INTERACT NETWORK NEWSLETTER

Vol. I, No. 1 The IN Newsletter, published quarterly by Micro Video Corporation Spring, 1981

Letter From The Editor:

REMARKS

Hello Interactophiles!

I've spend a lot of time in the last couple of months trying to decide what form this newsletter should take: the directions, the philosophy, the goals. "Sure," you say. Micro Video is publishing it, so it's simple. "Sell more Interact stuff." Micro Video, is of course, running a business that's partly based on Interact software and accessories. But it's not that crass. Of course, one objective is to inform you of what's available, to provide information on what the software does and what the books contain so you can make intelligent selections. You can buy what fills your needs and desires and have it perform to your expectations. If you're happy with the software you select you'll buy more. And that benefits everyone.

But I want this newsletter to be much more than just an expanded catalog. We know that most of you bought your computers for more than just playing games. We want to help you use and enjoy your computer to its fullest potential.

The folks at Micro Video realized that it's hard to be objective when you own the store, so they asked me to write and edit the newsletter for them (a very wise move!). I own an Interact, program it in BASIC and machine language, and have some writing experience. I also have a full-time job. My computer is my hobby. I am not an employee of Micro Video. I'm an Interact owner, and Interact owners are what this newsletter is all about.

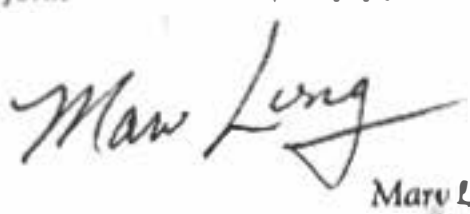
A short time ago, I was talking with some users. The talk always seemed to take a negative turn. The Interact can't do this. The Interact can't do that. The What-a-ma-callit computer is better.

Hogwash! You own a fine computer! No, you can't run a general ledger package. A floppy disc drive will probably never be available. We've got big letters and small memory, but I still contend you own a fine computer. Try color graphics on a Heathkit. Do you know how hard it is to get sound on a TRS-80? Atari is bragging about the capability of playing an audio cassette through the T.V. speaker — we've had that capability all along. The keyboard on the TI 99/4 makes the Interact's raised keycaps look like a professional keyboard! Best of all, try to get an Apple for the cost of your Interact!

Your Interact has color graphics, tones, sounds, reliable tape loads, Microsoft BASIC, a large software library, machine language access, and pictures, learn to program in both BASIC and machine language, access other systems and data banks, educate yourself and your family, and even do some business tasks. That's not so bad, is it?

I think the Interact has dynamite potential! It's time we started accepting it as it is and exploring and enjoying that potential. The Interact Network Newsletter is in a unique position. It is truly an international forum of all Interact owners. We want you to use this publication to ask-share-communicate with the 4000+ in the Interact community. I've included a survey form with this issue. It's the only subscription price to the newsletter. Let us know what you like, dislike, and need to make your computer better for you. If you have questions, now is the ideal time to ask. If you want to share an idea or program, by all means send it along. If you know other Interact owners that are not getting this newsletter, do them a favor and send in their names.

Right now the form of this publication is loosely defined. What will emerge as its final form will be UP TO YOU!!



Marv Long
Editor

Product Notes

In each issue, I'll include information on new software, hardware, and publications from Micro Video. These will not be reviews, per se, as that only gives you one person's personal opinion of a product. Instead, I'll give you an expanded explanation of the products so that you can make your own judgement as to the product's worth to you. This issue's PRODUCT NOTES features the new BASIC manual.

BASICALLY SPEAKING

Undoubtedly the most requested item at Micro Video has been a new BASIC programming manual. Well, it's finally here! A real doorstopping, 200+ pages of information on Level II, RS232, and the new Microsoft 8K Graphics BASIC (EDU-BASIC is not covered), the book has 11 chapters and 4 appendices. Actually, though, it's functionally in two parts.

The first part, some 120 pages, is a tutorial on the Interact's three BASICs. It is involved enough that to list the table of contents would more than fill a page. It gives you a run-down on the interpreters, talks about functions, graphics, strings, game programming, data, subroutines, special hints, and the unique functions of RS232 BASIC. All of these and more are explained in detail, with lots of examples and commented listings. Know how to draw a checkerboard? How about 3D lettering, color rolls, or shimmering? Do you really understand string and array handling, how to debug your programs, and how to compact programs to squeeze every available byte into them? There's even an arcade-type game program that's fully explained.

The second half of the book is a reference of all BASIC program statements

(continued on page 8)

FOR ADVANCED PROGRAMMERS ONLY:

Adding Machine Language Subroutines To BASIC Programs

You'll find the technique described below useful in two ways. First, it helps determine where to put your subroutine. Secondly, it allows you to save both BASIC and machine code in one program.

When you write the BASIC portion of your program, enter the POKEs for your USR jump as 00. Later, when you've determined the proper location and entered the subroutine, you can change to the proper address without expanding the BASIC program and overrunning the machine language subroutine. When your BASIC code is done, PEEK locations 19709 and 19710 decimal (4CFD-4CFE Hex). The values in these two locations will give you the address of the end of your BASIC program (least significant byte, most significant byte). Your machine language subroutine should begin at least one byte higher in memory than that. Add the length of your subroutine to determine if you're in danger of running out of memory. Your subroutine must stop before 5FC0 or you'll clobber the ROM storage area.

When you're certain your program is *finished*, load in your subroutine at the specified address and POKE the ending address of your subroutine into 19709-19710 (again, LSB and MSB). Now, when you CSAVE the program, the whole works will be saved in one step. Try it . . . you'll love it!

If you're a beginning programmer and want more information on PEEK and POKE, consult BASICALLY SPEAKING. You can get tips on machine language programming in the BOMBS AWAY! Programming Tutorial. □

Game Add-On

Many BASIC games require the joysticks. The POT explanation in BASICALLY SPEAKING (pg. 10-61) states that the pot control will return a value of approximately 3 to 154 when plugged in and over 200 when disconnected. We can use this information for a handy subroutine that checks to see if the controllers are plugged in before the game will begin. We illustrate this in the following example. In the example, we check only for the left controller. You can, of course modify it for the right controller or both.

```
10 REM*GAME ADD ON
1000 A=POT(0):IF A<200THEN RETUR
1010 PRINT"PLEASE PLUG IN CONTR
1020 A=POT(0):IF A>200 GOTO1020
1030 PRINT"THANK YOU":FOR T=1 T
```

Interact Conquers Apple

The Big Apple, that is. General Motors is using an Interact in their building lobby display at the GM Plaza building in New York City, to provide a changing display that explains the many fields in which GM does research. The special custom software, written by Micro Video, uses text, sound, color, and graphics to tell about the General Motors that doesn't build cars. The program is planned to run for eight years as part of that display, and in the first six months there have been absolutely no problems with its operation. So, if you get to New York, visit your computer's "brother." And don't worry about another blackout in Gotham —that Interact has its own battery pack! □

Editor's Note: *For more information on Micro Video's primary business, producing commercial advertising software for major corporations, see 'The CROWDSTOPPER' in Creative Computing, January 1981.*

SMALL

How tight can you write? Try your hand at Small Bytes. The rules? Simple. Write a program in 3 lines or less. Take your choice of Level II, EDU-BASIC, or Microsoft 8K BASIC. Send in your pro-

```
1 REM*SCOTCH PLAID*
10 COLOR0,1,2,7:A=107*R
20 PLOT0,B,C,112,D:PLOT
```

HELP!!!

This column will appear in each issue to answer your questionsabout the Interact and programming it. If you have a question, send it to Micro Video, attn: HELP. We'll try to answer all submissions.

Q *Why doesn't somebody offer a replacement character chip for the Interact so we can have smaller letters?*

A Many people would like this, but the reason it hasn't been offered is that no character generator chip exists. All letters generated are drawn by a graphics routine in the ROM to a bit map in the ROM. As all graphics are hardware set to the 112x77 pixel screen format, changing the ROM would not help. Although it's technically possible to modify the Interact for smaller characters, it's a major undertaking for every computer, requiring extensive internal modification. Most people wouldn't be willing to pay what it would cost to make those changes!

If the character size is really a problem for you, you can always install an RS232 port and get a CRT terminal. You lose graphics capabilities, and it is a rather expensive approach, but it's currently the only workable solution.

Q *The Interact uses channel 3 for its output and that channel is used for television broadcast in my area. Can I change the Interact's output?*

A Yes, it is possible to modify the R.F. output of your Interact. Contact Micro Video for information on this modification.

