

# Welcome to WATCOM News



*James W. Welch, President of WATCOM Products (left) with K. Ian McPhee, President of The WATCOM Group (right)*

The WATCOM Group and the University of Waterloo have created a joint venture to provide distribution and customer support of software products. WATCOM Products has been formed to provide these services both for the Computer Systems Group at the University of Waterloo and for WATCOM Systems Inc.

The formation of WATCOM Products reflects a decision by both groups to expand and improve their customer service and support activities. WATCOM Products will assume the responsibility for the services currently handled by WATSOFT Products Inc. I am pleased that Sandra Ward, Angie Rohrbacher, Cindy Pfisterer and Dagmar McIntosh will be associated with WATCOM Products to assist us in our new endeavours and to provide continued and expanded support to our current customers.

I hope this first newsletter will provide an introduction to our company and to some of the exciting new activities in Waterloo. The newsletter will replace the current newsletters of the Computer Systems Group (WATNEWS) and of WATCOM Systems (InfoWat). Our intent is to make the newsletter interesting in a general sense, as well as informative about our products.

Yours truly,

*James W. Welch*

James W. Welch,

# Watcom News

# WATCOM

## WATCOM Products Inc.

WATCOM Products Inc. markets software developed by the University of Waterloo's Computer Systems Group (CSG) and by WATCOM Systems Inc., a member company in The WATCOM Group. For over two decades the Computer Systems Group has been producing software that has been widely accepted by universities and colleges throughout the world. In the last few years, WATCOM, whose roots are in the Computer Systems Group, has been producing software with similar success and acceptance.

Long standing successful products developed by the Computer Systems Group include WATFIV, WATBOL, ASMG, TRACE, WATERLOO SCRIPT, WIDJET, WATFOR-11, WATBOL-11, Waterloo BASIC, Waterloo Pascal and Waterloo Systems Language (WSL).

Portable software products developed recently include the WATCOM language interpreters for APL, BASIC, COBOL, FORTRAN and Pascal.

Waterloo's communication tools include JANET (an IBM PC local network), Waterloo PC Network (an IBM PC to IBM mainframe network marketed by IBM), HOSTCM (mainframe file access for micro software), and various terminal emulators for micros.

Waterloo and WATCOM products are software tools designed to optimize the productivity of student and professional programmers. Tools are used to develop solutions to specific application needs. Recent Waterloo and WATCOM products take the tool concept one step further allowing non-technical users to develop solutions without programmer assistance.

Waterloo and WATCOM products are strongly supported by clear, self-help documentation. In many cases, there are both a Tutorial and Reference Manual and a User's Guide specific to the machine and operating system being used.

These books are often written for use by students and priced for book store sales volume. One of the key reasons for the success and longevity of Waterloo and WATCOM products has been the care taken in producing comprehensive and legible documentation.



### Portable Software

Most of the software products available from WATCOM Products are portable and have been adapted compatibly to a range of micro and mainframe computers. They include IBM PC/DOS, IBM PC/PORT, IBM VM/SP CMS, Digital VAX/VMS, Digital Professional, the Commodore 64, Commodore SuperPet, and the CEMCORP ICON.

The systems programming language called WSL (Waterloo Systems Language) and a collection of libraries (WSLLIB) provide developers like WATCOM with the technology needed to produce software which is portable across different machine architectures and different operating systems and yet executes efficiently in native machine language.

Since the same software runs on different systems, the user benefits from **compatibility** beyond that normally achieved by independently developed products following standard specifications. The user also benefits from a **common user interface** across systems.

Waterloo and WATCOM portable and compatible software provide the user with complimentary use of micros and mainframes. Maximum portability of user applications across systems is provided. Maximum mobility of users between systems without re-education is possible. Waterloo and WATCOM communications support allows micros to share files and devices and to access mainframe resources.

