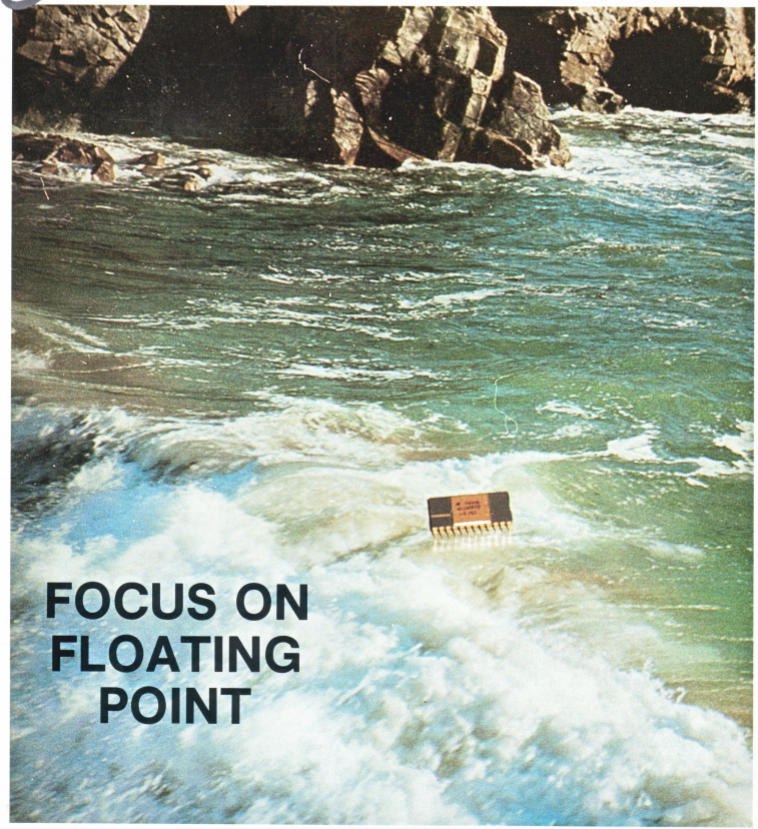
STRIDE

January 1985 Vol. III / No. 1



FOCUS ON FLOATING POINT

SAGEBRUSH

by Hyperception

GRAPHICS FOR SAGE AND STRIDE COMPUTERS

HYPERCEPTION CAN ENHANCE SAGE II, SAGE IV, AND STRIDE 400 SERIES COMPUTERS WITH VERY POWERFUL GRAPHICS AT VERY LOW COST

Besides the standard SAGEBRUSH graphics command software, Hyperception also offers business software that uses menu selections to create charts and graphs from text files.

The following list of features shows why SAGEBRUSH graphics is clearly the performance/price answer for Sage and Stride systems:

- **True bit-mapped graphics and text.** Unlike a terminal with added-on graphics, images may be transferred to and from disk, and to a hardcopy device. SAGEBRUSH software supports hardcopy for popular printers. Combination of bit-mapped text and powerful software text-labelling features allow infinite variety of text fonts and sizes.
- **Fully integrated, p-System compatible software.** Some SAGEBRUSH graphics command set highlights:

ARC	arcs, circles, and elipses	DRAWF,	foreground vector
AXES	x-y axis pair w/tic marks	RDRAWF	and relative vector — used for hidden line removal
CIDR	text rotation	FRAME	quadrilateral generation
CSIZE	controls character dimensions in x and y directions independently	GDUMP	screen dump to hardcopy device
		LTHICK	controls line thickness
CSLANT	character slant	LTYPE	controls line type
CTHICK	character boldness	SCALE	scales screen to user-defined units
WINDOW	text and graphics window function ("clipping")		

The disk transfer command set is equally powerful. Some disk transfer command set highlights:

GLOAD	transfer disk image file to video display
GSTORE	transfer video display to disk image file
GLOAD-logicals	AND, OR, and XOR disk image files with p-System array
GREAD	read images from video display to p-System array
GWRITE	write images from p-System array to video display
GREAD-logicals	AND, OR, and XOR video display with p-System array

- **Multi-user/single-display and multi-user/multi-display operation.** In the former case all users share a SAGEBRUSH unit and display; in the latter, each user has a dedicated unit and display. Dedicated multi-user operation is achieved by chaining SAGEBRUSH units together.
- **BRUSHRAT option can add free-form graphics entry, screen positioning capability.** BRUSHRAT connects directly to a SAGEBRUSH unit, and supports shared/dedicated multi-user operation. Option includes software.
- **Standard monochromatic composite video output** — no need for an expensive video monitor. Video output available at both a phono and a BNC connector.
- **Only low-cost, standard printer with dot-addressable mode necessary for hardcopy** (e.g. Okidata, Epson, etc.). No need for expensive color plotter.
- **512 x 256 resolution (non-interlaced refresh) or 512 x 512 resolution (interlaced refresh).** Units may be upgraded to 512 x 512 resolution by adding memory and changing an EPROM.
- **VMEbus-compatible design.** Units may be upgraded from Sage to Stride operation at any time via conversion kit. Kit includes connector-translation card (no active components), and proprietary PAL.

The Hyperplot business package is also available from Hyperception. An easy-to-use, menu-driven software package, Hyperplot features:

- Five types of output formats (3-D histogram, pie-chart, task-scheduler, multi-variable graph, standard histogram)
- Data sets created by menu query or text-editor, modified using text-editor
- On-line HELP menus
- On-line example displays

ALL PRICES SUGGESTED RETAIL; DEALER PRICES MAY VARY

	512 x 256 res.	512 x 512 res.
SAGEBRUSH (Sage II, IV):	_____ at $1059 ea.	_____ at $1259 ea.
SAGEBRUSH (Stride 400s):	_____ at $1159 ea.	_____ at $1359 ea.
Resolution Upgrade:	N/A	_____ at $200 ea.
Sage to Stride Conversion:	_____ at $100 ea.	_____ at $100 ea.
Stride to Sage Conversion:	_____ at $0 ea.	_____ at $0 ea.
Monitors:	_____ at $175 ea.	_____ at $175 ea.
Users Manual:	_____ at $10 ea.	_____ at $10 ea.

