

# 12-BIT ARTICLES . . . .

DECUS 12 BIT NEWS  
=====

NUMBER 46

MAY 1984

-----  
Contributions and correspondence should be sent to:

Robert Hassinger, 12 Bit Coordinator  
c/o DECUS MR2-3/E55                    ..or.. Liberty Mutual Research Center  
One Iron Way                            71 Frankland Road  
Marlboro, MA 01752                    Hopkinton, MA 01748

(Please include reference to Newsletter number and page when inquiring about material published.)

## NEWSLETTER SUBMISSIONS

Submissions are accepted at all times and are normally used in the next issue to go to press regardless of date of receipt.

Material submitted in machine readable form is particularly desirable because it can be edited and incorporated into the newsletter format more easily. Higher quality reproduction is also possible this way. Contact Bob Hassinger for further details on acceptable media and formats if you plan to make a submission in machine readable form.

## IN THIS ISSUE...

There is some very exciting news this time. DEC has finally made OS/278 for the DECmate II available and they did it by submitting it to the DECUS Program Library so you can get the whole system including an improved version of BASIC, a new full screen scrolling editor and FORTRAN for just the DECUS reproduction charge.

Because I am the 12 Bit Librarian for the DECUS Program Library I have been very active since the release working with it and converting OS/8 Library programs for it. There are several articles based on my initial experiences and contacts with the developers.

Also of great interest to many users will be the news that John Easton has placed his very sophisticated Pascal-OS/8 package in the public domain and submitted it to the DECUS Library.

There is also an article reviewing the history of the OS/8 family of operating systems that is intended to clear up some of the confusion about the relationship of the various system designations that have been used over the last 14 years.

## 12 BIT COMMITTEE

---

Robert Hassinger  
- address above -  
(617) 435-9061

COS/DIBOL and WPS liason  
Lawrence H. Eisenberg  
17141 Nance Street  
Encino, California 91316  
(818) 788-0354

Education, Multiuser systems, PASCAL  
Father Geoffrey Chase O.S.B.  
Portsmouth Abbey School  
Portsmouth, RI 02871  
(401) 683-2000

Representitive to DECUS Product Planning Committee  
Jim van Zee  
Lab Data Systems  
10320 Ravenna Ave NE  
Seattle, Washington 98125  
(206) 522-6950

12 Bit Software Project  
Wally Kalinowski  
The Aerospace Corporation  
PO Box 92957  
Los Angeles, CA 90009  
(213) 648-6940

## DECMATE II OS/278 AVAILABLE!

---

Since the last Newsletter there has been a major breakthrough in the area of OS/8 for the DECmate II. DEC has submitted DECmate II OS/278 to the DECUS library! Ever since work started on the DECmate II DEC has had a version of OS/8 working on it because they needed it for their own development work. The problem has been that it was never released as a product. Apparently a good many copies of various versions have circulated unofficially but nothing has been formally available to the general public, either as a DEC product or otherwise.

DEC recently decided not to market OS/278 as a product and that allowed it to be submitted to the DECUS Program Library. The version that was been submitted is designated Version 2 to distinguish it from the preliminary versions that circulated before.

The DECUS order number for OS/278 is DM-101 and it comes on three RX50 diskettes. I do not have the media code yet or the DECUS pricing for RX50s so you will have to check with them when you place your order. There are a set of

text files on the discs that summarize the new features and changes from the OS/8 version 4 release. In addition to those notes, you will want to have an OS/8 User's Manual for the full OS/8 version 4 documentation. It can be ordered from DEC (not DECUS) under order number AA-5748C-TA.

The catalog abstract reads as follows. "OS278 V2.0 is a software system designed to support the PC200 (i.e. DECmate II - RH) OS278 provides an extensive collection of application software development tools and an efficient run-time environment for the production use of these application programs. OS278 is controlled through a Concise Command Language (CCL) that simplifies program development and execution."

In terms of microcomputer and personnel computer software, this is one of the best bargains you can find. For the DECUS reproduction charge for three RX50 diskettes, you get a complete updated OS/8 family operating system including utilities, FORTRAN, a new full screen editor and a new, upgraded version of BASIC. Keep in mind that this is a compiled BASIC, not just an interpretive one like many of the popular microcomputer versions of BASIC, which means your BASIC programs run much faster. The package even includes support for the Winchester disk option.

Here are a few of the most interesting notes about the new release.

- o - The system (Keyboard Monitor, CCL, Command Decoder, and system programs) now will accept lower case inputs. This is the first version of OS/8 that could do this and it is very nice now that we are using it with terminals that have full upper and lower case keyboards.
- o - A new version of WPFLOP with many fixes over version 3.0 is included. WPFLOP allows you to convert files back and forth to WPS word processing format. The previous version was only available from DECUS as a separate item.
- o - The new version of BASIC has many new features such as the ability to handle long variable names (now you can name a variable "NEW.FILE\$" instead of having to settle for a name like "N\$" for example) and features to take advantage of the DECmate II hardware features. There are many other new features in this BASIC that will have to wait for another Newsletter when I have more time or someone else helps out with a review.
- o - The old RESEQ.BA program for resequencing line numbers in BASIC programs has been replaced with a new one called RENUM.BA. It can number segments of your program each with the starting line number and increment you chose. I like this because I like to write my programs so major sections start at round line numbers like 1000, 2000 and so on. The problem is that after you work on the program a while and go to resequence it, normally all the lines end up numbered in increments of 10 or whatever and you lose the structure the round number convention gives. This program gives a way to deal with the problem and it also seems to be able to deal with programs that have been prepared with a text editor that do not have every line numbered (a little known feature of OS/8 BASIC that is very handy). RENUM is also a good example of using many of the new BASIC features too.