### Maintenance Policy

Waterloo and WATCOM software provide written and telephone support free of charge for one full year from the date of purchase. Maintenance releases of the software will resolve reported user problems and possible incompatibilities with new versions of operating systems. Performance and minor functional enhancements may also be included in a maintenance release. A telephone "Hotline" has just been introduced and is staffed with personnel able to handle user problems and committed to efficient response. Software purchasers will receive our newsletter which provides new product information and frequently includes helpful tips and techniques related to our software.

### Maintenance Follow-on

After the first year of use of a Waterloo or WATCOM product, maintenance will continue as above for a yearly renewable fee (in the case of mainframe software this is a license for both use and maintenance). The fee is dependent on type of software purchased (e.g., micro or mainframe). Written, "Hotline" and maintenance release support will continue as will receipt of our newsletter. Further, if new versions of the software are offered with major functional enhancements at a higher price, these will be offered to maintenance customers at incremental cost.

# What's New

## WATCOM Pascal for the Commodore 64

WATCOM Pascal for the Commodore 64 is a full function Pascal\* conforming to both ANSI and ISO-draft standards and extended to support Commodore 64 features such as sprites, sound synthesizer and colour and bit-map graphics. WATCOM Pascal is already available on a number of micros and mainframes including IBM VM/SP CMS, IBM PC/DOS, DEC VAX/VMS, the Commodore SuperPet and the CEMCORP ICON.

\* The one omission from the standard is that you cannot pass a procedure as a parameter.

### Features

- WATCOM Pascal is unique as an interactive interpreter. An interpreter is an extremely efficient tool in both program development and teaching because it gives the user immediate feedback and execution rather than waiting through the usual compile/link/execute steps.
- WATCOM string extensions to Pascal provide the ability to handle variable-length strings and improve normal string manipulation facilities.
- Extra input/output features are included. Relative access files and extensions to the **reset** and **rewrite** procedures allow system file names to be used.
- Built-in procedures and functions permit machine level interface including **peek** to examine memory, **poke** to store into memory, **sysfunc** and **sysproc** to call machine language routines and **address** to obtain a variable's machine address.
- The **case** statement is extended with the **else** clause to allow for cases which are not defined.

- WATCOM Pascal contains a function to generate random numbers; a feature not normally part of the language implementation.
- An interactive debugger provides immediate execution of Pascal statements, execution of a Pascal program one statement at a time and invocations of the debugger from any point in a running program.

### Special Features

- The standard input/output devices on the Commodore 64 can be addressed directly from a Pascal program. These devices include the printer, the disk and the cassette.
- There are three procedures to manipulate bits in a byte, **bitset**, **bitreset** and **bitread** which allow full access to sprites, the sound synthesizer chip and any other particular I/O devices.
- WATCOM Pascal has also provided a bit-mapped graphics capability, a significant expansion of the normal graphics modes available on the Commodore 64.
- **sysfunc** or **sysproc** commands can have parameters which are passed to the called program. In the case of **sysfunc** the machine-language routine may also return an integer value.
- The user workspace of WATCOM Pascal on the Commodore 64 permits programs of 700-800 lines (depending on the number of comments used).
- The full-screen editor integrated with WATCOM Pascal is also loadable standalone from the cartridge provided.

### Documentation

WATCOM Pascal for the Commodore 64 is documented in one book which explains both the language and the editor. This book is designed to be either a self-teaching tool or a textbook for a course and could be used at the introductory level in high school or university.

The book includes a language primer with step-by-step examples, an advanced section on Pascal suitable for a second level course, a complete editor reference manual and finally the full syntax and semantics of the language. Additional copies of the text can be purchased from WATCOM Publications (see below).

### Availability

WATCOM Pascal for the Commodore 64 is packaged as three separate components:

- A diskette containing the WATCOM Pascal interpreter and library.
- A cartridge containing the WATCOM Editor in 16K of ROM
- A book containing both textual and reference material for WATCOM Pascal and the WATCOM Editor

# What's New

## Waterloo Structured BASIC for the Commodore 64

Waterloo Structured BASIC extends the normal BASIC system on Commodore-64 machines to include Structured Programming statements. These extensions are necessary in order to teach proper programming methodology using the BASIC language. The Commodore-64 version is very similar to the implementation used since 1980 with the Commodore PET.

