= =

From the Editor

To say the least, the last six months have been somewhat hectic. Starting up a new company is a very educational experience that everyone should have the pleasure of enjoying. The only way you really learn how to start up a new operation is by doing it. You figure the main problems will be in one area and then find out they are somewhere you didn't count on, such as writing a program in less than a day and then taking over 2 weeks to get it running. We do feel fairly good about the entire operation. Going in four months from conceiving the product to first delivery is something of a record in the computer industry, even for micro-computers. To date, we have shipped over 100 systems, which in terms of number of units shipped puts us ahead of some of the large main frame suppliers. Production is now smoothing out and we expect to be shipping about 600 systems a month by February or March 1976.

I hope that this newsletter will become a useful way for SPHERE users to communicate with each other. If you come up with some good ideas, please share them! Hopefully, this newsletter can become a User Newsletter in every aspect. Besides software, hardware developments are also useful. If you develop a new piece of hardware, type up what you did and we will try to publish it. It helps if you send in clean copy so we do not have to re-type it. Letters of general interest will also be published.

The newsletter, as you can tell from the current issue, will also communicate any goofs that may have been made on the system, as well as what the current status is on any new product. With your help, the newsletter will continue to grow along with the rest of the company.

Eric Jameson

A NOTE FROM THE PRESIDENT

I suppose it is appropriate at this time to thank all of the people who trusted Sphere to produce a product when such a unique product had never been delivered.

A special thanks should be offered to those who had to wait for the product for a period longer than we had promised. Most of those people have received a rebate for their delivery setback. This rebate was not required by any contractual obligation, however, Sphere does what it says it will.

We make *mistreaks* some times. Most people realize that any man-made organization is subject to falability. This is especially true of ●w organizations. Other people aren't so tolerant; however, and expect that every angle should be covered before the first offer for sale. In retrospect, I and my staff would definitely find many points of agreement. Now we have delivered disks, and systems with large memory, line printers and miscellaneous other equipment. If we and our initial customers had not taken a risk, we would not have the world's lowest cost computer *system*. There are mistakes yet to be made, however, as each one is found it will be as our past mistakes are, either corrected or being corrected.

Many of the inquiries wonder why we charge the full amount from Sixty to Ninety days prior to delivery. Some are upset about it. "After all, big OEM customers can demand the product and pay 60-90 days after delivery", which by the way isn't the case with us. Prepayment also has the disadvantage that con-artists could have a hay-day. I know a group that is starting up for that very purpose. But I cannot do anything about it because I am a manufacturer.

So why the money first? Bluntly, we initially ●

needed the money to finance the dream. Now we need the money to finance *your* system. This means ● we don't have the hassel, paperwork, or finance charge of financing *your* system, plus we don't need credit checks or worry whether you will cancel the system prior to your payment. This brings up another point; the reason for 60-90 day delivery.

If we overstock we could get into the same position as some calculator manufacturers . . . Safe and orderly planning can occur. Through increased planning efficiency, the system will be available on shorter notice. We are also opening stocking distributors across the nation.

In March, I started this firm, if I had any idea of the effort involved in building a company with minimal capital (my own), I probably would not have done so. It is an exhausting effort. Without goals and commitments far greater than the hardware and software already delivered, it would be far more convenient to stop and relax. What you have seen so far though is only a tip of an Iceburg, so the goal must go on. We were the first to deliver disks, others will come up with disks, and others will come up with 16K memory boards, but the Sphere commitment means, that we will continue ●very of products and improve service while leading the microcomputer industry in innovative products.

B. S. YOU SAY . . .

Look at what we've done in 6 months . . .

Watch and see what happens in the New Year.

Mike Wise

New Prices

PRICE CUT! New prices have been announced for add-on memory. Kits have been dropped from the product line, being replaced by lower priced assembled units. The new prices are:

$215	-	4K memory
$402	-	8K
$562	-	12K
$696	-	16K

A new price list will be out around the end of the month.

Coding Sheets

Extra coding sheets are available at a rate of $1.75 for 200 sheets.

Meet the Staff

In order to serve you better, we at Sphere feel you should know who is in charge of each function in case you have any problems.