o - The EDIT.SV on this system is a new "Virtual" text editor. It can access your entire file from top to bottom and back again. The text is not broken up into buffers the way it is in most of our editors. This is a full screen editor that lets you move the cursor around to the point where you want to edit then just type in what you want to add and to delete what you want to get rid of. No more line numbers or position pointers to keep track of. It is similar to other full screen editors like TECO with the VT52 or VTEDIT macro and KED and EDT from the PDP-11 and VAX world. The keys you use to control it are similar to the WPS word processing editor so if you use WPS on your DECmate you already know a lot about how to use this one.

All in all it is quite a package and the "price is write". It is the best buy in microcomputer software anywhere. With this package, you could buy just the basic DECmate II without the WPS or COS software or the CP/M option at a very low price and put up a very useful system that will run a great many existing OS/8 family programs and allow you to write your own programs in BASIC, FORTRAN or assembly language. I have had very little time with OS/278 so far but I am already very enthusiastic about it.

#### PASCAL-OS/8 NOW IN THE PUBLIC DOMAIN

John Easton and James Miner at the University of Minnesota have released their version of Pascal for OS/8 to the public domain and they have submitted it to DECUS. At this time DECUS has not yet assigned an order number but with a little luck it will be available before long.

This version of Pascal is very different from the PASCAL-S (the so-called German Pascal) which has already been submitted to DECUS. PASCAL-S is a core only, compile and go system that recompiles each time you run a program. I understand it has some restrictions and limitations and requires a 32K word memory but since it is written in machine language it is said to compile and run rather fast. On the other hand, Pascal-OS/8 is a full implementation of the language with an extensive interface to OS/8 and files. In fact, it has more features than just about any other language we have ever had on the PDP-8 family.

Pascal-OS/8 requires at least 24K words of memory to compile a program but small programs can then be run in as little as 12K words. To help reduce memory requirements, it even has features for breaking your program into segments which do not need to be in memory when they are not executing. At run time the loading of segments is all handled automatically. The compiler even has a feature to automatically do the segmenting although you can also do it manually by inserting instructions in your source code to indicate where the segments should be. The prime reason this feature was developed was that the compiler itself is written in Pascal and is quite large so it had to be segmented to fit. A result of that is that the compiler runs better if it is located on a fast disk incidentally.

Pascal-OS/8 runs on just about any PDP-8 or PDP-12 family machine that supports an OS/8 family operating system and has enough memory. I have run programs on a DECstation 78 under OS/78 with no problem although the 78 does have only 16K words of memory so it can not compile programs. The package is so portable I have already been able to put it on 5 1/4 inch RX50 floppies disks and run it on a DECmate II under OS/278. If further testing on the DECmate shows no problems, I anticipate submitting the RX50 version to the DECUS Library as soon as they finish processing John's basic submission.

A very nice feature of this package is that it comes with an extensive set of working example and development tool programs that demonstrate how to use many of the features and provide some very useful functions. Many of them offer excellent starting points for further development to meet specific needs.

I think maybe the best part of all about Pascal-OS/8 is that it comes with an outstanding 136 page manual. If DEC did as well with all their manuals we would all be much better off. It assumes you know Pascal or have a standard reference for it. As a result, the manual is devoted to the specifics of this implementation, how to install it, how to customize it for your particular needs, what the special features are and how to use them, and even a large section on benchmark comparisons with the other major OS/8 languages and PASCAL-S which is very interesting and fairer and more balanced than most such comparisons I have seen. The compiler has also been tested against the standard Pascal Validation Suite and there is a section in the manual that gives the results of the tests and discusses them. In general, I think Pascal-OS/8 compares favorably with the other languages and, although a few things showed up in the validation tests, it seems to be more compliant than many other implementations, with few if any significant problems.

Although this Pascal works fine on plain machines, it will also automatically take advantage of extra memory and an FPP-12 or FPP-8A if they are available. An interesting note is that the internal design of Pascal-OS/8 even allows for 17-bit addresses (i.e. 128K word memory), which could be supported by the KT8A memory controller, but, because the authors did not have a KT8A and compatible memory, the KT8A support has not been implemented. Currently memory support is limited to 15-bit addresses (32K words) but if someone is interested in supporting development of the KT8A support they are invited to contact the authors who are still interested in the project. Now that would really be a first. I can not think of any program for the PDP-8 family that uses more than 32K for a single job and certainly no higher level language that can generate programs that use more than 32K. A 128K Pascal on the PDP-8 would really be something! All it would take is for someone to make a KT8A and memory available to John for the development.

Hopefully we will have more news on Pascal-OS/8 and a DECUS Library order number for it by the time the next Newsletter goes to press.