Type and model of printer: _____

Method of Payment: _____ Credit Card _____ COD _____ Check or MO (Texas residents add 6%)

Name: _____ Company: _____

Address: _____ City: _____ State: _____ ZIP: _____

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Inside *In Stride*

by Verlene Bonham, Editor

This month, In Stride takes a look at laser printers, the company history, and the new 400 Series floating point option (FPU). (Our cover shot of the FPU chip body surfing off the Oregon coast does not imply that Stride will soon be offering a line of aquatic computers.) Naturally, just describing the FPU isn't going to be enough for the mathematical folks who really push the limits of number crunching. So, benchmarks are clearly in order, especially now that the magazine has room to print the programs and results.

Benchmarking has got to be one of the most "dicey" games around; anybody can prove anything with the right numbers (or the right program). But, with caution, a reasonable estimate of machine performance can be made. This issue looks at the well known Whetstone benchmark, which measures overall performance, not just FPU operation.

Next month, we'll present different types of benchmarks, hopefully with comparisons for other machines. Source to the benchmarks will be published so that all of you can try them on various hardware. I'd like to encourage you to do so and to send the results in. There's nothing like a controversial benchmark to liven up the mail!.

Be sure to specify the operating system, the compiler, their versions (where appropriate) and what floating point hardware (if any) was installed. Give the results to the nearest second. When in doubt, round UP! Few people argue if your numbers come out one second higher than theirs.

Notice in the listing of the Whetstone program, there is a statement which prints out the point at which to start timing. This allows the measurement of CPU performance, not program load time. The load time differs considerably between floppy, hard disk, RAM disk, etc.! It is always easy to forget when creating a benchmark that loading overhead should be specifically left out — unless that's the parameter you're trying to measure.

Excessive printout should be avoided, since the speed of the I/O device will start to impact the measurement. For example, don't send the Whetstone results to your printer. This means, unfortunately, that CPU benchmarks will never be very visual. For the same reason, a screen—intensive program, such as Towers of Hanoi, is NOT a benchmark, as it is limited by the speed of the terminal. Since it does a fair amount of calculation, it's not a good test of terminal throughput either. I mention this just because some folks thought it was a nifty way to show how fast the Stride/Sage was. Sorry, it's a fun program but not a benchmark.

Editor, Verlene Bonham
Staff Assistant, Chris Klinkert

In Stride is published monthly. Subscriptions are $24 for one year. Prospective articles and requests for ad rates should be sent to Stride Micro's Reno headquarters c/o of Editor, *In Stride*.

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Stride 400 Series Whetstone Benchmark

The following Whetstone benchmark gives an indication of how well scientific programs would operate on a given machine. The Whetstone benchmarks were written by the National Physical Laboratory in England. The program was derived from the analysis of 1000 ALGOL.60 programs as an attempt to represent an average instruction mix.

It is really ten different modules, each of which tests slightly different machine operations. Included are many different operations, floating point calculations, integer calculations, transcendentals, array manipulation, conditional jumps, etc. The measurement is expressed in terms of a somewhat arbitrary entity known as a Whetstone instruction. One loop through represents 1,000,000 Whetstone instructions. The results are generally shown in thousands of Whetstones per second.

This particular program is the FORTRAN version taken from the article written by Curnow, H.J., and B.A. Wichmann, published in the Computer Journal, Vol. 19, No.1, England. Note that it can be easily changed to another language, as none of the instructions are highly FORTRAN specific. This was intentional on the part of the authors.

The values examined so far for the Stride/Sage products are:

	(K Whetstones/sec)
Stride 400 Series	
CP/M-68K SVS F77 w FPU	83
CP/M-68K SVS F77	59
Sage II/IV	
CP/M-68K SVS F77	48

The actual timing for the Sage was 21 seconds. While the Stride 400 Series took 17 seconds; both using software floating point. With an FPU on the Stride, the time was 12 seconds.