There are several academic benefits to be derived from the Waterloo Structured BASIC system. Most notably, programs written with the system are *more readable*. This means:

- programs are easier to write, debug and maintain
- the BASIC language is easier to teach and to learn
- students learn important principles which can be applied to other programming languages.

Students learn proper programming discipline and style. They write Structured Programs, not the old-style "spaghetti code".

### Features

#### (a) Structured Statements

Waterloo Structured BASIC extends the normal BASIC with new statements to control loops and selection with IF statements. Loops are written as

```
LOOP
or WHILE condition
  ... BASIC statements
ENDLOOP
or UNTIL condition
```

The IF statement has the following general format:

```
IF condition
  ... BASIC statements
ELSEIF condition
  ... BASIC statements
ELSEIF condition
  ... BASIC statements
. . .
ELSE
  ... BASIC statements
ENDIF
```

The ELSEIF and ELSE portions are optional.

#### (b) Procedures

It is important to be able to modularize a program in a meaningful way. This is accomplished in Waterloo Structured BASIC with *procedures*. A procedure is a group of BASIC statements which are given a meaningful name:

```
PROC name
  . . . BASIC statements
ENDPROC
```

The procedure can be invoked from anywhere in the program using a CALL statement:

```
CALL name
```

#### (c) Additional Commands

Several commands are added to facilitate program development.

**AUTO** automatically generates line numbers as program text is added to a program.

**DELETE** used to remove a range of lines from a program.

**RENUMBER** renumbers the lines in a program including all references.

### Documentation

Waterloo Structured BASIC for the Commodore 64 is documented in one book which is designed to be either a self-teaching tool or a textbook for a course. The book is a tutorial and reference manual which assists the student in learning the modern concepts of Structured Programming and top-down design. Additional copies of the text can be purchased from WATCOM Publications (see below).

### Availability

Waterloo Structured BASIC for the Commodore 64 has two separate components:

- a cartridge containing Waterloo Structured BASIC in 4k of ROM
- a book containing tutorial and reference material for Waterloo Structured BASIC

To obtain further information concerning Waterloo software, contact:

WATCOM Products Inc.,  
415 Phillip Street,  
Waterloo, Ontario,  
Canada, N2L 3X2  
(519) 886-3700  
Telex 06-955458

# What People



## Yes, Virginia there is a Sandra Ward!

For more years than she'd care to remember, Sandra Ward has been told that she doesn't really exist. Purchasers of Waterloo and WATCOM Software have often been surprised to find out that 'Sandra Ward' isn't a fictitious name covering numerous persons and a hive of activity. Well, nowadays, there *are* numerous persons but the hive of activity is still Sandra Ward.

Sandra Ward is currently Director of Sales and Distribution at WATCOM Products Inc., a software marketing company jointly owned by the University of Waterloo and The WATCOM Group. Sandra has pioneered several distribution systems for University products and it is her expertise that will go a long way to produce success for the new marketing company.

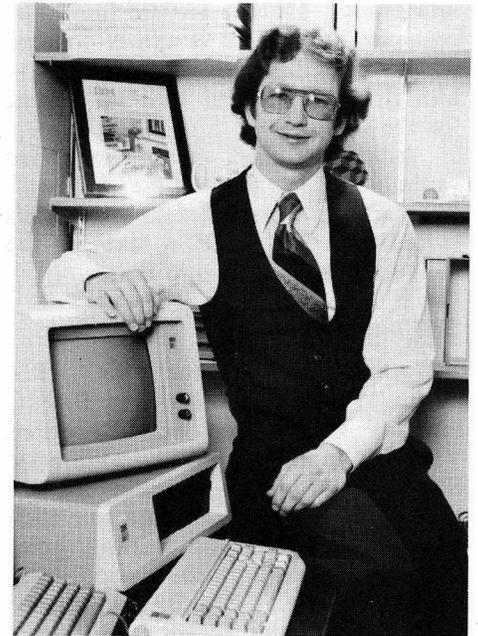
An Ontario Scholar, Sandra first came to the University of Waterloo in 1965 on a mathematics scholarship. In 1967, she put her academic career on the part-time burner to accept the position of Program Librarian for the WATFIV project at the Department of Computing Services. She's been at the University of Waterloo since then working at the Department of Computing Services and with the

Computer Systems Group as well as managing WATSOFT Products Inc. from 1981-1983.