## DECUS LIBRARY PROGRAMS FOR OS/278

---

As soon as OS/278 was released I started thinking about making programs available for it through the DECUS Program Library. Since OS/278 is upward compatible from OS/8 and OS/78, there are many programs already in the Library that should be usable if they are available on the new 5 1/4 inch RX50 floppys. The result was a project to do conversions on a few of the better candidates to get the ball rolling. I selected several programs that have been popular and successful that I was familiar with and that had good prospects for being converted without difficulty.

At this writing four packages have already been converted, tested and sent to DECUS. In all four cases no changes at all were required. Just conversion to the new media, testing and submission paper work. It is not clear yet how DECUS will catalog the submissions. They should be listed under the present PDP-8 numbers as another media but DECUS may also want to catalog the RX50 version under a new catalog section for the DECmate II. In any case submission processing had not been completed at Newsletter deadline time so I can not tell you about ordering yet.

The first package to be completed was the WVU Sort/Merge/Extract - DECUS 8-925. This is a package of programs for sorting OS/8 ASCII (i.e. text) files. SORT is the principle utility. MERGE and XTRACT are companion programs to assist in the efficient sorting of large data sets. This package is of particular interest to those writing business and data processing applications under the OS/8 family. OS/278 BASIC and this package combine to give a very usable set of tools for such work.

The next program was another originally written at West Virginia University, Tom McIntyre's RUNOFF - DECUS 8-880. RUNOFF is a program to facilitate the preparation of typed or printed manuscripts, such as memorandums, manuals, theses and so on. The user prepares his material on any terminal and writes it into a file using EDIT, TECO, VISTA, SCROLL or any other editor. The user includes not only textual material, but also formatting information. The RUNOFF program then takes the file and reproduces it on a printer or in a file in final form. It performs the formatting as directed and will also perform line justification, page numbering, titling, footnote and index formatting and so on as desired. This version of RUNOFF was designed to be as compatible as possible with versions of RUNOFF available on other systems such as DECsystem-10 and RSX.

DIRECT V7 - DECUS 8-842, Jim VanZee's improved version of the standard system directory utility was next. It is an improved version of the regular directory listing program distributed with OS/8 family systems. It is functionally equivalent to the DEC's original version and is installed simply by replacing the standard DIRECT.SV file with the one in this package. The instructions in the system manuals apply without change. Significant features of this program included the ability to output multiple column directory listings arranged in column order rather than row order, and the ability to print alphabetized directory listings. Date sorts and number of blocks used displays are also available.

In the past there was a problem using this version of DIRECT with CCL because CCL had problem that kept it from passing on the /A option switch that is used to request the alphabetized format. It was a pleasant surprise to discover that the OS/278 release has fixed the problem. As a result, DIRECT V7 works even better with OS/278 than it always has with previous OS/8 family members.

Finally, I converted DECUS 8-602 - the PDP-8 Cookbook. The Cookbook is a collection of subroutines at the assembly language source level. Many of the routines are immediately applicable for program development and others offer examples that can be modified and expanded. Some of the routines are specifically designed for OS/8 system functions, some are generic PDP-8 routines usable in any operating environment and some are specific to other PDP-8 operating environments such as TSS-8 and the Disk Monitor. This package can be very helpful to the assembly language programmer, particularly by saving time coding standard functions needed in many programs and as examples of working PDP-8 assembly language. Because of the nature of this package, only conversion was required, no testing.

There are several more packages I hope to be able to convert in the near future. More about them as the work progresses. I hope all you PDP-8 family programmers will get busy converting and upgrading your existing programs and writing new ones for the DECmate II and OS/278 and submit them to the Library.

The new machine and OS/278 offer many interesting and challenging opportunities.

For example, I already have a line on a very valuable assembly language debugging package, far better than the standard ODT. It is said to be much more powerful than ODT and it avoids the standard ODT problems like debugging interrupt code. This is done by running in the DECmate II's "front panel memory" rather than in program memory. As a result it is TOTALLY transparent, requiring absolutely no program memory, not even the three locations required by ODT. When you want it, you just type the F6 function key. It wakes up and takes over the system, suspending normal program execution. A halt instruction will trap to it too as will the breakpoints it can set. It gives us back the kind of debugging capability the lights and switches on the older machines gave us plus multiple break points and more. If no problems arise, the authors of this package have said they will submit it to the DECUS Library soon. It will make assembly language program development far more practical on the DECmate II. In fact, from the sound of it, this package could make the DECmate II the best assembly language development system in the history of the PDP-8 family!

#### CONVERTING PROGRAMS TO OS/278

My initial experiences in the effort to convert OS/8 family programs in the DECUS Library for OS/278 give some idea of what is involved in getting existing programs to run under OS/278 on the DECmate II. In general I have found all you need to do is get the files onto an RX50 floppy and use them. In other words, it is no different from converting to any new media. There is no need to reassemble or even relink assembly language programs.

The DECmate II has 32K words of memory so there is no problem with memory size. So far, because OS/278 is upward compatible from previous versions of the OS/8 family, I have found no problems involving operating system compatibility and of course files are fully compatible. As with any new machine, you do need to sort out any I/O devices the program addresses directly rather than through device drivers of course.

