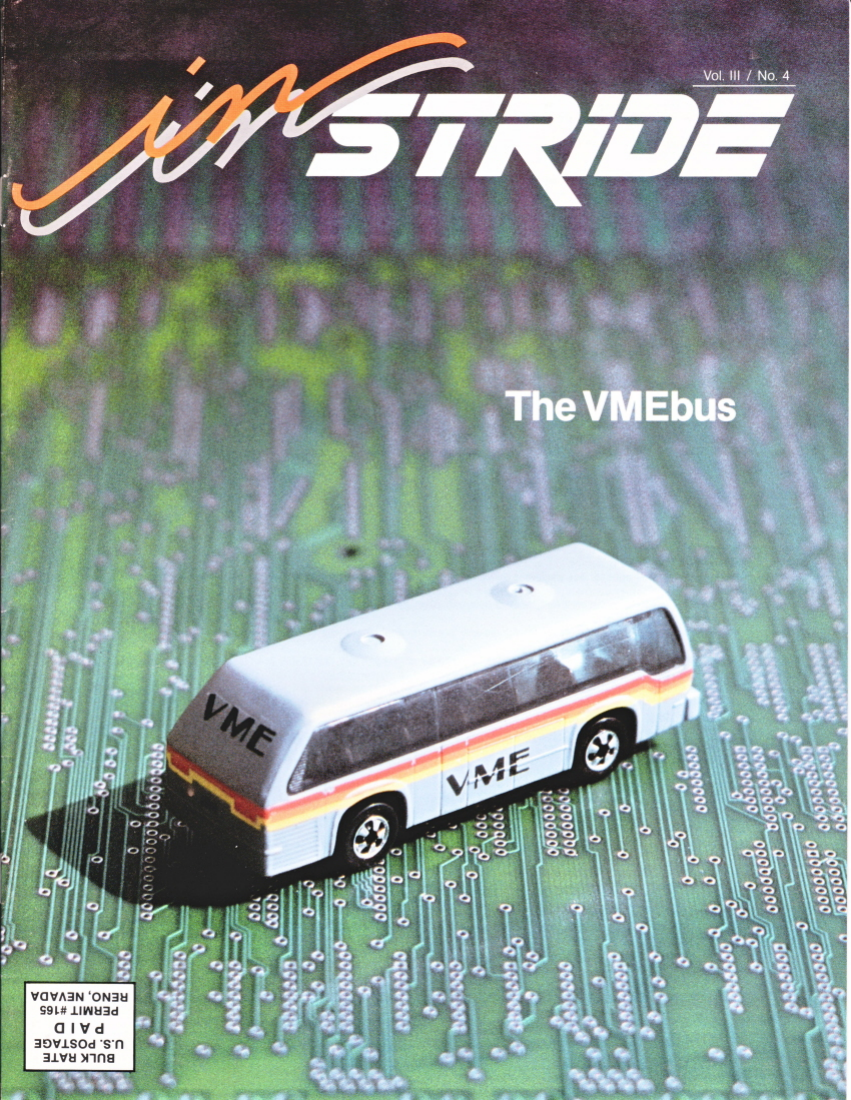
Vol. III / No. 4

STRIDE

The VMEbus



BULK RATE
U.S. POSTAGE
PAID
PERMIT #165
RENO, NEVADA

Hyperception FIRST IN SAGE AND STRIDE GRAPHICS

SAGEBRUSH: GRAPHICS HARDWARE FIREPOWER FOR SAGE AND STRIDE SYSTEMS . . .

- **True bit-mapped graphics and text.** Images may be transferred to and from disk, and to a dot-matrix printer. Text may be of any size and boldness and written at any angle.
- **512×512 resolution (interlaced display) or 512×256 resolution (non-interlaced display).** Units may be upgraded to 512×512 resolution by adding memory and changing an EPROM.
- **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 display. Dedicated multi-user operation is achieved by chaining SAGEBRUSH units together.
- **BRUSHRAT mouse option.** Connects directly to SAGEBRUSH unit (doesn't use computer serial port), supports dedicated multi-user operation.
- **Standard monochromatic composite video output.** Requires only standard, inexpensive (less then $100) monitor. Avoids overlay of terminal and graphic displays. Video output available at both phono and BNC connectors; two displays may be connected in parallel.
- **Printers with dot-addressable mode supported.** Okidata, Epson, etc. HP Laserjet, too.
- **Fast SAGEBUS/VMEbus video memory interface doesn't hinder computer operation.** Memory-to-memory display update rate of 25.4 frames/sec. (10MHz 68000, frame=512×512 resolution 32kbyte video memory). No computer serial port required.
- **Sage to Stride upgrade at any time.** Upgrade package includes 'connector-translation' card (no active components) and 3 ICs.
- **Small (6.5″×8.5″, 2″), attractive 'baby Sage' unit** that connects easily to Sage and Stride 400 series machines.

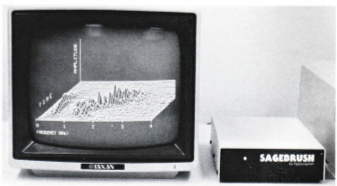
. . . AND SOFTWARE THAT WON'T BATTLE YOU OR YOUR COMPUTER-AND EVEN MAKES FRIENDS WITH THE STRIDE TERMINAL GRAPHICS OPTION!!

- **Powerful command set software.** Includes real-number display scaling, windowing, character size, boldness, rotation, and slant directives, foreground line-drawer, arc, elipse, and quadrilateral generation, image transfer to and from disk and to printer, and Boolean image operations.
  - — p-System (Pascal, BASIC, FORTRAN 77)
  - — CP/M 68K (C, SVS FORTRAN)
  - — Modula-2
- **p-System Hyperseries applications packages** utilize menu-driven interfaces to provide immediate, useful graphic output.
  - — Hyperplot Business Graphics creates 5 types of output displays from text files. Single text file format for all displays.
  - — Hyperpaint Sketchpad Graphics generates figures and free-form graphics via icon selection. Requires BRUSHRAT mouse.
  - — Hypersignal Signal Processing Graphics provides time and frequency analysis, fast 68000 asm. lang. signal processing library.
- **SOFTWARE RUNS ON STRIDE TERMINAL GRAPHICS OPTION, TOO.** There is only one version of SAGEBRUSH command set software; a 'hardware recognition' module automatically determines host machine type (Sage or Stride w/SAGEBRUSH, or Stride with Wyse graphics overlay).

