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in STRIDE



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Inside in Stride

Things go better with p-System

Guest Editor

By Buddy Franz

I was quite proud when I was promoted to vice president of marketing about six months ago. However, two recent events made me seriously question whether or not I really want the word "Marketing" on my business card.

First the "marketing" folks at Coca-Cola took the world's oldest and most popular soft drink and changed it. Unfortunately, they have forced their loyal customers to look for a substitute. The Pepsi people must be ecstatic. I can just hear the screams as they exclaim, "Coke... Was it?"

The second incident hit closer to home. SoftTech, the parent company behind Soft-

Tech Microsystems and the p-System operating system, announced that they were "abandoning" their microcomputer software and looking for a buyer. The news was shocking, but not totally unexpected.

While Micro Sage Computer, USIS and hundreds of software programmers have been telling people for years about the benefits and features of the p-System, unfortunately, SoftTech never seemed to share that enthusiasm. The p-System is not technically perfect, but it is a lot better than many operating systems that are considered successful today. I doubt you can find an OS anywhere that combines ease-of-use, portability and development features in such a small and cost-effective package.

If you're in the marketing side, you're technical issues, that the p-System has failed. The reasons are almost too numerous to mention: the first (and most important) IBM PC port was awful, later native OSes are never supported, new products were painfully delayed, developer concerns were ignored, market plans seem in constant flux and so on.

Stride suffered as much as anyone. Despite the fact that we were one of the only manufacturers to bundle and promote the p-System, SoftTech inevitably left us out of their acts.

A worse example was when we became the first hardware vendor to purchase a license for the Custom Local Area Network. We did so because it is one of the best small-system LANs on the market. It is low-cost, portable, has full life support serving

capabilities and is directly integrated to the OS. Before the announcement, our contract, SoftTech dropped that product to pursue different interests. It was understandable, because even today, no other LAN on the category has equivalent volume of features.

For me, the final blow was delivered by Ben Goodson, the president of IANS. In an interview late last year in **PC Week** he made the incredible quote that "...if there was an operating system we would buy" it was not exactly what a marketer like myself wanted to hear.

My colleagues and I at Stride have been contemplating what this "abandonment" will mean to our future. It will surely have a negative impact on existing edge development sales. It would be unrealistic to expect that programmers might launch new project scenarios based on the p-System. While it is still an excellent environment for those types of jobs, it's tough to go it alone without any support from the vendor. We anticipate that these developers will end up at the other operating systems on Stride to their liking.

As far as the p-System applications are concerned, there's a real time change. Generally, I've noticed that p-System solutions seem to be a bit more elegant than their counterparts in other operating systems. And since most developers kept the fact that they were working in a p-System a trade secret, its passing should have little effect on the end consumer that utilizes feature rich operating systems. These excellent databases, utilities, word processors and central market applications already in the market should continue their growth for at least some years to come based on their functionality — not their heritage.

Stride's development, which I find quite commendable, will not continue any longer. The product on the shelves for some time to come. Our rationale is that the p-System remains a quality product. It allows us to communicate to our vast OS users in a common tongue. Also, we don't like deserting our friends.

Have no doubt that the company has decided to aggressively expand into the LAN, AMI OSs and CP/M-86 markets — but we will unconditionally support the existing p-System. As evidence of this commitment, Stride will continue releasing the latest version of the OS — V4.21.

Since Stride employs it's a unique Multi-user BIOS, I remain convinced that the p-System will be around to offer our customer. Hopefully, SoftTech will find a new and enthusiastic owner soon. That's the way, because I think Coke and the p-System were both the real thing. It's just too bad their marketing guys don't. □



Editor: Vedene Bonham
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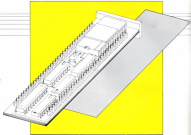
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Jet-8: Hardware Floating Point For The Sage



by Gene Jones

Floating point operations are done one of two ways on a computer system. The slow way is to implement the algorithms in software. The CPU must labor its way through many instructions for each real-number operation given it. A hardware implementation of floating point operation can significantly speed up the application since the FPU (Floating Point Unit) does the equivalent of the many instructions in only one or two instruction times.

You may wonder, if hardware FPU is so superior to a software implementation, why didn't the original Sage II and Sage IV computers (Steve Jobs) have hardware floating point? Some of the fault lies with Motorola, the vendor of the 68000 processor. Plans for a co-processor FPU for the 68000 were "in the works" for some time after the 68000 was on the market, but the FPU chip never materialized. Indeed, Motorola decided ~~not~~ to create an FPU for the 68000 but went on to develop one for its newer CPU design, the 68010. This left manufacturers like Sierra Sage without an FPU for the 68000.

Just recently released, Motorola's MC68881 FPU works as a co-processor to the MC68000 chip. Co-processor operation is possible with the MC68000 or the MC68010. It is possible to have the MC68881 co-processor FPU on a 68010, but the operation is slower. The MC68881 arrived very late on the market and is also somewhat expensive.

Benchmarks show an overall improvement of about 2 to 3 times.

However, another chip manufacturer, National Semiconductor, had produced a floating point unit — the NS16081. Some

samples were available as early as December, 1983. In the new design for the 400 Series, Sierra Sage utilized the NS16081 for floating-point hardware. The new design was not a true co-processor design since the NS16081 was intended to work with National's processors, not Motorola's. But it did give a satisfactory increase in real-number performance and, most importantly, was immediately available. However, the Sage II and Sage IV workshouses were still without FPU support since Sierra's R&D team had their hands full with the new 400 Series introduction and had no time to do a rebit.

Knowledge Software, Inc. recognized the importance a Sage FPU implementation and the Jet-8 was born. The Jet-8 board is a plug-in unit that fits underneath the MC68000 on the Sage CPU board, which uses the NS16081. The "8" in the name refers to the 8-bit cycle rate at which the FPU is refreshed. The first Jet-8 board was shipped in July, 1984.

Installation

The main tool required is **patience**. Remove the CPU board and place-on a flat surface, preferably on an anti-static mat or an aluminum foil. Using a flat screwdriver and some static, slowly pry the MC68000 out of its socket and place it on the mat or foil.

Place the Jet-8 over the MC68000 socket. Check that none of the legs are bent. Slowly apply even pressure while continuing to check the legs. Once in, replace the MC68000 following the same procedure.

