microware PIPELINES

In This Issue:

Have you got news for Pipelines? If you do send your article(s) to Microware. Comments and suggestions for Pipelines are welcome. If there is someone you know who would like to be on our mailing list, please call or mail their name and address.

GET THE MOST OUT OF BASIC09 THE OFFICIAL BASIC09 TOUR GUIDE

The Official BASIC09 Tour Guide is skillfully written for those new to computers and to BASIC09. It's also a valuable reference book for programmers, students and hobbyists, providing an in-depth look at BASIC09 plus an overview of the OS-9 operating system.

* * NCC '85 * *
WE WENT, WE SAW, WE CONQUERED . . . (WE HOPE)

NCC '85, the National Computer Convention, was held this year in Chicago's McCormick Place, July 15th - 18th. In past years there has always been a representative of Microware present at the shows, but this was our first year as an exhibitor.

Our booth had four different computer systems, demonstrating the versatility of OS-9/68000 and VME, multi-bus, single board and Hitachi graphic systems. Booth activity was constant the entire four days. We were delighted by the number of people who stopped by to say that they had heard of us through our outstanding industry reputation.

Wednesday was a red letter day: we held a joint press conference with Hitachi and Graphic Software Systems to announce the newly developed support software for the Hitachi ACRTC chip (See ACRTC article in this issue). The spokesman from Hitachi blessed the project and the continued efforts between the three companies.

On the non-business side of NCC, we had a wonderful time in the Windy City. The hospitality suites were all very enjoyable, meeting new people and catching up on the lastest with our customers. Many of our people also had a chance to visit some of the other fantastic sights of the city.

This year turned out to be an overwhelming success and the Microware Staff is looking forward to next year. The convention will be held in Las Vegas, Nevada, June 16th through the 19th. We look forward to seeing you there!

YOU ARE INVITED TO THE 4TH ANNUAL OS-9 SEMINAR

The 4th Annual OS-9 User's Seminar will be held November 1-4 at the Des Moines Marriott Hotel. The seminar is designed for both the novice and the pro. It will allow you to explore the inner workings of OS-9, while picking up programming tricks and polishing your present skills.

Seminar topics will focus on OS-9 for the 6809 and 68000, C, Pascal, Fortran and Basic. There will also be additional discussions on OS-9 for the Color Computer, networking, graphics and developing and marketing products for the Asian market. The speakers will be the actual authors of OS-9 and the Microware programming languages.

The annual OS-9 User's Group meeting will be held on Saturday evening. We understand that elections are being conducted by mail this month. The ballots will be counted and the results tallied in time for the passing of the Presidential gavel at the meeting. A note of thanks to the current officers; they have done a fantastic job with the User's Group the past two years.

Sunday afternoon we have set aside some time for those of you who have developed an interesting application for OS-9. The criteria for the use of this time is that the application must be software oriented, and no additional hardware can be used. You may use our terminals and video projection equipment. The presentation can take no longer than 25 minutes. If you are interested in presenting an OS-9 application please contact Microware for presentation information.

On Monday we will hold an open house at Microware's offices. We are very proud of our new home and welcome the opportunity to show you around.

The exhibit area will feature booths from many of the leading suppliers of OS-9 compatible hardware and software. It looks as if it will be an exciting place to be. We still have a few spaces open if you are interested in reserving a booth.

All registration for the Seminar must be done in advance by October 15, 1985. The cost is $150.00 per person, and includes registration for all seminars, the dinner buffet, brunch on Sunday, ground transportation between the airport and hotel via Microware's "Micro Bus" and admittance to the exhibit hall. No company purchase orders will be accepted unless special arrangements are made with Jeanne Kaplan.

This year, we are offering a "Hotel Package". This package is designed to take the worry out of hotel reservations. It includes the registration package, 3 nights and 4 days at the Marriott for $350.00. If you are planning to share a room add $35.00 plus the additional seminar fee of $150.00.

If you are not planning to stay for the entire seminar we suggest that you contact the Marriott for further informtion. Their number is 1-800-228-9290.

We do hope that you will be able to attend and learn more about OS-9. It is going to be an exciting seminar. You'll get to meet new friends and reminisce with the old. November is just around the corner so be sure and get your reservations made today. If you have any questions or would like more details please call Microware and ask for Jeanne Kaplan.

It's <u>the</u> place to be
November 1st, 2nd, 3rd and 4th.

Meet the people making it happen. The movers and shakers who are helping OS-9 become the fastest growing operating system in the world for the 6809 and 68000.