In the early seventies, Sandra was chairman of CLING (Co-ordinated Library Interest Group - Ontario) and of USIG (User Services Interest Group - Ontario). Since the mid-seventies, she has served SHARE (North American IBM educational users group) in several official capacities. These include being project manager of the FORTRAN Project and project manager of SHARE's University Interest Group. Sandra has given many speeches at meetings of SHARE, GUIDE (North American IBM Commercial users group) and other user groups such as UNIVAC's.

Among her many activities, Sandra has co-ordinated conferences on campus for such groups as OUC (Ontario Universities Computing Conference), CIPS (Canadian Information Processing Society) and Canadian VM User Groups. Sandra is a member of the Board of Directors of the University Club at the University of Waterloo and of two private companies, Cyberware Computer Systems Ltd. and Dynasty Computing Inc.

An avid traveller, Sandra has taken her computing interests abroad, most recently attending the SEAS (European equivalent to SHARE) conference in Oxford last September. Yes Virginia, there is a Sandra Ward and she's a very busy lady!



## Fred Crigger

Director of Research and Development, WATCOM Systems Inc.

One of the three founding members of The WATCOM Group in 1981, Fred has been in the mainstream of software development at the Computer Systems Group, University of Waterloo and at WATCOM Systems from the time he started as a co-op mathematics student in 1974.

Fred's first contact with computing came when his enterprising Grade 13 math teacher brought a FORTRAN text to school and suggested his students study computing for one month. Together, they worked from that single text and from blackboard examples in preparation for a one-day visit to the University of Waterloo. Fred borrowed the text, and read it from cover to cover. It only took the visit to Waterloo to confirm that he was hooked on computing - before he had even touched a terminal.

The main focus for Fred during his computing career has been on the performance of software. He has often been involved in the optimization of various software products. "I seem to have a unique talent for looking at a project I haven't been involved in and coming up with several recommendations on how to increase performance."

Jim Welch, President of WATCOM Products Inc., comments, "When Fred was a student, the only way I could manage him was to give him too many things to do so he wouldn't find something more interesting. He has terrific focus and concentration. Fred is one of the few people who thrive on diversity. Give him five projects and he'll be looking for the sixth!"

Although Fred is a confirmed workaholic, he finds time for golf, windsurfing, and following his favourite basketball team, the University of Waterloo Warriors.

### Software Projects

Waterloo BASIC for the IBM Series/1; Waterloo Structured BASIC for the Commodore Pet, SuperPet, VIC 20 and 64; WSL (Waterloo Systems Language) compiler for the IBM 370, DEC pdp11, and the 6809 and 8086 processors; floating point library for the 6809 and 8086 processors; WATCOM BASIC for the IBM PC; graphics library for the IBM PC; large workspace support for WATCOM APL on the IBM PC and has consulted to IBM in Florida.

Current projects include: adapting WATCOM interpreters to the Port operating system (Port is a product of Waterloo Microsystems Inc.), WATFILE data management system, and a "load-and-go" FORTRAN 77 compiler for the IBM 370.

### Further Information

To obtain further information concerning Waterloo software, contact:

WATCOM Products Inc.,  
415 Phillip Street,  
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Inquiries about text books may be directed to WATCOM Publications Inc. at the same address. Any questions concerning seminars may be answered by WATCOM Seminars at the same address.

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## Testing Waterloo and WATCOM Software

There are two essential purposes to testing, (a) verify that the software works as intended, and (b) make sure the human interface is acceptable and that the software and documentation are easy to use.