How The Design Works

Again, the NS16081 was designed to work with the National Semiconductor

microcomputer family, not Motorola's 68000. Therefore, the NS16081 is treated as a peripheral with the NS16081 registers mapped into the MC68000 address space. The MC68000 can communicate to the FPU by writing to the appropriate memory locations. This is the approach taken on the Jet-8 board and on the Sage 400 Series. The NS16081 registers simply appear as MC68000 memory locations.

In order to do a calculation, the floating point values are loaded to these locations, that is, into the registers of the FPU. There are eight single-precision or four double-precision registers. The commands — addition, subtraction, etc. — are also loaded into the FPU. The NS16081 quickly forms the result and places it into another register. It is then read by the processor.

Because of the close physical proximity of the Jet-8 board and the MC68000 — they sit *together* — a tight hardware signal coupling is achieved. Signal transition between the two is done via microstrips. In the 400 Series, synchronization is done with a cooling loop. The mounting method involves less overhead than galling. It also avoids problems with bus contention encountered by other FPU boards, for example, the well-known Sky floating point processor board. (The Sky board connects to a system via the VMEbus.)

Because communication with the FPU is via memory access and not microcoded into the CPU, it takes time to move information to another FPU. In *independent* calculations, this overhead can be reduced if the result from one calculation can be left in the FPU registers for use in the next calculation. For example, an algorithm may require a calculation such as this:

$$\begin{aligned} x &= 4.5 \\ y &= 4.5 \end{aligned}$$

FPU

Instead of moving it from the FPU back to the CPU memory and then reloading it, a smart algorithm will recognize that it is needed at the next step and store it in the FPU register.

A very effective place to use this technique is in the trigonometric algorithms used by the operating system. For the *z*-system, these algorithms require the π , $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, and $\sqrt{10}$. For RASICAL, knowledge hardwired in the *z*-system trigonometric routines is to "store" absolute values in registers and to check and reload the values needed for the next operation on-board the MEMORG. This reduced the number of moves to and from the FPU dramatically and provided an increase of 8 to 10 times in speed.

Multitask Operation

Another factor to be considered is the large multitask environments. The multitask system relies through the users' tasks, to pre-empt a certain amount of time — the **time slice** — before the system switches to the next user. Since the FPU must be shared among the users, one task cannot load the FPU registers and expect the values to still be there if it is excluded out at the end of its time slice. The task that may also need the FPU and could change the registers.

Whether they have the multitask routine save the FPU registers, which would take time, a memory location is reserved as a software interrupt. If an attempt is made by another user to access the JBL-8 while it is in use by another program, that user's time slice will be postponed. The task user task can then complete the calculation securely.

How Fast Is It?

Benchmarks with the JBL-8 board show overall improvement of between two to three for non-engineering work. This implies that systems with the FPU implemented only in software spend 50-70% of their time calculating the results of floating point operations.

The benchmark programs listed here were used to get the times above. The calculation is by two different methods. The first method is a series expansion and gives the results as shown above as **pi Leap**. The second method uses the Arctan function with results as shown in **pi Arctan**.

Dedicated Applications

As with all other computer devices, there are techniques for obtaining extra performance. In the case of the JBL-8 it is the use of the floating point registers in the MEMORG. Results of calculations can be kept in these registers providing higher performance. The drawback of this technique is that it requires code to be written specifically for the application. In some areas, such as Fast Fourier Transform, the effort is usually rewarded. For 8088 users wishing to access the JBL-8 directly, the sources of the routines used in the implementation of floating point code are available at cost.

For the "standard" user, a modified interpreter and package (LACOS), or modified runtime library (Arctan, Sin, and Merge Functions) are provided. These have been coded

to access the JBL-8 board and require no recompilation of user software. If the program has been linked with the runtime system, a re-link will be required.

One of the application areas being examined at the moment is vector arithmetic. Calculations on rows and columns of matrices can be handled more efficiently if coded to know about the JBL-8. What is being done is provide some standard procedures that could be called to update these vector operations. These would be called from the user's program and provide a higher performance than if the user had coded the routines, in Pascal or FORTRAN, to do the same operations. \square

All data on this disk available for download from the JBL-8 board and software are available on diskette. The price is \$29.95 and includes software required to do a disk.

version 01.15 software & word roots			
	FastFPU		
	Single user	Multitasker	Software
	with hardware	with hardware	only
40 Lines	140	110	175
20 Arctan	50	40	100

```

Program pi4;
var
  i,
  j: integer;
  m,
  L: real;
  P,
  Pi: real;
begin
  L:=1;
  m:=1;
  P:=1;
  while m < .00001 do
  begin
    L:=L*(1+1/m);
    m:=m+1;
    P:=P*(1-1/m);
  end;
  Pi:=4*L*P;
end;

Program pi4p;
var
  i, j: integer;
  m, L: real;
  P: real;
begin
  L:=1;
  m:=1;
  P:=1;
  while m < .00001 do
  begin
    L:=L*(1+1/m);
    m:=m+1;
    P:=P*(1-1/m);
  end;
  Pi:=4*L*P;
end;

```

A Comparison of UNIX Pascal and UCSD Pascal

The UNIX environment offers you more than just C for programming. Typically, many compilers for all popular languages are at home in UNIX systems. Last month, Steve Miron announced the release of a FORTRAN 77 compiler and a Pascal compiler for his System 3 UNIX implementation. They are the products of SWS, Silicon Valley Software, and are heavy-duty compilers often packaged by major computer manufacturers under their own privateset. Steve Miron has had good experience with these compilers under the CP/M-86 operating system. Source code written under CP/M-86 or under UNIX can be easily moved between the two systems.

Those of you coming with Pascal compilers should consider the compiler from SWS if your background is with UCSD Pascal; many features will make you feel at home. It compiles a little slower, with multiple passes, but the result is 88000 native code programs exceptionally fast. The linking and packaging is well done and Steve has had good support from SWS in general. If that introduction will make you wish to write Pascal programs from the p-System UNIX? How compatible are the two implementations? The following detailed comparison of differences between UCSD Pascal and the SWS Pascal may prove helpful.

No Error Return To The Editor

Before going any further, note the Pascal does not take you back to the editor when encountering an error in the file. The compiler does display two lines of text when encountering an error to help you locate where the fault occurred.