Q *How can I get a sideways moving message effect, like the T.V. newsflash bulletins?*

A There are several approaches to this. One way would be to output the words, erase them, then output them again a few pixels to the side. Another way is to POKE location 24888 with 1. Now, each PRINT statement will cause the screen to scroll sideways. To return to normal scrolling, POKE 24888,32. See the new BASIC manual (pp. 10-57 and 58) for more POKEs.

```
1 REM POKE SIDEWAYS SCROLL FOR LEVEL II BASIC AND GRAPHICS BASIC
10 POKE19215,25:CLS
11 REM LINE 10 NOT NECESSARY FOR GRAPHICS BASIC
20 POKE24888,01 :POKE24864,01
30 OUTPUT"MICRO VIDEO",0,35,1
40 FORT=1TO200:PRINT:TONE50,50:NEXT
50 POKE24888,32:POKE24864,05
```

```
ER"

000:NEXT:CLS:RETURN
```

BYTES

m (attn: SMALL BYTES), and 'll publish some of them. The ogram judged best by our judge ns a prize. Below is an example, ogrammed with Microsoft 8K SIC.

The following simple program was developed by a 12-year-old boy. It makes the most awful noise you can imagine. At last, a program that has absolutely no useful purpose (except fun)!

```
20 FOR X=1TO3000
30 SOUND3,X
40 NEXT
```

Not to be outdone, I too came up with a program that makes useless sounds. The gauntlet is thrown down — see if you can one up my sick bird.

```
10 FORX=1TO1000
20 SOUND0,24844:SOUND3,264
30 NEXT
```

```
(1)+1:B=72*RND(1)+1:C=4*RND(1)+1:D=4*RND(1)+1
C,D,77:GOTO10
```


Cut along dotted line.

On The Inside:

SOFTWARE DEVELOPMENT

The software available for the Interact has grown tremendously in the last year. Since Micro Video started producing tapes, the number of titles in the library has doubled.

Ever wonder why and how a program get to that library? Well, I did, so I asked Dave Ross, President of Micro Video.

Dave Ross

Q. *Dave, where do the ideas for your programs come from?*

A. Ideas come from many sources. Some programs, like EZEDIT, were started at Interact before it went out of business, and Micro Video finished them. Some, like Earth Outpost, are patterned after popular arcade games. In this case, it's a space war type game. Some, like STAR TRACK or our new Troll Hole Adventure, were inspired by games popular on other, larger computer systems. The best source, however, is user requests. The MONITOR, for example, was developed because many people asked to have machine language access.

Q. *What's the next step after you get an idea?*

A. Evaluation. All program ideas and finished programs submitted by outside programmers must meet certain criteria. Does it fit into the library? That is, do we already have something like it and does it add balance to one of the various categories? Does it have broad appeal? Programs take expensive time to produce, and each must pay its own way. The successful program takes advantage of the Interact's strong points. Good use of color, sound, and graphics, if indicated, is imperative. And, of course, it must be a good game or useful piece of software or we run the risk of souring owner's on future purchases.

Q. *What are the actual mechanics involved in programming?*

A. It depends both on the program and choice of programmer. Some programs, like COMBAT!, were entered directly into the Interact in hex machine code. Others, like the Troll Hole Adventure, were written on another machine in assembly language and transferred to the Interact. Most of our in-house programs are written on an Intel Development machine in a language called PLM.

Q. *OK. You have the program written and evaluated. What comes next?*

A. Testing. For usability, of course, but most importantly for bugs. Then, after it's rested, it must be fully documented. This job falls on Cori Walker. Working with the program, then explaining it in a clear, concise manner can take some doing.

Q. *Then you have to produce the software for distribution. How do you copy tapes? I would think that would be a time-consuming process.*

A. Actually, it doesn't take that much time. We have the specially constructed tape stand that Interact Electronics originally used, and can make 10 copies at a time. Computer Holding Company also used our equipment to duplicate the tapes they distributed, so our equipment is really the "standard" against which duplication and alignment is measured.

Q. *What's in the works? Can you tell me a little about that?*

A. I want to be careful not to make promises until each program finishes its evaluation. There are programs coming to support the RS232 port further, some new games, both in machine language and BASIC, and perhaps another language. Then, of course, there's the memory expansion, about which we'll be announcing details soon. The expansion to 32K RAM will open up new doors for all us Interact programmers.

Our future plans will revolve around the desires of users. They can be assured that our intent is to continue expanding the software library, accessories, and support services as long as people's interest for the Interact continues to expand. It's a dandy little machine that still amazes me with it's capabilities, after two years of working with it.□

???? PUZZLING ????

Fill in the words from the clues given, then use the letters in the boxes to find the answer to complete the sentence.

1.	LOAD	1. Command to read a tape
2.	ROM	2. Memory you can't write to
3.	CPU	3. The part that computes
4.	BYTE	4. 8 bits
5.	UART	5. Serial _____
6.	RUN	6. Make it go
7.	__ __	7. A program jump
8.	___	8. _____data

THE NEW BASIC MANUAL IS A . . .

COMMUTE MBU____

Answers in the next issue.

UPDATE: Repair Service

Micro Video has expanded its service department! In order to give continued good service on repairs, Micro Video has just completed major purchases of additional test equipment and parts stock. Also a full-time service technician has been added to the staff. These new additions will allow for quicker turnaround on service and make it possible to offer special modifications like the forthcoming RAM expansion.

Of course, all of the standard Micro Video procedures are still in effect. Each unit gets special attention — each is checked, repaired, fully burned in, and then checked again before it's returned to you.

What this all means is simple. Micro Video meets *all* your Interact needs. □

Product Notes (continued from page 1)

for the Interact. That includes the "secret" commands (PEEK, POKE, USR) not in the original manual. Each command is given no less than a page (some 2 or 3), and every one has an explanation and short program illustrating the statement.

For novice programmers, this book is a necessity. No other BASIC programming guide covers Interact BASIC specifically. For the more experienced programmer, BASICALLY SPEAKING offers a good review, a chance to pick up special odds and ends you may have missed, and it puts all needed information in one handy sourcebook. Costing about the price of one piece of software, the manual gives you a tutorial, a full command reference, and enough programs and routines to get you started and keep you programming for a long time. □

MICRO VIDEO.

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INTERACT NETWORK NEWSLETTER

Vol. I, No. 2 The IN Newsletter, published quarterly by Micro Video Corporation Fall 1981

What Really Happened to Interact Electronics?
See page 6 and 7.

? FRE(0)-16314

At long last, the most asked-for hardware add-on, memory expansion, is here! I recently had the pleasure of sitting at an Interact keyboard and dimensioning at 30x100 data array And I still had 3.7K left!!! That's only 1K less than the original 16K machine started with

This added 16K means we're now in the big leagues. Virtually every program published in magazines is for a 16K standard At last, a world of software is opening up to Interact owners!

A few facts:

The expansion (a fifth generation) is of modular construction It requires the addition of a memory board and a power supply board The power supply is totally self-supporting, supplying all the power needed for the expansion and *future add-ons* The addition of the power supply means your Interact will now have two power cords, but power is common to the existing switch The expansion is designed to work with Micro Video's RS232 port and the upcoming (if enough of you want it) BASIC in ROM The new board supplies its own requests, grant, and timing Address lines are fully buffered It uses 4116 dynamic RAMs