----------ALL PRICES SUGGESTED RETAIL ONLY; DEALER PRICES MAY VARY----------

	SAGEII, IV	STRIDE 400s	STRIDE 400s W/ GRAPHICS OPTION
512×512 SAGEBRUSH AND COMMAND SOFTWARE	$895	$930	—
512×256 SAGEBRUSH AND COMMAND SOFTWARE	$795	$830	—
SAGEBRUSH COMMAND SOFTWARE ONLY	*	*	$349
BRUSHRAT MOUSE (FREE HYPERPAINT INCLUDED)	$125	$125	—
SAGE-TO-STRIDE CONVERSION	$45	—	—
RESOLUTION UPGRADE	$100	$100	—
HYPERPLOT BUSINESS GRAPHICS	$235	$235	$235
HYPERSIGNAL PROCESSING GRAPHICS	$595	$595	$595
USERS MANUAL (120pp., sim. Suede cover)	$20	$20	$20

*Command Software Included



Operating system _____

Type and model of printer: _____

Method of Payment:_____ Credit Card_____ COD _____Check or Mo (Texas residents add 6⅛)

Name:_____Company: _____

Address: _____City: _____State: _____ZIP:_____

Mastercard No: _____Interbank No: _____Exp. Date:_____

Visa No:_____Exp. Date:_____

Hyperception / 3636 Lemmon Ave., Suite 400 / Dallas, TX 75219 / (214)698-5538

Up In Smoke

Guest Editorial

by Buddy Frank

The Surgeon General has been warning us for years that cigarette smoking can be dangerous to our health. Since I and most of my co-workers at Stride Micro are confirmed non-smokers, I never thought much about that warning. Until last week.

A little history might help explain this story. It was about one year ago that I first learned that Sage Computer was dying — despite excellent sales, a strong track record, and a growing reputation. A trademark attorney from Washington D.C. had just informed me that Sage must find a new name.

As a public relations man, the news hit me as though there'd been a death in my family. *BYTE* magazine's Jerry Pournelle had just written that Sage was "the best 68000 computer available," and this lawyer was telling me that the name Sage was "undefendable in court." It seemed to confirm my suspicion that law schools should have been banned when the Founding Fathers penned the Constitution.

Granted, Sage was not exactly a household word in early 1984, but it wasn't completely unknown either. We'd been favorably reviewed in *InfoWorld*, *BYTE*, *Popular Computing* and *Personal Computer World*. And we'd already sold several thousand units. So when the "name-the-company" contest was held during March and April last year, it did little to boost my spirits. Can you imagine promoting a firm named XIAM Systems or COLEMAN Computers?

Another complication was that Research and Development was finishing work on a completely new set of machines. Thus we needed names for the company *and* the machines (Sage IIe was also unacceptable).

Since Sage was still everyone's personal favorite, I'll admit that when we first heard "Stride," it didn't exactly send shudders of excitement through the corporate consciousness. But the lawyers liked it. And soon it began to grow on us, too. It was even better when we put it together with "Micro." Most other 68000 manufacturers pretended they were building a big VAX in a little box. We, on the other hand, were microcomputer folks and proud of that heritage. Stride Micro was a statement, as well as a name.

So after being in business three years, we were again a completely unknown company, selling three unknown products (The Stride 400 Series). It was a scary time in the early Fall. The first month we answered the phone "Good morning, Stride Micro," about half the callers hung up. The other half said "Who?" On our introductory press tour to the East Coast in mid-September, we continually tripped over our own tongues, often calling ourselves Sage Micro or describing the machines as "Stride IVs."

Despite these setbacks, overall sales of the 400 Series picked up more rapidly than we'd anticipated. Unfortunately, sales of Sage dropped like a rock. I was beginning to wonder if I could emulate Adam Osborn and make a living by writing a book about "How I Ruined a Successful Computer Company."

Thankfully, things quickly improved. The press actually gave more coverage to Stride in the single month of October than Sage had received since its founding. Good marketing or not, it's apparently still hard to hide a truly good computer. In January, *Electronics Products* magazine awarded the 400 Series a "Product of the Year" award over such contenders as Apple's Macintosh, AT&T's 6300, and IBM's PC-AT. Stride Micro had arrived.

As proof, the first three months of 1985 have already been the best in the company's history. Clearly the new products are standing on their own merits, and the name change "experience" was behind us. Until last week.

That's when cigarette smoking may have produced it's first ulcer. Right in the middle of a well-known national magazine I saw: "Welcome to STRIDE where taste runs rich." In two bright red packages in the middle of the page were the STRIDE Deluxe Blend Kings and 100s. Suddenly, my mental health was in danger whether or not the Surgeon General had determined anything.

As I frantically dialed our lawyer's number, I envisioned the "Product of the Year" award going up in a cloud of smoke. I had a vision of corporate attorneys from the huge tobacco manufacturer, the Liggett Group, flying to Reno to confiscate our logos. My heart rate slowly returned to normal when the lawyer assured me that tobacco and high tech (while both addictive) are dissimilar enough that they can't take our name away nor vice versa.

Today, we're not thrilled to share our billing with a pack of cigarettes, but it's certainly a lot better than being forced to fight or switch. So now, after an unsettling week, I can relax and devote my time to more important things like the New Zealand firm that is marketing a line of men's underwear known as "Stride briefs." □

Ed. Note: Buddy Frank is Vice President of Marketing at Stride Micro, recently promoted from Director of Marketing.

in STRIDE

Editor: Verlene Bonham
Advertising: Diana Swaim

***In Stride* is a monthly publication of Stride Micro. Subscriptions are $24 for one year. Purchase of a Stride computer includes a one-year subscription upon receipt by Stride Micro of a fully completed owner's registration card. Back issues are available for $2.00 per copy, as supply lasts. Requests for subscriptions, reprint permission, ad rates, bulk orders, or submission of prospective articles should be sent to the Editor, *In Stride*.**

Postmaster: Change of address notices should be sent to :

Editor, In Stride
Stride Micro
4905 Energy Way
Reno, NV 89502
(702) 322-6868 (8am - 5pm PST)
TWX: 910-395-6073

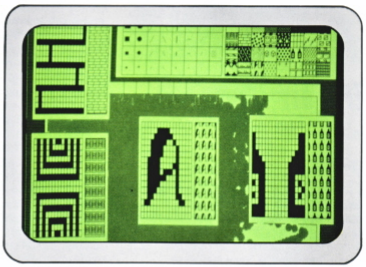
Stride Micro Eastern Division
15 New England Executive Park
Suite 120
Burlington, MA 01803
(617) 229-6868

Stride Micro Southern Division:
14755 Preston Road
Suite 600
Dallas, TX 75240
(214) 392-7070

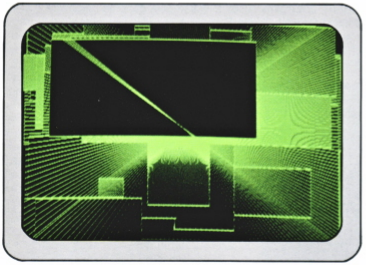
Graphics

Last month's article on the new Stride Micro graphics board illustrated only one screen, a photo of multiple windows. However, some tricky video features can produce a variety of interesting effects. The following

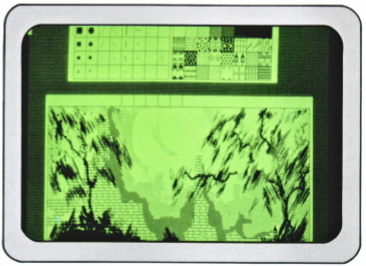
This three dimensional display is a prototype for a future release of the existing Mantri Chess game. In this example, one of the queens glides smoothly around the other chess pieces, a good example of the animation possible with the system.



One of our programmers built an experimental in-house graphics editor using a mouse. It quickly allows patterns to be created bit-by-bit using a "bit-block." Note how the "A" of the center bit-block pattern is shown in an expanded size in the larger left-hand portion of the block, while the actual pattern is shown to size in the strip to the right. This format allows the designer to have a correct idea of the final pattern at all times.