The staff:

Doug Hancey	Marketing
Randall Waters	O.E.M. Sales
Bob Blanchard	Treasurer
Doris Moak	Exec. Secretary
Dan Koford	Shipping-Manufacturing
Garry Frogget	FDOS; Basic Development
Eric Jameson	PDS Development-Newsletter

Software Library

With the delivery of the PDS Sys 1 V3A software, the first complete SPHERE systems have now been delivered. It is our hope that this will just be the start of a large library of programs developed both by Sphere and by the users. In order to encourage the submittal of programs to SWAP, we are rewarding execeptional submissions with certificates of up to $1,000 good toward the purchase of Sphere equipment. Program submittals should contain a description of what the program does, what the entry and exit values are, a flowchart of the program, and a source listing with full comments. It is preferred that all submittals by typed for more legible copying. Abstracts of programs will be published in future newsletters. There will be a copying charge of $2 — $5, for each program you get from the library.

Manual Updates

As with everything in life, the users manual tends to evolve with time. The chapter 9 documentation has been changed. The 'OPERATING NOTES FOR SYSTEM 1' should supplement section 9.1. Some of the first manuals to be sent out did not include the memory map (pages 10-11 to 10-14) or the utility routine address assignment memory map (pages 9-8; 9-9). The PROMS and the utility routine map should both have the same software version number. Updates for the manual are being sent out with this newsletter.

"HAVE SPHERE WILL TRAVEL"

The Sphere Mobile Office, affectionately referred to as the "Truck", has been on the road again this fall. In September it was off to San Francisco, where we demonstrated our wares at Wescon "75". Without going through the hassle other external exhibitors had we were an official "WESCON EXTRA"!

At Wescon, we displayed to the electronics industry the realness of Sphere Computer Systems which were estremely well accepted as a product which is starting a revolution in decentralized computers. A sneak preview of our color graphics terminal (which will be formally introduced in early '76) was witnessed by those participating in our demonstration. While in the Bay Area, we met with Homebrew Computer Club and gave a demonstration.

On down the coast, the truck stopped at many Universities to give demonstrations and offered "Hands On" experience to those who met with us. All in all we enjoyed meeting with many of our users on this two week jaunt.

*** More to Come ***

October brought the Canadian Computer Show in Toronto. On this little three week trip, we set a very expedious itinerary. Off to Chicago the "truck team" left, only to get stuck in an infamous Wyoming snow storm. The storm was the first of the season and as a result, no one including the road crew was prepared. Under these conditions, as could be expected, I-80 and all alternate roads were closed. So there sat the "Truck". I know, I was on it, and when the Wyoming wind blows, it gets cold. We eventually were able to get out of the snow and again it was on to Chicago.

From the windy city, we headed down the main street of the east and proceeded to spend time getting through Canadian customs.

To make a long story short, the Canadian Computer Show which was held in Toronto was a very interesting event. We made many good contacts and enjoyed talking with Canadians (who we find to be very delightful people).

From Toronto to Boston to New York to Washington, D.C. (where our van was broken into), to Indianapolis, to Columbus, to Kansas City and HOME.

It was a long, informative, and very rewarding trip. To those of you whose city we were unable to visit, we promise to come back soon.

Have Sphere will travel.

By: Doug Hancey

"DIRECTIONS"

The time has come to expand our sales facilities. For those who have casually referred to Sphere as only a mail order operation, we now put that myth to death! We recently opened our south California office and it's growing faster than expected. Our Sphere Marketing Strategy calls for, among other things, offices and stores to cover the face of the earth. Each office will be staffed by qualified sales representatives who will give mass demonstrations, mini demos, hold seminars, assist user groups, sell and take orders. At each office, systems will be available for 'hands on' training. Factory trained service people will be available for those who happen to find a problem in their computer. We are presently negotiating with several groups around the United States and Canada. Offices which will be open by Christmas include Berkeley, Chicago, Boston, New York, Montreal, Toronto.

"Numero Uno"
In Southern California is
Ernie Dixon

A dynamic person who is responsive to the needs of computer users, Ernie has an extended background in Software/Hardware relationship. It is his belief that "You've gotta have them working together", is in keeping with the Sphere System computer concept. In 1969, Ernie got his first dose of the computer field. Since then he has gotten involved with the industry from both ends. Working as a hardware engineer, then as a software man, he became aware of the relationship that must exist between hardware and software. This idea, being intune with the Sphere concept, along with Ernie's friendliness and aptitude for business have brought about the union between Sphere Corporation and Ernie Dixon.

