS **Version:** December 1987

**Submitted by:** N. A. Bourgeois, Jr., NAB Software Services, Inc., Albuquerque, NM

**Operating System:** RT-11 V5.4, TSX-PLUS V6.2 **Source Language:** FORTRAN IV, MACRO-11 **Software Required:** FORTRAN IV or FORTRAN 77 **Hardware Required:** MMU to support TSX-PLUS **Keywords:** FORTRAN, Libraries - RT-11

**Abstract:** TSXLIB is a library of FORTRAN callable routines that implement the TSX-PLUS system services which are unique to TSX-PLUS. The library has been updated to include all TSX-PLUS unique services through TSX-PLUS V6.2.

Like RT-11, TSX-PLUS offers the MACRO-11 programmer a number of system services. These services are implemented via both the RT-11 programmed requests (for those services common to both RT-11 and TSX-PLUS) and raw EMT instructions (for those unique to TSX-PLUS). RT-11 makes its system services available to the FORTRAN programmer through the system subroutine library, SYSLIB. TSX-PLUS also honors the bulk of the service requests in the SYSLIB routines. TSXLIB, however, makes the TSX-PLUS unique EMTs available to the FORTRAN programmer.

These TSX-PLUS library routines provide facilities to support communication lines, detached jobs, device allocating and de-allocating, file structured device mounting and dismounting, communication between running programs, job privileges control, job status monitoring, program performance analysis, real time program execution, shared runtime systems, shared files, special files information, spooler control, subprocess control, system status information, communication between running programs and a terminal, program control of the terminal, ODT activation mode, user name control, windowing, and several miscellaneous EMTs.

The TSXLIB distribution kit includes the MACRO-11 source modules for all the routines, a user's manual in machine readable form, an indirect command file to build the library, and the implemented library.

**Changes and Improvements:** Bug Fixes.

**Media (Service Charge Code):** One RX02 Diskette (LA) **Format:** RT-11, 600' Magnetic Tape (MA) **Format:** RT-11

**DECUS No:** PRO-150 **Title:** APPELM - Mandelbrot Set Explorer **Version:** 2, December 1987

**Author:** R.J. Wilden and Glenn Everhart

**Operating System:** P/OS **Source Language:** FORTRAN 77 **Keywords:** Graphics

**Abstract:** APPELM displays in graphical form the so called Mandelbrot\_\_Set. With the help of a 'graphic-microscope', the complex-plane can be scanned for nice looking pictures.

When you use the graphic-microscope, the cursor position is the origin of a new picture. You can change the origin with the four Cursor-Keys and select a specific origin with the Select-Key. To continue with a new frame, you have to press the Resume-Key. When you intend to save a picture on disk, be sure to have enough space. The disk-space used for GIDIS-Metafiles is enormous.

**Changes and Improvements:** Added version with faster evaluation of pointer in Mandelbrot\_\_Set. Original version present intact also.

**Media (Service Charge Code):** One RX50 Diskette (JA) **Format:** P/OS

DECUS No: PRO-163 Title: PROPLOT Version: 3.1. December 1987

Submitted by: Ronald Getts, BFGoodrich R&D, Brecksville, OH

Operating System: P/OS V2.0A Source Language: FORTRAN 77 Memory Required: Standard Hardware Required: LA50 or LVP16 (HP7475 or HP7470) if hard copy desired. EBO and color monitor helpful, but not required. Keywords: Graphics, Plotting

Abstract: This diskette contains software developed at BFGoodrich R&D in Brecksville, OH, for the PRO-350.

PROPLOT does least squares curve fitting to polynomial equations, graphs the resulting curves on the monitor, and has provisions for hard copy to an LA50, LA100 or Digital Equipment Corporation (HP) two or six pen plotter.

PROPLOT V3.1 automatically supports color monitor and/or HP7475, HP7470, HP7440 or Digital Equipment Corporation LVP16 plotters, if present. This provides color graphics support.

Data can be input from the keyboard or from a data file. The program asks the user questions regarding parameters and allows creation of data files for later recall. Scaling is automatic or controlled by the user.

PROPLOT V3.1 supports .CTL file for repetitive re-plotting of same data sets. The .CTL file contains the answers to the questions PROPLOT asks. See CTL.DOC for details.

Notes: Operating system P/OS V2.0 or higher is required.

Changes and Improvements: Control files, additional plotter support.