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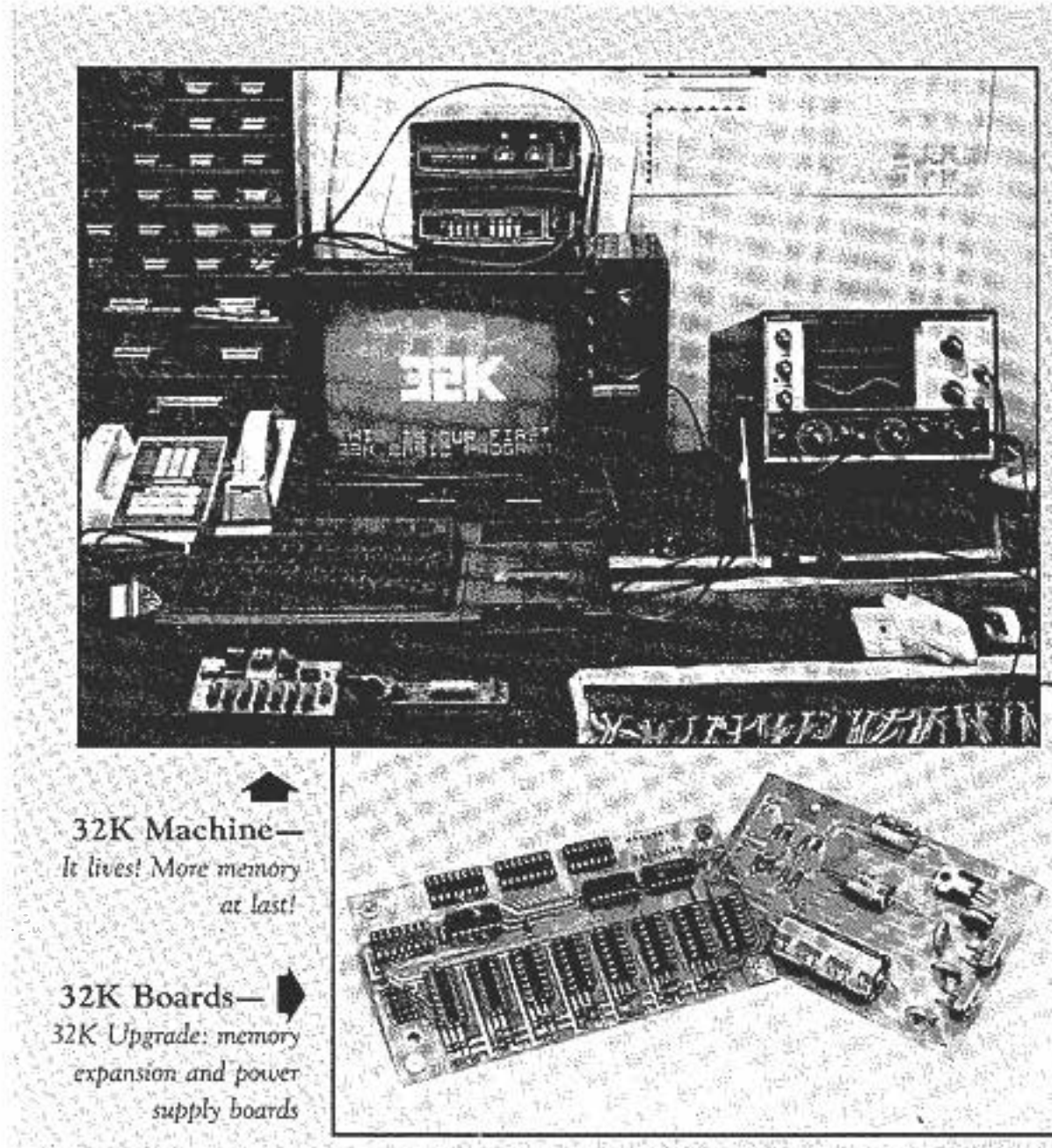

32K Machine—
It lives! More memory at last!

32K Boards—
32K Upgrade: memory expansion and power supply boards

Letter From The Editor

REMARKS:

Hi folks!

Well, here I am, a few hundred surveys later. To those of you that answered our questionnaire, a big THANK YOU! If you haven't sent yours in yet, be sure to do it soon, so we'll know you want to continue receiving the newsletter

Owning and using your Interact is a positive experience, but for a moment, let me be negative The surveys expressed a lot of wants, and while we wish to fill as many as possible, some will just never be. We are pretty much stuck with 16 character lines You cannot load tapes from other brands of computers, but this is not a situation unique to the Interact. You also can't load an Atari tape on a TRS-80, a TRS-80 tape onto an Apple, an Apple tape onto a TI 99/4, etc. No cross compiler is forthcoming. COBOL and FORTRAN are out of the question (COBOL is available for the Apple It requires 48K, softcard, 2 disc drives, and costs $750.)

Another thing that came up in the surveys is people wanting free access to products Micro Video sells The RS232 port and the new memory expansion involved a great deal of engineering, prototyping, and manufacturing costs The designer and Micro Video expect a fair return on their work, so no building plans will be offered. The same applies to the software I just recently finished a

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REMARKS:

continued from page 1

machine language game that will be marketed through Micro Video. It took over two months of work in my evenings and weekends to complete. With our small market (compare against TRS-80's 400,000+ users!), the best expected return is very small. If you like the software, it's worth 15 dollars. (This is cheaper than software for most other micros.) If it's not something you're interested in, then don't get it. Bottom line: Software is hard work to produce. It's just not fair to ask for listings or routines to produce copies. With BASIC even more so. Microsoft owns our BASIC, and Micro Video spent a lot of money for a license to sell it. A published listing either free or for sale, would be in violation of that license. Try to keep in mind that it costs Micro Video real dollars to support the Interact market. If they don't get a fair return on their efforts, they won't be able to afford to continue that support.

A lot of you have asked for more hardware information in the newsletter. We will be covering hardware more, but on a relatively simple applications level. I'm not a hardware expert, nor does Micro Video have a large staff of electronic engineers. The information we'll provide will be basic and useful to the average user. If you want to be a tinkerer, then do so, and tell us what you've come up with. The Interact Network Newsletter is a perfect forum for information exchange between users, so use it that way!

A few of you have the impression that you must have more equipment to make your computer worthwhile. Have you taken what you already have to its limits? Micro Video is producing new things all the time. In the Spring catalog they've listed four new BASIC games, two new RS232 programs, a new machine language game, and the expansion to 32K RAM. Many other things are being readied. A machine language training course is in the works, and BASIC in ROM is being seriously considered. We've added columns to the newsletter, which has increased to 12 pages (and is still free, let me point out!). It's remarkable that our little micro, considered a dead product less than two years ago, is now so well supported. I feel like hanging out a sign saying "WATCH US GROW!!"

Let's all grow. Use your computer. Expand your knowledge. We've only just tapped the surface of what's possible. Read! I get every computer magazine I can. They cover a lot of information that can be transferred to the Interact. *Byte* for hardware information. *Softside* has loads of BASIC games. *Dr. Dobbs* gives you advanced software information. *Creative Computing*, with its special issues on graphics, music, etc., can help you take full advantage of your Interact's capabilities. *80 Microcomputing* is one of my favorites. I know it's written for TRS-80 users, but the ideas are great. *On-Computing* and *Personal Computing* are terrific for beginning users.

Books are helpful too. Micro Vid 's *BASICALLY SPEAKING* has been touted as one of the best BASIC tutorials around, and it's completely Interact-specific. Once you've read that, try *The A to Z Book of Computer Games* (TAB #1602, $7.95) which has 26 games, easily converted to the Interact environment. All will fit into 4K, and each is presented with a tutorial on techniques used. Starting on machine language? Pick-up *8080/Z80* by Sprackler, available at most computer stores or through Micro Video ($8.95).

Most important of all, use your computer. Turn it on! Write a game, disassemble the ROM, run a printer, balance your budget, wire in a weather station, simulate WWIII, access a timesharing system, try machine language, play a game, do animations, write a teaching program, play music. Explore! The Interact gives you the possibility for expansion, not just hardware, but expansion of the mind. With your computer, you'll either grow to new vistas or grow stale, but grow you must. Come on, guys, fiddle those bits!

Sincerely,

Marv Long

Marv Long
Editor

P.S. Don't forget to write! Your thoughts and ideas are welcomed. ■

★ ★ ★ ★ ★ ★ ★

Answer to Last Issue's "Puzzling"

The new BASIC manual is a "COMPUTER TUTOR"

PRODUCT NOTES

Two games share the winner's spot for the favorite Interact program, as shown by your responses to last issue's survey. They are Earth Outpost I and the Troll Hole Adventure. We'll talk about them, so those of you haven't tried them will know what you're missing, and also take a peek at Micro Video's newest game release, GOOFY GOLF.

EARTH OUTPOST I — 1 player

Earth Outpost I is the biggest seller Micro Video has had to date. Although it was patterned after the popular "space war" arcade games, it has features and a style of play that make it unique. The object of the game is to defend two cities, randomly plotted on the bottom of the screen, from destruction by invading missiles. Hovering above the cities is your outpost station which you can move, via the joystick, from side to side as well as up and down (something different!). You position the station beneath the falling bombs and press the fire button to shoot them down. There are two types of missiles in the game. The regular missiles must score a direct hit on one of the cities to destroy it and end the game, but watch out for the super rockets! With those, close counts. You also try to avoid your station being hit by missiles. While a collision with a missile destroys the missile, it also damages your space station and slows your ability to move. You score points for deflected bombs, based on the type of bomb and the altitude from which you fire at them. As the game progresses, the number of invading missiles increases until it becomes difficult to check them all. If you're good enough, your cities will survive the intense invasion, and the number of missiles will ebb, giving you a little "breather" before the next wave starts. High scores of over 30,000 take more than an hour to achieve — can you do it?

THE TROLL HOLE ADVENTURE — 1 player or group

Adventure is a game born of computers. There are many different scenarios for Adventure games, but all are simulation puzzles in a narrative form. Typically, they all work in pretty much the same way. You are placed in an environment, such as a haunted house, castle, jungle, or cave, in which there are a number of obstacles and objects you can use to overcome them. The program has a vocabu-

T-N-T is Dynamite!