Now that Ernie is on board, his responsibility will be to give demonstrations, seminars, 'hands on' training, answer questions, participate at conferences and conventions and in general, work with users, potential users, hobbiests, user groups, clubs and anyone who is looking for a micro computer. Ernie is located in Culver City at the present time.

He will carry our full product line of computer systems, peripherals, and components as time permits. Ernie will be working with those who are actively pursuing microcomputers, and would appreciate a note hearing from you. He can be reached by calling 213-870-2212, or drop him a line at P. O. Box 3102, Culver City, California 90230.

Welcome on board Ernie, and give 'em #@*#, Hombre.

Handling Fees

Some questions have been raised about the warrantee. The warrantee starts 10 days after shipment and continues for 90 days.

● you feel that you are missing kit parts, check the parts with the shipping list and parts list. If it turns out that they were really left out, call or write Sphere immediately and we will replace the missing parts.

If parts arrive damaged, contact the shipper to file an insurance claim. Sphere will be glad to supply parts costs in support of a damaged shipment claim.

A fee of $5.00 is charged for handling any kit parts returned for replacement or fixing. This fee was imposed to cover the overhead of handling and mailing, and also to encourage people to buy a 17¢ I.C. or 5¢ resistor locally rather than go through us. Parts are replaced free (except for the handling fee) during the warrantee period. Replacements for MOS chips will be made only on arrival of the handling fee and the bad chips. Please use care in packaging chips for shipment back to Sphere.

Assembled units that fail should be shipped back to Sphere in the original shipping container. Return shipping costs should be included. A description of all problems encountered should ●included with the returned system. Alternately, a suspect module can be shipped back for checking and repair. Feel free to call Sphere if you have any problems with your assembled system.

For parts that fail out of warrantee, Sphere will share its volume discount by selling parts at surplus house rates (this does not mean Sphere buys surplus chips).

If a hardware problem during kit building can not be isolated, the board or boards in question can be sent to Sphere to repair and testing. Repair will be done at a rate of $20.00/hr. in addition to a $5/board handling fee, with a minimum charge of $20.00 and a maximum charge of the difference between the kit and assembled price. Parts costs will also be charged unless the system is under warrantee.

The $5 handling fee is for any service, whether or not the unit is covered by the warrantee.

Sphere Featured

● Byte Magazine is running a feature article on Sphere in the January issue. The November issue of Computer Design featured a description of the Sphere System as the lead in the micro-computer section.

A Note on Microprocessors

Here is the place where Microprocessors (preferably the 6800) are pushed . . . No, we don't push Micro-Processors. I could say that this or that is better (or worse) about the 6800, 8080, PACE, etc., but why?

The only reason we selected the 6800 was because it was the best processor (in our opinion) to design to.

Many people are getting lost in all the Manufacturers cross talk. The fact is that a "Personal Computer" will, in general, out pace most any need you have . . .

Lets say computer X is ten times as fast as computer Y. A teacher enters all of the test scores of his students into the computer. He wants to determine an average score and fit the score to the proverbial "curve" for scoring. In addition, he wants to determine which responses were most often guessed wrong by his students so that he can discuss the result.

In addition, he wishes to add the current score to the cumulative score for the grading period and print a list of scores for past tests, this test and totals so far. The computer is to assign a letter grade according to the percentage of points earned vs. total possible so far. Below is a list of operations and the required time for each.

Computer X (Fast)

Test Data Input	1 hr. 15 min.
Total Computation	.3 seconds
Print Time	1 min.
Total	1 hr., 16 min., .3 seconds

Computer Y (Slow)

Test Data Input	1 hr. 15 min.
Total Computation	3 seconds
Print Time	1 min.
Total	1 hr., 16 min., 3 seconds

Although the Sphere will match guns with any other computer microsecond for microsecond, it is a limited comparison *at best*.

The real measure of performance is *your* time. Time to load the assembler, editor, debugger, basic program, your program, or anything that uses your time.

Some applications require Ultra high speed. Any Micro may do the job but only very, very rarely will the difference between two micros mean the difference in success or failure.

We like our Micro . . . 6800, but don't get caught in the trap.

q and a

Q. What is the status of the Com/Cas board?

A. Preliminary versions were delivered in mid October without cassette or modem capability. The modem and cassette were not delivered because of implementation problems caused by the use of the modem on a cassette. The modem has high quality notch filters which will allow only designated frequencies to be accepted within a tolerance of about 1%. This means that use with a cassette (which constantly allows speed fluctuations) is ruled out.