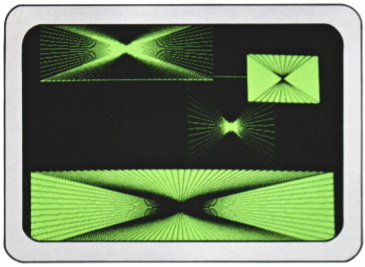


An important technique in graphics is "clipping," where any lines extending beyond the display area are not shown. The algorithm for the display above creates a window, calculates a line across the entire face of the screen and then clips the line at the window edges. A full screen of lines is drawn before repeating the process with another window. Here, as all the windows are clipping the same image, the lines in one window can be seen to continue in an adjacent window.

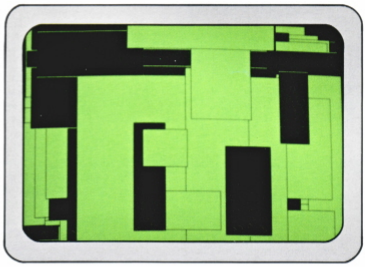


The patterns available through our demo graphics editor make it easy to draw simple sketches such as the trees above. The leaves and grass are short vertical lines drawn using a large "brush," while the ruined building in the background was created with a brick pattern.

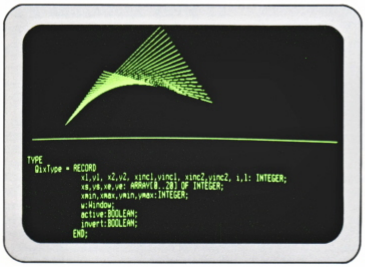
screens were built by demo routines written for the Stride Faire. The demo programs are not released products, (and probably won't be) but do serve to show the overall flexibility and speed of the graphics hardware.



The lines in these windows are calculated individually in real time. The small window to the right is shown partially completed. At full graphics speed, a small window and its lines can be created faster than the screen can display it; that is, before another window can be created overwriting it.



Unfortunately, it isn't possible to show the speed of this display on a static paper page. The demo which drew this screen uses the fastest video transfer method, from a 68000 register to video RAM, at 58 fps (frames per second). Note that motion pictures are only 24 fps. (The system RAM to video RAM transfers used for the other displays achieve 35 fps.)



The Stride terminal (Wyse WY-50) used for the graphics display has built-in capability for split windows. Above, a bouncing line drawing is displayed in the upper window at the same time standard text is scrolled in the bottom window. The text input and video input on the terminal are two separate inputs, making this type of dual display very fast.

This display also demonstrates the effectiveness of having a separate text and video input in the terminal. Here, both a dancing line pattern and scrolling text are displayed in the same window (the whole screen).

S1™ OPERATING SYSTEM

by Steven Hannaford

S1™ is a new general-purpose operating system offered by Multi Solutions, Inc. of Lawrenceville, NJ. The company was founded by Charles J. Lombardo and Robert R. Knight III. Mr. Lombardo had previously worked with the Apollo and Gemini programs on plasma physics, but his true love was theoretical physics. He called Princeton University looking for a word processing system which could handle the many complex mathematical symbols needed for his equations. Princeton referred him to Robert R. Knight III, a lecturer there, who had already fleshed out the S1 concepts.

They formed Multi Solutions in 1982, took the company public in 1983 and are currently into the first phase of marketing. S1 is targeted for OEM and software distribution channels. A recent contract for $40 million with CEC (Computer Engineering Consultants, LTD.) to distribute to Japanese computer companies is an indication of the increase in interest in the operating system.

S1 has been ported to the Stride family of computers, supporting either a multiuser or a single user environment. It is currently in the final stage of Beta test.

(Ed. Note: Unfortunately, we at Stride have not personally seen S1 running on a 400 Series system. At Fall COMDEX in November, we did get a hands on demo on a Sage IV, but at that time, it appeared that only 50% of the OS was complete. We will do our best to keep you informed of the progress on this interesting new operating system.)

The operating system combines a high degree of functionality, flexible modularity, and straightforward portability. It offers a unique new programming environment. While considerable space could be devoted to describing the many key features of S1, this article will concentrate on two critical issues for system designers: functionality and programmer interface.

FUNCTIONALITY

Many of the functions built into S1 are never found co-resident in microcomputer operating systems. These features include a real-time programming environment, sophisticated terminal handling capability, a full-feature file system and networking built-in to the OS. All these features are accessible in all of the S1 languages, including 68000 assembly language, and can be invoked as system calls. As a result, task generation can be handled in S1-Pascal, indexed files in S1-C, and windowing in S1-FORTRAN. (The S1-Pascal is ISO standard Pascal; S1-C is Kernighan & Ritchie C with the standard I/O library; S1-Fortran is ANSI F77.)

Although a general-purpose operating system, S1 can function as a real-time system as well, due to its rapid context-switching time and low task overhead. S1 also offers upward and downward counting timers, as well as fast intertask communication by means of events, gates, several types of messages and shared memory. Users are able to set task priorities, and start and stop tasks at will.

A dazzling array of file features provides great flexibility. The programmer can use unstructured stream files or variable-length record files. ISAM, VSAM, and B-tree access file indexing methods are available. Files can be allocated as linked, mapped or contiguous. The designer, not the operating system, decides which trade-offs to make in terms of recoverability, flexibility and access speed when setting up the file.

S1 is devised with modern terminal features in mind. A complete range of full screen library calls (from showing the cursor to clearing the screen) is supported by the operating system. Both bit-mapped and character windows can be setup. S1 windows are held in memory; they can be displayed, removed and have new coordinates set with a few system calls. S1 windows can scroll up, down, right and left. They can be overwritten and then restored, still having all their content for display. A task can be assigned to each window, allowing each window to function autonomously.

Fonts are also supported by S1 on bit-mapped terminals. A special font editor allows a user to create his own font characters and identity them to the keyboard. Most important, the S1 font subsystem allows for the rapid display and coherent use of bit-mapped characters of varying sizes on the screen.

Networking is supported by S1 with specific network architectures handled on the driver level. The user can transparently access remote files and can cause remote job execution to take place. The user can easily connect and disconnect from a network, allowing machines to be accessible only when both systems want to support interchange. A wide variety of functions is available under the networking.

PROGRAMMER INTERFACE

The system functions we have discussed are accessed through resident system routines, available by system call. These calls are invoked as functions or procedures, with parameters passed to and from the user program. S1 system call handling is extremely efficient with very low overhead.

Using system calls in S1 does not require knowledge of the structure of S1 control blocks. The system is designed this way for two principal reasons. First, as any programmer familiar with control block structures can attest, it is very easy to make fatal mistakes in reading and writing them. Such errors are often hard to detect because of their intermittent and indirect effects. Second, and more important, when the precise offsets of a control block structure are known, and when many applications programs depend on the specific layout of that block, future changes, updates and enhancements of an operating system become difficult, even impossible.

"S1 gives application programmers some of the power usually reserved for system programmers."

With S1, all relevant control block information can be read and set (with some limitations, of course, based on privilege). However, the reading and setting is done through particular system calls, most of which deal with only one field at a time. For example, the 'priority' field in a task control block is set by a 'tasksetpriority' system call. Likewise, the 'access' field in a file control block in a directory is set by a 'filesetaccess' system call and read by a 'fileaccess' system call.