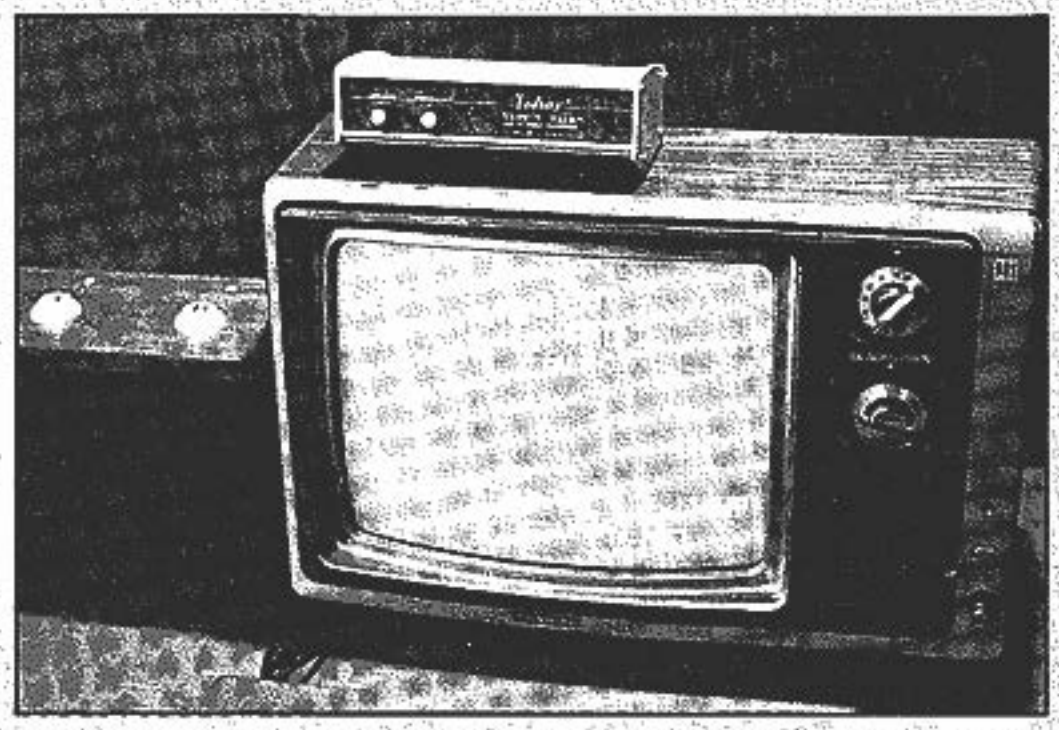
Tired of yelling at your Interact? How 'bout letting it yell at you? With the addition of the Votrax Type-'N'-Talk (T-N-T), a new, widely publicized voice synthesizer, your Interact now has the power of speech.

True, the voice does sound more like a robot than the computer on Star Trek or HAL from "2001", but the speech is quite intelligible and easy to program. The unit is a small, self-contained box with its own power supply and amplifier. It uses an RS232 interface—yep, plugs right into the port on any so-equipped Interact. To make it talk, you just type. The unit talks in ASCII, so you can use either your COMMUNICATOR or LPRINT in RS232 or 32K BASIC. The unit speaks when you hit a carriage return and can hold up to 750 characters in its buffer.

Of course, there's a catch. The unit isn't very smart when it comes to nonstandard rules of pronunciation (of which there are many in the English language!). While most words will sound just fine the way they are normally spelled, sometimes you have to spell phonetically (that's the way I always spell, just ask Cori, who has to edit my copy!). For example, the word ENGLISH would have to be spelled "IN-GLISH" to get the proper pronunciation. This is really a very small drawback, however, as you can correct and test as fast as you can type. The T-N-T also has provisions for accessing its phonemes directly, so you can make your Interact speak foreign languages or make special sounds.

Amazingly enough, the Interact bested the Apple on this one. When Micro Video tried to hook up their T-N-T to an Apple II-Plus, the result were erratic. Sometimes words and sentences were clear, but frequently letters, words, and sentences were dropped, resulting in gibberish. The Apple II-Plus, it turns out, isn't equipped with the proper handshaking protocol in its RS232 interface to handle the T-N-T as is; another communications interface is required!

The Votrax Type-'N'-Talk can be ordered from Micro Video for $359 (below Votrax's list price of $375). Information on cable wiring is included for the do-it-yourselfers in the crowd. You can even wire a dual hookup to use the T-N-T and a printer at the same time. If you'd rather not wire the cable yourself, you can purchase one from Votrax ($24.95) or from Micro Video ($19.95). When you order the unit from Micro Video, a free sample demonstration program to get you started is included. Contact Micro Video for a Votrax flier and further details. A great Christmas idea for the computer nut in your family? ■



Interact/TNT—*Converse with your computer with the Votrax Type-'N'-Talk.*

lary of nouns and verbs that you can use to move around in the environment and manipulate objects you find to solve the puzzle. Part of the fun and challenge of the game is discovering what words the computer understands.

I don't want to give away part of the Troll Hole puzzle, so let me illustrate the idea with an imaginary example. At the top of the screen, you'd see your location, for example, A DARK DUNGEON. Below the location is a list of the obvious directions to exits — N S E W. Then, the computer tells you what it "sees" — A SKULL, A CHAIN, A BOWL OF LIQUID—and asks you what to do. You might type a direction and go on to explore other areas. You might type PULL CHAIN and discover a secret passageway. You might DRINK LIQUID, only to find it a deadly acid or the water you need to extinguish a fire in another room. You never know what will happen, which makes the game a real adventure!

In the TROLL HOLE ADVENTURE, you venture into a troll's cave, try to locate and remove the hidden treasures for a maximum score of 100 points. It takes hours, even days or weeks, to solve the puzzle completely, so the program has a built-in feature that lets you save a partially completed game and resume play later.

In the personal computer world, adventure games rank among the most popular ever devised, and it's no wonder. They combine what most computerists like best: the necessity to strike out and explore new territory and the requirement of using brainpower to win. It's not a question of how fast you can react by pushing a button or lever, but rather how well you can think. If you like puzzles, you'll find the TROLL HOLE ADVENTURE will provide hours of absorbing entertainment for you and your friends.

GOOFY GOLF — 1 or 2 Players

The newest machine language addition to the Micro Video catalog is GOOFY GOLF, which puts the lively entertainment of miniature golf on your TV screen. The game has 18 different holes, and you can play the front 9, back 9, or all 18. Each hole is a maze of hazards and barricades, and angle shots are sometimes necessary to maneuver around them (much like shooting pool). If you hit a blue water hazard, you lose your ball and have to tee off all over again. Red mystery hazards randomly move your ball to a different part of the playing field—sometimes good, mostly not. Two holes even have gates that open and close, requiring careful timing to get the ball through to the hole. You can move your club anywhere on the course to hit the ball. When you've positioned the club, you press the fire button to strike the ball. The farther away from the ball your club is, the harder the hit. You can therefore putt softly toward the hole, or smash the ball and send it careening around the playing field. Our testers tell me that GOOFY GOLF, while not as flashy as some games, has long-term playability. It promises to remain entertaining long after other games become dull. ■

SMALL BYTES

Well, all you BASIC bulbes, it's the Battle of the Byte again. This issue has some interesting Small Bytes submitted by Interact owners. Try these on for size, and, if you haven't already, send in your try. Remember, the rules are to write a program, using any Interact BASIC, in three lines or less. Send to Micro Video, ATTN: SMALL BYTES. The program selected best by our panel of judges will win $50.00 in product credits from Micro Video. So, give it a squeeze, and send it on.