Units

Units have INTERFACE, IMPLEMENTATION and LIBRARY statements like the p-System and compile separately. This is one of the major areas other Pascals lack. As almost any large p-System program has to be COMPILED into units, having this capability saves you a lot of compilation time.

However, Unit initialization and termination code are not supported. Those options were considered handy to use anyway, as you can never be sure of the order in which the units were initialized. Their omission is probably not major.

Supported in version 3 of the p-System and never supported on any release shipped with a Stratus/Logo machine, the BINARY units are not supported in the SWS Pascal.

SEGMENTS are done with a compile option **SE**, not with the reserved word.

Units are not supported in and out of memory. MEMLOCK and MEMUNLOCK are not necessary or available. The maximum size of a program is 4M bytes, so you no longer face the agony of using units to fit memory. Units are there for the convenience of separate compilation and/or compatibility with p-System Pascal.

As SCRAMBLE, DYNAMIC, SYSTEM, FILENO, WILD, TREESEARCH, APPLESTUFF or TURTLEGRAPHICS units exist. However, you have complete access to all UNIX system commands, which gives a remarkable control of the environment.

Full Access To UNIX

The access to the UNIX system is provided through the standard EXEC command which is implemented as an external function in the SWS Pascal. This example shows the structure needed to call another program from a Pascal program. If the call is successful, the first program quits, never to return, and the called one runs. It is possible to do UNIX **calls** from the program.

```
TYPE
  parmarray(0..255) OF - 128..+127;
  strparm(1..100) OF - string;
```

```
FUNCTION EXECUTER (arg:parmarray;
  list:parmarray) LOWORD;
  CEXTERNAL;
```

The program is called in **pathname arg** in the argument list per UNIX argument protocol.

The CEXTERNAL attribute provides linkage to any other standard system calls for UNIX and is not available for the CR/86xxx version.

The EXTERNAL attribute is available to provide assembly code access to privileged access to other Pascal, FORTRAN or any other routines. As long as the calling convention is observed, you can connect to it.

Strings

Strings have no default length. To convert, change STRLEN to STRING @;

STR is not implemented. The idea of STR was to print IN (EOL/NL) types in UCSD Pascal. SWS has the LOGICAL type which can be printed normally with WRITELN. If needed, an STR routine is very simple to write.

SWS file I/O seems to be fairly efficient. The conclusions p-System took now go

brought forward a few file quality irregularities not necessary under SWS.

The detailed string functions LENGTH, COPY, CONCAT, POS, DELETE, and INSERT are available. SCRAMBLE and DYNAMIC logical and not equal words are used instead of SCAM.

Arrays

PACKEDARRAY, LOW, HIGH, OF, CHAR, must have a correct bound of size if used with arrays in array comparisons.

Comparisons of ARRAY and RECORD is not supported except for PACKED ARRAY [..] OF CHAR. COMPONENT arrays are not supported.

Pointers in a packed record and elements of packed arrays can not be passed as REFERENCE parameters to procedures.

Types

Long integers are defined to a new type, LOGICAL, not INTEGER=4. DOUBLE is a new type for DOUBLE PRECISION REALS. SETS are implemented with elements 0 through 255, versus 4096. SET internal storage is different as is internal record packing.

Extended Program Flow Control

The EXIT call is allowed, but EXIT (PROC, GOTO) must specify the true program name.

Program cancellation programs via the EXECIO protocol.

HALT is not a macro-called debugger but a compiler-generated UNIX operating system. It has an argument which enables any shell calling the program to make conditional decisions. In CP/M-86, the argument is ignored.

GOTO is global and does not need a compiler option. Statement labels range only from 0 to 9999 (ISO standard).

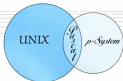
ARGC and ARGV describe the number and value of any parameters passed from the command line to a running program.

CASE has an OTHERWISE clause. This is a feature long thought necessary by Pascal programmers and one of the few things everyone agreed to when standardizing Modula-2.

Procedures and functions may be passed as parameters (ISO standard).

A New Operator

The operator @ placed in front of a user variable, function or procedure generates



the address of that entity. Type returned is `int`, and can be assigned to any pointer variable. The function `POINTER` converts an integer expression to a pointer value.

Good Arithmetic

All INTEGER arithmetic is done at a precision of either 34 or 32 bits depending on maximum size of any arguments. LONGEST is 32-bit value. HEXADECIMAL integer constants are supported. Signed numbers must be 32 bits long.

REAL and DOUBLE values are stored according to the IEEE standard. DOUBLE is 64 bits, one bit for sign, 11 bits of exponent and a 52-bit mantissa. This gives a precision of about 15 decimal places. The Number Range is:

```
REAL = -3.4E-38 to +3.4E+38
DOUBLE = -1.8E+308 to +1.8E+308
```

Negate operations don't blow up a NaN if created (NaN is Not a Number). Positive and Negative Infinity are represented.

Another useful math feature is the AND, OR and NOT can be directly applied to INTEGERS as well as DOUBLEs and do these logical operations. ORed is the same as OR but returns a 32-bit integer.

Larger Addressing Space

This is one of the best parts of programming under UNIX in the SVS Pascal. Your maximum program size is 64K bytes. This is a limitation of the memory management system of the 486 Series rather than the Pascal compiler.

A program has no limit to the total number of bytes allocated for variables. However, a maximum of 32K bytes of VALUE parameters is allowed. More than 32K of variable-length or location-relative causes the higher-velocity-ports-accessed via pointers, which is slower. UNTIL, however, always use full 32-bit addressing mode for their goblets. The maximum size of record is 62K bytes. There is no limitation size of variables allocated by NEW.

MEMMGR, is not implemented in UNIX. But it is in CP/M-86K, where it causes the top-left tetrapole stack and the heap in order to accommodate checking of the larger address space. MEMMGR, returns bytes, not words of type LONGINT.

Functions

UNIX does not allow users direct BIOS access. Therefore, SVS Pascal cannot

support LAIRMAIL, LAINTREAD, LAINTWRITE or UNITSSTATUS. However, the CEXTERRAL system access provides much of the same functionality, under CP/M-86K, the functions UPREAD and UWRITE are available.

CRDISCLOSED() writes differently and returns only a 0 or a 1. As the logical operations exist on integers, you no longer require convertback and forth with ORD and OOD.

