

PIPELINES

Microware Systems Corporation • 5835 Grand Avenue • Des Moines, Iowa 50312 • 515-279-8844 • TWX 910-520-2535

WIN A LEVEL TWO SYSTEM: HELP US TELL THE WORLD

Help us tell the world about the amazing combination of Microware OS-9 software and the incredible 6809 - and possibly WIN A COMPLETE OS-9 LEVEL TWO COMPUTER SYSTEM WORTH OVER \$7,000.00!

Microware is sponsoring a "TELL THE WORLD CONTEST" to increase the number of informative magazine articles written by users of OS-9 family software. All you have to do to win is write and have published a qualifying article about OS-9 family software. It's impossible to "lose" because A \$400.00 SOFTWARE GIFT CERTIFICATE WILL BE GIVEN TO ALL QUALIFYING ENTRANTS.

One Grand Prize will be awarded to the best entry picked by the independent judges. The Grand Prize will include:

- * 2 Mhz 6809 Mainframe with 128K RAM
- * Dual Floppy Disk System
- * OS-9 Level Two Operating System
- * Basic09, Pascal, Cobol, and C Languages

All qualified entrants will receive a gift certificate redeemable for up to \$400.00 worth of any Microware software. As an additional bonus entrants may receive compensation paid directly by some magazines to authors of articles.

The subject matter of qualifying articles must be primarily software-related and must feature Microware software products such as OS-9, Pascal, Cobol, C, or Basic09. Suggested topics include product reviews, tutorials, and interesting or unusual real-life applications. Articles as printed must be at least 1,500 words long (not counting program listings) and published in a nationally distributed magazine of over 5,000 copy paid circulation. To enter this contest send your name, address, and a copy of your published article and original unedited manuscript to Microware by registered mail.

Entries must be received by Microware no later than January 31, 1984. Entrants will receive a gift certificate within 60 days of receipt by Microware of their qualified entry. Only one gift certificate will be awarded to any individual but all entries will be considered for the Grand Prize. A panel of independent judges will determine the qualification of entries and will select the Grand Prize winning article on the basis of general interest, style, and content. The winner will be contacted by March 1, 1984. The judges decisions are final; Microware will not be responsible for entries lost or delayed in the mail. Prizes may not be redeemed for cash and entrants are responsible for payment of any applicable taxes. Employees and relatives of Microware, its advertising agency, and the judges are not eligible.

For further information please contact Jeanne Kaplan at Microware, phone 515-279-8844.

NEW C AND PASCAL NOW AVAILABLE!

SEE INSIDE

SECOND MICROWARE SEMINAR REGISTRATION DEADLINE NEARS

August 12-15 seems just around the corner as we at Microware firm up the plans for the 1983 User Seminar. Two months can seem like just a few days with all the planning and work that goes into such an event!

The seminar has been expanded this year by one day to allow for more informative "roundtable" type technical sessions. 12 hours of sessions in all! At these sessions you can pose questions to the Microware staff members who designed each program. Also, one session has been set aside for a discussion with some of the people, from outside Microware, which have developed interesting applications using OS-9.

A bigger and better Exhibit Area will have display booths from many leading suppliers of OS-9 compatible hardware and software. Their representatives will be available to answer your questions. This will be a golden opportunity to see and compare what's new in computer systems, disk and storage devices, and application software for OS-9.

You will also get a preview of Microware's exciting new 68000 software products plus demonstrations of new 6809 software.

A buffet dinner is planned for Friday, August 12th, and a brunch will be held the morning of August 14th. Guest speakers will be featured at both events. Part of the evening of August 13th has been set aside for a meeting of the OS-9 User Group. Hospitality Suites will open at 8:00pm on the evening of the 13th also.

The cost this year will be \$100.00 per person which covers the cost of the Reception and Buffet dinner on Friday evening, tuition for any number of sessions you wish to attend and the Brunch on Sunday morning. Again, this year we do ask that you pre-register before the cut-off date of July 29th, 1983. (Sorry, no Net 30 company purchase orders can be accepted.)

Don't miss this chance to increase your knowledge and skill in the latest in microcomputer software technology - register for the Microware User Seminar (1983 edition) TODAY! For more information and your registration packet, contact Jeanne at 515-279-8844.