This system call apparatus is used both internally by the system and externally by application programs. If a task control block is lengthened to include a few further parameters, or the size or the acceptable range of particular fields is modified, those changes will effect only a very small number of routines, because only system call internals will have changed.

In general, S1 features are limited only by the physical limits of the hardware on which the system resides. For example, any number of concurrent tasks can run on an S1 system, limited only by the number of task control blocks that can be placed in system space and the number of stacks that can be accommodated in memory. In a similar fashion, any number of files can be open at one time, limited only by the amount of memory available. With events, messages, message queues and windows, it's the same idea. The reason for this is that S1 control blocks are dynamically allocated—there are no fixed lists. An application program can allocate those resources it wants to, and ignore those resources it has no need for.

There are over 300 system calls in S1. These calls are all labelled with names that are self-documenting. For example, the primary file system calls have names that should be meaningful to any programmer:

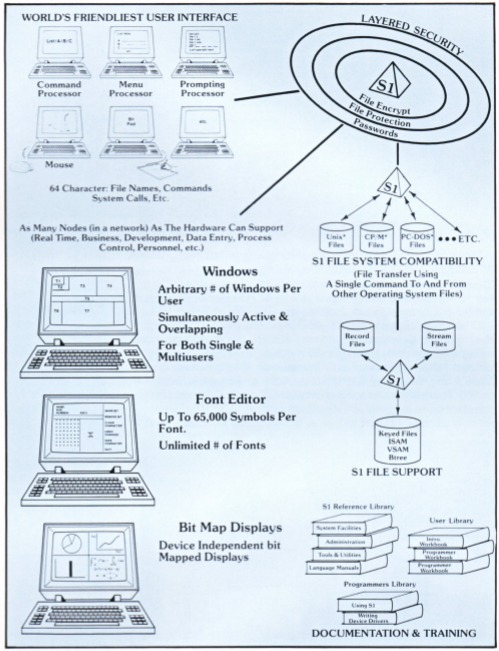
fileopen
fileclose
filewrite
fileread
fileseek

These are supported by another set of calls doing less-frequently called jobs that are also clearly labelled.

filesetcreationdate
filesetbackupdate
filesetaccess
filerename
filetruncate
filesize
filelockposition
fileunlockposition
filesetowner

In spite of the large number of system calls, S1's systematic naming conventions allow a programmer to remember a wide variety of calls and parameter sequences. Because S1 can support up to sixty-four character identifiers in any language, it is possible to have names for system calls and variables that fully signify the thing being described.

The calls also allow the programmer to handle complex internal objects (like tasks, intertask messages, timers and directory entries) at a highly symbolic level. This symbolic handling allows for a higher-level programming approach, giving the application programmer the capacity to design complex structures with simple elements, protected from much of the specific lower-level manipulations required. For example, a programmer can weigh the benefits of mapped versus linked allocation of files in an application by adding one system call. A programmer can rearrange the relative priority of several tasks by changing one parameter in one system call. For most users, manipulation of a control block can be seen in terms of manipulation of the object itself—a font, an event, a window. S1 thus lends itself to powerful, elegant and readable programming.



CONCLUSION

The features outlined above are only the most prominent ones, by no means a complete list. S1 also features IEEE floating point libraries, packed decimal arithmetic, time, date, numeric, and character conversions, pooled memory allocation, three types of command processors, user-defined error handling, and more. Taken together, they indicate the general philosophy of S1, which is to offer as wide a range of tools as possible to the system designer in a straight-forward manner. Most important, it gives application programmers some of the power usually reserved for system programmers—they can generate tasks, and they have a good deal of choice as to where and how that task will appear. □

Ed. Note: Stephen Hannaford is Director of Systems Support with Multi Solutions Inc., Suite 207, 123 Franklin Corner Rd., Lawrenceville, NJ 08648 (609) 896-4100. S1 is currently in Beta test on the Stride machines. Expected retail price is $950.

Faire'85

Those of you new to Stride may be wondering what the Stride Faire '85 was all about. The main idea is to provide an environment that will spark new ideas and growth within our computer community. It is a way for all the folks doing business with Stride to meet each other and have a chance to talk face to face — and party!

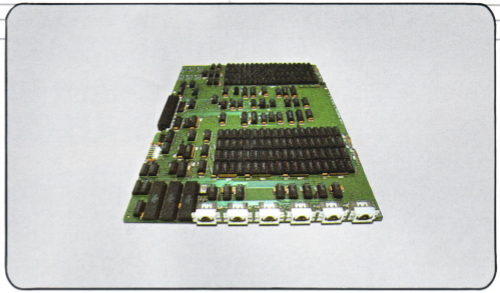
Although the Faire crowd is generally pretty serious, as you can see from Rod Coleman (left above) with Dr. Julian Menashe, our roving camera crew managed to catch a few of the more light-hearted folks in action. Paul Pownall with PDBase "Hot off the Press!" and our funny friend Steve Ause at Flexware had lively booths. There were also a few unprintable "Candid Camera" photos, but you'll have to come to Reno to see those. . . . □

Paul Pownall (left with beard) and friends of PDBase.

Steve Ause (Author of Flexware) is the one with the hat.

RAM

More Memory Available



The RAM memory board supports up to 4M bytes of memory and six additional serial ports.

The first introduction of the 400 Series in September 1984 used 150ns 64K bit RAM memory chips. Since then, Stride Micro has announced the availability of 256K bit RAM chips, providing more and larger memory configurations. In some cases, the memory configuration may make a difference to your application, so let's review the RAM designs.

'Memory Maximums'

First, remember that the heart of the 400 Series is the CPU board. The main features of the CPU board are the 68000 processor, CMOS RAM area, Omninet chip set, four serial ports, one parallel port, floppy disk controller, the Real Time Clock circuits and, our main interest here, the low address RAM area.

Always optimists, Stride Micro's R&D team initially laid out this area to accept both 64K bit and 256K bit RAMs even though the price (and availability) of 256K RAMs were appalling in the early part of 1984.

The RAM chips are arranged in four rows of up to 18 chips each. With 64K bit RAM chips, nine chips (eight data bits and one parity bit) provide 64K bytes of storage. The minimum shipped with any system is 256K bytes, or the first two rows of chips.

Previously, the first two rows were soldered in, now all chips are socketed, to make memory upgrades easier.

With 256K bit RAM chips, the amount of memory now possible in the same space is **four times** greater. The maximum amount on the CPU board is 2M bytes. This is the limit of the 420 machine, which is designed to hold just the CPU board (and optionally, the graphics board).

As the 68000 address a 16-bit wide memory word, the minimum RAM available with 256K bit RAM chips is 512K (18 chips).

The Winchester board also supports both 64K and 256K bit RAM chips. Its memory layout is identical to the CPU board, allowing another 2M bytes, for a total of 4M bytes with the two boards.

The new RAM board (pictured above) provides not only more memory, but another six serial ports. As adding more users generally means the system will need more memory, the two functions were designed onto one circuit board. The layout includes two groups of 18 chips, providing a maximum of 1M bytes additional memory using 64K RAM or 4M bytes additional memory using 256K RAM. The RAM board is available with no memory stuffed, in case your main need is for more serial ports not memory. The RAM board is not available for the 420 unless in OEM quantities.