Bill Doyle *of Manchester, Michigan, provided this noisy and colorful Level II program. We thought it should be called "Invasion from Outer Space" He said his wife called it "A POX ON YOU!"*

```
20  CLEAR:CLS:FORJ=1TO3000:COLORD,1,2,4
30  SOUND0,(24844-C+J):SOUND3,(200+J):SOUND3,J
40  C=INT(RND(1)*77):B=INT(RND(1)*112):D=INT(RND(1)*3):PLOTB,C,D:NEXTJ
```

From **Jay Gardella** *in Bonita, California, a Level II one-liner that gives a colorful Interact greeting:*

```
10  COLORA,0,0,B:PRINT" ** HELLO **":A=INT(RND(1)*7):B=INT(RND(1)*6):GOTO10
```

E. C. Hertzler *of Dearborn, Michigan, POKEd a sideways scroll in his Level II program for a staggered effect that's rather interesting. POKE 24888,32 to return to normal scrolling when you're done running this program.*

```
1  CLS:COLOR7,1,3,4:POKE24888,1:Y=12:A$="MICRO":B$="-VIDEO":S=46:GOTO3
2  FORI=1TO12:OUTPUTC$,70,Y,C:?:TONES,9:FORP=1TOS:NEXT:Y=Y+6:NEXTI:RETURN
3  C=3:C$=A$:GOSUB2:C=1:Y=14:C$=B$:GOSUB2:COLOR4,1,3,5:D$=INSTR$(1):GOTO1
```

Ten-year-old **Todd Trumbull** *submitted this Microsoft 8K Small Bytes. Take cover!!!*

```
10  CLS:COLOR7,2,4,4
20  OUTPUT"RED ALERT",31,55,2:SOUND5,398
30  COLOR1,0,0,7:GOTO10
```

Jim Gindin *of Ann Arbor, Michigan, sent in this Microsoft 8K program, which moves a game paddle on the screen and tests for a hit on a target. In only 3 lines!*

```
1  A=INT(RND(1)*55)+11:CLS:PLOT90,A,3,2,2:DEFFNA(X)=INT((C-3)/2.08)+1
2  PLOT20,B,0,2,5:C=POT(0):B=FNA(X):PLOT20,B,2,2,5:E=E+1:IFFIRE(0)=1THEN2
3  A$=STR$(E):OUTPUT"T="+A$,38,50,1:IFA-B=1ORA-B=2THENOUTPUT"HIT",47,60,1
```

From **Jeff Thompson** *in W. Melbourne, Florida, came this cheerful, one-line Level II program. He calls it his "Bird Sanctuary"*

```
5  SOUND0,24844:FORX=3TO21:NEXT:SOUND7,4096:FORS=3TORND(1)*98:NEXT:GOTO5
```

Another budding genius! Twelve-year-old **Drake Diedrich** *of Gig Harbor, Washington, submitted these musical bytes (Level II)*

```
100  CLS:READA:FORB=1TOA:READC,D:PLOTB*3+20,60-C16,D+1:TONEC,9000/C*D:NEXT
110  DATA18,133,1,133,1,99,2,133,1,99,1,79,2,133,1,99,1,79,2,133,1,99,1,79
120  DATA2,99,1,79,1,62,1,79,1,99,1,133,1:RUN
```

Elmo Ferguson *of Miama, Florida, came up with this one-liner, which he titled "Micro Boogie Woogie" Let it run all the way through to get the rhythmic effect.*

```
10  FORX=1TO4100:SOUND0,X:FORY=1TO20:NEXTY:NEXTX
```

From **Steve Smith** *in Dearborn, Michigan, a program that illustrates 8K BASIC at its finest. You can use Control-S to freeze the program action and study the intricate patterns.*

```
10  CLS;FORJ=0TO7:COLORJ,J+1,J+2,J+3
20  FORI=1TO77:PLOT56-I/2,I,2,I,1:PLOTI+16,40-I/2,1,1,I
30  PLOT56-I/2,77-I,0,I,1:PLOT94-I,40-I/2,3,1,I:NEXTI,J:GOTO10
```

HELP!!!

Q *One of my Micro Video tapes won't load. What should I do?*

A Tape loading failures can result for several reasons. First, there's dirt. Keep your computer's tape head and capstan clean with a cleaning tape or commercial cleaner from your local audio store. Secondly, your tape head may need realignment. Micro Video has an alignment kit available for this purpose, and every Interact owner should have one. The third reason a tape can fail to load is that it is defective. While the reliability of Micro Video's tapes is generally excellent, an occasional bad tape does get out. Micro Video warrants their program tapes for 90 days from purchase. If, during this warranty period, your tape fails to load, you can return it, and they'll replace it with a copy of the same program at no charge. Realizing that tapes can simply wear out with extended, frequent use, and that this won't always happen during the warranty period, Micro Video has established a trade-in policy. You can return a defective tape that is no longer under warranty, and they will replace it at 50% of the list price.

You can do a lot to protect your tapes against damage and failure. Keep them clean and dry. Storing them in their plastic cases will protect against dust and static discharges. By all means keep your fingers *off* the exposed portion of the tape. Keep the tapes away from extreme heat and cold. And don't put them near magnets or magnetic fields (this includes putting them on top of the TV set or speakers).

Finally, if tapes consistently fail to load, you may have a hardware problem. If you've exhausted all other contingencies, you can send your unit into Micro Video for repair.

Q *What exactly is ROM?*

A Rom means Read Only Memory. These chips are "firmware" and have software more or less permanently installed on them. The program stays in the computer even when it is turned off, and is automatically available when the computer is turned back on. Read Only Memory means you can read from it but cannot write to it. The chip is incapable of taking code in.

The Interact's ROM is 2K and contains routines to make the letters, accept input from the keyboard and controllers, and read tapes, and perform other utility routines. Without the ROM, you would not see the "L TO LOAD TAPE" screen when you turn on your computer, nor would you be able to read in a tape. Some of you have asked about the empty ROM socket in the Interact. It will take a 2716 and has been used by some experimentors. However, Micro Video has no commercial ROMs available for that slot. The socket is only mapped for 2K, and, as BASIC requires much more than that, it is not possible to put ROM BASIC in that spot, which some have suggested.

Q *How can I move a token on the screen without erasing the background?*

A I'm afraid I don't have a good, useful answer for you BASIC programmers. The technique, while slow, is actually straightforward. You must store the background in memory, place your token on the screen, then replace the background color and place the token in its new location. You can do this using the POINT function to store the background in a variable or variable array, displaying the token, then wiping it out using the color background color information from the POINT. The problem is that this is quite slow. In machine language you can use G TPIX for a pixel save or a block move, as in the BOMBS AWAY! Programming Tutorial. To illustrate this point (if you'll pardon the pun), here's a short program that uses the technique:

```
10 CLS:COLOR 1,7,0,4
20 PLOT 0,0,3,56,77
30 FOR X = 0 TO 112
40 C = POINT(X,35)
50 PLOT X,35,1
6  PLOT X,35,C
70NEXT
60 GOTO 30
```

■

Ralph Babson *of Tucson, Arizona, sent us this patriotic Microsoft 8K program. He called it simply "America"*

```
10  CLS:COLOR0,1,7,4:FORY=70TO38STEP-6:PLOT10,Y,1,74,3:PLOT10,Y-3,2,74,3
20  NEXT:PLOT10,3 ,1,74,3:PLOT10,52,3,32,21:FORX=12TO39STEP3
30  FORY=71TO5 STEP-4:PLOTX,Y,2:OUTPUT"AMERICA",25,30,X:NEXT:NEXT:RUN
```

Larry Jensen *of Annandale, Virginia, proves that you can do useful operations in just 3 lines. His program, entitled "Pocket (??) Calculator", computes the sum, difference, product, or ratio of any two numbers.*

```
1  PRINT" A=";:INPUTA:PRINT"     + - */    ?":X$=INSTR$(1):PRINT" B=";:INPUTB:C=A*B
2  IFX$>"*"THENC=A+B:IFX$>"+"THENC=A-B:IFX$>"-"THENC=0:IFB<>0THENC=A/B
3  CLS:OUTPUTA,9,50,1:OUTPUTX$,4,44,2:OUTPUTB,9,44,1:OUTPUTC,9,36,3:GOTO1
```

Our last Small Bytes program for this issue reached me sans the programmer's name. Will the author please identify him/herself?

```
10  CLS:A=INT(6*RND(1)):COLOR7,A,A,A:PRINT"REM-THINK SHORT":TONE50,50:GOTO10
```