My biggest problem so far in fact has been just the simple process of getting files copied from other OS/8 media like 8 inch floppy disks to the 5 1/4 inch RX50 floppy disks for the DECmate II. Fortunately I have had access to a DECmate II system at the DECUS offices that is equipped with the 8 inch floppy interface option and an RX01 drive that allows simple COPYs of the files from 8 inch RX01 floppys to the new RX50s. Once the files are on an RX50 floppy everything goes fine.

As with the DECmate I, you do need to keep an eye out for the chance an assembly language program might have an obscure coding sequence for the console terminal that could trip up on the fact that the skip on flag instructions clear the flag rather than leaving it set in the 6120 based systems. So far I have not found a program that has this problem.

FORTTRAN has not been changed so it should work as it always has. Programs written for it should still compile and work fine. I doubt you even need to recompile or relink. There have been a few modifications and upgrades in BASIC so when you recompile your BASIC programs you need to watch out for them but I am told there should be very few problems. I believe you do need to recompile BASIC programs to work with the new version of the BASIC runtime system.

Overall, the conversions have been no more difficult than any other media conversion aside from the shortage of systems with both RX50 floppys and other OS/8 media. This problem seems to exist across all DEC lines. They seem to have been very slow to make RX50 options available for any of the older machines. The only direct solution for the DECmate II is the 8 inch floppy option. The alternative route is to transfer the files to a DECmate II electronically on a serial line from another system that has the required media. I have done that for source files, using the WPS CX option into a WPS file and then using WPFLOP under OS/278 to convert the file to OS/8 format. There were a few problems with formatting but it worked. I am looking at some of the existing OS/8 programs for this sort of transfer and hope to get one up soon.

One of the best electronic file transfer programs that is available in the public domain is called KERMIT. It is available for most mini and micro systems but I have not found it for the PDP-8 family. It does seem to be possible to run a CP/M version of KERMIT in the DECmate II CP/M option, giving CP/M format files that have to be converted to OS/8 format (if you have a conversion program) but what we really needed is a PDP-8 version. Does anyone know of such a version of KERMIT or any work on one? Please let me know.

## HINTS AND KINKS FOR OS/278

---

There are already a few tidbits of information of interest to users of OS/278 and the DECmate II. These items apply to OS/278 version 2, the one released to DECUS.

- o - OS/278 prompts with a curly bracket instead of the traditional period. Just don't let that confuse you as you read the OS/78 manual and the writeups for OS/8 family programs. An obscure result of this change is that you have to modify your BATCH files to change the periods in the first column to curly bracket.
- o - The current version does not have the DUPLICATE program so it is not immediately clear how to copy disks. For system disks, I have been doing the following:

- 1) Boot the system to be duplicated in drive 0
- 2) Insert the blank disk you will be copying to in drive 1
- 3) Do ZERO RX51:/Y - the /Y is critical to copy the firmware on tracks zero, 78 and 79 and to copy the system area.
- 4) Do COPY RX51:<SYS: - this copies all the files to the new disk

In the case were you want to copy a non-system disk, the only way I have found on a two drive system is to use the duplicate program on the third (i.e. Winchester building) disk. I found that I could put my blank disk in drive one, boot system disk number three in drive zero then select the duplicate option on the menu that is displayed and then at that point I could take the system disk out of drive zero and put in the one I wanted to copy from and tell the program to go ahead with the copy. This seems to work fine but the system halts after the copy is complete (I presume because you do not have the system disk in drive zero when the program exits). That is OK though, just replace the system disk in drive zero and reboot the system.

Another option is to make a system disk with just the minimum files needed to do file copies then copy the files you want from the source disk in drive one onto the system disk then replace the disk in drive one with the one you want to go to and copy the files back over to it. If you do this, remember that if you are using a new disk that has not been initialized you need to do a ZERO on it to establish an OS/8 file structure first.

- o - It was not quite clear at first what the device names on the DECmate II are. When using a floppy system, drive zero with the system disk, is usually called SYS: as usual and drive one is called RX51:. If you have an RX01 or RX02 option installed then the 8 inch drives are called RX20: and RX21: for drives zero and one respectively. This change in names from the old convention is documented in the text files on the distribution disks along with several others.

- o - The LPT: device driver outputs through the printer port to a serial printer such as the LA50, LA100 or LQP02. It does a form feed for free each time it is loaded and called for the first and it also forces the printer port to 4800 baud. You have to be sure the device you have connected is set for 4800 baud before you try to output to it.
- o - The COMM: device driver in the system is intended to do input and output to the communications port but it has some problems. I have not gotten it to work yet. Instead, I have been using the printer port. It is really a full bidirectional port like any regular PDP-8 serial interface. The device codes for the printer port are 32 and 33 (the codes for the communications port are 30 and 31 but the programming of it is unbelievably involved, nothing like a conventional port).
- o - The system supports commands to SET SYS OS78 and SET SYS OS8 as well as to SET SYS OS278. SET SYS OS8 is particularly useful because you can then do certain things that you can not do when the system is set to OS78 or OS278 such as RUNning system programs like DIRECT, PIP and so on in the you do on OS/8 systems. The problem with this on the DECmate II is that there is a bug in SET that makes a DECmate II system disk unusable when you do this. Block zero of the system disk gets corrupted due to an obscure checksum problem when the SET command modifies it. If this happens I am told you can restore the system disk by using the following command

PIP RX50:<RX50:/Y

This rewrites block zero with the correct checksum and makes your system disk usable again. Note that this uses an undocumented CCL command that passes commands to PIP. By the way, apparently PIP will not work for more than one command now (a problem with one time code located in a buffer). If you RUN PIP while in OS/8 mode and try to give a second command it blows up and may damage the contents of the system disk too. The solution is to always do just one command when you RUN PIP, or, better yet, use this CCL command each time instead. That way, you are sure to always have a fresh copy of PIP for each command.