MOD works properly on negative numbers. The p-System had a bug in this area for a long time.

Self-Pascal supports the functions: NEW, DISPOSE, MATH, RELEASE, ABS, SQRT, RM, COS, SIN, TAN, EXP, POW, PLOTTER, LN, SQR, COS, SIN, EXP, TRUNC, ROUND, ORD, CHR, SUCC, PRED, evaluate MOVE, LIFT, MOVE, PLOT, PLOTCHAR, SUCCEED, CONCAT, COPY, DELETE, SUBST, LENGTH, POS, BROADCAST, BROADCAST and INTERRUPT.

Note the new features ORD4, POINTER, HALT and CEXTERRAL, described previously in this article.

File I/O

Files in UNIX appear to the user/programmer as a contiguous set of bytes, regardless of how they are split up on the disk. This early BROADCAST and BROADCASTWRITE work identically to the p-System. Note that on Streamer UNIX it will be more efficient to transfer 1K rather than 512 bytes at a time, as the disk buffer is bigger.

The EOF end-of-file characters Control-Z or Control-C.

There is no "typed" TEXT, use PACKED FILE OR COMP. There is no predefined file called KEYBOARD.

INTERACTIVE file handling is the same.

Keyboard Response

When reading is a number, alphabetic characters do not bomb the program. If not removed, the value read in will be the numeric value to the left of the first alphabetic character. For example, if you type **123ABC**, the value read will be 123.

UNIX will support security users as there are serial ports up to 27 with a special console, 16 normally. Additionally, a 440 supports four-hour users adequately, right application types with little problems and

more if you're not picky. (Typical UNIX users seem to accept whatever p-System users would tolerate as ANSI.)

UNIX requires quite different because the UNIX file driver always handle a line of input at a time, a stream. In a multitier environment, this line buffering necessarily hogs throughput.

One major side effect of this is that programs that used to act on empty lines in the p-System will now also require a carriage return. For some applications, you may want raw (RAWCHOP) responses, rather than reading in a line at a time. To do this, you must change the terminal mode to single character mode (called `cbreak` mode). This is done by calling the UNIX `termio` again with the CEXTERRAL, facility. Almost all users of UNIX have to do this, if it's one of the trade-offs of the line buffering systems. It's easy, however, but a heavier load on the system and should be used with care when designing an application for many users.

Multitier Record Locking

Record locking in UNIX is minimal. System V requires the programmer do it all themselves. However, there is support for message passing semaphores, etc. Note that System V, 4.2 BSD and M386 have different ways of supporting file and record locking. If you architect/design a system to be as portable as possible, you should research this aspect most carefully.

Conclusion

As you can see, there are a lot of minor differences. Conversion will take a lot of effort/size before your program runs. However, your program does not need major restructuring as it would if UNIX were not supported or if you were converting to another language.

Get the environment that had you get some important features such as the larger addressing space, system access and file access while keeping other conveniences such as immediate return to the editor on a compiler error. Developers looking at UNIX should give SVS Pascal serious consideration. □

80 Bytes if you intended to see and the 486 Pascal manual is available from (John of 250, The 486 Pascal compiler user 1988 at 175-100 is available for \$25.

The Stride introduction of graphics brought all of the game players out of the back room. For example, Sage Follow fit Bonheim, who's usually hard at work on the BIOS in operating system internals, took some sub-words to TCR. The events in the RA-TOP graphics game may not be as vivid as the great white shark on the cover, but that's a lot of fun to watch and the game was a great way to test the graphics system.

Some nifty new games have shown up recently, specifically Polar and the whole new set of UNIX 386, your editor felt that a review of what's available seemed in order. It was also a perfect excuse for the Stride staff to do a little heavy research into the subject. We haven't tried all games listed here, but almost. Let us know if any we missed and have fun!

COMPUTER SHOOTER

Be a better hunter with **COMPUTER SHOOTER**. Display the bullet path, drop, energy, time of flight, velocity and wind drift. Ball and compare use control of bullet ballistic coefficient and weight, muzzle velocity and more. The p-System version from KaseSoft Int., Box 76, Sney, CA 91774, is \$49.95.

BCS

All BCS games are free of charge to BCS users on request to BCS National, Inc. 2887 Walnut Hill Lane, Suite 200 Dallas, TX 75229.

OTHELLO (Reverse)

Othello is played using two color tokens. Each player takes a turn by placing a token with the appropriate side up in an empty square. Subsequently with each turn, a player must capture one or more of the opponent's tokens. The play continues until the board is filled or nothing more outstanding is possible.

SPACE INVADERS

BCS's version of the popular arcade game.

TOWERS OF HANOI

A demonstration more than a game, it shows the necessary moves always keeping smaller disks on larger disks. It uses direct cursor addressing.

PERFORMANCES

In this game, the computer lets performers into rectangles.

COMB WAR

COMB WAR is available for CP/M-800. **COMB WAR** teaches the basic concepts of artificial intelligence, using two programs that battle in 80 memory. The price is \$75. Contact Phragma, 375 Jupiter Dr., Littleton, CO 80120.

GRAPHIC LIFE

This is a graphic version of the game of Life. It exists on Sage and Stride computers using Hypercon as a graphic software and hardware. It is available by contacting Thomas Breiden, P.O. Box 1214 University Station, Charlottesville, VA 22903.

LINK

The following games run under System 3 UNIX and are included on the standard release cassette or available with your Stride UNIX system.

ARITHMETIC

Arithmetic types out simple arithmetic problems and waits for an answer. If the answer is correct it types a new problem. If the answer is wrong it waits for another answer. Every twenty problems it publishes statistics on correctness and the time required to answer.

BACK

The program is your opponent for the game of backgammon. It is designed to play at three different levels of skill.

BJ

BJ is a serious attempt at simulating the dealer in the game of blackjack (twenty-one).

CHESS

Chess is a computer program that plays chess O chess. Moves may be given either in standard chess notation or in assigned notation.

CRAPS

Craps is a form of the game of craps that is played in Las Vegas. The program simulates the thrower. The player places bets. The player may bet with the roller or with the house.

HANGMAN

Hangman chooses a word (at least seven letters long) from a dictionary. The player guesses letters one at a time.