These results are very respectable. Hopefully, if enough people send in results, a comparison of various machines will follow in the next issue.

```
C     WHETSTONE BENCHMARK, H.J.CURNOW,& B.A.WICHMANN,
C     THE COMPUTER JOURNAL, VOL.19, NO.1, ENGLAND
C     DIVIDE EXECUTION TIME INTO 1.0E+06 TO
C     GET "WHETSTONES/SEC."
C     ---------------------------------------
      MAIN PROGRAM
      REAL X1,X2,X3,X4,X,Y,Z,T,T1,T2,E1
      COMMON T,T1,T2,E1(4),J,K,L
      WRITE(*,1005)
1005  FORMAT('Start timing.')
      I=10
      T1=0.50025000
      T=0.499975000
      T2=2.0000
      ISAVE=I
      N1=0
      N2=12*I
      N3=14*I
      N4=348*I
      N5=0
      N6=210*I
      N7=32*I
      N8=899*I
      N9=516*I
      N10=0
      N11=93*I
      N12=0
      X1=1.0
      X2=-1.0
      X3=-1.0
      X4=-1.
      IF(N1)19,19,11
   11 DO 18 I=1,N1,1
      X1=(X1+X2+X3-X4)*T
      X2=(X1+X2-X3+X4)*T
      X4=(-X1+X2+X3+X4)*T
      X3=(X1-X2+X3+X4)*T
   18 CONTINUE
   19 CONTINUE
      CALL POUT(N1,N1,N1,X1,X2,X3,X4)
      E1(1)=1.0
      E1(2)=-1.0
      E1(3)=-1.0
      E1(4)=-1.0
      IF(N2)29,29,21
   21 DO 28 I=1,N2,1
      E1(1)=(E1(1)+E1(2)+E1(3)-E1(4))*T
      E1(2)=(E1(1)+E1(2)-E1(3)+E1(4))*T
      E1(3)=(E1(1)-E1(2)+E1(3)+E1(4))*T
      E1(4)=(-E1(1)+E1(2)+E1(3)+E1(4))*T
   28 CONTINUE
   29 CONTINUE
      CALL POUT(N2,N3,N2,E1(1),E1(2),E1(3),E1(4))
      IF(N3)39,39,31
   31 DO 38 I=1,N3,1
   38 CALL PA(E1)
   39 CONTINUE
      CALL POUT(N3,N2,N2,E1(1),E1(2),E1(3),E1(4))
      J=1
      IF(N4)49,49,41
   41 DO 48 I=1,N4,1
      IF(J-1)43,42,43
   42 J=2
      GO TO 44
   43 J=3
   44 IF(J-2)45,46,46
   45 J=0
      GO TO 47
   46 J=1
   47 IF(J-1)411,412,412
  411 J=1
      GO TO 48
  412 J=0
   48 CONTINUE
   49 CONTINUE
      CALL POUT(N4,J,J,X1,X2,X3,X4)
      J=1
      K=2
      L=3
      IF(N6)69,69,61
   61 DO 68 I=1,N6,1
      J=J*(K-J)*(L-K)
      K=L*K-(L-J)*K
      L=(L-K)*(K+J)
      E1(L-1)=J+K+L
      E1(K-1)=J*K*L
   68 CONTINUE
   69 CONTINUE
      CALL POUT(N6,J,K,E1(1),E1(2),E1(3),E1(4))
      X=0.5
      Y=0.5
      IF(N7)79,79,71
   71 DO 78 I=1,N7,1
      X=T*ATAN(T2*SIN(X)*COS(X)/(COS(X+Y)+COS(X-Y)-1.0))
      Y=T*ATAN(T2*SIN(Y)*COS(Y)/(COS(X+Y)+COS(X-Y)-1.0))
   78 CONTINUE
   79 CONTINUE
      CALL POUT(N7,J,K,X,X,Y)
      X=1.0
      Y=1.0
      Z=1.0
      IF(N8)89,89,81
   81 DO 88 I=1,N8,1
   88 CALL P3(X,Y,Z)
   89 CONTINUE
      CALL POUT(N8,J,K,X,Y,Z,Z)
      J=1
      K=2
      L=3
      E1(1)=1.0
      E1(2)=2.0
      E1(3)=3.0
      IF(N9)99,99,91
   91 DO 98 I=1,N9,1
   98 CALL P0
   99 CONTINUE
      CALL POUT(N9,J,K,E1(1),E1(2),E1(3),E1(4))
      J=2
      K=3
      IF(N10)109,109,101
  101 DO 108 I=1,N10,1
      J=J+K
      K=J+K
      J=J-K
      K=K-J-J
  108 CONTINUE
  109 CONTINUE
      CALL POUT(N10,J,K,X1,X2,X3,X4)
      X=0.75
      IF(N11)119,119,111
  111 DO 118 I=1,N11,1
  118 X=SQRT( EXP(ALOG(X)/T1))
  119 CONTINUE
      CALL POUT(N11,J,K,X,X,X,X)
      STOP
      END
C SUBROUTINE PA
      SUBROUTINE PA(E)
      REAL T,T1,T2,E
      DIMENSION E(4)
      COMMON T,T1,T2
      J=0
1     E(1)=(E(1)+E(2)+E(3)-E(4))*T
      E(2)=(E(1)+E(2)-E(3)+E(4))*T
      E(3)=(E(1)-E(2)+E(3)+E(4))*T
      E(4)=(-E(1)+E(2)+E(3)+E(4))/T2
      J=J+1
      IF(J-6)1,2,2
2     CONTINUE
      RETURN
      END
C SUBROUTINE P0
      SUBROUTINE P0
      REAL T,T1,T2,E1
      COMMON T,T1,T2,E1(4),J,K,L
      E1(J)=E1(K)
      E1(K)=E1(L)
      E1(L)=E1(J)
      RETURN
      END
C SUBROUTINE P3
      SUBROUTINE P3(X,Y,Z)
      REAL T,T1,T2,X1,Y1,X,Y,Z
      COMMON T,T1,T2
      X1=X
      Y1=Y
      X1=T*(X1+Y1)
      Y1=T*(X1+Y1)
      Z=(X1+Y1)/T2
      RETURN
      END
C SUBROUTINE POUT
      SUBROUTINE POUT(N,J,K,X1,X2,X3,X4)
      REAL X1,X2,X3,X4
      WRITE(*,1)N,J,K,X1,X2,X3,X4
1     FORMAT(1H ,317,4E12.4)
      RETURN
      END
```

Stride Micro introduces the contemporary Wyse WY-50 as the recommended terminal for the entire 400 Series product line. At last, a terminal with a full set of function keys that runs at 38.4K baud!

Wyse Terminal Becomes New Standard

Seeking a terminal that would take advantage of the high performance capabilities of the 400 Series, Stride Micro will now market the Wyse WY-50 video display terminal.

In explaining the move to Wyse, Stride president Rod Coleman cited the WY-50's ergonomic design, the keyboard functionality and especially the performance. "The Wyse is one of the few terminals on the market that can take advantage of the 38.4K baud rate available on all the Stride 400 Series serial ports," he said.

This higher speed is clearly evident in applications which require extensive terminal I/O. A few minutes spent with the p-System editor will prove the argument. "If you blink during a scroll, you'll miss a whole page," was a recent comment heard from one of our engineers doing program editing with the Stride/Wyse combination.

Other standard features of the new terminal are 16 programmable function keys (32 when shifted), 80 or 132-character screen widths (allowing full document or spreadsheet displays), and a character set composed of a 7 x 13 matrix in a 10 x 13 cell (resulting in improved readability on the large 14" screen).

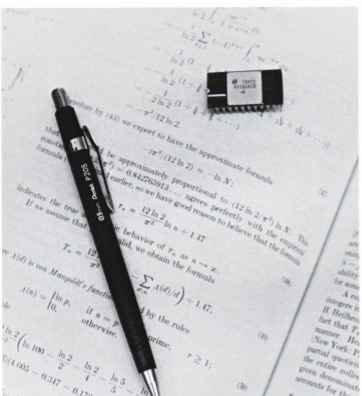
The design of the new terminal is extremely contemporary featuring a full tilt-and-swivel screen and a low profile, detachable keyboard.

The keyboard features excellent "feel" with a key roll-over design that makes missed keystrokes a thing of the past. Overall, there are 101 keys including a distinct numeric pad and full cursor control keys. Optional language codes including German, French, Spanish and Danish are available via special-order ROMs.

Menu-controlled setup functions permit control of numerous attributes from baud rate and data bits to a half dozen display and cursor formats.

Coleman added that the Wyse terminal is also an excellent machine for future systems capabilities since it "has the potential to take advantage of emerging technology in both software and hardware designs."

Numerous terminals remain compatible with Stride and Sage systems, and Stride Micro will continue to offer Customer Support to all users. However, the Wyse will now become the "recommended" terminal.



This small chip is a 16801 made by National Semiconductor. It is a special type of processor, called a floating point processor, or unit, especially made to do arithmetic calculations.

Focusing On Floating Point

A lot of computer work involves floating point arithmetic, or "real" numbers. Adding a special math processor, called a Floating Point Unit (FPU), often dramatically increases the speed at which real number calculations can be done. The Stride 400 Series offers a FPU option using National's 16081 chip. The option includes two chips, the 16081 itself, which fits into an existing socket on the CPU board, and a different PAL (Programmable Array Logic chip) to handle the new addressing. The 16081 operates at 5Mhz on a 10Mhz CPU, and 6Mhz on a 12Mhz CPU.