- o - There is a very obscure point that you have to watch out if you force a value in the Job Status Word when you LOAD or SAVE an assembly language program. Back around OS/78 version 4 a bug crept in that somehow causes bit 10 of the JSW gets confused with the bit that is supposed to control the hook that keeps you from RUNning system programs in OS/78 or OS/278 modes. I do not think this is a new problem in OS/278 and in any case it should not be a problem except in the special case were you try to play with the JSW value. For the most part there is very little need to set bit 10 or 11 any more. They were intended as an optimization to speed up DECtape systems by avoiding the need to save the areas where USR and CD overlay when it was not needed.
- o - Be careful to read all the text file notes that come on the OS/278 disks. In particular be sure to read the note in the editor writeup about a bug that shows up in certain circumstances.

## THE OS/8 SOFTWARE FAMILY - PS/8 TO OS/278

---

Over the years, DEC and the users have used several names for the OS/8 family of operating system products. The result is that many people are confused about the differences between the various designations. The following is an effort to answer some of the questions that come up by briefly reviewing the history of the system.

In the beginning (1970) there was PS/8. This was the first release of our favorite operating system. It ran on all PDP-8 family machines (including the PDP-12 where it was sometimes called PS/12) which had at least 8K of memory and a mass storage device. The mass storage could be DECTape, LINCtape or a disk. In those days the disk typically was a fixed head, non-removable DF-32 so you also needed something like paper tape to initially load the system software onto the disk. PS/8 had provision for "two page" device handlers but almost all the supplied device handlers were one page and many of the important system utilities only had room for one page handlers. You got FORTRAN II with the SABR page independent assembler as well as PAL8 assembly language with this system.

Before PS/8 there had been the DECTape Library System, the 4K Disk/DECTape Monitor and the paper tape system that all needed just 4K of memory. When PS/8 came out an upgrade to an 8K memory was just starting to be a reasonable option. As a result, the significant improvements in design and functionality it offered were very popular and PS/8 rapidly became the standard operating system for the PDP-8 family.

In due course a new release of the system was developed that provided full support for two page device handlers. Just about the time it was due to be announced we had the famous price freeze. It has always been believed that DEC changed the name of the system to OS/8 at this point because they wanted to raise the price from \$125 to \$300 and the freeze kept them from doing it as long as the designation stayed the same. So, we got OS/8 version 1. Again, OS/8 was often referred to as OS/12 when it was used on a PDP-12.

Later we got version 2 with BASIC, BATCH and TECO as an optional extra cost option. About this time we also got OS/8 FORTRAN IV as an extra cost option. Still later, in version 3 we got the CCL command language and FOTP which allowed CCL to implement wild card file names in file manipulation commands. there was a version 3C that corrected many bugs and brought the system up to the full planned functionality.

Finally version 3D was released at the beginning of 1978. The principle reason for the 3D release was to fix the famous "date problem". Back in 1970 only three bits were allocated in the system design to represent the year (back then no one at DEC could imagine the system staying around more than the eight years this provided for) so after eight years we were out of dates. Version 3D implemented a scheme to deal as well as possible with this problem and came out just as the original dates were running out at the beginning of 1978. Later Version 3D plus the optional add ons were offered in one package as the "combined kit".

About this same time, the DECstation 78 product was developed. It was a much smaller system than earlier PDP-8s, based on the 6100 microcomputer chip implementation of the PDP-8. It was intended for a much less sophisticated market. DEC decided that OS/8 had grown too big and complex to support and document so a new release of the system was developed to go with the DECstation that eliminated many programs like the older FORTRAN II and some of the more obscure items like the BUILD program that was used to configure device drivers into the system. The new machine was going to come in just one configuration so there was going to be no need to provide a tool to change the device driver configuration. There was no real change to the system however, just a stripping out of unneeded programs so it would fit on floppy disks for distribution and to allow a new, smaller, better written manual. This release was called OS/78, version 1.

Except that certain programs and many device drivers needed for the older machines were not included in the OS/78 kit, it was really just a new release of the same OS/8 system. It included BASIC, BATCH and FORTRAN IV in the standard package. Because the DECstation 78 lacked an FPP option and various other hardware options, the FORTRAN IV support library was stripped down to only what would work on the new machine.

The OS/78 system could still be used on older machines with no problems. The older device drivers and BUILD and so on from previous versions worked fine with it. I put OS/78 on my old PDP-8/I for example with no problem. I was also able to take programs like BUILD and older device drivers over to the DECstation 78 and use them with OS/78 there.

OS/78 had three more releases, versions 2,3 and 4. In them BASIC went through a major upgrade (to the so called "commercial BASIC" version with eight bit characters, string arithmetic, random access record oriented files and formatted output among other things) and a new scheme (the SET HANDLER command) was added to the system to again allow changing device drivers for different system configurations because by then OS/78 was being sold on bigger PDP-8 based systems that needed the capability.

