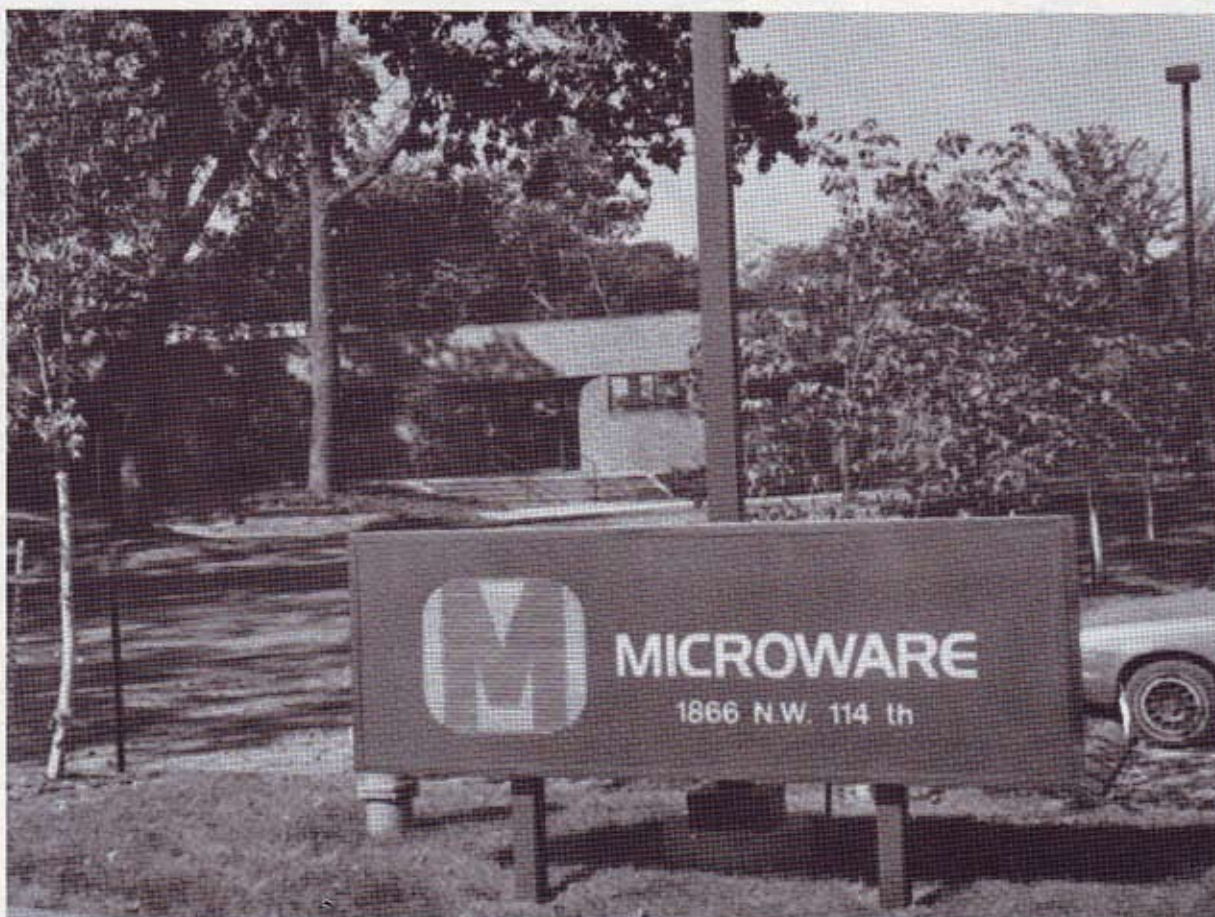


microware[®] PIPELINES

Covering the Full Spectrum of 6809 and 68000 Applications of OS-9

Volume 1 Issue 2

Winter 1985



In This Issue:

SEMINAR REVIEW

WHAT'S NEW AT MICROWARE

ON THE C SIDE

SHELL deBUGG

The Pipeline is published quarterly by:
Microware Systems Corporation
1866 N.W. 114th Street
Des Moines, IA 50322
(515)224-1929

Contributing Editors:
Andy Ball Kim Kempf
Phyllis Casel Dave West

Photography: George Edwards

Do you have news for Pipelines? If you do, send your article(s) to Microware, c/o Phyllis Casel. 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.