Thus, the CPU, Winchester and RAM boards determine the maximum amount of memory possible in each member of the 400 Series family. The following table shows the number of serial ports, maximum possible memory and the boards (C=CPU, W=Winchester and R=RAM board) for the three different physical machines.

400 #	Serial Ports	Max RAM	Boards Needed
420	4	2M	C
440	10	8M	C,W,R
460	22	12M	C,W,R,R

Currently, RAM size options are: 512K, 1M, 2M, 3M, 4M, 6M, 8M and 12M bytes. As of February 8, 1985, RAM prices are now about 20% less, with one megabyte of RAM averaging about $1600. Stride Micro reserves the right to fill the option with either 64K or 256K RAMs, depending on the option and RAM prices at the time.

Special PAL (Programmable Array Logic) chips are needed on each board to specify the memory size. An upgrade consists of replacing the PALs with new ones, adding or replacing memory chips depending on whether 64K or 256K RAMs are needed, and retesting the system.

All existing Stride systems may be upgraded to the new RAM configurations based on current price difference and a $100 upgrade fee to cover handling and re-testing.

'Memory Speed'

At 10 MHz, all RAM, whether on the CPU board or not, is accessed without wait-states. For 12 MHz, the speed of RAM access differs according to what board the memory is on. All RAM on the CPU board is accessed at full speed with no additional wait-states. At 12 MHz, an additional wait-state is added to memory accesses on the Winchester board and RAM board. Note that to run 12 MHz, 120ns RAMs are needed instead of 150ns RAMs. The 120ns RAMs are harder to get and more expensive, hence the difference in price and delivery time of 12 MHz systems.

The MMU (Memory Management Unit) needed for UNIX System V does not add any wait-states when run at 10 MHz. It is not available for 12 MHz systems.

'Memory Guidelines'

Although each user's needs are different, we can offer the following very rough guidelines for determining memory size based on the operating system used.

Operating System	Base Memory and 1 user	Add per User
p-System	172K	150K
UNIX	512K	100K
CP/M-68K	128K	128K
RM/COS	384K	64K
IDRIS	256K	64K
MIRAGE	256K	150K
BOS	64K	44K
S1	256K	64K

It is often wise to plan on memory for one additional user and to check memory requirements for all the applications that will be run frequently on the system. □

CONCURRENT MULTI-USER DATA BASE WITH INDIVIDUAL RECORD LOCKOUT!

UNLIMITED NUMBER OF FIELDS, FILES AND RECORDS!

- Menu Driven Option
- Conversational Query Language
- PD-Basic Interactive Procedure Language
- PASCAL Program Access to Data
- Concurrent Multi-User Support
- Omninet Multi-User Support (Byte Sex Independent)
- Single Record/File Locks
- 16,000 Files/User Name
- 32 Active Files
- 2 Billion Records/File
- 2,000 Fields/Record
- 32,000 Characters/Record
- 9 Levels of Security
- Data Field Compaction
- Dynamic Dictionary Definitions
- Complete Data Type/Range Checking
- Automatic Relational File Access (Hierarchical/Multi-Branch)
- Formatted Screen I/O
- Unlimited Sort Fields
- Unlimited Selection Criteria on Any Field
- Quick Report Generation
- Optional Mail/Data Merge Interface
- Application Developer/Dealer Program

For more information contact:

IOTC Inc.
P.O. Box 1365
Laramie, WY 82070
(307) 721-5818

IOTC™ Inc.

400 Series

RIDE THE VMEbus

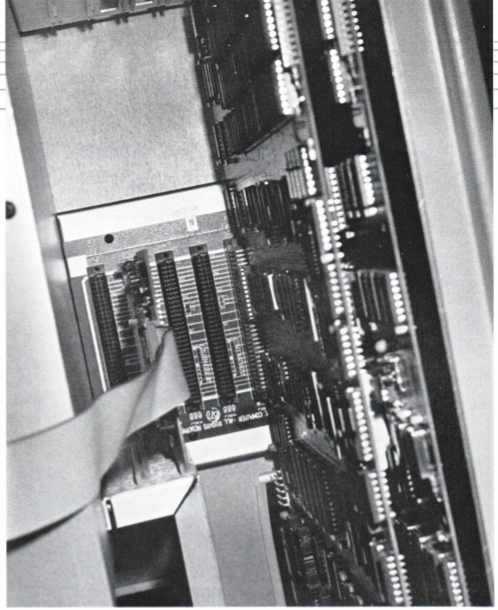
"Bus" systems provide a simple way for a user to add additional hardware to his computer system. Ideally, you pop the lid off the computer, insert your new card, close it back up and you're done! In practice, it is never that simple as you also have software to install, but often, it comes close.

On the Stride 400 Series, the bus chosen is the well-known VMEbus, originally introduced in 1981 and designed jointly by Motorola, Mostek and Signetics/Phillips. It has been accepted by close to 100 major manufacturers worldwide. Based on the popular Eurocard mechanical format with DIN pin and socket connectors, the VMEbus is presently being formally standardized by both the IEEE (P1014) and the IEC (47B) standards organizations.

The VMEbus features a master/slave asynchronous non-multiplexed data transfer structure, seven levels of priority interrupt and four levels of arbitration. It is a 32-bit bus with the capability of transferring 8-, 16- or 32-bit data. Complete technical data is available from Motorola in their handbook *VMEbus Specification Manual #MVMEBS/D1*.

One of the major advantages of the VMEbus is its speed with a maximum transfer rate of 57 Mbytes/sec. This is exceptionally fast when compared with two other popular buses, MULTIBUS II and S-100. Both of these buses transfer data synchronously, that is, handshaking is dependent upon the CPU clock rate. This limits the MULTIBUS II to a fixed 10 MHz clock rate, with transfer rates (for iPSB) theoretically limited to 40 Mbyte/sec. The new IEEE-696 S-100 standard specifies a clock rate of 6 MHz, even though many manufacturers have successfully run the bus at 10 MHz. In comparison, the VMEbus transfers data asynchronously, each board can be run at its own rate, with a theoretical limit of 57 Mbyte/sec. The concept of an asynchronous bus does not mean that it will run either faster or slower than a synchronous bus. The point here is that an asynchronous bus transfer can **adjust** to the transfer rate of the device accessing the bus. This is an important issue for a multiprocessing system.

One of the major problems with the older S-100 bus, is that not all boards work together. First designed for the Altair in January 1975, the S-100 signals consisted of little more than the buffered control, address and data lines from the 8080 microprocessor. Other computer manufacturers began to use the bus, but neglected to conform to any one set of timing standards. This was the major reason boards from different vendors did not work together. An attempt to clean up the problem resulted in IEEE-696, the S-100 standard passed on December 9, 1982, but S-100 users must still be very careful about mixing boards.



Looking deep into a 460 system, the connectors of the 400 Series VMEbus can be seen.