■

What Really Happened To In

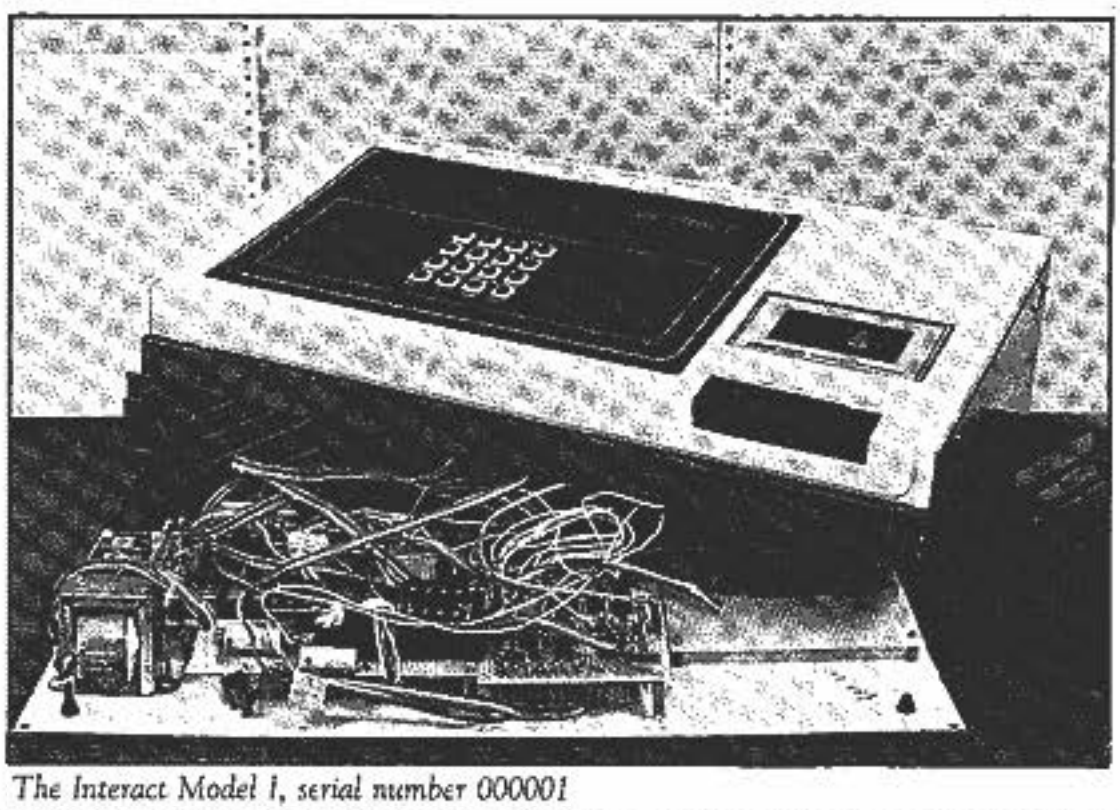
A PERSONAL PERSP

So many people have asked this question that we decided that INN was a perfect forum for telling Interact's story, once and for all. It's an interesting, though somewhat depressing, story of the failure of a small business. Mary asked me to guest-author this article because, as a former employee of Interact Electronics, I really was "on the inside." When Interact folded, I was still a relative newcomer to the scene, so I was in the interesting position of being an involved party, but not so involved that I couldn't be an objective observer. I'd been made aware of Interact's shaky status before I joined the company; therefore I was particularly tuned into recognizing problems as they arose. With that in mind, I'll tell you Interact's story as I know it. Please bear in mind that I don't know the *whole* story. I doubt that anyone, even the former president, does—the problems were long-term and complex.

I'll begin with a little history. Interact Electronics was born in 1976, the brainchild of Ken Lochner. (Ironically, Interact was then located in the very same office space that Micro Video now occupies!) Ken's history was impressive. He'd been one of the original designer/developers of BASIC, back in his Dartmouth College days. He later founded a high-growth timesharing company in Ann Arbor called Cyphernetics, which was subsequently acquired by Automatic Data Processing. Ken had been so successful in his previous ventures that there was no reason to believe Interact wouldn't be equally successful. So, what happened?

To begin with, Ken came into the micro world from the timesharing industry. As anyone who's experienced both can tell you, they're radically different environments. Not only is the technology very different, but the market is as well. Timesharing is, by its very nature, business-oriented. Sales are made to corporations, rather than to individual consumers like you and I. The very first problem Interact encountered, I believe, was a lack of understanding their market: how to penetrate it and then support it.

Then there was the matter of the evolution of the Interact hardware itself. Did you know that the original Interact prototype had no keyboard? It was designed to be a low-cost, 4K game machine, with no direct programming access. (It so happens that Micro Video acquired the original prototype machine. We thought you'd be interested in seeing your computer in its early stages, so we've included a photo. The dramatic changes that occurred during development are obvious!)



The Interact Model I, serial number 000001

The development process was long (almost 2 years) and involved, and slowly the Interact, as it exists today, emerged. It was a costly venture; by the time the computer was brought to market in 1978, its backers had invested in excess of a million dollars in development alone. The Interact had grown from a game machine that was to be competitive with the Bally and Astrocade game computers to a fully programmable micro, for which the main competition, from a cost and capabilities point-of-view, was the TRS-80. As new capabilities were added to the original design, such as a keyboard, programming access, RS232 and ROM BASIC add-on, production costs increased. In order to keep the price low, the designers took a number of short cuts. This is, for example, why your Interact has no built-in character generator.

Still, it was (and is) a nice little machine. By the time Interact got around to selling it, however, their resources and finances were severely strained. With all the money invested in hardware development, there was little left over for effective marketing. As I'm sure you know, you can have the best product in the world,

nteract Electronics

ECTIVE FROM CORI WALKER

Cori Walker

but if people don't know it exists, you're not likely to sell many

Interact's marketing efforts were plagued with problems from the start, from what I've been able to piece together They had a relatively high turnover in marketing personnel. As new people with new ideas became involved, the marketing strategy would change, resulting in no strategy ever being followed through to its logical conclusion. For example, the Interact was, at one time, promoted in such places as the *Wall Street Journal* and touted as a computer for the business executive This was especially ludicrous given that most of the software available at that time was strictly education/entertainment-oriented. While a number of executives, including chairmen of the boards of several Fortune 500 corporations, do own and love their Interacts, they're used primarily for entertainment purposes, not for serious business applications.

Interact did manage to get a good network of dealers in place, and machine sales went pretty well Unfortunately, quality control was a weak link, and the early machines had an abnormally high failute rate By the time Interact had machine reliability problems more or less solved, the dealers, as well as a lot of individual customers, had been soured. The hardware was basically sound, and there was a reasonable complement of software, but the Interact name had been besmirched.

Equipment reliability (or lack thereof), however, wasn't completely responsible for Interact's poor reputation Interact Electronics provided virtually no support for the machines once sold I don't believe they ever mailed new product announcements to owners, for example. Documentation was definitely substandard—the old Level II User's Guide, which I assume most of you have seen, was the only programming manual available. It was put together in a hurry, and was useless for all but the most advanced BASIC programmers. PEEK, POKE, and USR were not documented at all. Interact liked to pretend that they did not exist in Microsoft BASIC for the Interact, as they were paranoid about software piracy For that reason, machine language access was also totally denied New products were announced when they were in little more than the "idea" stage, months before they realistically could be delivered. A user newsletter was talked about, but never produced Customer letters, inquiries, and phone calls went unanswered, promises were made that were not kept, and Interact came to be viewed as completely unresponsive to the user's needs.

To be fair, I must say that this attitude was not intentionally callous. It can probably be related to the structure of the company, which was hardware heavy and marketing light. There was usually only one "marketing type" involved at any one time, and there was far more marketing work to be done than one person could possibly handle. There just weren't people available to write letters, answer phone calls, teach training cours , write better documentation, etc Financial constraints were such that the company couldn't support the additional people required to market the computer effectively.

A combined marketing/development problem, particularly toward the end of Interact's history, was that they were simply trying to do too many things at one time. In a last ditch effort, Interact tried selling computers through Montgomery Ward in the Houston a ea To date, no computer company has really been successful selling machines in a department store, due, I think to the technical nature of the product Interact was no exception. Although they had moderate success with machine sales there, the special training and extensive support the test market required rapidly consumed any profit from the sales It was also apparent that, to be competitive with other micros, a number of enhancements were required. Interact was pressured, by Montgomery Ward and others, into committing to several major upgrade p ojects, all at one time The result was that the projects got attention in fits and starts, as pressure from one source or another demanded it. At that time, Interact had five pieces of software in the works, as well as ROM BASIC, an RS232 port, and an interface to the EXATRON stringy floppy, any one of which is a major undertaking These were all under development for the Model I, of which there were several thousand, unsold, in inventory. Meanwhile, Interact was proceeding with another, highly secret, project—development of the Interact Model II!!!

At the end, Interact was involved in a desperate struggle to keep its corporate head above water. With no new products being released, sales poor, and creditors pounding at the door, the investors decided the situation could only get worse On December 31, 1979, Interact Electronics closed and locked their door for the last time

Enter Micro Video

If you're wondering how Micro Video became the support source for Interact computers, let me give you a little history on that too. Our president, Dave Ross (whom you will remember from last issue's ON THE INSIDE), formed Micro Video in June of 1979, to pursue the use of the Interact in promotional environments, such as trade shows and point-of-purchase displays. When Interact folded, Micro Video acquired Interact inventory and manufacturing rights, to ensure a supply of machines for those commercial applications, but Dave had no intention whatsoever of picking up where Interact left off. In fact, it wasn't until March 1980 that we decided to test the

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Before You Go Poking Around . . .

What's hex or hexidecimal?