Media (Service Charge Code): User's Manual (EA), One RX50 Diskette (JA) Format: FILES-11

#### DECUS Program Library Catalog Changes:

These corrections are to be made to the 1987/1988 Software Catalog.

. DECUS No: VAX-91, Title: SPLICE: A Mixed-Mode Simulation Program and DECUS No: VAX-92, Title: WOMBAT: A Netlist Comparison Program are no longer available on DECUS No: VAX-LIB-3 Title: VAX Library Collection 3. . DECUS No: VAX-92, Title: WOMBAT: A Netlist Comparison Program and DECUS No: VAX-174, Title: PLA TOOLS, please include the following note:

"Restrictions: U.S. Government export regulations prohibit the distribution of this program outside the United States without the appropriate export licenses."

. DECUS No: VAX-6, Title: SPICE 3 A6, DECUS No: VAX-44, Title: KIC2 and CIF to STRM; STRM to CIF Utilities, DECUS No: VAX-91, Title: SPLICE: A Mixed-Mode Simulation Program, DECUS No: VAX-92, Title: WOMBAT: A Netlist Comparison Program, DECUS No: VAX-141, Title: RELAX2.2: An Analysis of Metal-Oxide Semiconductor Integrated Circuits (MOS), DECUS No: VAX-174, Title: PLA TOOLS, DECUS No: VAX-216, Title: SPICE2, and DECUS No: VAX-235, Title: CAYENNE, please include the following:

"Note: This program was developed by the Computer-Aided Design Group, Department of Electrical Engineering and Computer Sciences, University of California-Berkeley".

#### CATALOG INSTRUCTIONS:

These corrections are to be made to the 1987/1988 Software Catalog.

DECUS No. VAX-163, Title: Escape From Manhattan. . Add the initial M. to the submitter's name.

. Add the following paragraph before "Restrictions..."

"The submitter would appreciate comments or suggestions about this program and has invited anyone who has solved the game to send him a dated listing of his name, score(s), and positive proof that he has indeed solved the game (i.e., how each puzzle was solved to get the President out). A list of such "winners" will be compiled, to be published with future versions of ESCAPE."

These corrections are to be made to the 1987/1988 Software Catalog.

DECUS No. 11-490, Title: TSXLIB: A FORTRAN Callable Library Implementation of EMTs for TSX-PLUS V6.0:

. Add to Media (Service Charge Code):

"Two RX50 Diskettes (JB) Format: RT-11".



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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:

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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.

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Abstract: (Please limit to one or two short sentences.)

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DTR/4GL SIG Spring 1988  
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S88-11	_____	S88-33	_____
S88-12	_____	TEAMDATA	(+-0)
S88-13	_____	S88-34	_____
S88-14	_____	S88-35	_____
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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.

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IAS WHIMS

WHAT: (Describe your WHIM) (Please print or type)

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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

- |                                    |                                |                              |                               |   |   |
|------------------------------------|--------------------------------|------------------------------|-------------------------------|---|---|
| <input type="checkbox"/> Debug     | <input type="checkbox"/> Bliss | <input type="checkbox"/> CMS | <input type="checkbox"/> TPU  | <input type="checkbox"/> C                | <input type="checkbox"/> Test Manager                                       |
| <input type="checkbox"/> Pascal    | <input type="checkbox"/> Basic | <input type="checkbox"/> MMS | <input type="checkbox"/> EVE  | <input type="checkbox"/> Ada <sup>1</sup> | <input type="checkbox"/> Runoff & DSR                                       |
| <input type="checkbox"/> Fortran   | <input type="checkbox"/> Cobol | <input type="checkbox"/> LSE | <input type="checkbox"/> EDT  | <input type="checkbox"/> APL              | <input type="checkbox"/> T <sub>E</sub> X & L <sub>A</sub> T <sub>E</sub> X |
| <input type="checkbox"/> Document  | <input type="checkbox"/> Dibol | <input type="checkbox"/> SCA | <input type="checkbox"/> TECO | <input type="checkbox"/> RPG              | <input type="checkbox"/> Cobol Generator                                    |
| <input type="checkbox"/> VAX Notes | <input type="checkbox"/> Emacs | <input type="checkbox"/> PCA | <input type="checkbox"/> PL/I | <input type="checkbox"/> Scan             | <input type="checkbox"/> 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.