The IEEE-696 also defined the proper way to interface to a 16-bit computer (previously the S-100 bus was only 8 data bits wide), but this fix is somewhat a patch-up as a concession to the new 16-bit processors such as the Motorola 68000. The VMEbus was not only designed to work well with 16-bit data but also 32-bit data in anticipation of 68020 systems. The 400 Series backplane does not include the extra connectors for 32-bit operation (there are almost no products that currently use them), but it is comforting to know that a growth path is already designed in place.

Another "bus" frequently mentioned is the SCSI bus (formerly the SASI bus). This is not a true general purpose bus, but a peripheral controller standard. For example, it would be highly inappropriate to interface additional serial ports to it. It is used primarily to add hard disk and tape storage to a system.

Another problem with the S-100 (and the original MULTIBUS, not MULTIBUS II) was the use of edge connector technology which was not resistant to shock or vibrations. The signal lines on the board ran directly to an edge where they were broadened slightly and plated with gold. These edge "fingers" were susceptible to corrosion and mated very loosely with the connectors in the back plane. Intermittent problems were often due to these poor connections.

The VMEbus DIN (pin and socket type) connectors perform especially well in applications where resistance to shock and vibration is important. When the connectors are mated, a complete seal is formed around the pins. On the 400 Series a total of 96 signals are brought out to three connectors inside the computer.

The VMEbus adopts the popular Eurocard mechanical format which has two sizes: the smaller single size is 100mm x

(continued on next page . . .)

(VMEbus continued . . .)

160mm while the larger double Eurocard size is 233.3mm x 160mm. Stride's own cards are somewhat larger (295mm x 395mm). Standard Eurocards are about 60mm smaller in height than the MULTIBUS II cards. Typical S-100 cards are about 10" wide by 5" high, with the new IEEE-696/S-100 standard allowing a double height board of 10" or about 255mm.

The photo (Page 11) shows both a single height Eurocard (the Mizer IEEE-488 card) and two Stride Micro RAM cards in the bus in a 460 system.

As an example of how cost-effective the VMEbus is to interface to, the Oct/Nov '84 issue of *In Stride* shows a simple interface schematic useful if you are designing your own board. However, numerous third party vendors already offer a large variety of VMEbus boards. The table given on the next two pages lists those Stride has found. Obviously, Stride Micro has not tested every board listed in the table. Those that have been tried (the Mizer IEEE-488 board and synchronous serial board) have worked well. The Stride 400 Series CPU, Winchester and RAM/Serial boards all work from the VMEbus and were easily interfaced.

Many of the vendors of these boards have written software packages to support them, such as Communication Machinery's TCP/IP and XNS protocol programs written in C for their Ethernet card.

The VMEbus has certainly arrived, with many vendors coming "on-board" with a wide variety of products. Those of you who try any of the products listed here are encouraged to contact us at Stride Micro and let us know the results. □

VMEbus Interface Cards

TYPE	COMPANY
A/D and D/A	Analog Devices Rte. 1-Industrial Park Norwood, MA 02062 (617) 329-4700 TLX: 92441 TWX: 710-394-6577
4 and 8 serial ports SASI host-adapter slave, SASI host-adapter master, VMEbus system controller, prototyping, wire-wrap board	Astraea Computer Corp. 846 Del Rey Ave. Sunnyvale, CA 94086 (408) 773-8500
Prototyping	Augat Inc. 40 Perry Ave. P.O. Box 1037 Attleboro, MA 02703 (617) 222-2202 TWX: 710-931-0644
4 serial ports, 8 pin parallel port, graphics board, display processor, floppy disk controller, bootstrap board, VMEbus debug board	Beston Electronics, Inc. P.O. Box 937 Olathe, KS 66061 (913) 764-1900 TWX: 910-749-6401
Power monitor module, extender board J1, speedwire wrap-board, speedwire prototype, wire-wrap board	Bicc-Vero Electronics, Inc. 171 Bridge Rd. Hauppauge, NY 11788 (516) 234-0400 TWX: 510-227-8890
A/D and D/A	Burr-Brown, Inc. P.O. Box 11400 Tucson, AZ 85734 (602) 746-1111 TWX: 910-952-1111
VME to Ethernet interface	Communication Machinery Corp. 1421 State St. Santa Barbara, CA 93101 (805) 963-9679 TWX: 910-334-3508
A/D and D/A, serial to parallel controller, parallel to DMA interface	Computer Products, Inc. 1400 NW 70th St. Ft. Lauderdale, FL 33309 (305) 974-5500 TWX: 510-956-9895
Graphics board, prototyping board	Crossbow Design 120 Mountain Ave. Bloomfield, CT 06002 (203) 243-5944
Wire-wrap board	Cuplex 1500 E. Hwy. 66 Garland, TX 75040 (214) 276-0333
Multi-purpose control board, evaluation board	Cybernetic Micro Systems P.O. Box 3000 San Gregorio, CA 94074 (415) 726-3000 TLX: 171-135 CYBER
Wire-wrap	Dage Eurosem Ltd. Rabans Lane Aylesbury Bucks HP19 3RG England (0296) 32881 TLX: 83518
4 serial ports, color graphics controller, CCD image storage board, floppy disk controller board, SMD interface controller, A/D and D/A, 32 opto-coupled input board, 32 output relays board, VME BASIC interpreter, EPROM programmer	Data-Sud Systems/U.S., Inc. 2219 S. 48th St. Ste. J Tempe, AZ 85282 (602) 966-3953 TLX: 165788
Host adapter DTC disk controller	Data Technology Corp. 2775 Northwestern Pkwy. Santa Clara, CA 95051 (408) 496-0434 TWX: 910-338-2044
Prototyping board	Dawn Technology 2403 De La Cruz Blvd. Santa Clara, CA 95050 (408) 980-1122
Extender board, wire-wrap board	Douglas Electronics 718 Marina Blvd. San Leandro, CA 94577 (415) 483-8770
Array processor	DSP Systems Corp. 1081 N. Shepard St. M/S-E Anaheim, CA 92806 (714) 630-1330
8 serial ports, 2 I/O lines, color video graphics module, intelligent disk controller	dy-4 Systems, Inc. 888 Lady Ellen Pl. Ottowo, Ontario Canada K1Z SM1 (613) 728-3711 TWX: 610-562-8967
Intelligent disk controller	Electronic Modular Systems Inc. 3837 W. Conflans Irving, TX 75061 (214) 986-1202 TLX: 795542
Prototyping board, wire-wrap board	Electronic Solutions 5780 Chesapeake Ct. San Diego, CA 92123 (619) 292-0242 (800) 854-7086 TWX: 910-335-1169
Graphics card, SASI disk controller interface, serial-parallel interface	Elite Corp. 906 N. Main Wichita, KS 67203 (316) 265-0959

(VMEbus continued . . .)