TWO NEW LANGUAGE RELEASES ANNOUNCED

"C"

PASCAL

A C language compiler for the Motorola 6809 microprocessor has been introduced by Microware Systems Corporation. The compiler conforms to the standard Kernighan and Ritchie C specification including all data types and initializers.

The C compiler runs on 6809 systems under OS-9 or as a cross-compiler on PDP-11 systems under Unix System III. The C compiler and its library give OS-9 users C-source code level compatibility with Unix application software. The output of the compiler is optimized 6809 assembly language source code which can be run on OS-9 or used in stand-alone systems, including ROM-based systems.

A unique feature of the Microware C compiler is its real-time profiler capability. When activated, the profiler counts procedure invocations during program execution. A report printed after the program runs gives a statistical breakdown of function execution frequency. Using this information the programmer can identify which functions can most profitably be optimized.

Another major feature is the compiler's ability to produce native code modules that can be called directly by Basic09 or Cobol programs. This lets the programmer quickly develop native code for parts of application packages that require very high speed and/or special functions not available in Basic09 or Cobol.

Microware's new 6809 Relocatable Macro Assembler/Linker plus a comprehensive standard function library is included in the compiler package. The standard library includes all C standard functions plus Unix and OS-9 system calls.

The C compiler package is available now from manufacturers and distributors of OS-9 based computers or directly from Microware.

FREE FOR THE ASKING

Microware has compiled directories of hardware vendors and applications software suppliers who offer OS-9 compatible products. These directories have been compiled as a service to our users and are available at no charge upon request.

The "Application Software Directory" contains a breakdown of OS-9 application software by type; i.e. accounting and business, data base and file system utilities, etc. The key features of the individual programs are listed to provide the reader with a capsulized description of the product. While this directory is hard to keep current due to the rapidly expanding OS-9 third-party software base, it is updated quarterly and gives a representative cross section of what's available.

The "Hardware Vendor Directory" is a list of all licensed manufacturers of general-purpose OS-9 based computers. Each listing indicates the primary applications the system is marketed for and other useful basic information such as the availability of hard disks and OS-9 Level Two. Use of a system is generally not confined to the category in which it is listed. Rather, it normally indicates that the system has special features or capabilities in that regard.

For copies of these vendor directories, please call or write Ms. Irene Coffman at Microware.

A major new release of Pascal is now being shipped by Microware and Microware distributors. Pascal 2.0 is an even better version of the Pascal system that has been described by reviewers as the most complete implementation of Pascal available for the 6809. OS-9 Pascal also retains the distinction of producing faster native code than any other 6809 Pascal. It includes new features, improved performance, a simplified user interface, and a totally new User's Manual.

New additions to the standard library include functions for easier creation of menu-driven programs and direct memory access. Some other I/O functions have been rewritten for more consistent use of OS-9's automatic input/output editing and so the standard I/O files can be used with pipes. The new functions are:

- GETCHAR - input single byte without editing
- IOREADY - test for input data available
- SIZEOF - return size of variable, array, etc.
- ADDRESS - returns address of variable, arrays, structures, etc.

The Pascal command line syntax and the user interface in general has been vastly simplified thanks to intelligent automatic default option selection. For example, swap buffer sizes used by the compiler and the virtual memory interpreter are automatically set according to the memory size given in the OS-9 Shell command line. Also, a number of internal changes have been made in which have significantly increased compilation speed. Program error checking has also been improved.

Perhaps the most visible change is a total rewrite, reorganized and expanded User's Manual. Each part of the Pascal system is clearly explained, and a Pascal language description and reference section with numerous examples has been included.

Even though a lot of effort has been given to the development of Pascal 2.0, its \$400 price has not been increased. In keeping with Microware's liberal update policy, owners of older versions can get a complete update for only \$100 - just return your original disk (with intact Microware label) and we'll send you a copy of Pascal 2.0 and a new manual.

WIZARDS WANTED TO WORK WONDERS

Would you like to be on the leading edge of software technology and get involved with the design and implementation of exciting 6809, 68000 and "beyond" innovative software concepts? Do you want to work in a friendly, congenial and intellectually stimulating atmosphere? If you've answered YES to these questions then you may be just the person we're looking for! Microware is expanding it's programming staff and is currently accepting resumes for present and future openings. If you consider yourself a SOFTWARE WIZARD, have a good knowledge of OS-9, Unix and C now is the time to send us your resume.

Send your resume containing educational background, work experience, and salary requirements to the attention of Jeanne Kaplan at Microware. No phone calls please!