Along the way, a hook was put in OS/78 to keep users from RUNning system programs like PIP, FOTP, DIRECT, and so on. This was intended to protect the unsophisticated user from the complexities of the older Command Decoder interface and require him to use these programs through CCL commands. The trick was that if you did a SET SYS OS8 command, the system went back to working like OS/8, letting you RUN these programs just as you always had. You did a SET SYS OS78 when you wanted return to working the new way. Otherwise, everything was still compatible. I moved CCL from OS/78, version 3 to my 8/I and used it there with no problem.

OS/78 version 4 came out about the time of the DECmate I announcement. The DECmate I was the first product based on the 6120 chip which, while still implementing the PDP-8 instruction set, has many new features and some obscure minor programming incompatibilities. This version of the system was patched to compensate for those differences in a compatible way so it still ran on the older machines. The SET SYS VT278 command was added too for when you ran version 4 on the DECmate I (which is also known as the VT278).

Now the newest version of OS/8 is called OS/278. It was put together by DEC but submitted to DECUS rather than being marketed due to limited resources and a desire to make the OS/8 family available on the DECmate II. It was developed as part of the DECmate II effort with the goal of running on both the DECmate I and DECmate II. As a result, certain of the new and upgraded components now have dependencies on the new hardware features in these machines.

Other than that however, even OS/278 runs on the older machines and it is still upward compatible. For example, I have already demonstrated that a twelve year old OS/8 program still runs fine under OS/278 and I understand someone has already gotten OS/278 up on a DECstation 78. Since the DECstation is one of the most limited members of the PDP-8 family it is safe to assume OS/278 will work on any PDP-8e or later. It remains to be seen if any incompatibilities with pre-8e machines have crept in along the way.

The version of OS/278 that is currently available from the DECUS Library is designated version 2. The purpose of this choice of version number is to distinguish the official DECUS release from the pre-release versions that circulated unofficially for quite a while. The change of name is intended to indicate an emphasis on DECmates and a new development group but it does not represent a significant architectural change. For example, I was able to install an OS/8 device driver written in 1973 with no problems.

As an aside, I should also mention some user written variants of OS/8. The early versions did not have CCL or BATCH. As a result John Covert, while a student at Georgia Tech, wrote a package that implemented commands like COMPILE that were similar to the command language then available on the PDP-10. Later an "invisible" batch type capability called HASP that worked in the basic 8K configuration was added.

The package was implemented as a set of programs to use with your PS/8 system plus some patches to the PS/8 system that provide the required system hooks. When OS/8 was released, sources of the system were not available, so John's package, which come to be known as DECsystem-8, could not be upgraded to the new releases because the system patches for the hooks could not be upgraded. Because many people liked the features in DECsystem-8, they continued to use PS/8 and never upgraded to the OS/8 version 1 and 2 releases.

The DEC OS/8 development group, John Covert and Doug Wrege, I and other representatives of the DECUS 12 Bit Special Interest group held a meeting at a DECUS Symposium and agreed that DEC would implement CCL to replace John's command language and provide the hooks in version 3 required to support upgraded implementation of the other features in DECsystem-8. John and Doug would replace the old version of DECsystem-8 with one reworked to go with version 3. The result was OS/8 version 3 with CCL and a new release of the DECsystem-8 that worked with OS/8 version 3 and would continue to work with new releases of OS/8. The DECsystem-8 package is still available from DECUS and still adds a number of useful capabilities to OS/8.

Another other user written variant of OS/8 that I recall was called OS/12S I think. It implemented the PDP-12 scope as the output device for the console terminal (quite a trick!) and various other PDP-12 oriented features. As I recall it was a major patch/overlay to the system. I think it was implemented for OS/8 version 2. The problem was that upgrading it for new releases of OS/8 would have been a very difficult task and was never done as far as I know. It as quite an accomplishment at the time and I was always sorry it did not follow the new DEC releases.

Over the years DEC and the users have used a number of names to designate the OS/8 family but, despite many improvements and extensions, the file structure, system service calls and underlying system architecture have remained unchanged. Programs I wrote for PS/8 in 1970 still work under the latest versions. Everything I have learned about the system over the last 14 years is still applicable today. That is quite a record and a great tribute to the original design. In fact, the OS/8 design was so good it was even used as the starting point for the very successful RT-11 system on the PDP-11 as well as some very popular systems for other hardware architectures too.

#### DIGITAL SOFTWARE NEWS UPDATE

---

Bob Kaplow from the DEC Region Office in the Chicago area called about the questions on the Digital PDP-8 Software News in past Newsletters. He said the correct order number is QF097-2Z and the current price was \$185 (US). He says the copies he has seen seem to be covering OS/78 version 4 and COS 310 version 9 and he thinks they are coming on a bimonthly basis.

Ian Templeton wrote with the following update on the same subject.

"After numerous phone calls the local DEC order office finally admitted that QF097-2Z was indeed a valid order number and that for Canadian \$250 I could order DSN for 1 year. This seemed to me rather expensive, and anyway part of my problem was the back issues I had missed. Finally someone at the local DEC office suggested I come and browse through their copies. I did so and found only one item in two years that apparently referred to my system, and even that was a patch to a different PAL8 from the one I have! In future, then, I will pay an annual visit to my friendly local DEC office - it's much cheaper."