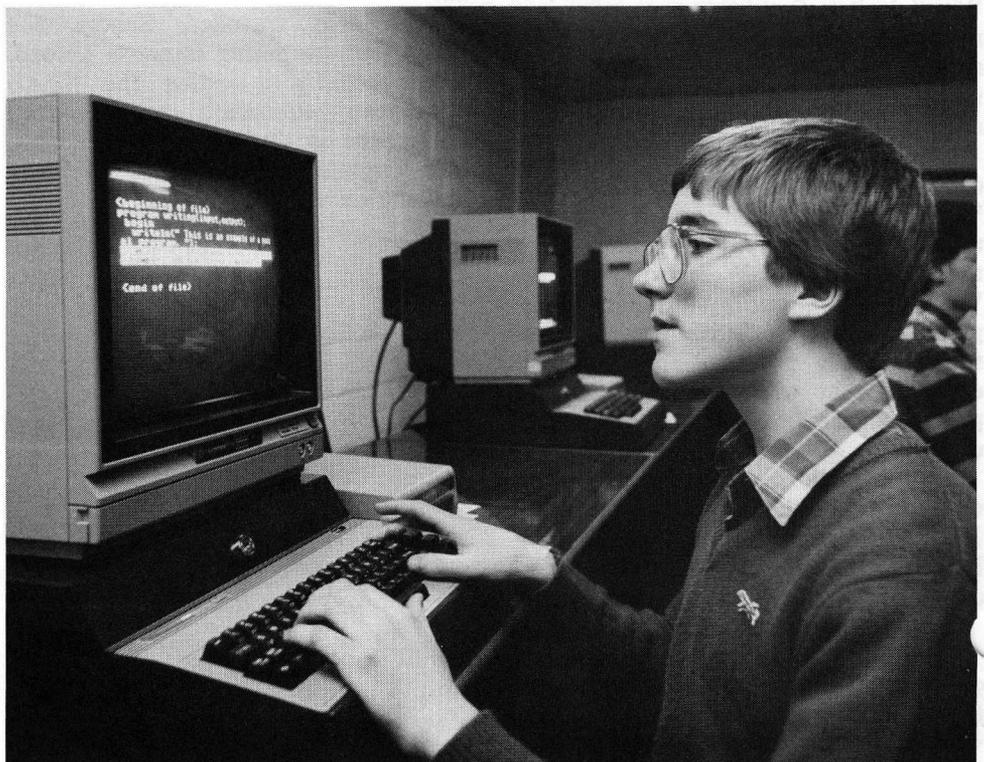
Before a product is released for sale by WATCOM Products Inc., it goes through this rigorous testing. Depending on the type of users the product may have, the testers may be students, teachers, programmers or business professionals. Often, the testing pool is a combination of these categories. No one involved in the development of the product is eligible as a tester.

Of course, software is tested continually during the development stage. Embryonic versions are often placed into limited production at locations such as the University of Waterloo. When available, the developers will use a stream of test data to verify that the software behaves as expected. As a project progresses, a test stream is also gradually developed by the programming team. This first phase continues until the developers have confidence in the reliability of the software product. The software is now ready to be tested by persons external to the development project.

The next phase of testing probes the limits of the software product and ensures its compatibility with the machine and operating system for which it is intended. Computing professionals and/or university students use the software in large projects.

User testing of the product follows completion of the documentation and the first phase testing. These tests are often arranged at selected university or corporate test sites. Over an extensive period of time the software and documentation are put through the paces of their intended use. Based on the testing, corrections are made in preparation for the official release of the product.

WATCOM Pascal for the Commodore 64 (announced in this issue) was tested by a group of 27 high school students and teachers from the Waterloo region. The testing was to probe not only the teaching facilities of the language on the 64 but to see what glitches, if any, junior students might make as they experimented. The result was enthusiasm from both the teachers and students for this full implementation of Pascal on an inexpensive machine like the Commodore 64. As reader order and use this product, we will look forward to feedback and comments that can be published in upcoming issues.



*A high school student using WATCOM Pascal on the Commodore 64*