JOTTO

Jotto is a word guessing game. The player has to guess the computer's secret word before it guesses the player's.

MAZE

Maze asks a few questions and then puts a maze to be solved.

MGO

Mgo is a number guessing game. The computer picks a four digit number. The game continues until the player guesses the number.

QUIZ

Quiz gives associative knowledge tests on various subjects.

REVERSE (Othello)

Reverse is played using two color tokens. Each player takes a turn by placing a token with the appropriate side up in an empty square. Subsequently with each turn, a player must capture one or more of the opponent's tokens. The play continues until the board is filled or nothing more outstanding is possible.

SAT

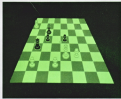
Sat predicts the apparent locations of the sun, moon and planets (at 1 Saturn) along with stars of magnitude at least 2.5 and certain other celestial objects.

TTT

TTT is the Tic-Tac-Toe game popular in elementary school. This is a learning program that never loses the same twelve times.

WUMP

Wump plays the game of "Hunt the Wumpus." A Wumpus is a creature that lives in a cave with several rooms connected by tunnels. The player wanders among the rooms trying to shoot the Wumpus with an arrow, while avoiding being eaten by the Wumpus or falling into bottomless pits. Super Data try to pick up and drop the player in some random room.



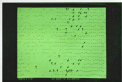
CHESS

Master Chess scores all the most powerful chess programs written and very tough to beat. It has game protection, checkmate problem solving, multiple levels, self play, custom board setup and help screens. It is a stand alone program — no connecting system is needed. The version for standard terminals may be purchased from any local dealer for \$60. The graphics version pictured here will be available soon.

WHA-TOR

This model of the relationship between predator and prey is taken from the Computer Recreations column in the December 1988 issue of Scientific American, by A. K. Dewdney. Sharks and fish, the two major residents of the coastal Wa-Tor, wage an ecological battle for survival. The sharks wander the ocean at random eating any fish they happen to catch. However, if a shark goes too long without a given period of time it starves. Both the sharks and their prey reproduce at different intervals if room exists to expand their numbers. The sharks and fish populations tend to oscillate showing the natural periodic population cycle between predator and prey.

WHA-TOR is a graphics demo rather than a game but fascinating to watch. It is shipped with the Slide Graphics System and written in Modula-2.



POKER

Two versions of poker are available in a new release from Slide. Written by Mike Carr, the "Real Casino at Poker" is the standard 5-card draw poker played just like the casino poker machines but without the coin slot. Statistics are given on the win/loss status of your games. A second game, Poker Party, lets you against an opponent. The computer can play as a "partner". Both versions work under the System on standard terminals and use character graphics. The dealer may be purchased from any Slide dealer for \$60. A World Class Poker program (not really a game but a serious program in development) will use the Slide graphics board.

P/DOS

The following games are included with the P/DOS system.

ADVENT

Advent is the original text adventure which began as an experiment in artificial intelligence. The game is explored to tremendous depth and a number of things can happen. It provides many hours of entertainment.

AMAZING

Amazing is a maze generating program. It was produced as a college level programming project.

BOATY

This is a fast action game in which the hero pushes obstacles into position so that the boats have no where to move. It requires quick thinking and action or the boats will eat the hero.

BOA

Boa is a fast action game in which the computer controls the growing snake of a's and the gamster controls one of a's. Competition is to run out of food. The snakes grow to the number of steps made. The goal is to reach 100 segments long.

BALLS

Balls is a game in which the computer and player each pick a number. The player has to guess the computer's number before the computer guesses the player's.

CLOCK

This is a large numerical direct cursor addressing terminal clock display.

DRAG

Drag is a mathematical evaluation of a drag race car. Compare performance of two theoretical car designs of race against the computer's drag.

EGAL

EGAL is a decision making aid. Give all the parameters to the computer and it will give the logical choice based on the strings of each influencing factor.

FOOD

Food evaluates your home food storage inventory.

HANGMAN

Hangman chooses a word at least seven letters long from a dictionary. The user is to guess letters one at a time.

HYPLOT

Displays a three dimensional plot in two dimensions.

MERRY

Merry is a dynamic Christmas tree terminal display using direct cursor addressing.

OTHELLO

The P/DOS version of this popular game.

PUZZLE

With puzzle, the computer generates word search puzzles.

SEX

Statistically determine the sex of your children by using the projected variables.

SNOOPY

The standard Snoopy himself is a graphic with calendar. It can be displayed in printed out.

STAR TREK

Plot the galaxy of invading Klingons while dealing with maintenance problems aboard the Enterprise as well. Good help is provided in the game.

WORM

As a worm, the players see how long they can hang from eating themselves in the direct cursor addressing game.

P-System

The following games are available for the P-System from the USLS library users. It is an organization of P-System users. You must join the organization if you want the games. Membership is \$25 annually.

Once you've mailed your check to USLS, P.O. Box 1148, La Jolla, CA 92038, don't wait for a reply. Go ahead and order the software library which has other interesting programs besides just games. There are 12 volumes in all, three to a diskette. The games are usually Pascal source. You will need to compile them.

The diskettes are formatted for 1600 tracks, not 1200. You must change the configuration with UTLS to read them the first time. Each diskette is \$9 for a total of \$36.

Order/Sage users can order the library from Henry Baumgardner, 3220 Hartsell Street, Lincoln, NE 68506 or Jon Worley, Box 148 Ardmore, PA 19003 or Jim Harrison, Box 3277, Silver Spring, MD 20901.

BLACKJACK

Blackjack is a serious attempt at simulating the dealer in the game of blackjack twenty-one.

STOCK

Learn how to play the stock market.

OTHELLO (Reversi)

Othello is played using two-color tokens. Each player takes a turn by placing a token with the appropriate side up in an empty square. Subsequently with each turn, a player must capture one or more of the opponent's tokens. The play continues until the board is filled or until no more capturing is possible.

WURMUP

Play the game of "Hunt the Wurmup." A Wurmup is a creature that lives in a cave with several rooms connected by tunnels. The player wanders among the rooms trying to shoot the Wurmup with an arrow while avoiding being shot by the Wurmup or falling into bottomless pits. Super Balls try to pick up and drop the player in some random room.

SOOP ADVENTURE

An advanced ADVENTURE with more puzzles and therefore more points to make.