#### SPELLING CHECKERS FOR WPS

---

Richard W. McArdle wrote with the following question.

"I have a problem and am having a tough time trying to solve it. In January of 1983 I purchased a DECmate I with a quad drive. In July I bought another DECmate I with a quad drive. The complete WPS 8 software was also purchased. When I asked DEC if I could get a spelling checker I was told that in several months a program would be out for the DECmate II. It would be only for the DECmate II and I should trade in my other two DECmates if I wanted a spelling checker. Please let me know if you have any answers to my problem."

It happened that at the time Mr. McArdle wrote we were quite interested in the subject of WPS spelling checkers too. It seems we have several IBM Displaywriters that we would like to replace with DECmates so we would have systems that could talk easily to our other DEC systems and to save money. The main thing standing in the way of doing this was that the IBM systems have

spelling checker software and the DECmates did not. Our management felt they had to have spelling checking so we had to forgo the change for the time being.

This was going on just about the time DEC first announced new software for the DECmate IIs including what was supposed to be a spelling checking package. The problem was that when we asked DEC about the spelling checker everyone denied it existed then eventually they started to admit it did exist but we could not get a straight story about what it was, how it worked, or, mostly important, what it required to use it. Half the time we were told it required the Winchester disk option and the other half we were told it did not. This was a critical issue because adding the Winchester brings the cost of the system up to where it was no longer attractive enough to sell the change to our management. There were also rumors of a spelling checking package for the VAX and maybe an editor for the VAX that could handle WPS format files. That along with DX option on the DECmates might have been good enough but DEC could not get there act together on that one either.

All this was during the Winter. We still do not have a good idea of the answers to these issues from DEC so we still have not made any move towards a change over from IBM to DEC. I have been asking other sources about the questions though. The last report I got on the DECmate II spelling checker said it requires the CP/M option but is not supposed to require the Winchester disk. The problem is that with out the Winchester you have to do a series of disk swaps to run a spelling check. I assume this is because there is not enough room on one disk for all the software and dictionaries and so on. In any case, my informant told me the non-Winchester version would not work when he tried it!

My impression is that the reason this spelling checker only runs on the DECmate II is that some considerable part of it is actually 8080 code that runs in the CP/M option. I have been given the impression that the spelling checker actually uses both the CP/M processor AND the the PDP-8 processor in the DECmate II at the same time to get the job done. Since none of the older WPS systems has a CP/M option, this seems to be the reason why the spelling checker can not be made to run on them.

Does anyone know more about this issue? Also, does anyone know of a spelling checker that runs on older WPS systems?

## MAKE YOUR DECMATE II INTO A FIRST CLASS COMPUTER AT BARGAIN PRICES

DECmate II users, now you can make your word processor into an excellent personnel computer without spending a lot of money for the CP/M option and add on products like MBASIC. DEC has made OS/278 available for the DECmate II. Instead of marketing it however, they have put it in the DECUS Program Library so you can get it for just the Library's reproduction charge for three RX50 floppy disks. The order number is DECUS DM-101.

OS/278 is the latest release of the OS/8 and OS/78 family of operating systems. It comes complete with a new full screen editor designed to be similar to the WPS editor, a utility to convert files back and forth between WPS and OS/8 format, a new, improved version of BASIC plus FORTRAN IV and all the regular system utilities. It even installs and runs on the Winchester disk option although it works very well with just the standard dual RX50 floppy.

OS/278 is upward compatible from OS/8 and OS/78. Several DECUS Library OS/8 programs have already been converted to the RX50 format, tested and submitted to the Library. More will be coming soon.

This is the best deal available in microcomputer software. The OS/8 family is a mature, highly refined system for small computers. In fact, it was the original model for RT-11 and other single user systems. If you are interested in doing more with your DECmate II, take a look at OS/278. For more information, there are several articles in the 12 Bit section of this QA Newsletter.

## HELP WANTED . . . . .

ONE READER HAS REQUESTED THE FOLLOWING:

--HE WOULD LIKE SOME INFORMATION ON OS8 AND OS78 FOR DECMATE

--HE WOULD LIKE TO SEE AN ARTICLE ABOUT: " DECMATE/PDP8 BLOCK  
DIAGRAM; PROGRAMMING; I/O; DISK FORMATS; COMMUNICATING WITH  
OUR VAX"

HE ALSO WRITES: "HOW CAN I FIND OUT WHAT THE DECMATE CAN DO AND HOW TO  
OBTAIN AN OPERATING SYSTEM FOR IT. WE ARE NEW TO DECUS SO THESE THINGS HAVE  
PROBABLY BEEN IN NEWSLETTERS----"

IF YOU CAN PROVIDE SOME INPUT ON THESE AREAS, PLEASE GET IN TOUCH WITH:

L.D. CANFIELD  
ELECTRONICS ENGINEER  
NEURODYNE CORPORATION  
12744 SAN FERNANDO ROAD  
SYLMAR, CALIFORNIA 91342

11

FROM THE EDITOR: SOME OF THE INFORMATION CAN BE FOUND IN "12-BIT NEWS"  
IN THIS ISSUE.--md

# HELP OFFERED . . . .

BOB HASSINGER REPLIES TO A REQUEST FOR HELP IN THE LAST ISSUE:

I was interested in the note from Mr Logan in the March 1984 issue of the OA Newsletter (page 5 - The Forum / Help) about programming on the DECmate II. The following may be helpful to Mr Logan.