The effort was then directed toward finding a suitable substitute technique. In Kansas City, a meeting was sponsored by Byte Magazine to determine an audio cassette standard. Sphere will develop an interface to this standard. This means a delay until about Christmas for this board. More information will be carried in the next newsletter.

The preliminary configuration for the redesigned board is shown in the block diagram below. Note that the capability of each board has been improved. System 2 boards will be delivered with A & B, but C (optional second cassette interface) which will be available for approximately $40 extra.
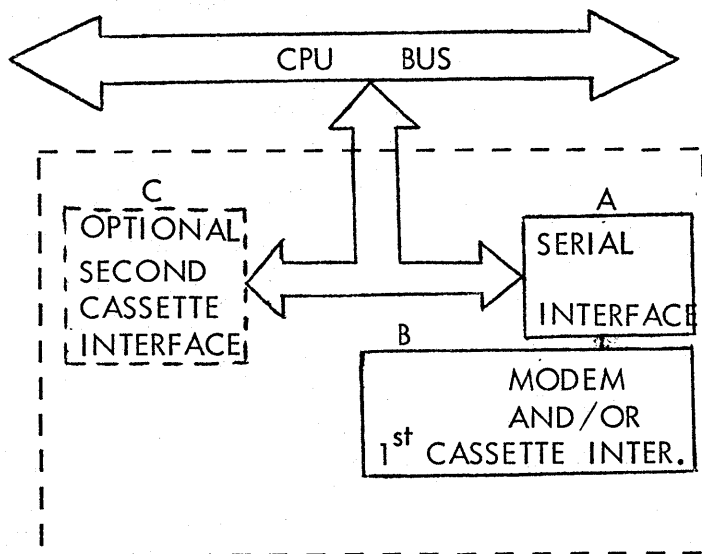
Q. How soon before FDOS is delivered?

A. The disk drives and a preliminary version of FDOS have been delivered. The final version will be delivered shortly. Sphere was unable to acquire source listings for the disk resident portion of the FDOS, the line editor and the full assembler. Because of this, it is taking longer than originally planned to create the software.

Q. Is BASIC currently being delivered?

A. No. There are 3 versions of Basic: 4K BASIC designed to fit in the PROM and using decimal arithmetic; 8K BASIC, with 4K for programs and 32 bit floating point numbers; 20K Extended Basic with string and matrix manipulation, 48 bit floating point numbers and 8K+ program memory.

Sphere contracted to have the 8K and 20K Basic implemented by an outside software developer who then broke the contract halfway through debugging. There is no good estimate of when these will be up and running. The 1K EPROM Basic is being developed in house and requires about 6 to 8 man days of work to finish. All programming work is currently concentrated on the FDOS and will be put onto BASIC as soon as FDOS is finished. There should be a version of Basic to go out as soon as the CAS1 board is delivered.

Q. When can I expect delivery of my light pen?

A. Because we are concentrating all R & D on the CAS1 module, it will probably be January or February before first delivery. The CRT board currently has the interconnect circuit designed in and the enclosure was redesigned so that the plastic faceplate can be removed for access to the video monitor with the light pen.

Q. How will the Sys 2 software differ from the Sys 1?

A. The difference will be the replacement of an existing Sys 1 module with the load and save cassette routines. Any glitches in the Sys 1 software will be corrected at this time. As the final Sys 2 design has not yet been settled, any user comments on what module should be deleted and what changes should be made in it would be appreciated. Also offered with the System 2 software will be the line editor and the full assembler on cassette tape and a 225p assembler reference manual for $20.00.

Q. Do you recommend any specific brand of cassette drive?

A. No. The cassette interface was designed to interface to any good quality cassette tape recorder. However, we plan to use the PHI-DECK cassette drive for our own in house use. More on this in the next newsletter.

Q. Can programs be run from the CRT buffer memory?

A. Yes. Since the buffer is part of the main memory, it can run programs. However, you should not ● the buffer for stack storage.