TRADEMARKS

A reminder to Application Software Vendors and OEM's: When placing advertisements in magazines or making reference to OS-9 or BASIC09, you must indicate that they are registered trademarks of Microware Systems Corporation and Motorola. Microware's advertising specialist reads the fine print of all ads with a magnifying glass, and the less you hear from that department the better!

CORRECTION

In the Fall, 1985 edition of Pipelines a transposition of numbers was made. Under the OS-9/68000 Version 1.2 release, the "make" utility should be edition number 15, instead of 10. And the operating system "math" module should be edition number 10, instead of 15. The Pipeline staff apologizes for any inconveniences this may have caused.

1985 SEMINAR REVIEW



There was a fervor in the air. OS-9 Users came from far and wide to participate in Microware's Seminar. The four day event was the highlight of the OS-9 social season.

Registration began Friday, November 1st. There were enthusiasts from 28 states and nine foreign countries. The exhibit hall was buzzing with 22 exhibitors demonstrating their hardware and software. Friday night a reception and dinner banquet for 225 attendants was hosted. The guest speaker was Lonnie Falk, editor and publisher of Rainbow Magazine. After dinner Microware's special travesty awards were presented. Recipients of the symbols of excellence were: Bill Gates, Lonnie Falk, Dave Partington, Mike Smith, Arlene Don, Tony Hoffman and Doug Smith. Decorum prevents this writer from giving you the specifics of each award.

Saturday was the start of the technical sessions. Topics included: everyday OS-9, OS-9/6809, OS-9/68000, networking, graphics, feedback loops, CoCo special interests, and the Japanese connection, featuring speaker Toshio Shinjo from Microware Japan. Later in the afternoon special User Application demonstrations were given by: Vern Schwanke of Foseco, Ken Friedank of Honeywell, Andre Felix of Gespac, and Bill Brought and Paul Stimson from Candlewood Software.



Saturday evening the OS-9 Users Group held their annual meeting. (See article on page 6 for details) Later that evening, hospitality suites were hosted by Microware Systems Corporation, Gimix, Smoke Signal Broadcasting and the OS-9 Users Group.

During Sundays brunch the featured speaker was Peter Dibble. He made some very humorous predictions about the future of computers. Brian Lantz then accepted the Presidential Gavel of the Users Group. As his first official act he presided over the User Group Raffle. Esther Puckett drew the ticket for the Kimtron terminal, which was won by Frank Hogg. After brunch the technical sessions resumed for the rest of the afternoon.

Round Table discussions were held Monday morning for those who had specific questions about OS-9. Then the attention turned to Microware, an open house was held at their facilities.

The 4th Annual OS-9 Seminar was an overwhelming success. It was a mixture of education and entertainment. A chance to reminisce with old friends and meet many new ones. The staff from Microware would like to thank all those who attended this year. You helped to make this the greatest seminar yet. They extend condolences to those who were unable to participate, you have no idea what you missed!

LOOK WHAT'S NEW AT MICROWARE!!

New Sales Manager

On October 15th Andrew (Drew) Crane joined the Microware Marketing staff as Sales Manager. Drew is a 1981 graduate of Drake University with a degree in Finance and Computer Science. After graduation he moved to Houston, Texas, and began working for Tele-dyne Exploration.

In 1982, he joined IBM as a Systems Engineer. After completing IBM's Sales Training Program he joined the Houston Process Branch Office as a work station specialist. He gained knowledge of how micro computers are utilized in a corporate environment through working with accounts such as Amoco, Exxon and Marathon Oil. Responsibilities included the development and implementation of strategic workstations resulting in multiple volume purchase agreements. Teaching classes on application program usage, networking p.c.'s, main-frame to p.c. communications and work station security. He received recognition from IBM for his outstanding account success on numerous occasions.