This is the year's biggest event for OS-9ers and the perfect opportunity to exchange your views, whether you are an oldtimer or a new convert to OS-9.

Lively and informative round table discussions will cover the design and use of Microware Software. We'll also discuss OS-9's dynamic growth, where we are today, and where we may be in the future.

The exhibit area will feature booths from the leading suppliers of OS-9 compatible hardware and software. It's a great opportunity to sharpen your skills and increase your knowledge in the latest microcomputer software technology. Plan to attend — Register Today!

Pre-Registration Only!

4th ANNUAL OS-9 SEMINAR

- Exhibits
- Speakers
- Latest Hardware
- Newest Software
- Technical Sessions for 6809 or 68000

Seminar only $150 Hotel Package $350
Location: Marriott Hotel, Des Moines, IA
Don't Miss It — Pre-Register Now!
Call Jeanne at 515-224-1929 or Return the Attached Card

MICROWARE SYSTEMS CORPORATION
1866 N.W. 114th Street • Des Moines, IA 50322

THE LATEST 68000 EDITIONS

With the new release, comes new editions. You can use the ident utility to check your software against this list. If you don't have the latest edition, give us a call for information on updating your software. Or use the form supplied on this page.

OS-9/68000 VERSION 1.2

Utilities:	Module	Edition
	Attr	17
	backup	11
	binex	12
	build	11
	cfp	17
	cmp	11
	code	10
	compress	11
	copy	18
	count	11
	date	13
	dcheck	12
	debug	13
	deiniz	11
	del	12
	deldir	14
	dir	20
	dsave	21
	dump	16
	echo	13
	edt	11
	exbin	13
	expand	12
	fixmod	9
	format	3
	free	11
	grep	9
	ident	11
	iniz	11
	link	11
	list	11
	load	10
	login	13
	makdir	11
	make	10
	mdir	15
	merge	11
	mfree	11
	os9gen	11
	pd	11
	pr	18
	printenv	2
	procs	15
	qsort	12
	rename	15
	save	10
	setime	17

LANGUAGE SOFTWARE UPDATES NOW AVAILABLE

Microware is offering a special offer to purchasers of updates of the latest release of OS-9/68000 Microware Basic and OS-9/68000 C Language Compilers. These updates include revised and reformatted documentation delivered in an attractive gray binder with slipcover for no extra charge (see picture on opposite page). To take advantage of this special offer, simply fill out the adjacent update order form and return it to Microware with your original language diskette with a $103 update fee. Customers outside the continental United States should contact Microware for information about appropriate shipping charges. Allow 3-4 weeks for delivery.

MICROWARE SOFTWARE PRODUCT UPDATE ORDER FORM

Company Name:_____

Address:_____

_____

_____

Purchasing Contract:_____ PO#: _____

Phone Number:_____

Mastercard__Visa__Card #_____ Expiration Date____

Check Enclosed__ Signature:_____

PLEASE INDICATE THE DISKETTE SIZE AND FORMAT ON WHICH YOU WISH TO RECEIVE MICROWARE SOFTWARE PRODUCTS

Format: _____ Disk Size: 5": __ 8": __

Number of Sides: 1: __ 2: __

Density: 1: __ 2: __

Number of Cylinders (tracks): 40: __ 80: __

** NOTE: YOUR ORDER WILL NOT BE PROCESSED UNLESS THE **
** ORIGINAL DISK IS RETURNED **

Utilities (cont.):	Module	Edition
	shell	20
	sleep	10
	tee	9
	tmode	14
	touch	9
	tr	12
	tsmon	12
	unlink	10

Operating System:	Module	Edition
	PIPEman	14
	RBF	22
	SCF	11
	Cio	6
	Math	15
	Sysgo	1