STAR TREK

Plot the Galaxy of invading Klingons while dealing with maintenance problems aboard the Enterprise.

SPACE WAR

Fast action for two-players shooting it out in their space ships. It will require work to get it running.

LIFE

A simple rule of life for successive generations of a colony. The patterns created can be very attractive.

CASTLES

A board game for two or more players in which opponents are warriors plomping each other and raising armies.

CHASE

Avoid the robots and the forces on the robots one by one come to life and attack you. Use the secret passage for a quick getaway. Make the robots robots run into the electric pyrotes. The longer you survive from the faster they become.

SNOOPY

A Snoopy calendar featuring the W.I. Flying Ace.

BANNER

This prints banners in large letters.

BLACK BOX

A guessing game based on particle physics.

STARGAME

Fill the boxes with stars. But watch out — adding one may take several others away. □

Q&A

Is there a new edition of Strider's software directory?

A new release is in the works now. If your company has a product listed, they should contact Steve Coleman to update the entry. New entries are welcome.

I tried to add a user to my Stride multi-user system. Its local drive was labeled 9. Channel 9 was mapped to device 9, subdevice 18. When I try to load, the system goes away... What's wrong?

Subdevice 18 is really the second drive's first 400 partition. Partition 40-01 each drive is reserved for system use only. This means that D, H, J and K should not be used as subdevice numbers. In your case, you should map to partition 11 — use device 9, subdevice 11.

Do CONFORMANT arrays work under p-System IV.20?

No, but the problem will be fixed in the release of version IV.21.

Is Keypad available for LORRY?

Yes, it is distributed at no charge with the standard LORRY distribution/cassettes or tape.

Is there a way to use the Stride terminal, type RT-10, with the Timberline System?

Yes, a new "type" file for this terminal is now available. Call your dealer or Strider's Technical Support. The version on the updated disk works with both IV.13 and IV.20 p-Systems.

NEW DEALERS

A name welcome from all of Stride Micro to our new dealers and SAs!

HEALTH DEVELOPMENT INC.
1400 Stride
1785 West 340 Ave.
COURTOLA, OH 43012
(614) 294-2588

COMPUTER LEARNING SYSTEMS
CHERRY DRIVE
5800 Cherry St. E. #11
ABINGDON, MD 21511
(301) 266-1420

COMING ASSOC.
P.O. Box 1000
22 North Ave.
Amherst, N. 01002
(617) 267-8212 or (617) 266-4333

LASERTECHNO, INC.
Chris Ragan
5500 Webster Ave. #42
Abingdon, MD 21511
(301) 600-1100

Mosys THE MODULA-2 SYSTEM

At last, a native code Modula 2 system for Stride and Sage computers. MOSYS is complete and self-contained, the ideal program development environment. MOSYS includes compiler, screen editor, document processor and symbolic debugger.

New Release 100%
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Educational site licenses and source licenses also available on 20% active terms.

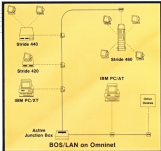
Availability —

in the U.S. from:

Mosys Microsystems Ltd.
6068 Bannock Road
Corvallis, Oregon 97330
Phone: (503) 839-2662
Contact: Mr. J. Swartz

outside the U.S. from:

Radstone Systems Ltd.
Red Lion House
St. Mary St., FARNBOROUGH
Surrey, GU14 6JH
Phone: (0442) 813888 or (0713)
Telex: 43432 DSA G
Contact: Mr. B. Ryle



This figure shows how Slide 400 series computers and other computers can be networked under the BOS operating system using Omninet.

Local Area Networking With The BOS Operating System

By Pam Wilson

In recent months considerable excitement has been generated in the computer world as the prospect of practical micro-computer networking systems for business users.

Businesses have a common need to integrate information flow. Data must be available not only to the individual in his or her office but also to others in the same company. Microcomputers solve the individual's problems and multiterminal machines the department's. But until now the only answer to data processing and storage on a company-wide scale has been expensive and inflexible mainframes or times.

BOS/LAN is a network available for microcomputers that provides an all-in-one solution to the information flow problem. Multiple computers — such as the fast Slide 440 and 480 — are supported in the network software. The popular Omninet chip set used by the Slide computers allows connection to other BOS systems running an IBM PC/XT LAN. Remember the large-disk capacity enclosures faster speed (about 3 times faster than the IBM machines), the 480 is a good choice for a file server on the net.

Business users do not need (or want) to pay for redundant processing power. What they do need is an economical and practical method of moving data around a building and processing it where necessary with proven business software. As chief BOS software designer Noel Levine put it: "It's crucial to large businesses, networking computers under BOS/LAN is the answer — taking up to 100 information available terminals and nodes, not just the local with a screen-on-thought computer."

BOS/LAN can in fact support up to 100 users on up to 64 computers, with 26 computers acting as file servers for the other machines on the network, in addition to supporting one or more screens. Each screen of a BOS/LAN system can access all the disk files on the network without restriction: a program running on computer A can load programs from computer B, use data files on computer C and report prints on computer D. The BOS Spooler can be used to share printers and the new spooler status-command allows any user to check and control the print schedule.

A designated "master" computer must be running BOS before other computers

LAN

can sign on. Once signed on, the master computer need not be accessed again and BOS/LAN will continue to function even if it is switched off. Any computer on the network can be switched off or used to run another operating system without affecting BOS/LAN. Thus BOS/LAN is very resistant to the failure of one of the computers on the network.

Every computer on the network must consist of a local diskette or hard disk and, therefore, must have at least one disk drive. However, on a diskette-only computer, BOS can be installed to use a spooler unit on the hard disk attached to another computer, so that the local diskette is only used for the initial booting.

Existing BOS software developed for IBMOS/2 or BOS/NET will run unchanged on BOS/LAN. However, if the software makes its own unit assignments, rather than having decisions by the menu program as is usual, it will be restricted to using files on the local and master computers. This restriction can be overcome by simply renaming with the latest system substitute library.

BOS/LAN has unique unit addresses of the form 400 to 399 which correspond to local units 200-299 on computers A to Z. This version of the unit address can be used to access the local disks as well as those on other computers. This enables any computer to use the same addresses. Thus, for computer B, unit addresses 809 and 223 refer to the same unit.