As Microware's Sales Manager, Drew plans to implement additional sales programs, further develop key target markets, provide incentives to OS-9 application software developers and increase customer contact. Microware looks forward to a very promising future with Drew.

Welcome New Employees

Debora Jackson is the new voice of Microware, she has assumed the receptionist's position. Two current employees have been promoted. Phyllis Casel has moved to Marketing as the Communications Coordinator. She will be writing the OEM News Bulletin and Pipelines. David West is now responsible for the Customer Support Service "Hot Line". Microware has been experiencing a great deal of growth in the past months. The addition of these staff members will allow us to better serve you.



Ground Breaking

Saturday, October 9, 1983, was a date that went down in system software history books. The informal ground breaking ceremonies for Microware corporate headquarters, marked the beginning of a new era for the company.

History will again be made in the Spring of 1986. Microware has blossomed and outgrown its present two acre, 7500 square foot facility in only two years time. A \$1 million dollar expansion project, now being designed, will be a two-story, 15,000 square foot building immediately north of the original site. It will house production, marketing and administrative departments. The present enterprise will continue to be the domain of the Research and Development Staff. Expansion plans also include hiring more employees to fill technical and marketing slots.

Award Winner

Microware Systems Corporation has been selected by the Des Moines Chamber of Commerce Bureau of Economic Development as an Iowa Economic Impact Award winner. The award is in recognition of the new jobs generated within the local economy as a result of Microware's recent one million dollar facilities expansion.

The award will be presented by Iowa Governor Terry Branstad in a ceremony on November 26. It will be accepted on behalf of the company by Microware President, Ken Kaplan.

Committee Member

The widespread acceptance and success of the C language has led to the need for a consensus of which facilities and capabilities should be part of the C language and which should not. The American National Standards Institute (ANSI) X3J11 Technical Committee is the official name for the ANSI C language standards committee. Mr. Kim Kempf, the Research and Development Manager and C language specialist at Microware, is an active member of the ANSI C guidelines committee. Recently, he met with other members in Monterey, California to continue technical discussions. Kim is scheduled to attend the next ANSI C meeting December 9-13th, 1985, in Ft. Lauderdale, Florida. Microware's participation in the ANSI C Committee will help insure that the customers stay on the leading edge of C Compiler technology. The final draft of C Standards will help to facilitate and expedite the standardization process, and its expected release is March of 1986.

Communications Program Now Available For OS-9/68000.

COM, a utility enabling communication between an OS-9 based system and a remote computer, is now available from Microware. COM can be used to interface your OS-9 system to timesharing systems, information utilities, video-text services and other facilities.

COM has two operational modes: In Communications Mode the usual OS-9 control keys are disabled, and the terminal only responds to the control keys of the remote system. The Control Mode provides the user with the ability to change operating parameters, upload/download files and access the Shell. COM also provides a programmable "function key" feature that supports up to ten user-defined text sequences.

To find out more, call your local Microware representative, or call Microware Systems Corporation at (515)224-1929.

ON THE C SIDE

While C has been called a "programmer's dream", it has also been the cause of many programmer's nightmares. It is an easy language to learn but a hard one to master. Consequently, Pipelines would like to share a few strategies with you to "get you through the night". Hopefully, they will be helpful and clear up some of the misapprehensions concerning C. The topics discussed in this issue are C library I/O, C documentation and choosing the correct I/O function.

Avoid System calls or C Library I/O in Signal handlers.

The results of using C library functions in signal handler functions are unpredictable. This is because most library functions use static storage and consequently are not re-entrant. Because OS-9 signals do not queue, it is important that a signal handler finish as fast as possible to allow other signals to be handled. **Keep signal handlers short and avoid functions or system calls. The best way to use signal handlers is to provide global condition flags that the signal handler raises when signals occur.** The executive mainline then tests the flags and takes appropriate action.

Sometimes, a signal handler is required to perform time consuming or non-trivial processing such as updating files. A scheme that uses multiple processes communicating via events or a data module will give better results.