Typically, the FPU option will provide a 3 fold increase in speed. The performance increase depends on which operating system and compiler is used. (On one compiler, where the software package was not optimum, a 10 times increase was benchmarked!) Details on speed and precision will be addressed on an on-going basis as the results of various benchmarks come in.

The 16081 was intended as a coprocessor for National's NS16032 microprocessor. However, as Motorola never released their promised FPU for the 68000, Stride chose the 16081. Note that the 68000 and 16081 cannot operate as coprocessors. Instead, the 16081 is an input/output device for the 68000. The performance of this hybrid design is possibly less than could be achieved by true coprocessing, but still very effective.

One common FPU (Floating Point Unit) is the Intel 8087 used by many popular personal computers. Most 8087 implementations differ from the Stride 400 Series design in that the 8087 is used as a coprocessor with the 8086/88. This may give it a bit of an advantage over the hybrid 68000/16081 design. Also, the 8087 keeps 80 bits of internal precision while the 16081 keeps 64 bits. The designers of the 16081 felt that as most long word real numbers were stored in memory in 64 bit values, keeping more than that would unnecessarily slow down the calculations. If memory-to-memory operations are compared, then the precision of the 16081 is the same as the 8087. If many calculations are done, and the software executes them in the FPU registers, then the 8087 can be slightly more precise. However, in overall performance comparisons, the major advantages the 68000 has over the 8086/88 processor cancels out most of the small gains the 8087 makes.

These hardware differences will probably not be the major factor in how fast the machine processes real numbers. The type and efficiency of the software algorithms will still heavily determine speed. The bottom line is that the software implementations on the machines being compared will probably make more difference than the FPU hardware.

Calculations within the 16081 conform to the IEEE standards group Task P754. This proposed standard is basically a format definition for binary floating point arithmetic (both single and double precision) and is being well accepted by the mathematical community.

When discussing FPU hardware, it is almost impossible to get away from inspecting the basics of real number arithmetic. The subject is worthy of the many textbooks written about it, but a few pointers that pertain to computer operation are certainly worth reviewing.

What is a "real" number, anyway? Well, integer numbers, or whole numbers, are the familiar values:

. . . -3,-2,-1,0,1,2,3 . . .

A real number is an integer number with a fractional part called the "decimal expansion." For example, the real number 4.321 is the integer 4 plus the decimal expansion 0.321. Real numbers are often shown using scientific notation. In this notation, the real number is given with a value indicating a power of ten. For example, the number 54.321 could be shown as:

54.321 E00	=	54.321 x 1
5.4321 E01	=	5.4321 x 10
0.54321 E02	=	0.54321 x 100
543.21 E-01	=	543.21 / 10

Note that the decimal point moves around depending on what the exponent is. This is where the term "floating point" arithmetic comes from.

Internally, the FPU keeps the real number information in the proposed IEEE format, which has three parts: a single— sign bit, an 11— bit exponent, and a 55— bit fraction or "mantissa." Each part undergoes a separate process when a floating point instruction is executed. Note that in a computer, the value is not kept in a power of ten exponent, but a power of two — as contemporary computers are binary, not decimal, machines. This means some values, such as .1, are not accurately represented internally, as there is no exact binary equivalent for them.

One problem that always raises questions is that the same real number program may generate different results on different systems, or different results on the same machine for different compilers. It depends on what pre-

cision is being used. This can be either *single precision* or *double precision*, sometimes called two-word (32—bit) and four-word (64—bit) arithmetic. Generally, the more bits, the more accurate the result of the calculation will be.

The range over which real numbers are defined depends on the software implementation. With 64— bit precision (32— bit precision is optional) the 16081 FPU range can be:

+/-1.7976931346231305 E308

However, high precision does not guarantee the right result. One of the most frustrating aspects of real numbers is "round-off" errors. For example, if you divide 1.0 by 3.0 the result is 0.3333... — the exact number never really ends! But in a computer environment, a stopping point must be reached somewhere. The stopping point is called the number of significant digits, which is closely tied to the precision. Packages using 64 bits will generally deliver 15 to 16 decimal digits of accuracy. It is important to check exactly what precision is being used. For example, double precision on a Harris computer is only 11 digits of accuracy.

Consider again the result of dividing 1.0/3.0 using p-System Pascal. The result is 0.333333333333333. What happens to the amount that gets dropped off? Depending on the type of round-off used, the last digit will increase or decrease by one, giving a small error in the value. If the routine involves many calculations where a small part of the value is lost (or gained) each time, the error may become large enough that the result is incorrect. The following program demonstrates this common pitfall.

```
PROGRAM Accumulate;
{An example of how round-off errors accumulate.

   R_many = 1/3 + 1/3 + 1/3 ...  (Num_Ops times)
   R_one = 1/3 * Num_Ops

R_many and R_one should be the same number. However, it
takes many operations to get R_many, each of which involves
a little round-off error. The error becomes larger
as the number of operations (Num_ops) increases. }

VAR R_one,Third,R_many:REAL;
    I:INTEGER;
    PROCEDURE calc(Num_Ops:integer);
    BEGIN
      R_many:=0;
      FOR I:=1 TO Num_Ops do R_many:=R_many +Third;
      R_one:=(Third * Num_Ops);
      WRITELN(R_many,'    ',R_one);
    END;
BEGIN
  Third:=1.0/3.0;
  calc(2);
  calc(205);
  calc(2005);
  calc(20005);
END.
```

Many different programming techniques can be used to minimize round-off errors.

The proposed IEEE standard for binary floating point arithmetic (Task P754) defines *four* types of round-off. As the main difference is what occurs at the halfway point, the following defines these four types:

Round to nearest value. Halfway point=even value.
Round towards zero.
Round toward positive infinity.
Round toward negative infinity.

For real calculations, the 16081 chip can be programmed (in assembly code) to use any of the four IEEE rounding methods. It defaults to the first one and rounds to the nearest (even) value. Remember that round-off within a computer algorithm is done to the nearest binary value —not decimal value.

Computers systems also differ in how a real number is rounded to an integer. This is not the same process as the rounding described above for real numbers alone. For example, most compilers have functions to TRUNCATE a real number to an integer, or to ROUND it to an integer. Truncation is fairly simple. The fractional part of the real number is dropped. Rounding is an attempt to give the integer closest to the exact result.