Our standard number system is decimal, that is, base 10. Numbers run from 0 through 9. The system most commonly used in the micro world, however, is hexadecimal, that is, base 16. Because we only have 10 digits in the structure of our counting system, we must have some way to represent the other six digits in the hexidecimal counting system. So, we work within another familiar system, the alphabet. The letters A through F are used. 0 to 9, then A to F. The decimal 10 is 0A in hexadecimal, 11 becomes 0B, etc. When we PEEK or POKE through BASIC, it expects decimal numbers, but if you work with machine language, you must learn to count in hexadecimal. And, if you get a reference card of instruction codes for 8080 machine language, you'll usually find they are given in hex notation.

What's an address?

The 8080 CPU can talk to or keep track of 65535 (decimal) bytes of information. A byte is a number from 0 to 255 (decimal), or 0 to FF in hex. It's technically possible to have addresses between 0000 and FFFF, but it's only possible to work with addresses that have hardware to check or put information into. In the 16K Interact, memory stops at 7FFF.

A final note:

All the routines for PEEK and POKE given here are for Level II and 8K BASIC. If you are using Level II, however, you'll find that it has some limitations. POKES are not initialized when BASIC is loaded, so you'll have to remember to POKE 19215,25 to be able to use PEEK or POKE. This will be understood and not shown for the routine given, so if a program doesn't work, check to see that you did that important POKE.

Secondly, if you try to PEEK level II BASIC, you'll find that there are limits on the locations that can be examined. You can remove those limits with the following three POKE statements:

```
POKE 30462,195
POKE 30463,25
POKE 30464,119
```

If you plan to do any PEEKing in Level II, it's a good idea to do these POKEs first. These POKEs are unnecessary in Microsoft 8K BASIC, as the limits have already been taken off. ●

Load 'N' Go (almost)

One question often asked is how to get BASIC to load a program and execute it without having to type RUN. Sad to say, I haven't found a way, as BASIC itself would have to be modified to do this. Micro Video's magician, Tom Matulevich, however, came up with a short series of POKEs that comes close. With this series of POKE statements, a BASIC program will automatically run when you press RESET, then "R" to restart. Load in a BASIC program you have handy, then enter these POKEs from the keyboard to check it out.

```
POKE 24581,1
POKE 24582,110
POKE 24583,105
POKE 24584,197
POKE 24585,195
POKE 24586,224
POKE 24587,102
```

Now hit RESET/R, and your program will start up automatically. You can also place these POKE statements into a small initialization program and run it before you load in your BASIC program. Try it, you'll like it! ●

On The Inside . . .

continued from page 2

home computer water. We completed the software Interact had left unfinished and sent out a catalog. The response to that mailing was the deciding factor—it was overwhelming. Interact owners, having been ignored for so long, were happy to find that they could get new software, repairs as needed, and their questions answered. We became committed to Interact support.

Because both Dave and I had watched Interact go under and had evaluated the reasons behind that failure, we've been able to avoid making the same mistakes. We've corrected as many of the deficiencies as possible. We've released a plethora of new software and accessories, rewritten the BASIC manual entirely to make it a solid training tool and reference document, and have developed hardware enhancements, such as the RS232 port and the 32K expansion (which Interact said couldn't be done!). We've established a full repair facility with a technical wizard who can fix anything. Like Interact, we're limited in our resources—there's only so much eight people can accomplish. We do have a much larger staff devoted to marketing and customer support than did Interact, so calls get returned, letters get answered, catalogs and newsletters mailed n a market as diverse as the Interact market is, we are realistically never going to be able to satisfy every request. We try to be as responsive as possible, however, and to keep the cost of our products and services reasonable. As Matv said in his REMARKS column, though, Interact owners *must* understand that our support can't be free. We've got overhead—rent, bills, payroll, supplies, etc. Although it's gratifying to achieve customer satisfaction by helping out with questions, repairs, and new products, customer satisfaction alone doesn't pay the bills. The bottom line is that if supporting the Interact market means losing money, we'll discontinue that support and pursue our commercial applications exclusively. We're probably the Interact's most ardent enthusiasts, so we don't want that to happen. We hope you don't either! ●

PEEK AND POKE UNMASKED

If you're new to BASIC programming, mysteries surround you, waiting to be unraveled. Learning the language and logic that will make your computer do what you want is an exciting and challenging prospect. Once you've mastered using loops, anays, functions, and other programming techniques, you'll probably be ready to tackle the more advanced aspects.

PEEK and POKE are two of BASIC's most powerful functions, but they have not been widely used. They border on the unseen world of MACHINE LANGUAGE!!! Only witches and warlocks have the power to tame these snange beings. At least that's what Interact Electronics wanted us to believe.

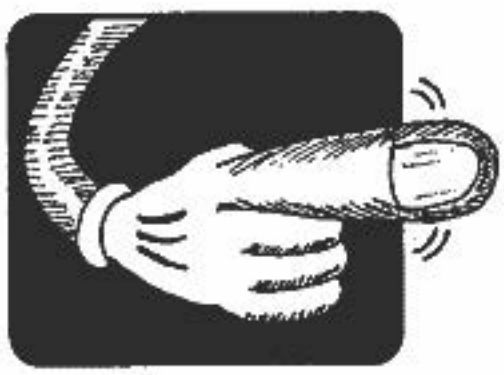
Actually, both capabilities are simple and straightforward, although using them to advantage will require careful study to gain expertise. You'll find the effort well worth the time, though, as PEEK and POKE take you one step closer to making your computer obey your every wish.

PEEK— to take a look

That's exactly what PEEK is for. It lets you find out what value is stored in any given memory location. If you PEEK an address, BASIC will return the contents of that location as a decimal value. If you're working with machine language, you'll find that mnemonics and ASCII values are generally furnished in hexidecimal, so you'll have to convert them to decimal for use with BASIC. An easy way to do this is to look it up. *BASICALLY SPEAKING* has a table for this purpose (page II-3).

Ready? Then let's try an example. With Level II or 8K BASIC loaded into your computer, type PEEK(25951). Got a syntax error, huh? That's because PEEK is a function, not a command, and you must PRINT the value of a function. Try typing ?PEEK(25951). Now you got a value of 79, right? Now, ?PEEK(25952). The value stored there is 107. These locations happen to contain the ASCII values (letter and number symbols) for O and K. It's the OK that BASIC uses as a readiness prompt. As you can see, PEEKing is easy, but you have to know the proper address and what kind of information it contains to do anything meaningful. Some locations you might want to look into are given in the *Guide to ROM Subroutines*, and under POKE in *BASICALLY SPEAKING*. As you gain proficiency you can disassemble BASIC and learn more.

POKE— to push in



POKE is the complement of PEEK. It lets you specify the value to be stored in any particular location. This can be extremely useful, and it can also be very dangerous. You can POKE BASIC right out of existence if you type the wrong thing or disrupt a working piece of code, so use caution with POKEs.

Let's use POKE in combination with the PEEK example above, and see what we can do. Type in POKE 25951,72. That's decimal for an ASCII "H". Now, POKE 25952,73. We have just put new values into the addresses that store the OK prompt, so it now prints "HI" instead.

While this isn't exactly earth-shaking, it does illustrate how easy PEEK and POKE are to use. Take a look at the way they are used in other sections of this newsletter, then strike out on your own. You're on your way!

POKING AROUND IN BASIC— THE ASCII HUNT

One thing you can do with PEEK is to take a look at BASIC. This is sort of like turning a microscope on yourself. Try this program:

```
1 REM DON'T FORGET LEVEL II INITIALIZATION POKES
10 FOR N = 24576 TO 32767
20 V = PEEK(N)
30 PRINT N; CHR$(V)
40 NEXT
```

24576 is 6000 Hex, the start of the main code of BASIC, and our loop runs from this point until it reaches the end of the BASIC code (32767). What we are doing with this program is PEEKing each address consecutively, and setting a variable to its value (V). In line 30, we have the program print N, the address in decimal, then take V and try to print it as an ASCII character. Some of the numbers don't represent ASCII characters, but BASIC can't tell the difference, and will try to print them, so you'll see junk characters. Some will, however, have the same value as an ASCII character, and you'll recognize those as they print on the screen. When you get the the real ASCII storage areas in BASIC, you'll know it because the letters will form words. For example, locations 25956 through 25960 contain the ASCII characters for the word BREAK, which prints when you stop program execution with a Control-C. This technique can be carried much further, of course. See if you can discover how to use it to unlock BASIC's secrets. ■

ACTION GAMES IN BASIC???