Oh! That Documentation:

Interpreting C Library functions

One of the major sources of hotline calls involve problems with calling C library functions. The synopsis of a library function shows how the function and arguments would look if written as a C function definition. The function could actually be written in assembly language or coded as a macro. For example, the synopsis in the documentation for the `gettime()` function states:

```
SYNOPSIS: #include <time.h>
gettime(timebuf)
struct sgtbuf *timebuf;
```

This synopsis states that `gettime()` requires one argument of type "pointer to struct sgtbuf." This means the function expects a pointer to a buffer in which to place the `sgtbuf` structure information. Programmers often erroneously use the `gettime` function as this program fragment demonstrates:

```
#include <time>
struct sgtbuf *timebuf;
badone()
{
    gettime(timebuf);
}
```

`struct sgtbuf *timebuf` declares a pointer to a `struct sgtbuf`, which in this case is initialized to zero when the program is started. The `gettime()` function will place the time information starting at address zero, which will almost always result in disaster. The problem is even worse if the `timebuf` declaration appears inside the function. In that case, the declaration is `auto`, and is initialized to garbage when the program is run. This results in random unpredictable program operation.

The preceding example is correctly used as follows:

```
#include <time.h>
struct sgtbuf timebuf;
goodone()
{
    gettime(&timebuf);
}
```

Choosing the proper I/O functions.

The Microware C compilers provide library I/O functions at two levels: **high-level** and **low-level** I/O functions. High-level functions are generally portable to other C compilers and operating systems. Low-level functions are system specific and, if present, may not operate in a consistent manner.

High-level I/O functions.

The high-level I/O (stdio) functions that are provided in the Microware C Compiler library are:

<code>clearEOF</code>	<code>clearerr</code>	<code>fclose</code>
<code>fdopen</code>	<code>feof</code>	<code>ferror</code>
<code>fflush</code>	<code>fgetc</code>	<code>fgets</code>
<code>fileno</code>	<code>fopen</code>	<code>fprintf</code>
<code>fputs</code>	<code>fread</code>	<code>freopen</code>
<code>fscanf</code>	<code>fseek</code>	<code>ftell</code>
<code>fwrite</code>	<code>getc</code>	<code>getchar</code>
<code>gets</code>	<code>getw</code>	<code>printf</code>
<code>putc</code>	<code>putchar</code>	<code>puts</code>
<code>putw</code>	<code>rewind</code>	<code>scanf</code>
<code>setbuf</code>	<code>sprintf</code>	<code>sscanf</code>
<code>fprintf</code>		

Use the stdio functions exclusively to provide maximum portability. The stdio functions are well aware of the nature of OS-9 and choose the best sequence of low-level I/O operations to attain maximum efficiency while retaining the generally accepted semantics of the respective function.

Low-level I/O functions.

Low-level I/O functions provide access to the operating system service requests. Because of this, these functions are inherently operating system dependent and should be avoided in code that is to be ported to other machines. The low-level I/O functions provided in the Microware C Compiler library are:

<code>_cmprnam</code>	<code>_gs_devn</code>	<code>_gs_devn</code>
<code>_gs_eof</code>	<code>_gs_eof</code>	<code>_gs_gfd</code>
<code>_gs_gfd</code>	<code>_gs_opt</code>	<code>_gs_pos</code>
<code>_gs_rdy</code>	<code>_gs_size</code>	<code>_ss_attr</code>
<code>_ss_lock</code>	<code>_ss_opt</code>	<code>_ss_opt</code>
<code>_ss_pfd</code>	<code>_ss_rel</code>	<code>_ss_rest</code>
<code>_ss_size</code>	<code>_ss_ssig</code>	<code>_ss_tiks</code>
<code>_ss_wtrk</code>	<code>access</code>	<code>attach</code>
<code>close</code>	<code>creat</code>	<code>create</code>
<code>detach</code>	<code>dup</code>	<code>getstat</code>
<code>lseek</code>	<code>open</code>	<code>read</code>
<code>readln</code>	<code>setstat</code>	<code>unlink</code>
<code>unlinkx</code>	<code>write</code>	<code>writeln</code>

Sometimes, the only way to perform an operation is with low-level access. For example, if special handling of a serial port is required such as changing the port characteristics or checking for data ready, low-level access is required. Low-level I/O must also be used to fully utilize the RBF record locking facilities in a record-oriented application. In these cases, try to isolate such code in separate functions (or macros) so it will be easy to change if the program is moved to a non-OS-9 machine.