For example, the statement INT:=ROUND(4.5) in p-System Pascal may give a result of INT equal to 4 or INT equal to 5, depending on availability of an FPU. The FPU rounds to the nearest integer, with halfway values going to the even integer, while the p-System software algorithm rounds to the nearest integer, with halfway values going to the highest integer. In both cases, the computer will have done its job properly, but most humans see a lot of difference between 4 and 5.Currently, environments that support the Stride FPU are:

p-System Pascal
CP/M-68K SVS FORTRAN
CP/M-68K SVS Pascal
CP/M-68K Whitesmith's 'C'
Volition's Modula-2
IDRIS 'C'
IDRIS Pascal

Other environments will soon be working with the FPU.

Looking Back

January, '85 - marks the third anniversary of Stride Micro, formerly Sage Computer.

August '81 - development starts in Bob Needham's basement. The three founders, Rod Coleman, Bill Bonham and Bob Needham (above with "Attack Cat") soon move to real offices.

January '82 - Fire! Just as the designs start to prove themselves, the office and inventory are destroyed. The team is undaunted, and a new place is found within hours.

March '82 - The booth at the Seventh Annual West Coast Computer Faire isn't much, but the response is great! Jerry Pournelle first spotted us here.

June '82 - The Sage II is ready! Lonnie Cline, Tom Edsall, Rod Coleman, Bill Bonham, Verlene Bonham, Dave Cline and Bob Needham are ready to ship the first systems.

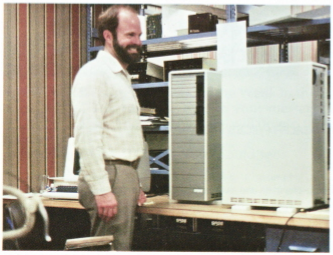
November '82 - A new booth at the Las Vegas COMDEX draws a good crowd.

February '83 - Regional Sales Offices are opened in Boston, (above) and Dallas. Forty International distributors are added to the team.

May '83 - Another move to new offices. Nevada Governor Richard Bryant awards the Nevada State Seal to Stride, welcoming the company to Nevada.

June, '83 - The first month Al Bennett (right) ships over one million dollars, Rod Coleman (left) throws a picnic.

February, '84 - The first Sage Faire is such a success, that the MGM crew had to remove wall panels to make room for attendees.



September, '84 - Months of design effort by Research and Development produce the latest product line, the 400 Series. Paul Lima looks proudly at an early 460 - code named the Sage VI. Sage becomes Stride Micro.

Looking Ahead

The next big event is the Stride Faire in February, 1985. Join us!

Hyperception

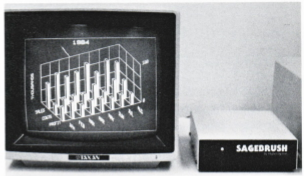
SOFTWARE FOR SAGEBRUSH GRAPHICS ON SAGE AND STRIDE COMPUTERS

HYPERCEPTION PRESENTS THE HYPER-SERIES: SOFTWARE SUPPORT FOR SAGEBRUSH GRAPHICS

In addition to standard SAGEBRUSH command software, Hyperception also offers complete packages which enable immediate and effective use of the outstanding graphics provided by SAGEBRUSH units for SAGE and STRIDE computers:

• Hyperplot A business display package, Hyperplot features a truly friendly human interface. Using Hyperplot comes naturally; users typically do not find it necessary to refer to documentation.
Some of the reasaons why Hyperplot can quickly provide charts and graphs that communicate business information so much more effectively:

- Menu-driven selections
- On-line HELP menus
- Five types of output format (3-D histogram, pie-chart, task-scheduler, multi-variable graph, standard histogram)
- Data sets created by menu query or text-editor, modified using text-editor
- Single data set structure, allowing one data set to be presented in any of the five output formats
- On-line example displays
- Screen dump to printer with dot-addressable graphics mode

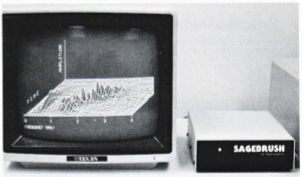


• Hyperpaint Turns a SAGEBRUSH display into a graphics sketchpad via the BRUSHRAT option (joystick or mouse). In line with the software design philosophy at Hyperception, Hyperpaint also boasts an exceptional human interface:

- Icon-driven selections
- Free-form graphics entry (pencil and varying widths of paint brush)
- Figure generation (boxes, circles, 'radialoids')
- Text labelling (horizontal and vertical, varying boldness)
- Disk storage and retrieval of images
- Screen dump to printer with dot-addressable graphics mode
- Constant user feedback provided by screen cursors which change personalities depending on the current function

• Hypersignal A powerful signal processing package which takes full advantage of the speed provided by 68000-based machines, Hypersignal offers a few surprises for signal processing professionals:

- Menu-driven operation in all cases
- Frequency analysis. Includes 3-D type spectrogram representation with hidden line removal (using the SAGEBRUSH foreground line-drawer for speed), optional cross-hatching, and full 3-axis generation. Also includes FFT generation, Hamming window, and log magnitude approximation (all 68000 asm. lang. coded for speed).
- Frequency-domain generation of complex signals using BRUSHRAT option (either joystick or mouse) for zero-phase transformation into time waveform.
- Time analysis. Includes time-waveform display with scaling and zoom functions. Also includes periodic time waveform compression and re-creation via linear predictive coding technique (also 68000 asm. lang. coded).
- Disk storage and retrieval of images
- Screen dump to printer with dot-addressable graphics mode



ALL PRICES SUGGESTED RETAIL ONLY: DEALER PRICES MAY VARY

Hyperplot: _____ at $235 ea.
Hyperpaint: _____ at $235 ea. (free with purchase of BRUSHRAT option)
Hypersignal: _____ at $595 ea.
BRUSHRAT: _____ at $225 ea. (includes command set software to access analog channels and external 8-bit digital port)

Method of payment (Texas residents add 6%): ☐ Credit Card ☐ COD ☐ Check or MO

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Electronic Socrates Has The Answers

by Bruce Robertson, Software Engineer

Our newest employee at Stride, Socrates, is part of our Customer Service group. Socrates (Stride Off-hour Customer Service) is a graduate of the new 400 Series class, a 440 to be exact, running Idris, with a Hayes Modem connected to an incoming phone line.

Socrates will now take your electronic calls between 5:00 p.m. and 8:00 a.m. during weekdays, and anytime during weekends. Messages will be checked first thing by the Customer Service group on the next working day.