As noted elsewhere in this Newsletter, DECmate II OS/278 is available in the Library now (DECUS DM-101). It is a general purpose, multilanguage operating system that comes complete with a new, upgraded version of BASIC, a new full screen editor that is quite similar in many respects to the WPS editor plus PAL8 assembly language, FORTRAN IV and support for the Winchester disk option. It is fully upward compatible from the well know and popular OS/8 and OS/78 family. Since it is available from DECUS and does not require the purchase of the CP/M option it is a very cost effective possibility for DECmate II users.

As OA and 12 Bit Librarian, I have been busy working with the DECUS Library on a project to start to convert some of the best of the existing OS/8 family items in the Library to make them available for the DECmate II. The first one I worked on was the WVU SORT/MERGE/EXTRACT package (DECUS 8-925). It has been submitted to the DECUS Library although I do not have an order number yet. With any luck it will be available soon and should be exactly what Mr. Logan asked for.

I am not sure exactly what Mr. Logan is looking for when he asks for "file loading" and "other types of utility sub-routines" so it is hard to comment on that point. As you know, the DECUS Library is quite lean on business programs in general so if that is the sort of thing he is looking for he may not be able to find a solution in the Library. I do think OS/278 BASIC (DEC's so called "Commercial BASIC") and other OS/278 software offer good tools to address most needs for those interested in doing some programming. I have used these tools for many years with great success.

DECmate II OS/278

Version: V2.0, January 1984

Submitted By: Digital Equipment Corporation

Operating System: OS/278

Special Hardware Required: DECmate II

OS/278 V2.0 is a software system designed to support the PC200, DECmate II. OS/278 provides an extensive collection of application software development tools and an efficient run-time environment for the production use of these application programs. OS/278 is controlled through a Concise Command Language (CCL) that simplifies program development and execution.

Three diskettes are provided:

Diskette 1 of 3 contains all system files, and development tools.  
Diskette 2 of 3 contains BASIC, and FORTRAN 4.  
Diskette 3 of 3 is the Hard Disk Install Diskette which will install OS/278 on a Winchester hard disk.

Note: Sources are not available at this time but will be submitted at a later date.

Restrictions: No DSN patches are to be installed.

Associated Documentation: User can obtain a copy of the OS/78 V4.0 User's Manual. Order No. AA-5748C-TA from Digital Equipment Corporation.

No Source Available.

Media (Service Charge Code): 5 1/4" Floppy Diskettes (JC)

Format: OS/278

Keywords: Operating  
Systems OS/278  
Tools - Software Development  
Operating System Index:  
OS/278

February 13, 1984

September 23, 1983

FOR IMMEDIATE RELEASE ....

## DECUS ANNOUNCES PRO-350 SOFTWARE

(Marlboro, MA) The Digital Equipment Computer Users Society (DECUS) recently announced the first Professional-350 software to become available from their user program library. This software package, priced at less than \$40.00 (in the U.S.), is a developer's kit for the PRO-350 which includes an advanced text editor (TECO) a sophisticated directory listing utility (SRD) a utility for reproducing floppy diskettes (COPY), and a "command line interface" (MCR) which provides a software development environment similar to Digital's RSX-11M operating system.

The command line interface provides the following fourteen functions: SET terminal attributes, SHOW terminal attributes, SHOW partitions, SHOW commons, SHOW tasks, SHOW active, SHOW memory, SHOW logicals, RUN filespec, INSTALL filespec, REMOVE filespec, SHOW TRANSLATIONS logname, ASSIGN logname value, and DEASSIGN logname. Although MCR was written for use with P/OS Version 1.0, source files are provided, along with hints for adapting it for use with future versions of Digital's P/OS operating system. TECO and SRD are equivalent to the corresponding programs commonly used on Digital's PDP-11 computers.

The developer's kit was written by Richard J.D. Kirkman of Filetab Support Services, London, England. It has been used with P/OS Version 1.5, and as expected, many of the MCR functions require modifications in order to be operable. The other utilities, however, appear to work normally under P/OS V1.5. Extensive, built-in "HELP" messages are included with the developer's kit; still experience with RSX-11 software is extremely helpful in using these programs. Sources are included only for MCR.

The Digital Equipment Computer Users Society was established in 1961 to advance the effective use of DIGITAL computers. DECUS is a computer users group supported in part by Digital Equipment Corporation. A major activity of DECUS is the Program Library which distributes software written and submitted by DECUS members. A wide range of software is available for various Digital computers including compilers, utilities, and application packages. Programs and software are distributed for nominal service charges; however, the DECUS Program Library is a clearing house only -- it does not sell or test programs. All programs and information are provided "AS IS", and no software support is provided by DECUS or Digital Equipment Corp.

To order the PRO-350 Developer's Kit (DECUS Part No. PRO-101) call (617)467-4135.

MasterCard and VISA are accepted. For additional information about DECUS and the DECUS Program Library, write to: DECUS Program Library, One Iron Way, MR02-1/C11, Marlboro, MA 01752.