Scred:	Module	Edition
	maketerm	7
	scred	42

Languages:	Module	Edition
	Basic09	16
	RunB	16
	c68	48
	cc	14
	cpp	9
	o68	8
	l68	21
	r68	17
	rdump	6
	pc68	5
	pp68	5
	pt68	5
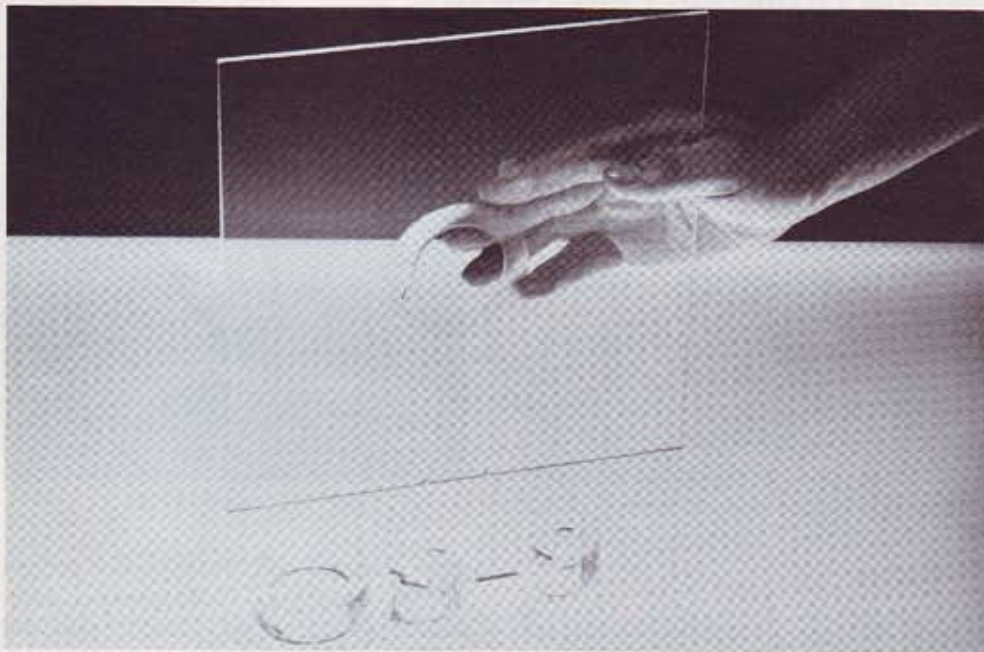
ANNOUNCING... OS-9/68000 VERSION 1.2

Who says hard work doesn't pay off? After 9 months of painstaking review, addition and enhancement, Microware is excited to present to you the slickest version of OS-9 ever released.

Several major changes have occurred in the OS-9/68000 kernel for the 1.2 release. The most notable are the addition of event (semaphore) routines and named pipes.

Improvements have also been made in the OS-9 drivers for this release. Specifically, the TMODE and XMODE utilities have been upgraded to allow for the specification of baud rates with corresponding changes in the drivers. The serial port drivers have been upgraded to allow for modem control.

The version 1.1 math package consisted of two different trap handling routines to provide floating point math support. The new version has combined those trap handlers into a single module that contains all of the math routines.

The most substantial change in the Shell provides UNIX-like environment variable facilities that can be accessed by C programs. The DSAVE utility has been upgraded to allow for the specification of dates and times, for ease in backing up files.

SCRED has been enhanced to improve performance, in particular in the area of I/O.

Numerous bug fixes have been made in the BASIC09 language. When combined with the fixes in the math libraries, it is a much more reliable product. The major addition to the C compiler is a new data type "remote" that allows for the specification of very large arrays.

All previous documentation has been upgraded for this new release. Indexes have been included for the first time! The text has been rewritten to be more easily understood by new users of OS-9. This includes a greatly expanded tutorial section in the BASIC09 Manual and a rewritten tutorial section in the User's Manual. A new format for our manuals are also being introduced with this release. Not only are they now in beautiful grey binders with slipcovers, but they will soon be laser printed to enhance the overall appearance.

IT'S NEW: OS-9/68000 PASCAL

Microware is pleased to announce the release of OS-9/68000 Pascal. Programmers familiar with Pascal will be pleased by the thoroughness of our implementation of the language. If you haven't yet explored Pascal, you will be happy to find it is easy to learn.

OS-9/68000 Pascal is easy to use and extremely friendly. It is managed by an executive program which scans compile time options and initiates four separate compilation phases automatically (without user intervention).

Historically, the internal operation and execution of Pascal compilers has been complex and demanding of a computer. Microcomputer versions of Pascal have been quite limited and much slower than equivalent versions for large computers.

This performance gap has been eliminated by the combination of OS-9/68000, Microware Pascal and the 68000 microprocessor. The 68000 was specifically designed to efficiently execute high-level languages such as Pascal. OS-9/68000 Pascal is a full implementation of the language specified by the ISO Standard 7185.1 Level 0 and includes many powerful and popular extensions.