All you need is a computer, a modem, and a communications package, and you can talk to Socrates. The Teletalker program, distributed with every system, works nicely for p-System users. In Idris, the program STTY is used to set up the communications parameters and the program "cu"(for "call up") is the communications routine. (To use "cu" with a 300 baud modem, type "cu -s300.") Almost any communications program will work, Socrates doesn't care, as long as the following parameters are met:

```
1200 or 300 baud
8 data bits, No parity
Full duplex
```

Once you set this up, it is simple to call Socrates; use your communications routine to dial 1-(702) 322-7944. (For the Hayes modem this sequence is ATDT17023227944.) Socrates will answer the phone with:

```
Idris 3.0 (Stride)
Login:
```

If you are sending at 300 baud (vs 1200 baud) this will print out as garbage. Send a BREAK (not the break key on your terminal, but a break over the modem; your communications routine should allow you to do this) and the message will re-display correctly.

At the "Login:" line type "Socrates cr " Upper case "S", lower case "ocrates". You will see:

```
Last login:  DOW Month Day hr: min: sec on console

Socrates welcomes you.

Type in your message, and then press CTRL/D
when you are done. Be sure to include your name and
a phone number where we can reach you during the day.
```

(Note that DOW stands for Day Of the Week in the time shown above.) You can now type in your message. An "@" will erase the line. A backspace will delete the last character.

When done, type CTRL/D. You should see:

```
Thank you. Your message will be given to Customer
Service who will contact you with an answer.

Good bye — Socrates.
```

Hang up your end of the phone (ATH0 for a Hayes Modem). That's it. Socrates will see that Customer Service gets your message.

Ed. Note: Due to a strange problem in our phone system, if you dial in and the line is busy, you will not get a busy signal, but the phone will continue to ring. This is because the line is on a rotary circuit and you have been switched over to another phone line which has no modem. Try again in a few minutes.

Despite slow attendance at Fall '84 COMDEX, the Stride Micro booth was the most successful Stride has had to date.

Stride 400 Series Debuts At Fall Comdex

Trying to cement its title as the world's largest trade show, COMDEX '84 (the **CO**mputer **D**ealer **EX**position) completed a 5-day run in Las Vegas on November 18th to mixed reviews. Despite additional space, this year, the promoters hopes of attracting 92,000 may have fallen short. Many observers estimated the crowd to be only 60,000; that's down 20,000 from 1983.

For Stride Micro, the company's third appearance at the exhibition was certainly its most successful. The 400 Series took its first public bow and was well received. Along with the new machines, Stride also premiered the multiuser DB Master database from Stoneware, several sophisticated business applications running under RM/COS, and the new WYSE WY-50 terminal blazing away at 38.4K baud.

Perhaps the most interesting demonstration at COMDEX was in Stride's own booth where Skyworks Inc. showed a video tape of scenes shot with their new "Skycam." The visual effects possible with this cable-suspended aerial camera controlled by a Stride 420 microcomputer was spectacular.

As Stride Micro looks forward to February and its second annual technical fair (Stride Faire '85), the contrast with COMDEX is certainly apparent. In contrast to the sore feet and "grab-a-brochure-and-keep-moving" routine in Las Vegas, the Reno Stride Faire is dedicated to a "let's-sit-down-and-try-it-out" atmosphere.

At press time, a lengthy and impressive list of speakers was being finalized. Among the latest comfirmations: Niklaus Wirth on Modula-2, Iann Barron on the INMOS transputer, Tom DeMarco on advanced operating system concepts, and Motorola's Jack Brown on 68000 developments. Separate panels are confirmed for Modula-2, microprocessor architectures, and tomorrow's operating systems.

For more information on Stride Faire to be held in Reno's MGM's Grand Hotel/Casino February 8-10, 1985, contact Laura Smith, Trade Show Manager at (702) 322-6868.

Silent enough to run in a library, the HP Laserjet printer is so quiet it won't disturb phone conversations or people working in an office.

Is It Time to Buy A Laser Printer?

by Erik Smith, president of Scenic Computer System

Has the time come to give up the comforting racket of your daisywheel for a new technology? Here's a look at what's new in printing and, how to make a decision about what suits your needs best.

Laser printers are now available in a range of prices and capabilities. General advantages over daisywheel or dot matrix printers include speed, quiet operation, excellent paper handling and, a dramatic increase in capabilities. Software is now available for the laser printer that lets you generate camera-ready text with multiple columns, justified margins, a variety of fonts and specific page composition. And, of course, with a laser printer you can incorporate graphics.

At this time, there are two companies responsible for most of the laser printer mechanisms on the market; Canon and Xerox. Manufacturers have added front-end controllers with different characteristics to these mechanisms and have produced machines at several different price and capability levels.

The QMS 1200 printer is one of the most powerful (and most expensive at $25,000) printers on the market. It's shipped with 12 fonts and can also use downloadable fonts. The buffer is the largest on the market, a full 2.0 M Bytes, featuring excellent graphics possibilities, such as the ability to download virtually any graphics display, including photos. The QMS 1200 uses the Xerox 2700 mechanism.

QMS uses a Canon mechanism and excellent front-end capability in another machine, the QMS Lasergraphix 800. This machine, at $10,000, is somewhat slower than the 1200 (only generating 8 pages per minute as compared to 12 on the 1200) and offers graphic capabilities similar to the QMS 1200.

At the "low" end of the laser printer market is the popular Hewlett Packard LaserJet. This machine represents an enormous cost breakthrough and is making laser print technology accessible to a new and far wider market. The LaserJet, at only $3500, runs in near-silence and churns out an amazing eight pages per minute, just like some of its larger competitors. There are, of course, some serious differences, such as limits in font capabilities (some extra fonts are available on separately sold cartridges) and a somewhat limited buffer space, which makes it difficult to generate complex graphics.

The LaserJet has captured the attention of the media and the consumer public because of its attractive pricing. However, LaserJet "lookalikes" are already making an appearance. Corona has announced a laser printer, which runs slightly cheaper than the LaserJet, but with a major limitation, it can be driven only by a PC-compatible microcomputer, rendering it useless for Stride users.

Other considerations in selecting the right laser printer for your purposes are duty cycles and operating costs. Some machines, such as the LaserJet, have a limited lifespan of 100,000 to 200,000 pages. The machine can be overhauled at the midway mark and be practically as good as new. Others, based on the Xerox 2700, require monthly factory servicing (at additional cost), but can produce up to 25,000 pages per month and have a very long lifespan. The larger machines generally can be driven harder (producing more pages per month without problems) and hold more paper in supply trays.