TYPE	COMPANY
48 I/O lines, graphics card, A/D and D/A	Eltec Electronik Mainz GmbH Postbox 65 Galileo-Galilei-Str. D-6500 Mainz/Rhein W. Germany 06131/50031 TLX: 4187273
6 serial ports, graphics display controller, SASI disk controller, winchester floppy controller	Force Computers, Inc. 2041 Mission College Blvd. Suite 150 Santa Clara, CA 95054 (408) 988-8686 TLX: 172465
Prototyping board	Garry Electronics 9 Queen Ann Ct. Longhorne, PA 19047 (215) 949-2300 TLX: 843335
Graphics display controller	Graphic Strategies Inc. 1445 Koll Cr. San Jose, CA 95112 (408) 294-1300
VMEbus to VERSAbus adapter, VME to multibus adapter	Hal-Versa Engineering, Inc. 18597 Paseo Tierra Saratoga, CA 95070 (408) 374-2953
Real-time multi-tasking system, real-time operating system	Hemenway Corp. 1399 9th Ave. San Diego, CA 92101 (619) 239-2241
Versatile real-time executive	Hunter & Ready, Inc. 445 Sherman Ave. P.O. Box 11803 Palo Alto, CA 94306 (415) 326-2950
Wire-wrap prototyping board	Hybricon Corp. 410 Great Rd. Littleton, MA 01460 (617) 486-3174 TWX: 710-347-0654
1553 serial MVX to VMEbus interface	ILC Data Device Corp. 105 Wilbur Pl. Bohemia, NY 11716 (516) 567-5600 TWX: 510-228-7324
Multi-tasking operation system	Industrial Programming Inc. 100 Jericho Quadrangle Jericho, NY 11753 (516) 938-6600
8 serial ports, RS-232/422, graphics display controller, TV camera input, graphics card, winchester floppy disk controller, IEEE 488 (GIB) controllers, A/D, parallel I/O, EPROM programmer, factory automation interfaces, wire-wrap prototyping board	Ironics Inc. 117 Eastern Heights Dr. P.O. Box 356 Ithaca, NY 14850 (607) 277-4060 TLX: 705742
Extender board, prototyping board, wire-wrap board	Kabelton, Inc. P.O. Box 1793 Poughkeepsie, NY 12601 (914) 473-1222
24 I/O lines, 2-4 serial ports, timers, and calendar, stepper motor controller, prototyping board	Logical Design Group Inc. 541 Pylon Dr. Raleigh, NC 27608 (919) 834-8828
SASI host adapter	Manudax Nederland B.V. P.O. 25 Meerstraat 7 Heeswijk-Dinther 5473 ZG Holland (Netherlands) 04139-2901 TLX: 50175
Wire-wrap prototyping board	Methode Electronics, Inc. 7444 W. Wilson Chicago, IL 60656 (312) 867-9600 TWX: 910-221-2468
Speech synthesizer	Microvoice Systems Corp. 23362 Peralta Dr., Ste. 5 Laguna Hills, CA 92653 (714) 859-1091

TYPE	COMPANY
Video controller board, floppy disk controller, SCSI interface, IEEE 488 (GIB) controllers, A/D and D/A, system controller, debug monitors	Mizar Inc. 302 Chester St. St. Paul, MN 55107 (612) 224-8941 TLX: 469542
4 serial ports, floppy disk controller, VME SASI interface, VME system controller board	Mostek Corp. 1215 W. Crosby Rd. Carrollton, TX 75006 (214) 466-6000
SCSI interface, IEEE 488 W/DMA, dual RS-232C, dual 16-bit parallel, SASI adapter, buffered 9-track magnetic tape, analog conversion, opto isolated I/O, winchester controller, floppy disk controller, remote I/O module, remote intelligent A/D converter, Ethernet interface	Motorola Inc. 5005 E. McDowell Rd. Phoenix, AZ 85008 (602) 244-6900
IEEE 488 (GIB) controllers	National Instruments 12109 Technology Blvd. Austin, Tx 78727 (512) 250-9119 (800) 531-5066 TLX: 756737
32 I/O lines, industrial power I/O	Opto 22 15461 Springdale St. Huntington Beach, CA 92649 (714) 891-5861
VMEbus to multibus interface	Performance Technologies Inc. 300 Main St. E. Rochester, NY 14445 (716) 586-6727
Intelligent hard disk controller	Presskon Technology Inc. 3837 W. Conseans Rd. Irving, Tx 75061 (214) 986-1202
Extender board	Schroff, Inc. 170 Commerce Dr. Warwick, RI 02886 (401) 732-3770 TLX: 952175
128K, 2 serial ports, 32 I/O lines, A/D and D/A	Serial Lab Products Inc. 50 Brigham St. P.O. Box 766 Marlboro, MA 01752 (617) 481-1684
Winchester floppy tape controller, SMD controller	Sigen Corp. 1800 Wyatt Dr., Ste. 6 Mission Park Santa Clara, CA 95054 (408) 988-2527
Winchester/floppy controller, VMEbus systems controller	Signetics Corp. 811 E. Arques Ave. Sunnyvale, CA 94086 (408) 739-7700 TLX: 910-338-2104
Floating point processor	Sky Computers Foot of John St. Lowell, MA 01852 (617) 454-6200
SMD controller	Stollman & Co. GmbH VB Technische Systeme Rappstr 2 2000 Hamburg 13 W. Germany 0 71 36 5031
Prototyping board, wire-wrap prototyping board	Vector Electronic Co., Inc. 12460 Gladstone Ave. P.O. Box 4336 Sylmar, CA 91342-0336 (213) 365-9661
Floppy disk controller, dual RS-232C serial port module	Work Space Computer Inc. 3848 Carson St., Ste. 301 Torrance, CA 90503 (213) 540-1553 TLX: 322800 WORK SPACE
A/D, isolated DC input module, relay output module, system resource module	Xycom, Inc. 750 N. Maple Rd. Saline, MI 48176 (313) 429-4971

Q&A

What is the official release date for the new products?

The NOD, UNIX, and Graphics products will be released May 6, 1985. Gamma test versions are available in single unit quantity as of March 15.

What is included in the UNIX release?

C, FORTRAN 77, SNO, BS, VI, SED, LEX, AWK, MR, NROFF, TROFF, TBL, VOLCOPY, FINC and FREC to name a few. Stride has not split any portions of the UNIX system out for separate sale. All utilities are included. The release will be a little over 10M bytes of code.

Will the FPU run at 12 MHz?

Yes. The FPU chip runs at one-half the speed of the CPU clock. As it is rated at 6 MHz, it runs nicely on a 12 MHz system.

Will the FPU be supported under the UNIX languages?

Yes.

Can 256K bit RAM chips be used in the SAGE II and IV machines?

No. Adding the necessary addressing circuitry would be very messy.

What is the largest memory segment allowed under the MMU system?

The MMU (Memory Management Unit) has been changed to support either four segments of 2M bytes or two segments of 4M bytes. The official UNIX release will use the 4M byte option.

What length is the video cable?

Current length is 16". A longer cable of 3' to 4' is being designed for final release in May 6, 1985.

Will the NOD work with the Sage II or IV?

Yes, actually the NOD will work on any computer with an RS-232C port, although you will have to write the software.

What is the disk drive average access time?

This varies according to the size of the hard disk. Previously, Stride used IMI drives for the 15M option which had an average access of 50msec. However, IMI went out of business. The 400 Series now uses these disks:

SEAGATE	85msec	15M
QUANTUM	45msec	33M
MAXTOR	30msec	67M
MAXTOR	30msec	112M

Can I get tapes of the speakers' talks at the Stride Faire?