OS-9/68000 Pascal extensions:

* OTHERWISE selector in CASE
  statement.
* Identifiers may contain '_' and '$'
  characters.
* External procedure directive.
* Automatic conversion of 16 bit integer
  and 32 bit Linteger signed types
* String data types
* Real functions ARCSIN, ARCCOS,
  TAN and LOG.
* Random access of any Pascal file
* Program control of error conditions.
* Operating system call with OS9
  procedure.
* Bit field manipulations
* Dynamic heap management
* Runtime parameter processing
* * * * and many more . . .

OS-9/68000 PASCAL is available now. Call Microware or an authorized Microware distributor for more information.

OS-9/68000 SOFTWARE SUPPORT FOR THE HITACHI 63484 ADVANCED CRT CONTROLLER (ACRTC)

In cooperation with Hitachi, Ltd., and Graphic Software Systems, Inc., Microware is offering an outstanding graphics-oriented system software package for high performance 68000-based systems. The software package includes software for the target system plus powerful tools for application software development including:

* OS-9/68000
* Specialized ACRTC Device Driver
* Device Driver Language Bindings for C and Basic
* ACRTC-Optimized Virtual Device Interface (VDI)
* VDI Language Bindings for C and Basic
* Basic, Resident C, and Cross C Compilers
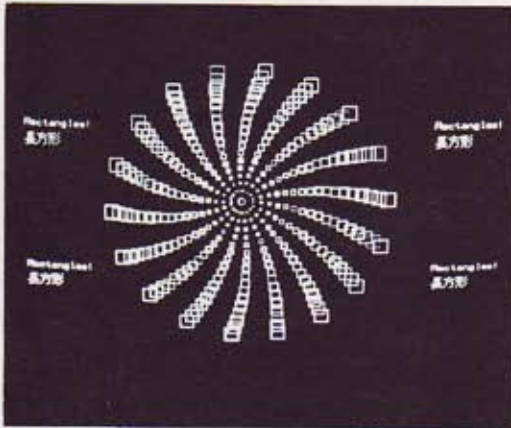
The foundation of the system software for the target system is Microware's OS-9/68000. OS-9 is easily adaptable to almost any hardware configuration and is ROMable. It also provides Unix-application-compatibility.

There are two ways that the ACRTC can be used under OS-9. The basic level is via the OS-9 standard ACRTC device driver. This level is relatively hardware dependent. The higher level is via the optional Microware/Graphic Software Systems Virtual Device Interface (VDI). This is the industry-standard, high-level, hardware-independent graphics interface for application software.

The most commonly used application development tools are the Microware C

and Basic languages. Microware Basic runs on OS-9 itself, while the C Compiler is available in resident or cross-compiler versions for VAX systems under the Unix or VMS operating systems.
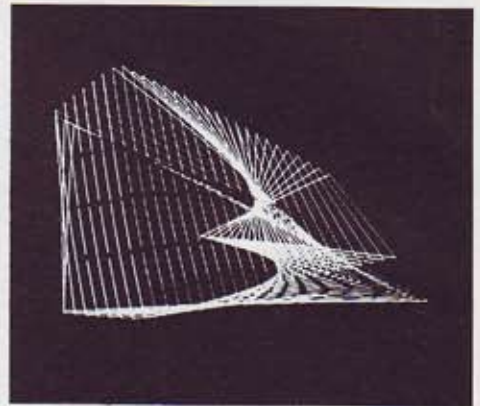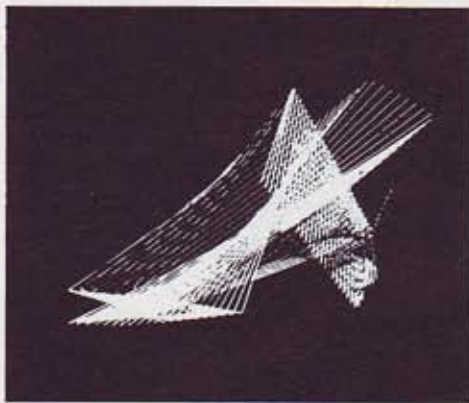
THE ACRTC DEVICE DRIVER

Microware has developed an OS-9 device driver for the Hitachi ACRTC device. This driver allows the ACRTC to be used to display combined text and graphics using virtual display windows. The driver gives direct access to all of the ACRTC's powerful graphics command set.

The ACRTC is an intelligent display processor that executes complex graphics commands in hardware at a rate of 400 ns. per pixel. Combined with the specially designed driver software, the end result is a very high speed and high performance system.