How about software? There are several packages that optimize the abilities of laser printers. One such product is ScenicWriter, which has been marketed for years as Sprinter. The enhanced version of ScenicWriter, due to hit the market in early December 1984, makes the most of the new generation of laser printers - especially the LaserJet. ScenicWriter gets the LaserJet to generate *fully indexed* documents with tables of contents and footnotes. Pages can be designed with headers, titles and displays all in different fonts. ScenicWriter supports multiple columns, converts files from other word processing systems, and lets you produce line drawings, such as boxes and tables on your page. ScenicWriter's ability to generate graphics on the LaserJet is limited only by the machine's buffer size (59K).

When ScenicWriter drives one of the large printers, you can generate much more complex graphics and integrate them with text. ScenicWriter can utilize fonts from any source, including fonts and width tables produced with Knuth's Metafont System.

In conclusion, we don't hesitate to recommend any of the machines we've mentioned. ScenicWriter drives all of them according to their capabilities. They're all dependable, cost effective and far superior in every way to daisywheels. It's up to you, however, to analyze what you need in terms of equipment cost, operating cost, and intensity of use. If you are opening a typesetting operation, for instance, you wouldn't want to buy LaserJets. And if you have a small to medium office, you probably don't need a QMS 1200.

Laser printing technology is in a rapid state of evolution. We'll update these remarks as new printers become available.

Ed. Note: ScenicWriter is available for the LaserJet for $995. This includes ASE, Spell, Sprinter 3, Menu, and SML macros. ScenicWriter with drivers for high-end Laser printers and phototypesetters is available for $5K. Contact Debryn Bear, Service & Sales, Scenic, 14852 NE 31th Circle, Redmond, WA 98052(206) 885-5500.

Katherine Hood, Documentation Co-ordinator, is working with the QMS 1200 Laser printer at Stride Micro. The majority of Stride documentation is created, camera ready, with the laser printer. A good example of the excellent quality produced is the set of new 400 Series manuals.

Varityper's new Epics 6100 Digital Typesetter is a slave output device which provides high-quality type for the Epics Composition System. Like the Comp/Edit series of digital systems, type is produced from 4-points to 85-points, and the output speed is rated at 175 newspaper lines per minute.

LASER MODEL	PRICE (USD)	BUFFER SIZE	FONT VARIETY	BASIC PRINT MECHANISM
Xerox 2700 II	20K	500K	limited uses cartridges	Xerox
QMS 1200	25K	2,000K	12 built–in downloadable	Xerox
HP LaserJet	3.5K	59K	2 built–in uses cartridge	Canon
QMS 800	10K	1,500K	12 built–in downloadable	Canon
Imagen 8/300	10K	500K	downloadable expandable	Canon

HP LaserJet Printer is a trademark of Hewett Packard. Laserografix is a trademark of Quality Micro Systems, Inc.

☞ *This table is a photograph of an actual printout from the QMS 1200.*

The comparison chart above was printed on a Stride Micro with QMS1200 laser printer using the Scenic Writer software. Notice the clean, solid lines and detail of the hand.

Fixing Real Number Printout

Dear Stride Micro,

This is one of several programs that I teach my students to run on every Pascal implementation to see what the system really does. We were quite surprised when we ran this program on our LSI-11's: the maximum exponent in Softech's 4-word reals in version IV.13 is still only 37-38! A companion program indicated 15-16 digits of accuracy as expected but the exponent range is horribly truncated. We were even more surprised at the interesting output from the Sage. Obviously, the internal numbers are okay, but the output in the 100-109, 200-209, 300-309 ranges could be confusing...

```
PROGRAM MinimumReal;
VAR x:REAL;
    C:CHAR;
BEGIN
 WRITE  ('Minimum positive real number is ');
 WRITELN('close to last number listed.');
 WRITE  ('When output stops, depending on ');
 WRITELN('your system, you may have to');
 WRITELN('REBOOT the system.');
 WRITELN;
 WRITELN('Type any key to start. ');
 READ(C);
 x:=1.0;
 REPEAT
   WRITELN(x);
   x:=x/10;
 UNTIL x=0.0;
END.
```

Cheers,
Prof. Henry Baumgarten
Dept. of Chemistry
University of Nebraska
Lincoln, NE 68588-0304

Dear Prof. Baumgarten:

The internal values are okay; the problem is in the output routine which prints exponents such as E205 as E25. This bug is listed in Softech's Problem Analysis Guide, available from Softech, as No. 1310. It was not fixed in version IV.2, but has been corrected for IV.2.1 which is still under beta test.

The following "patch" will fix the problem, but has a minor side effect: leading zeros are not always suppressed. This means that exponents such as E5 will print out as E05. In the example, type the key shown in front of the "(" for the command.

Type XPATCH to X(ecute PATCH. Then GSYSTEM.PASCAL to G(et SYSTEM.PASCAL. Then type R to R(ead the block number given for your version:

Release	Block,byte
IV.13, Sage Aug 8, '83	45, 125
IV.13, Sage May 7, '84	96, 125
IV.13, Sage May 7, '84 (with debugger)	126, 125
IV.20, 400 Series Oct 19, '84	101, 139

Type V to V(iew the block. The byte location should contain:

2109 B2F1 0D .

If it does, use T(ype and cursor keys to move to the byte location. Type H for H(ex mode and replace the values above with

9C9C 9C9C 9C .

Type Q(uit, to quit Hex mode, then S to S(ave the block. Another Q will Q(uit the PATCH program. Then REBOOT the system and try the program.

If you have different values at the location, do not change them. Your version may be slightly different if any of your system units, such as GOTOXY are different. Also, this patch is for the 4-word REALOPS. To find the correct location, which is the location of REALOPS Procedure 13, offset 399, you must use DECODE:

Type XDECODE to X(ecute DECODE, then SYSTEM.PASCAL when asked for the input file, then just a ⟨cr⟩ for the Listing file.

Type D for D(ictionary to find the number of REALOPS. Type in that number. Then type in 13, the procedure number. You may need to type CTRL/S to stop the display so you can read the location of the start of the procedure. (Remember CTRL/Q, or on some systems another CTRL/S, will start it again.) Add 399 to this location for the offset needed. For example, if the location were block 125, byte 238, then:

Blk 125 byte 238 + 399 = blk 125 byte 637
= blk 126 byte 125

Note that as there are 512 bytes per block, 637 mod 512 = 125 and the blk number increments by one.

Now that you have the correct location, use PATCH as shown above, to change it. You should reboot after you have patched the system.