In addition, unit addresses 600-699 refer to units 200-299 on the master computer. This is a temporary measure to enable software, which needs to be copied before local access, onto 600-299 before use from the master computer. These unit addresses should not be used except in this case.

For further information about BOS/LAN and applications that work with the BOS operating system, contact:

BOS National Inc.
2507 Walnut Hill Lane
Suite 200
Dallas TX 75209
U.S.A.
Tel 214-995-7122

or
BOS Software Limited
87-89 Barton Rd
London, EC4M 8DU
U.K.
Tel 01-621-8811

Letters

Letters to *in Stride* will be printed at space permits. If you're doing something new and exciting with computers, share it with us!

Dear Steve,

Enclosed is a complimentary copy of **COMPUTER SHOOTER™** for the Southwest, please pass it along. It won't help him carry his deer but can provide some comfortable personal gratification. Please excuse the low created graphics and/or speech by Stride standards. However, portability to low end home computers and rapid development were primary design objectives to get started with a plain vanilla Pascal implementation at our stated **Stage IV**. During an unrelentingly long term to Turbo Pascal for IBM-DOS & CP/M80, we really began to love the Stage's floppy disk configuration control. Now if we just had a **386-trunk drive** in addition to the 80 track we could manufacture in both formats on the Stage.

Here's a little info about our company. Stridewe is operated out of a small ranch of about 2000 acres on the John Day River in the high desert of central Oregon. Our headquarters are in the **ghost town of Richmond, Oregon**, population 7 through technology capital of Wheeler County. For perspective, the county seat is in Fossil, population 180. For transportation see my hobby on it is truly **Siemens Rogentron** which shares "**Curly**" **Ashford** with a few Angus and Hereford bulls and the occasional flock of sheep to keep the green burning. Just try to **burn sheep** off an arroyo sometime — they just **leap up** and eat for sometime to make a break for it. Deer eat but associates of **Kayoko Momo Wama** hold down the fort in **Jakaru** between forays into the white jungles of Kalimantan (Borneo) and Sulawesi (Celebes) where they steal **Kayu** (log) (logs wood again) from **Kayubaki** (Sulawesi). I guess that makes us the only manufacturer of computer software in the world.

Besides developing recreational software, we're consulting work in the area of **computer use in forest management** and are currently investigating **interactive video** (disc production) in collaboration with **Business Objects** of Kenilworth, Washington.

Please forgive the **foldback** extensions. It was hard to resist after reading **in Stride** this morning.

Sincerely,
Mark P. Miller
Raydon, OR

Bob says "Thank! Great program."



Here is proof, you see that a computer fails us more than just program. Bob Neatham, a Stride founder, shows off a nice three-point mule deer buck, shot while hunting the last fall.

Dear Steve,

Over the last twenty years, my students and I have developed a series of **FORTRAN** programs that perform several quantum mechanical calculations of chemical interest and importance. These were originally designed to work on "main frame" computers and have actually been run on IBM 360/50, 360/95, 370/158, 3635, 3651, CDC 3600 and CRAY J20 machines.

I can now add a Stride 440 to the list. In the late 1980's, at the start of this project I would never have dreamed that a machine that fits in my desk could handle these calculations. But that time has certainly arrived.

I received my new Stride 440, with a 1.5M byte disk and the PPU chip, last December and have been running it mainly in single user CP/M mode. This gives a better speed than the P-system for double precision number crunching, and the **FORTRAN II** is much easier to use than the P-system **FORTRAN**.

The mainframe machines mentioned above are approximately in order of increasing speed. Other Stride users may be interested in knowing where in the list the Stride falls. A complexity for comparison cannot be made since multi-tasking operating systems on mainframes never give a real time to a program and the **CPM** operating system on the Stride apparently falls somewhere between the IBM 360/50 and 360/95 — but closer to the upper end of the range.

The inaccuracies related to timing in the multi-tasking operating system make the main frame look better than they should be.

his comparison. When only one person has to use the machine, this is a very creditable performance.

In May of 1984, J. J. Dongarra of the Argonne National Laboratory published "Performance of Various Computers Using Standard Linear Equations Software on FORTRAN Environment". He compares computers ranging from the CRAY 3-MP to the APPLE II. I found the Stride 440 in his comparison to be roughly equivalent to the VAX 11/780 running under RMS in the full precision mode.

In recent times, the MPL/CPM (floating point operations) has become a popular unit for measuring the speed of computers for number crunching purposes. It is more fair, however, than an alternative unit — **MFLOP/MBUCK** — (MFLOP, per megabuck cost is more revealing on cost-performing computers. Unfortunately, the simpler reduced unit — **FLOP/BUCK** — although yielding the same number, is too replete of other activities to be taken seriously in Dongarra's table. The **CRAY 3-MP** is 2.2 MFLOP/MBUCK while the Stride 440 is about 1.8, if my measurement is accurate. The **list of 1987** is 2.3 in the same scale.

I believe that my Stride 440 was a very good buy, and I have been recommending it to all who have problems similar to mine.

Sincerely,
Gordon A. Galloghly,
PhD, of Colorado
Un. of Nebraska-Lincoln

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Service



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Serial Channel Crash

If an unused serial channel of a multiuser system has the REMOTE flag OFF but is not assigned to a user, it may pick up garbage signals and send them to the multiuser system. If the garbage signal is a NULL (zero) then the multiuser system may crash! To fix the problem, make sure all serial channels not assigned to a user have the REMOTE flag set ON.

SYS PORTRAM Fix

A problem existed in earlier releases of the CP/M-86K SYS PORTRAM if a WRITE to a string using internal I/O had a "1" format parameter, it wrote the hexdecimal format to the screen instead of the file. For a work-around, just remove the hexdecimal. An update disk is also available from Tech Support.

Execution Error Numbers

Appendix A of the *Linkon Manual* gives a list of execution errors and their meaning. Unfortunately, the error numbers are off by one. The list should start with 0, not 1.

CP/M-86K FABS

If you use the floating point coprocessor *table* for the CP/M-86K IC computer, you'll get an *Undefined Symbol* error message on compilation. There are two things you can do to avoid this.