Full CRT emulation in the driver (including cursor control and scrolling) allows the ACRTC to be used as a normal ASCII output device in the same manner a typical CRT terminal is used. Any of the standard Microware programming languages (C, Microware Basic, Pascal and Assembler) can be used with the driver to create text-oriented application programs. Special language bindings for the complete ACRTC hardware command set are provided for C, Microware Basic and the forthcoming Microware 68000 Fortran compiler.

The driver utilizes character sets stored in RAM or ROM modules. It can be

used with any combination of standard ASCII, Japanese JIS Kanji, or a user-defined character set. The font size and style may also be varied.

The basic ACRTC driver is included as part of the I/O device driver library supplied to OS-9 licensees. No additional license or royalties apply.

THE VIRTUAL DEVICE INTERFACE

The VDI concept is rapidly emerging as the industry standard for high-level interactive graphics interfaces. The VDI is the subject of a draft standard currently before the ANSI and ISO standards organizations, with formal ratification expected in the near future.

The VDI gives programmers a virtual programming environment. VDI translates commands within the virtual environment to the requirements and characteristics of the actual I/O devices used on a specific system. The VDI can interface to many different kinds of input, display and printing devices having varying physical characteristics. As a result, graphics applications can be easily transported between systems with different CPUs and I/O devices.

Graphic Software Systems, Inc. (GSS) is an acknowledged leader in graphics software for microcomputer-based systems. Microware and GSS are working together in order to offer versions of GSS' outstanding graphics software tailored to OS-9/68000.