Sadly, no. Despite a written contract, the MGM hotel forgot to make the tapes. We are attempting to get written transcripts from the speakers and will notify you if this proves successful. We apologize to all and are as upset about this foul up as you must be. □

Customer Service People

by Peggy Lakey

EXIT TO THE DEBUGGER

It is often useful to be able to exit out of the operating system to the SDT (Stride Debugging Tool). However, certain options must be installed in your operating system or multiuser system to enable you to do this.

Incidently, if you have version 3.05 of the 400 Series PROMS, you can get into a situation where you will *never* be able to get out of the operating system to the debugger. Therefore, it is important to set up one of the following options.

Under the single user p-System and CP/M-68K use UTIL to turn on the BREAK function for your terminal. Then typing the BREAK key will take you to the SDT. If you are at the p-System command line, you can also type "H". Under CP/M-68K there is a routine called HALT, which when run, will exit the operating system.

For the multiuser system, execute MU.UTIL to turn on the SYSTEM MANAGER Break option for one user. This option is accessed under the "Serial Channels" selection. When you type the BREAK key on the terminal, select the E(xit option and you will get to the SDT. This also kills the multiuser system, so warn the other users before you run it.

If you do not want your users to accidently type the BREAK key and bring down the system, put the following program on the disk instead of setting the SYSTEM MANAGER flag and run it when needed.

```
PROGRAM Halt;
{This program just calls
the assembly code routine.}
PROCEDURE SDT;EXTERNAL;
BEGIN
SDT;
END.
```

Assemble this 68000 program and link it with the Pascal program above.

```
.RELPROC SDT
TRAP #15
.END
```

The resulting code file will be the one to execute to get to SDT.

400 SERIES PROM UPDATE

If you still have PROM version 3.02, you should get updated. To check your version, reset the system. The version of the PROM is shown on the screen in brackets [3.02]. If you haven't been contacted already, give customer service a call. Modifications in later PROM versions are minor, anything from 3.03 and up is OK.

IDRIS PRINTER

If you happen to log out while the printer is printing (logout is either a CTRL/D or a "logout" command), and log right back in, the printer will no longer respond. To re-initialize it, type in "chmod — 0200 /dev/lp".

Better yet, don't logout when any process is running. File systems damage may result.

CP/M-68K DDT

There is a difference between calling DDT and DDT68000 under CP/M. DDT actually loads DDT68000, but into high memory avoiding the lower memory area where programs are usually run. Use DDT not DDT68000 when debugging a program.

DB MASTER KEYS

The control keys CTRL/R and CTRL/F may not work under DB Master if your SYSTEM.MISCINFO has those keys assigned to special functions. On some versions of the p-System, CTLR/R was used to set the terminal to all capitals (and back), while CTRL/F flushed the terminal buffer.

Stride has had these keys removed from the SYSTEM.MISCINFOs distributed with our systems since about August '83. However, if you are using your own SYSTEM.MISCINFO, you should use the SETUP program to turn the **Key to Alpha Lock** and **Key to Flush** options off. Replace the values with a CTRL/@ (a null). Once this is done, DB Master will be able to use the CTRL/R and CTRL/F keys.

While you are in SET UP you may also want to turn off the **Key to Stop** function by setting it to a null. On a Stride 400, use XON/XOFF protocol so that you can type CTRL/S to stop the screen display and CTRL/Q to start it again.

BOOT COMMANDS

The Owner's Manual is incorrect in stating how to set up what partition or floppy to automatically boot to from the SDT. The correct commands are:

BT	to the debugger.
BT F0	to the left floppy.
BT F1	to the right floppy.
BT Hx,p	where 'Hx' is H0-H3 for one of four possible hard disks and 'p' is 0-15 for a partition. □

Charlie DeGroff

Diana van de Berg

Chances are that if you've called Stride Micro's corporate office in Reno you've talked to **Diana van de Berg**, our Executive Sales Assistant. Diana is the "anchor man" for the sales team, answering questions about our products, taking sales orders and providing sales support to our Stride dealers.

After graduating from the University of Connecticut with a Bachelor's degree in Art, Diana became Office manager for our Boston office. On a visit to Reno, however, she was so impressed with the area that she transferred to our headquarters here in Nevada. The irresistible attraction was skiing, and Diana is first on the slopes as soon as the Sierra Mountains are covered with snow.

While skiing appeals to her active side, Diana also enjoys weaving, which she claims is very relaxing. Attractively displayed in her apartment are beautiful wall-hangings, pillows and shawls in bright designs.

As Stride Micro's Materials Manager, **Charlie DeGroff** is responsible for the planning of raw materials, manufacturing systems and warehouse purchasing.

Raised in up-state New York, DeGroff attended Rochester Institute of Technology and received his Bachelor's Degree in Science and Business Administration. He brings to Stride his varied business experience with Cutter Laboratories, Norton Company-Sealant Division and International Gaming Technology.

Charlie, who also enjoys the Sierra, finds numerous outdoor activities all year around. When he's not downhill skiing, chopping wood, or sailing his hobie cat up at Lake Tahoe, he relaxes as he builds a project for wood shop class. As an outdoorsman, Charlie looks forward to his yearly mule deer hunting trip. He packs in on horseback into the remote Reese River Valley located in Central Nevada. Now that's a vacation away from it all! □

THE WORLD OF BOS

BUSINESS OPERATING SOFTWARE

THE PROVEN MULTI-USER SOFTWARE

Choosing the right software . . . unfortunately, most financial software that helps you grow can, itself, be quickly outgrown. What seems an economical choice to begin with can soon end up an expensive mistake when your needs exceed the system's capabilities. BOS software grows with you allowing up to 32 users.

BOS Reliability . . . BOS software has been tried and tested for over seven years with 1000's of satisfied users all over the world — small firms, big businesses, DP departments, schools, accountants, doctors and government departments. BOS software provides that assurance of maturity and reliability which no new software can hope to match.

BOS Portability . . . Now, you can change or upgrade your computer and avoid the costs of software conversion. BOS software is equally at home working in single-user, multi-user or local networking mode and the unique BOS concept allows identical software to run on over 70 different computers with a wide range of processors.

BOS Quality . . . Designed and built by software professionals.

Choose from:

***BOS/Office Software**
- BOS/Writer — Word Processor
- BOS/Planner — Financial Planner
- BOS/AutoIndex — Interactive Database
- BOS/AutoClerk — Report Writer

***BOS/Business Software**
- BOS/Accounts Receivable and Invoicing
- BOS/Accounts Payable
- BOS/General Ledger
- BOS/Inventory Control
- BOS/Order Processing (available 1st Qtr. '85)

BOS/MicroCobol Programming Software
- Full File-sharing, Record-locking, Screen Formatter and Editor

*International versions available.

Please send more information

- ☐ BOS Programming Software
- ☐ BOS Office Software
- ☐ BOS Business Software
- ☐ Stride/Sage
- ☐ IBM PC, XT, AT
- ☐ Other _____

☐ **Remarketer** ☐ **User**

Name _____

Company _____

Address _____

City/ST/Zip _____

Telephone (____) _____ - _____

North America:
BOS National, Inc.
2607 Walnut Hill Lane, #200
Dallas, TX 75229 USA
(214) 956-7722

International:
BOS Software, Ltd.
87-89 Saffron Hill
London, EC1 N 8QU, England
01-831-8811