Q & A

Why does the p-System Editor (version IV.2) hunt through all the volumes when I call it?

On some releases, the Editor was QUICKSTARTED and is looking for a volume that doesn't exist. QUICKSTART it on your system and it will come up quickly without "hunting." Note that the Filer and Compiler do not reference any units outside of themselves so they will not have this problem.

How is data verified on the 400 Series Tape Drive?

As the first head writes along the tape, a second head behind it reads the data. The controller compares the data written with what is read to verify that it is correct. If an error occurs, the controller will try again up to 16 times.

I thought I could use regular phone jacks for my terminal cable, but they only have four wires instead of the six in the Stride connectors. Can I do this?

Yes, you can use the four wire connectors if you do not need two of the RS232 signals, Carrier Detect (CD) and Clear To Send (CTS). Note that you also lose the ground pin. Set up your terminal and system for XON/XOFF protocol and you should not need those signals. If you are using RM/COS, which requires CTS to be true, you should use the Stride cables.

To build your own cable, refer to the Owner's manual Vol. 1, page 83. You will see a wiring list for several cables. Ignore pins 1,6,7. Treat pins 2-5 as pins 1-4.

Can I get an FPU on my SAGE?

Yes, there is a retrofit board using a 16081 available from Knowledge Software. Contact Derek Jones, Knowledge Software Ltd., 18 Lea Springs, Fleet, Hants GU138AS. England. Phone (0252) 520667 (TMAIL KNOWLEDGE).

Congratulations are due the graduates of the December 400 Series Training class. Pictured (front to back and left to right) Bill Tyson, W.T. Tyson Company, Inc.; Mary McLellan, W.T. Tyson Company, Inc.; Charles J. Lewis, Lewis & Clark Computers; Russell Hockins, Network Nexus; Michael D. LeBeck, V.P. AJM Data Services, Inc.; Steve Squibb, Albertson Data Management; and Bill Albertson, Albertson Data Management.

Rhonda Bilyeu, International Operation's new Executive Assistant.

Davide Lee, Stride Micro's Comptroller.

People

Rhonda Bilyeu is Executive Assistant to D. Michael Deignan in International Operations and one of Stride's newest employees. Besides covering for Mike while he's on one of his many trips, she also helps with international customer support.

A recent graduate of the University of Nevada, Reno with a Bachelor's Degree in Journalism, Rhonda also has an Associate Arts Degree in Business Administration. Her background includes marketing and public relations. Before coming to Stride Micro, she worked for a real estate developer and was assistant controller for a construction firm in Reno.

Claiming to have "wanderlust in her toes," Rhonda loves to travel, England being a favorite country. She lived in the UK for six months while attending the University of London.

One of her hobbies is photography. She once did a series of photographs for the Reno newspaper on our local, colorful "river people." Rhonda also enjoys reading, writing and playing racquetball in her spare time. Please join us in welcoming Rhonda to Stride Micro.

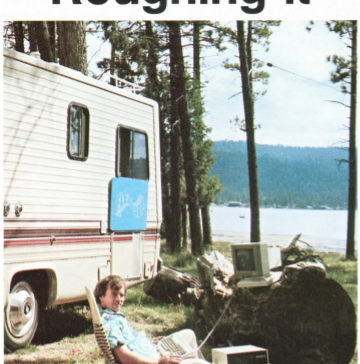
Hidden within every company, is an unsung hero called the comptroller. Stride Micro's comptroller is a tall, friendly guy named **David Lee.** If you glance in his office, you will see David meticulously pouring over stacks of computer reports, overseeing Stride's finances.

His credentials are impressive! David has a Bachelor's Degree in Accounting from the University of Nevada, Las Vegas and is currently working on his Master's Degree. He is also a Certified Public Accountant of Nevada. Before joining Stride in April, 1984, David was a CPA for the Reno firm of Kafoury, Armstrong and Company.

Softball and basketball are David's favorite sports, both playing and viewing. As a student, he played basketball for the University of Nevada, Las Vegas. Last week, when his Alma Mater played the University of Nevada, Reno, he cheered for Las Vegas despite all his Reno friends. (Reno won!)

When David gets too keyed up from handling all the money, he relaxes with music; folk and jazz are his favorites. David plays guitar and enjoys strumming a few chords with other musical friends. We hope he'll always keep our books in tune!

Roughing it



Steve Ause's idea of camping is to move the office to the shores of Big Bear Lake, CA.

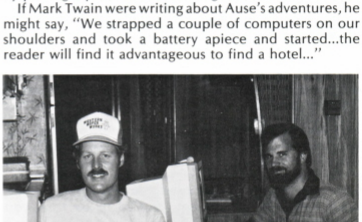
Mark Twain in *Roughing It*, told of his trip to Lake Tahoe, "We strapped a couple of blankets on our shoulders and took an ax apiece and started... we were on foot. The reader will find it advantageous to go horseback..." Steve Ause, President of Microfinancial, has a different idea of camping out. Faced with the choice of taking a vacation and giving up programming, he solved his dilemma by taking his computer with him. The motorhome in which Steve "roughs it" has an 8,000 watt Onan generator to power his computers. Steve also has a portable Honda 600 watt generator which he uses outside of the motorhome.

Steve's staff, Gary Wright and Terry Orgill, also take advantage of the "working" vacation, an unusual job benefit not offered by many companies. When the programming is done, regular outdoor sports such as water skiing or frisbe take over.

All programming is an art, and when Ause needs inspiration, he will go to any heights to get it — including attaching a Sage to climbing ropes and hauling it to a mountain top, there to enjoy the clear air which stimulates the brain. For these trips, a car battery and inverter serve as the power source.

Steve utilizes every bit of programming time. Once, while his wife, Denise, was driving, he was running a Sage IV and Televideo in the car. Power came from an orange extension cord strung from the front of the engine in through the window. The car hit some potholes causing the disk heads to bounce and creating bad blocks. Always ready for a technical challenge, Steve solved this problem by putting a pillow under the Sage!

If Mark Twain were writing about Ause's adventures, he might say, "We strapped a couple of computers on our shoulders and took a battery apiece and started...the reader will find it advantageous to find a hotel..."



Gary Wright and Terry Orgill, Flexware programmers, "rough it" in the motorhome.

Ed. Note: Microfinancial Corporation makes the Flexware products. A demo disk is available for Stride and Sage microcomputers by calling (818) 961-0237 or writing to Microfinancial, 15404 East Valley Blvd., Industry, CA 91746.

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