First, you can use the **U** option as indicated in Section 8 of the *Programmer's Guide*. The format is:

```
object .xxx .tab -> T1.ARM .x.m with /lib.a
```

The second way is to reorganize your *lib.a* file by using the **ARSS** utility:

```
arsh x lib.a mess.o      /r extract a copy of mess.o from library 'x'  
arsh d lib.a mess.o     /r delete mess.o from library 'x'  
arsh na mess.o lib.a mess.o /r put mess.o after mess.o in the library 'x'
```

Also refer to Section 7 of the *Programmer's Guide* for more information.



ProCalc: A Sophisticated μ -System Spreadsheet

by Jay Kohnst

ProCalc is a second generation spreadsheet from Software Products International (SPI) that is now available on Strata micro-computers running the μ -System. It has all the features you'd expect from an advanced financial planning and report generation program. In addition to the functions shown in the list below, ProCalc has:

Virtual memory which allows extremely large spreads and reports with over 16,000 entries per model. ProCalc can directly access over 60,000 entries using multiple windows and files. Incoming model recalculations due to forward and backward references or reference loops are eliminated by topological calculation. A change in order of calculation is not needed.

Multiple windows (up to six) that may be tiled to scroll together. More than one model can be accessed simultaneously or the windows may be used to view different areas of the same model. Simple interrelationships between multiple models is supported since equations can reference other models for computation or relational purposes.

A setup utility enables the program to use any terminal and take advantage of highlighting features (such as inverting), multiple-character function keys and terminals that display up to 180 columns and 50 rows. Printer features such as underline, boldface, italic and alternate character sets may be used.

Help functions are available at every level. Many users report that they rarely need to refer to the printed documentation while learning to use ProCalc; the on-line help is clear, logical and concise. Files (i.e., models) are displayed and selected from a menu.

Protection allows an entry to be protected from change. **Format** (entry is part of a file format). **Justification** (an entry is flush right, flush left, or centered in the column). **Precision/Paragraph** (entry has decimal places/paragraph) is a horizontal paragraph. **Commas** (numbers have commas every three digits). **Dollars** (numbers have a floating dollar sign). **Emphasis/Indication** (the entry is printed using special capabilities of the printer). **Percent** (numbers displayed with floating percent sign). **Signs** (numbers can be displayed in combinations or followed by either **CR** or **CL**,

	Business functions:
PV	(present value)
FV	(future value)
PMT	(annuity payment)
APV	(annually present value)
DEPRN	(depreciation)
	(sum of years method)
DEPRD	(depreciation)
	(declining balance)
LIST	(order lookup)
TABLE	(table lookup)
LNDSRT	(linear int. regression)
IRR	(internal rate of return)
MIRR	(modified internal rate of return)
	Other Functions:
ABS	(absolute value)
INT	(integral value)
NOT	(logical not)
AND	(and/or)
DATE	(current date)
COUNT	(size of range)
SUM	(summation)
MEAN	(arithmetic mean)
VAR	(variance)
STDEV	(standard)

There are many sophisticated features, for example, any area of a model may be labeled with a label which can then be used in commands or formulas. In the profit/cost/loss for example, you can enter the formula **Income** as **expenses**. Rows and columns may be inserted and deleted, of course. Rows may be easily copied and formulas adjusted for their new locations. Data can be sorted by columns in either ascending or descending order. The **LOCATE** command will search all cells in a model for a given label string. The **UPDATE** command will apply an expression to all constant values in a given area. **Model-IF-THEN-ELSE** statements, which can return text values and user-defined (non-algebraic) functions, are supported. Equations associated with entries can be viewed on the screen or a dump format of entries, with cross references of equations by reference, can be printed.

ProCalc interfaces to other SPI packages such as the LogGuard Database Manager and Asset Accounting Modules. It is available from Microstrategies, Inc. for \$260 (811) 375-4300.



Susan
Lacey

Curt
Hedges

Susan Lacey is almost superstitious about July 7. "Everything happens to me on that day," she said. For example, on that day she started here at Strata, she moved to New Mexico and she moved back to Strata. All in different years, of course.

But every day of the year has excitement for Susan. She's recently been promoted from receptionist to executive assistant in the International Sales group. Before coming to Strata, she was never the least bit interested in computers. But "It's by any computer," she said. And it seems that she has. She had worked 26 years before settling down at Strata (and at such a young age). She was accepted to the Omega School of Los Angeles but decided the fashion merchandising was not for her.

Lacey works hard at her job and even harder at juggling. She does have some time however for going out for horse adventures, wind surfing.

If you want to meet a real cowboy (and a "cowboy" to Strata's newest cowboy, **Curt Hedges**, he never wears a cowboy hat, he wouldn't be caught dead in a pair of cowboy boots and he doesn't even like Country and Western music) but every summer as a boy he spent his days on a horse. He worked at his father's cattle ranch, so he knows what it's really like to live on the range. Maybe that's why he became an accountant.

Hedges received his Bachelor of Accounting at Brigham Young University and put it to practice at Deane Wilson as Controller and Chief Financial Officer. When he first came to Strata, Curt commuted back and forth from Pocatello, Idaho for several months before he was finally able to move his wife, Betty, and his four children to Reno.

Hedges enjoys his family the most of all but when he has the time, he also likes to escape to a favorite fishing spot or to sit down a favorite powdered mountain. ☐

MIRAGE

FASTEST OPERATING SYSTEM ON THE STRIDE

MIRAGE is a true multi-user, multi-tasking operating system, yet resides in only 45K ram. MIRAGE takes full advantage of the inherent power of the Motorola 68000 by allowing direct access to 16MB memory. Written entirely in 68000 assembler, execution speed is optimized. Features include device independence, built-in screen handling, multi-directory filing system, full interrupt-driven capability, background and immediate printing, and built-in provision for networking. A comprehensive set of re-entrant utilities is supplied, including a very powerful screen editor and 68000 macro assembler.

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UNIT 7F TIDEWAY INDUSTRIAL
ESTATE 87 KIRTLING ST.
LONDON SW6 6BP

I would like more information on MIRAGE and those supported languages:

- APL 68000
- SWIFTS COMPILED BASIC
- SWIFTS FORTRAN 77
- SWIFTS PASCAL
- TRAP RECORD MGT SYSTEM
- WINDOW WORD PROCESSOR

Name _____
Company _____
Address _____
City/Country _____
Telephone _____
 dealer user

I would like a sales rep to contact me