It is imperative that you avoid mixing stdio and low-level I/O functions applied to the same I/O path. Such actions are sure to cause unexpected results, unless extreme caution is exercised. High-level functions employ a **file pointer** that describes a small structure that contains the information required to perform buffered I/O on an arbitrary device. Low-level functions use a **small integer** assigned by the system to identify a system I/O path. Using a file pointer in a low-level function or a path number in a stdio function is a common mistake among C beginners that always causes unpredictable program behavior.

NEXT ISSUE:

Understanding Stream I/O

OS-9 USERS GROUP



Hey! Are you a member of The OS-9 Users Group? Do you have an extensive library of OS-9 software at your fingertips? Are you receiving a newsletter written by professional software authors and experts answering your questions on OS-9? If your answer to any of these questions was NO, you have no idea what you are missing out on. The greatest thing to happen since Microware developed OS-9, was the organization of The OS-9 Users Group. It was formed to foster communications between users of OS-9. Group activities include a national members meeting, newsletter, bulletin board system and software exchange mechanism.

The Annual Users Group meeting was held during Microware's 4th Annual OS-9 Seminar on November 2, 1985. New officers of the Users Group are: President-Brian Lantz, Vice President-William Turner, Secretary-David Gibson, Treasurer-Steve Odneal. The Groups new address is: OS-9 Users Group, 9743 University Avenue, Suite #330, Des Moines, Iowa, 50322. When sending materials of any type, they request that you label the outside of the envelope with its' contents. To find out more about joining, send your name, address and daytime phone number to the address listed above. Please mark the outside of your envelope ATTN: Membership. The OS-9 Users Group is independent of Microware Systems Corporation and may not be reached through their offices or phone.

LANGUAGE SOFTWARE UPDATES - FINAL OFFER!

Microware is making a special update offer to purchasers of Version 1.1 of Microware Basic and Version 1.2 of the OS-9/68000 C Compiler. These updates include revised and reformatted documentation delivered in an attractive gray binder with slipcover for no extra charge. 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 ****

SEASONS GREETINGS FROM THE MICROWARE STAFF



Microware will be closed for the holidays December 24th through January 2, 1986.



If you are a faithful Ann Landers reader you will be pleased to know that her cousin, SHELL deBUGG, is the syndicated columnist of OS-9's Silicon Valley. She gives advice on more than love, marriage, diseases, social graces and which way to hang your toilet paper, print side facing in or out. Please send in your most complex questions. SHELL will tell you everything you want to know about OS-9, but were afraid to ask. She will change all names to protect the innocent.

Dear Ms. deBUGG,

I am a hard-working husband and father of four. When I was younger I seemed to have the stamina to wait for my C programs to compile until the early hours of the morning; yet still find time to spend with my family. However, as I've grown older my "get up and go" has gotten up and gone! I hate to decrease the amount of time I devote to my family, so I was wondering if there is a way to minimize compilation time of 68000 C programs.

-Twiddling Thumbs in Boston

Dear TTB,

I'm glad that you have come to me with this problem before it starts to cause problems with your family. Without a strong father-figure around the house, the kids might wander off and join a punk-rock band. Before it's too late, use `-t=<dir>` option of "cc", which causes the C executive to place temporary files of any compiler phase in the directory named `<dir>`. If the device containing the directory is the ram disk (r0), compilation time will be drastically reduced. EXAMPLE: `cc -t=r0 file.c`

If the time spent with your family is really precious, use the `-v=<dir>` option of "cc", which specifies a directory to search for preprocessor `#include` files. The name of the include file must be placed within `<>`'s. and the directory must contain all the `#include` files

used. This path will be used rather than the DEFS directory on the default device. Good luck, and keep an eye on the music your children listen to.