SOURCE COMPARISON IN MICROWARE BASIC

The following program is a handy tool to compare different editions of any ASCII file. Due to printing "srcmp" in columns, some lines have been continued on the following line. These lines have been commented within the code.

```
PROCEDURE srccmp
(* the following line has been broken *)
TYPE record=name,lines(20):STRING[80]:
     count,ptr:INTEGER; path:BYTE
DIM rec(2):record
DIM function,i,j,k,l:INTEGER
DIM command:STRING[80]
DIM wrap:BOOLEAN

GOSUB 10 \(* print command list *)
FOR i=1 TO 2
rec(i).count=0
rec(i).ptr=0
FOR j=1 TO 20
rec(i).lines(j)=""
NEXT j
1 j=ERR
IF j<>0 THEN PRINT "      eError #"; j \ ENDIF
PRINT "file "; i; "? "; \ INPUT "",rec(i).name
ON ERROR GOTO 1
OPEN #rec(i).path,rec(i).name:READ
ON ERROR
NEXT i
command="C" \wrap=FALSE

LOOP  \(* dispatch routine *)
REPEAT
function=SUBSTR(LEFT$(command,1),"?CDLQRVW$")
ON function GOSUB 10,20,30,40,50,40,60,70,80
IF function<1 THEN
PRINT " I don't understand: "; command
command=""
ELSE
IF SUBSTR(LEFT$(command,1),"CLR$?")>0 THEN
(* the following line has been broken *)
RUN prtsrc(rec(1).count,rec(1).lines(rec(1).ptr),
     rec(2).count,rec(2).lines(rec(2).ptr),wrap)
ENDIF
command=MID$(command,2,255)
ENDIF
UNTIL LEN(command)=0
INPUT "now what? ",command
RUN upcase(command)
ENDLOOP

10 (* print menu *)
PRINT
PRINT "Commands:"
PRINT "(?) - Display menu"
(* the following line has been broken *)
PRINT "(C) - Continue to next non-matching
               source line"
(* the following line has been broken *)
PRINT "(D) - Display last 20 lines source
               from both files"
PRINT "(L) - Step left file (file 1)"
PRINT "(Q) - Quit and return to OS-9"
PRINT "(R) - Step right file (file 2)"
PRINT "(V) - Vertical Trace"
PRINT "(W) - Wrap around toggle switch"
PRINT "($) - Access OS-9 Shell"
PRINT
RETURN

20 (*'C' Continue to next
        non-matching source line"*)
REPEAT
FOR i=1 TO 2
rec(i).count=rec(i).count+1
rec(i).ptr=MOD(rec(i).ptr,20)+1
IF EOF(#rec(i).path) THEN
rec(i).lines(rec(i).ptr)="       <<<eof>>>>"
ELSE READ #rec(i).path,rec(i).lines(rec(i).ptr)
ENDIF
NEXT i
IF EOF(#rec(1).path) AND EOF(#rec(2).path) THEN
PRINT "compare completed" \ PRINT \ END
ENDIF
(* the following line has been broken *)
UNTIL rec(1).lines(rec(1).ptr)<>
        rec(2).lines(rec(2).ptr)
RETURN

30 (*'D' Display last 20 lines
        of both source files*)
PRINT
PRINT TAB(9); "---"; rec(1).name; "---";
PRINT TAB(49); "---"; rec(2).name; "---"
l=rec(1).count
IF rec(2).count>1 THEN l=rec(2).count \ ENDIF
IF l>20 THEN l=20 \ ENDIF
j=rec(1).ptr+20-1 \k=rec(2).ptr+20-1
FOR i=1 TO l
j=MOD(j,20)+1
k=MOD(k,20)+1
(* the following line has been broken *)
RUN prtsrc(rec(1).count+i-1,rec(1).lines(j),
     rec(2).count+i-1,rec(2).lines(k),wrap)
NEXT i
RETURN

40 (* 'R' and 'L' Step in file *)
i=1
IF LEFT$(command,1)="R" THEN i=2 \ ENDIF
rec(i).count=rec(i).count+1
rec(i).ptr=MOD(rec(i).ptr,20)+1
READ #rec(i).path,rec(i).lines(rec(i).ptr)
RETURN

50 (* 'Q' Quit and return to OS-9 *)
CLOSE #rec(1).path
CLOSE #rec(2).path
PRINT  \ END

60 (* 'V' Vertical trace *)
PRINT rec(1).lines(rec(1).ptr)
PRINT rec(2).lines(rec(2).ptr)
RETURN

70 (* 'W' Wrap around toggle switch *)
wrap=NOT(wrap)
IF wrap THEN PRINT "wrap mode enabled"
ELSE PRINT "wrap mode disabled" \ ENDIF
RETURN

80 (* '$' Access to OS-9 Shell *)
SHELL ""
RETURN

PROCEDURE prtsrc
PARAM Lcount:INTEGER; left_line:STRING[80]
PARAM Rcount:INTEGER; right_line:STRING[80]
PARAM wrap:BOOLEAN \(* wrap inhibit *)
DIM Lheader,Rheader:STRING[8]
DIM Lline,Rline:STRING[80]
Lline=TRIM$(left_line)
Rline=TRIM$(right_line)
Lheader="("+STR$(Lcount)+")"
Rheader="("+STR$(Rcount)+")"

REPEAT
PRINT Lheader; TAB(8); LEFT$(Lline,30);
PRINT TAB(40); Rheader,TAB(48); LEFT$(Rline,30)
Lheader="" \Rheader=""
Lline=MID$(Lline,31,255)
Rline=MID$(Rline,31,255)
UNTIL NOT(wrap) OR Lline+Rline=""

PROCEDURE upcase
PARAM text:STRING[1000]
DIM i:INTEGER
DIM char:STRING[1]
FOR i=1 TO LEN(text)
char=MID$(text,i,1)
IF char>="a" AND char<="z" THEN
char=CHR$(ASC(char)-$20)
text=LEFT$(text,i-1)+char+MID$(text,i+1,999)
ENDIF
NEXT i
```

MICROWARE'S 4th ANNUAL OS-9 SEMINAR PRE-REGISTRATION CARD

Name_____ Title_____

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Address_____

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Phone (_____)_____ Number In Party*_____
Use Separate Sheet for other Names.

I wish to:

☐ Register for the Seminar Only ($150.00 USD)* $_____

☐ Take Advantage of the Hotel Package ($350.00 USD)$_____
   For details of Hotel Package, see inside.

☐ I have developed an interesting application which I would like to share with
   the group. Please contact me for further information._____

☐ I would like to see special discussions of_____

Please enclose a Check or Money Order (In US Dollars) with this Registration Card and return to MICROWARE SYSTEMS CORPORATION, 1866 N.W. 114th Street, Des Moines, IA 50322 Attn: Seminar Registration.

You Must Register in Advance of the Seminar. Registration deadline is October 14th. 1985. We do not accept Company Purchase Orders for this event without prior arrangements. Your return invoice will serve as confirmation of the acceptance of your registration. If you cancel your attendance &/or Hotel package registration after Oct. 14, 1985 your fee will not be refunded. This also applies to no-shows. Cancellation prior to Oct. 14th will be subject to a 10% charge.

Please add $40 for any member of your party who wishes to attend banquets only.

MICROWARE.

Microware Systems Corporation
1866 N.W. 114th Street
Des Moines, Iowa 50322

place mailing label here