Q. Is there anything I should know about programming the 6800 that isn't obvious from available literature?

A. Yes . . . the **compare index** works only for the EQUAL or NOT EQUAL CONDITION.

Although the NON-MASKABLE INTERRUPT is not used on the Sphere System, you may design your own interface which uses it. If you do, always precede the "CLI" (Clear Interrupt Mask Instruction) with a NOP (No Operation), otherwise, the machine may vector the NMI interrupt through the IRQ vector.

Because of some obscure timing problem on the MPU chip or our system, if the stack is placed in the CRT buffer memory at an odd memory location and a SWI, JSR or BSR is performed, the high byte of the return address (and the index reg. in the SWI) will be set to FF. If the stack is at an even address the TOS gets set to FF.

● What is the status on the 16K mem board?

A. It is up and running and deliveries have started. All back ordered systems should be delivered before the end of the month.

PCC Visit

Keith Britton of Peoples Computer Co. visited Sphere last Saturday and plans to do an article on Sphere for the next PCC newsletter.

Program Listings

Source copies of the PDS V3A software are available for a copying charge of $4.00.

Of Interest

The September issue of Computer Design has several good articles, including a description of a DMA for the 6800 on page 72.

EPROM Programming Service

A price of $5 plus 10¢ byte up to a maximum of $20 has been set by Sphere for those users who need to have proms programmed. Coding sheets for the proms should contain the address of each byte in both hexadecimal and decimal from the start of the PROM and the contents in hexadecimal. As only proms bought from Sphere or originally from Sphere will be programmed, a price of $17.50 has been set for the 256 byte 1702-A unprogrammed EPROMS.

Check Your System!

Before you apply power to the system, check to see that all components are inserted and oriented correctly, and that there are no cold solder joints, solder bridges or breaks in the etching. Make sure that the cables all connect to the same pins. Check to see if any pins were bent when inserting a pin into a socket. Extra care must be used when handling the 4K memory chips as they are sensitive to static charges. The cards can be inserted into the rack in any order, though it is preferred that the CRT card be connected first on the power line.

Keyboards

Are you having trouble with the keyswitches? The keyswitch manufacturer has come out with a new version of a switch around Christmas time and will replace all old switches free of charge. Send in any and all switches you would like replaced to Sphere (with the standard $5 handling charge) and we will replace them for you. The swtiches should be dismounted from the board and the keytops removed. Send in to:

Sphere — Attn: Parts Handling

Want Ads

The newsletter will carry free Want Ads for anything relating to Sphere Systems.

MASON ENGINEERING
October 31, 1975

SPHERE CORP.
791 S. 500 W.
Bountiful, Utah 84010

Dear Doug, Randy, Bruce, Gary, et. al.,

Just a line to let you know that I am having a ball with my system. I had the keyboard, CPU, and CRT modules built by the time I received the power supply sheet metal Thursday a week ago. By Saturday I was ready for the smoke test (no smoke!). By Sunday night I was running *simple* programs, hand assembled and written-in through Debug with success. Monday night after getting some clarification from Bruce, I was running simple assembled programs. While I still have not figured out several elementary things (like how to enter data to my programs from the keyboard), I have successfully operated all Debug directives, assembled programs using the mini-assembler, and used all the Editor functions. The memory map, which I understand is on its way with the PDS supplement will sure help! Byte magazine is right, Computers are the worlds greatest toys!

As a matter of information I would like to pass on the problem areas I ran into in the hopes it will avoid them for others.

1. When I first applied power, I had a raster with evidence of data (dashes randomly scattered across the screen). I had horiz. sync, but no vertical. After much tracing, mostly getting to know the system, I located a short on the etched board at E31 between pins 13 and 14. The "dogbone" between pads was connecting the angled conductors connecting these pads to their circuits.

2. After cutting the "dogbone" I had a stationary raster with a full field of random characters including many non-flashing cursor blocks. This could not be changed by any combination of keys on the keyboard. Again after much tracing, I located another short; I won't dwell on this one — it was a Mason's soldering short. Score: Sphere 1, Mason 1.

3. I didn't realize it yet, but I now had a working machine! After a lot of playing I discovered the control E and D secret and shortly the ESC tricks. Now the machine was making sense. I did, however, discover that I had no "@" symbol. I tracked this down to a board conductor running from a very large pad above E9 to the +5 bus, holding a logic line high. Cutting the conductor (and replacing a pack) gave me my @. Score: Sphere 2, Mason 1.