-SHELL deBUGG

DEAR SHELL deBUGG,

My mother and I are having an argument that we are hoping you will settle. We have both agreed to abide by your decision. Our problem is this; if our OS-9 system does not have a real-time clock, when will task-switching be performed? My mother claims it only happens when you slap the side of the computer, but I think it has something to do with system calls. **-Betting in Peoria**

Dear Peoria,

You win the bet with your dear Mummy. If an OS-9 system does not use a real-time clock, task switching will only occur when a system call is performed. In a 6809 system with a clock, the CPU is interrupted by the clock at a usual rate of 10 times each second. This interval of 100 milliseconds is called a "tick". At each occurrence of a tick, OS-9 can suspend execution of one program and begin another.

-SHELL deBUGG

Dear SHELL,

My love life has been a shambles ever since my husband tried and failed to properly use the OS-9/68000 GREP utility. I've tried everything from black garters to intimate dinners to chase his blues away, but nothing seems to help. I need your advice desperately!

-Trying to Get a Grep

Dear Grep,

When used correctly the GREP utility is an excellent means for searching through a file for a specified string of words or characters. Here is how your husbands command line should look. **\$ grep Hello letter.to.john** In this example, GREP searches the file "letter.to.john" for lines of text that contain the word "Hello". If it finds any, it will then print these lines to his terminal. If he wants to get really fancy, your husband can use GREP's options to search more than one file, count the number of matching expressions, and print the line number on

which the expression was found. I hope this solves the hubby's blues so you two can start F\$Forking around again.

-SHELL deBUGG

Dear SHELL,

My oldest daughter left home several years ago to join the Rajneeshee Cult and discover the secret for the printing of floats or doubles in an OS-9/6809 C program. The Rajneeshees have tried to censor her mail, but a mother can tell when her child is in trouble. My daughter has told me that the Rajneeshees will not release her until she masters the art of C programming. Perhaps if you could share your knowledge of the OS-9/6809 C compiler, my daughter and I can be reconciled. What needs to be done to allow printf to perform float or double conversions in an OS-9/6809 C program?

- Distraught Mama

Dear D. Mama,

It is a sad state of affairs when our children are deceived by charlatans promising to teach the "easy" way to program. If only they would listen to the counsel of their elders and attend a reputable school. Pffinit() is used in the OS-9/6809 C compiler to allow for the printing of floats or doubles. The C source program must have the pffinit() function inside of main. If recompiling 6809 C source code on an OS-9/68000 system, your daughter should be aware that a "dummy" pffinit() function exists for source code portability. **-SHELL deBUGG**

Dear Readers,

By following this quarterly column you will sharpen your OS-9 skills and prevent the possibilities of committing "ERROR 223". **-SHELL deBUGG**

Send your OS-9 questions to:
Microware Systems Corporation
c/o SHELL deBUGG
1866 N.W. 114th Street
Des Moines, IA 50322

STOCKING STUFFERS FOR OS-9 USERS

When the holidays roll around there is always that special someone who is impossible to buy for. Let Microware solve your shopping blues and make your gift giving easier. They are offering special discounts on the perfect gifts for the OS-9 user in your life. Take advantage of sale prices on the Tour Guide, Entertainment Package or an OS-9 T-Shirt. There is no limit on the quantity you can order, so get one for yourself, the kids, Grandma and Grandpa. They will love them! This offer is good through January 31st, 1986. The coupon below must accompany your order to take advantage of these low prices.

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.

OS-9 T-SHIRTS

Microware had unique T-Shirts printed up for the seminar. And there are still plenty on hand. The picture speaks for itself. To be better you have to be different! Our software keeps your hardware up!



Please send me:

___ To Be Better T-Shirt @ \$7.50 each

___ Keep Your Hardware Up T-Shirt @ \$7.50 each

___ BASIC09 Tour Guide @ \$15.95 ea.
Add \$2.00 in the U.S. for UPS,
\$5.00 for Canadian Air Mail, or
\$10.00 for overseas air mail.
Iowa residents add 4% sales tax.

___ TOTAL

Name _____
Street _____
City _____
State _____ Zip _____

___ I have enclosed a check
___ Charge to my bank card
Mastercard ___ VISA ___
Card # _____
Expiration Date _____



MICROWARE.

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

place
stamp
here

place mailing label here