UNIVERSAL SYSTEM CALL INTERFACE FOR BASIC AND COBOL

In this edition of Pipelines we are including "SysCall", a very useful assembly language subroutine for use with Basic09 or COBOL. SysCall allows the execution of ANY OS-9 System call from Basic09 or Cobol program.

Here is an example that calls the OS-9 "Getstat" function to return a file's size using Syscall:

```
PROCEDURE filesize
TYPE Registers=CC,A,B,DP:BYTE; X,Y,U:INTEGER
DIM regs:Registers
DIM path,callcode:BYTE \>(* or INTEGER *)

OPEN #path,"test":READ
regs.A:=path
regs.B:=2 \>(* SS.Size code *)
callcode:=$8D \>(* I$GetStt code *)
RUN SysCall(callcode,regs)
(* check for error status: carry set *)
IF LAND(regs.CC,1)<>0 THEN
  ERROR regs.B
ENDIF
PRINT "filesize = ";
CLOSE #path
PRINT using "h4", regs.X; regs.U
END
```

Note that if the OS-9 function executed returns an error (carry set) this will not automatically cause an execution error to the calling Basic09 program. The "cc" byte in the register packet must be checked for carry clear to ensure the operation was successful as is shown in the example above.

HOW TO DEBUG YOUR DEBUGGER

In the last issue of the Pipelines, patches to make edition 2 of the Interactive Debugger work with OS-9 Level Two were published. In this issue, patches for edition 4 of the Interactive Debugger are presented. Edition 4 of the Interactive Debugger and the 'ident' utility are distributed with version 1.1 of Level Two. The 'ident' utility will allow you determine the edition number of any OS-9 module. Edition 4 of the Interactive Debugger can be easily patched for Level Two as follows:

1. Type "Debug" to load and start the debugger. It will be used to patch itself.
2. At offset \$67B change the current value of \$10 to \$39.
3. From offset \$604 through offset \$609 change the current value to \$12
4. Save the debugger to a temporary file by typing:
\$save temp debug
5. Exit the debugger by typing "q".
6. Update new debugger module's CRC, then delete the temporary file by typing:
.verify <temp >debug.new u ; del temp

The file "debug.new" will now contain the ready-to-run debugger. We then suggest that you replace the "cmds/debug" file with your new version of Debug.

TECHNICAL TOPICS

SYSCALL PROGRAM LISTING

```
nam SysCall - Universal System Call subroutine
use defsfile

pag
*****
* SYSCALL - a subroutine for BASIC09
* Author: Robert Doggett

* Calling syntax: RUN SysCall(code,registers)

TYPE set SBRTN+OBJCT
REVS set REENT+1
mod SyCalEnd,SyCalNam,TYPE,REVS,SyCalEnt,0
SyCalNam fcs "SysCall"

E$Param equ 56 Basic09's "Parameter Error" code
M.OS9 equ $103F OS-9 system call code
M.RTS equ $39 return from subroutine

org 0 Parameters
Return rmb 2 return addr
PCount rmb 2 Number of params passed
Function rmb 4 OS-9 function requested
Regs rmb 4 register pack

SyCalEnt
ldd PCount,S Get parameter count
cmpd #2 Are there two parameters?
bne ParamErr No, abort
ldd Regs+2,S size of Register pack
cmpd #10 EXACTLY ten bytes?
bne ParamErr ..No; abort
ldd [Function,S] Get OS-9 function code
ldx Function+2,S get size of function param
leax -1,X byte variable?
beq SysCall0 ..Yes; (A)=function
leax -1,X Integer?
bne ParamErr ..No; abort
tfr B,A

* Build OS9 call, rts on stack
SysCall0 ldb #M.RTS return from subroutine code
pshs D
ldd #M.OS9 OS-9 call code
pshs D
ldu Regs+4,S get register ptr
ldd R$D,U initialize regs for system call
ldx R$X,U
ldy R$Y,U
ldu R$U,U
jsr 0,S execute system call
pshs CC,U save regs
ldu Regs+7,S
leau R$U,U
pshu A,B,DP,X,Y
puls A,X
sta ,-U
stx R$U,U
leas 4,S
clrb (omit if runtime error desired)
rts

ParamErr comb return carry set
ldb #E$Param Parameter Error
rts

emod
SyCalEnd equ *
```