<sup>1</sup>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):

- |                                    |                                |                              |                               |   |   |
|------------------------------------|--------------------------------|------------------------------|-------------------------------|---|---|
| <input type="checkbox"/> Debug     | <input type="checkbox"/> Bliss | <input type="checkbox"/> CMS | <input type="checkbox"/> TPU  | <input type="checkbox"/> C                | <input type="checkbox"/> Test Manager                                       |
| <input type="checkbox"/> Pascal    | <input type="checkbox"/> Basic | <input type="checkbox"/> MMS | <input type="checkbox"/> EVE  | <input type="checkbox"/> Ada <sup>1</sup> | <input type="checkbox"/> Runoff & DSR                                       |
| <input type="checkbox"/> Fortran   | <input type="checkbox"/> Cobol | <input type="checkbox"/> LSE | <input type="checkbox"/> EDT  | <input type="checkbox"/> APL              | <input type="checkbox"/> T <sub>E</sub> X & L <sub>A</sub> T <sub>E</sub> X |
| <input type="checkbox"/> Document  | <input type="checkbox"/> Dibol | <input type="checkbox"/> SCA | <input type="checkbox"/> TECO | <input type="checkbox"/> RPG              | <input type="checkbox"/> Cobol Generator                                    |
| <input type="checkbox"/> VAX Notes | <input type="checkbox"/> Emacs | <input type="checkbox"/> PCA | <input type="checkbox"/> PL/I | <input type="checkbox"/> Scan             | <input type="checkbox"/> 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:

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Newsletter                 | <input type="checkbox"/> Symposium Sessions       | <input type="checkbox"/> Pre-Symposium Seminars |
| <input type="checkbox"/> Masters Program            | <input type="checkbox"/> Working Group Activities | <input type="checkbox"/> Session Notes          |
| <input type="checkbox"/> Information Folder         | <input type="checkbox"/> SIG Tape                 | <input type="checkbox"/> DECUS Store Item       |
| <input type="checkbox"/> 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. \_\_\_\_\_

Mail to: Shava Nerad, L&T Wishlist Coordinator, MIT, 77 Mass Ave. W91-219A, Cambridge, MA 02139; (617)253-7438





# DATAGRAM

DATAGRAMs are short messages, comments, requests, or answers that are published in NETworks. 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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Stamp  
Here

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E. Catherine Ditamore  
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Philadelphia, Pa. 19107

**RT-11 WISH LIST SURVEY**

Name (optional) \_\_\_\_\_

Address (optional) \_\_\_\_\_

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 | _____ |
| 2.17 | _____ | 3.7m | _____ | 3.10j | _____ | 4.7i  | _____ |      | _____ |
| 2.18 | _____ | 3.7n | _____ | 3.10k | _____ | 4.7j  | _____ |      | _____ |
| 2.19 | _____ | 3.7o | _____ | 3.10l | _____ | 4.7k  | _____ |      | _____ |
| 2.20 | _____ | 3.7p | _____ | 3.10m | _____ | 4.7l  | _____ |      | _____ |
| 2.21 | _____ | 3.7q | _____ | 3.10n | _____ | 4.7m  | _____ |      | _____ |
| 2.22 | _____ | 3.7r | _____ | 3.11a | _____ | 4.7n  | _____ |      | _____ |
| 2.23 | _____ | 3.7s | _____ | 3.11b | _____ | 4.7o  | _____ |      | _____ |
| 2.24 | _____ | 3.7t | _____ | 3.12  | _____ | 5.1a  | _____ |      | _____ |

Send Responses to: RT-11 Wish List Survey  
 Multiware, Inc.  
 2121-B Second St. Suite 107  
 Davis, CA 95616



## System Improvement Request Submission form

Page 1 of \_\_\_\_\_

---

Submittor:

Firm:

Address:

Phone:

---

How to write an SIR:

Describe the capability you would like to see available on VAX systems. Be as specific as possible. Please don't assume we know how it's done on the XYZ system. Justify why the capability would be useful and give an example of its use. If you wish, suggest a possible implementation of your request.

---

Abstract (Please limit to four lines):

---

Description and examples (use additional pages if required)

PAGESWAPPER - April 1988 - Volume 9 Number 9  
System Improvement Request Submission Form

Tear out or photocopy reverse to submit an SIR

Mark D. Oakley  
Battelle Columbus Division  
Room 11-6-008  
505 King Avenue  
Columbus, Ohio 43201-2369  
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