4. The largest problem remaining at this time was what I thought was a noise problem apparently in the CRT module. Random characters continually pop onto the screen. Most often in Editor, they occur on the line with the cursor, following the cursor, with some occuring on other lines. In Debug, they surround the currently opened data, with some occurring on the rest of the screen. When giving a system reset, it usually is necessary to reset two or three times to clear the screen. I stopped worrying about this problem (almost) when Bruce indicated it was almost certainly my AMI 6810's, and that they would probably be replaced with Motorola's.

5. I made a couple of changes to the power supply. R8, a 100 ohm 2W resistor checked out to be dissapating fully 2W (and also turned out to be a 1 watt resistor). I couldn't locate a 5 watter, so I installed a 10 watt in its place. It now runs relatively cool. Also D4 and 11v zener was running very hot and appeared to be running beyond its derated specs. I hung a 100 ohm resistor across the -12 volt line to reduce the zener current. Everything runs at a reasonable temperature now.

6. The "power on" reset circuit did not work at all. The problem was quickly traced to oscillations of E46 and E39 due to the slow transition through the switching region of input 12 of E46. I solved this problem by installing a 39 ohm resistor between the + leg of C24 and pin 12 of E46, and a diode between pin 6 of E39 and pin 12 of E46 (cathode end). This provides enough positive feedback to kick the input through the switching region at the first transition. It works great.

7. The keyswitches are pretty bad. I had to cut several apart and repair them, glueing them together again to get enough which worked and showed minimum bounce. Even so I have several which stick and multiple characters are a problem.

8. The only other change which I recall making was replacing 20k R17 on the CRT board with a 33k to allow centering the format on the screen of my TV.

So far I am very well pleased. I hope my list of items doesn't sound like I'm complaining, I'm not. I hope you can help me with the 6810 problem and the keys, but for a product this complex which was created in so short a period of time, you have done a fantastic job, with remarkably few problems.

Doug — my cabinet arrived unpainted, and only including the lower portion, apparently the record of my changed order did not get through to shipping. I will ship it back when I hear from you. I am not using it at all, except for the card rack. I mentioned to Bruce that I received no small 0 keytop (I did get an extra 5 and a Q), and my large 0 is rotated enough that it looks bad and may hit the cabinet when installed. If you would send me the two 0 keys I'll be happy to return my extras.

It's getting late, almost 1 a.m., as you can probably tell by my deteriorating typing, so I'll close.

I am really looking forward to receiving my com/cass board, my 16K mem board, and the 16D mod (and the cabinet).

I thank all of you for your continuing assistance and hope I'll get to meet you all sometime. I really think you have your competitors skunked with this system, and I expect to be hearing great thing about Sphere.

Again, thanks.

Dick

Thank you for your letter.   We appreciate constructive criticism and suggestions such as yours.   Ed.

APPENDIX E

SPHERE WORKING APPLICATIONS PROGRAM "SWAP"

Sphere Working Applications Progtam is a newsletter written inhouse to aid users and those who desire to extend the use of their computer. SWAP newsletter will act as application notes providing an opportunity for users to publish applications, programs, and design ideas that they might conceive.

In the beginning SWAP will be composed of comments, happenings, and applications derived by Sphere Corp. As users begin to submit data SWAP will eventually be turned over to the users of Sphere systems. At this time Sphere Corp. will produce "Sphere Application Notes", which will provide the backup support that computer users need to broaden the personal arena of applications. Back-up support will be written and programmed by Sphere programmers.

The newsletter will contain brief abstracts which have been submitted to SWAP at P. O. Box 213, Bountiful, Utah 84010. In addition, letters to Sphere or SWAP will be considered for publication. An attempt will be made to publish representative letters whether they be to the editor or to the user group.

In an effort to stimulate application program submittal, Sphere will reward exceptional submissions with up to $1000.00 certificates to be applied towards the purchase of Sphere equipment and peripherals. These awards will be at Sphere's discretion and according to Sphere's judgment. Awards will be published in the quarterly newsletter. These award announcements will be made for exceptional work in following area: languages and operating systems, statistical and engineering packages, business applications, educational packages, and any other applications including games.

Membership into SWAP can be gained by purchasing a Sphere Computer System or by simply purchasing the Operator Reference Manual. Sphere Newsletter will provide you with great insights into the minicomputer field if everyone will send in your programs and comments.