Writing games can be as much fun as playing them. As you learn more about programming, most of you will tackle an action or arcade-style game. Maybe you already have. In programming an action game in BASIC, one fact readily becomes obvious—wonderful Microsoft BASIC, with its blinding calculation speed is soooooo slo-o-o-ow. Many people feel the only solution lies in machine language. Well, yes, machine language is many times faster than BASIC. But machine language is harder to learn than BASIC, and it takes a long time to write a good machine language game (a good 8K game can take 2-3 months of evenings!). If you want to learn machine or assembly language, by all means do so. Meanwhile, don't discount BASIC entirely. Good action games are very possible if you give some thought to careful structuring of the program. Micro Video sells quite a few BASIC games, some of which can rightly be considered "action" games. Artillery Command, Bowling, Driver's Seat, and Dr. Doom are examples. Dr. Doom is a pretty fair representation of the arcade

motorcycle jump (perhaps you've dropped a quarter or two on it?). By following a few rules, designing your game carefully, and using speed techniques, you can write your own, very decent, action games in BASIC.

1. When possible design your game with "action off control". When the difficult movement starts, take control away from the player by design. In Artillery Command, for example, the player enters the angle and velocity of the rocket, then fires. At that point, the movement of the rocket is out of the player's hands. The shell movement calculations, plotting, and pointing, which BASIC does rapidly and well under its own control, can go on without having to check for user input. A further feeling of action can be generated by real time decision. In Bowling, for example, the playing speed comes from trying to release the ball at the right time, not on its roll down the alley. The player has no control over the speed of the ball, only on the point of release. The object becomes to calculate the proper time for release.

2. Limit the number of items in motion at any one time. Each separate movement slows the speed by one-half.

3. Use SOUND statements instead of TONEs. Due to the way a TONE is made, everything must stop until the TONE completes. Sounds, on the other hand, can continue indefinitely, and don't halt operation of other functions.

4. Write tight. Don't do things twice, if once is enough. If a routine isn't necessary, LEAVE IT OUT!

5. For graphic tokens, use CHR$. You can make your own special characters to use with CHR$. See the POKE statement in *BASICALLY SPEAKING* or Dr. Doom's Leap for Life for information on doing this. If you must draw, use Microsoft 8K BASIC—its graphics are up to 30 times faster than level II's.

6. Write straight line. Avoid using GOTO and GOSUB statements unless absolutely necessary. As discussed in FASTER BASIC, they force BASIC to search through your code, and thus slow down operation. Yes, I know that using GOSUB and GOTO is generally considered to be good programming practice, but there's an exception to every rule. For absolute speed, cut them.

7. Use PEEKs, POKEs, and machine language subroutines. If you're learning machine language, you'll find that small subroutines can help speed up a game with only a small amount of code. A good example of this is the BOMBS AWAY! program.

Well, there you have it. Let us know how you make out. Excuse me, I've got an enemy saucer at 12 o'clock high! ■

FOR ADVANCED PROGRAMMERS ONLY:

Pick Your USR

As your programming skills progresses, you'll find the USR command increasingly useful. The ability to blend BASIC and your own machine language routines allows for more complete program control, as well as faster execution. The one major drawback to this command has been the inability to call more than one USR routine without a lot of fancy footwork. With the following short piece of code, you can now specify USR with a real argument (i.e., USR(0), US (1),etc). By setting up a jump table of two byte addresses, you can use this routine to get and evaluate the argument, then jump to the assigned routine. My thanks to Harry Holloway for this idea.

```
CALL 6AB2   -This routine in BASIC gets the argument and puts it in DE
PUSHH       -Saves BASIC's pointer on the stack
LXIJTABLE   -Points to the address of the jump table
DADD
DADD        -Kicks it up to the proper address
MOVEM
INXH
MOVDM       -Gets the address for jump
XCHG
PCHL        -Executes the assigned routine
```

Don't forget that we stored BASIC's pointer on the stack. At the completion of your routine, POPH. For more information on USR, see *BASICALLY SPEAKING* and the Micro Video MONITOR Guide. Examples of the types of things you can accomplish with USR are shown in the BOMBS AWAY! Programming Tutorial. ■

FASTER BASIC

One technique to make BASIC programs run faster is to use subroutines properly. Microsoft BASIC calls must hunt for the requested subroutine, and the interpreter always starts looking at the beginning of your code. That being the case, the most efficient way to write your programs is to place the starting header, instructions, user inputs, and initialization code in a GOSUB or GOTO toward the end of your program. It's only accessed once, at start-up, so you can afford to lose the initial speed. Then, place your most used subroutines toward the top of your code. Then, when you call that routine, BASIC doesn't have to look very far to find them, and the operating speed will be faster.

Not convinced? Try these two short programs. The first, labelled "POOR PROGRAM," has to go to line 110 to find its subroutine. The second, labelled "BETTER PROGRAM," has two more lines, yet it executes faster. That's because it only has to go to line 20 to find the subroutine. The final "score" on the screen shows you the elapsed time. The first program takes almost 4 seconds to run; in the second, the time has been cut by almost half a second. Apply this idea to action-type programs, and you'll find a significant difference in how fast your programs run. In large programs particularly, this technique can cut minutes off execution time.

```
10 CLS
20 REM POOR PROGRAM
30 POKE24559,0
40 POKE24560,0
50 FORX=1TO600
60 GOSUB 110
70 NEXT X
80 PRINT PEEK(24560)
90 PRINT PEEK(24559)
100 END
110 REM
120 RETURN
```

```
10 GOTO100
20 REM
30 RETURN
40 FORX=1TO600
50 GOSUB 20
60 NEXTX
70 PRINT PEEK(24560)
80 PRINT PEEK(24559)
90 END
100 CLS
110 REM BETTER PROGRAM
120 POKE 24559,0
130 POKE 24560,0
140 GOTO 40
```

In the programs above, we used the Interact's internal clock. Many of you have asked for ways to time things. At address 24559, the clock runs at approximately 1/60th second intervals. It runs from 0 to 255. Address 24560 is the overflow; each time the clock hits 256, it updates the value in address 24560 and resets 24559 to zero. In the above examples, we POKEd zeros in both addresses to start fresh. There are more accurate ways to use the clock, but for time comparisons or a normal timing function (as in a quiz or game, see *REAL TIME QUIZ*), this method is a useful tool. ■

Real Time Quiz

How do you write a quiz program that has time limits on the answers? INPUT? INSTR$? Wrong, wrong. Both INPUT and INSTR$ suspend program operation for user input, so there's no way to keep a timer running accurately. So, how *do* you write a quiz program with a time limit?

You get 10 points if you said PEEK. When you're running a user input program with time constraints, you must maintain control to be able to keep track of the time. In *BASICALLY SPEAKING*, page 10-57, we are given an address that, when PEEKed, will return the ASCII value of the last key depressed (in decimal). You can PEEK that location to watch for keyboard activity, while keeping your clock running.

In this sample program, we'll use a simple step timer. You can control the time limit by changing the value of T, the time counter. We first POKE the "last key depressed" address (24529) to 0, to clear it. N is the value PEEKed. In this program, we are looking for a 1 (49 in ASCII decimal). In your own program you would check N against another variable that has been set to the correct answer. Where we have put the END statements in this program, you would put the branches (GOTOs) to the next part of your program.

```
10 POKE 24529,0
20 T = 1
30 N = PEEK (24529)
40 IF N = 49 THEN GOTO 90
50 IF N > 0 THEN GOTO 110
60 T = T + 1
70 IF T>100 THEN GOTO 130
80 GOTO 30
90 PRINT "CORRECT"
100 END
110 PRINT "WRONG"
120 END
130 PRINT "TIME'S UP"
```

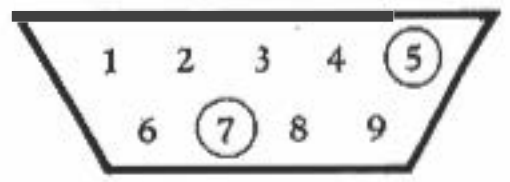
Another method of keeping time is to PEEK the clock. An example of this is given in the *FASTER BASIC* article. ■

Hardware Happenings — Eyes to the World

The Interact can sense what's going on around it. Yes, that's true. It responds to tape, reset, keyboard, and entertainment controller inputs. The next logical step is to harness this ability to accept input for our own uses. The joystick port is one of the best ways to "talk" to our Interact. It has four switch inputs (for the joystick) and three analog inputs (pot, fire, and spare). Let's examine using one of these in a very fundamental way.

The pot input measures a resistance. Any resistance device, within the proper parameters, can be sampled through BASIC. Changes can be measured and subsequently acted upon. I bought a photoresistor (#276-116, $1.19) from Radio Shack and attached the leads to pins #5 and #7 of the left joystick port to give my Interact eyes.

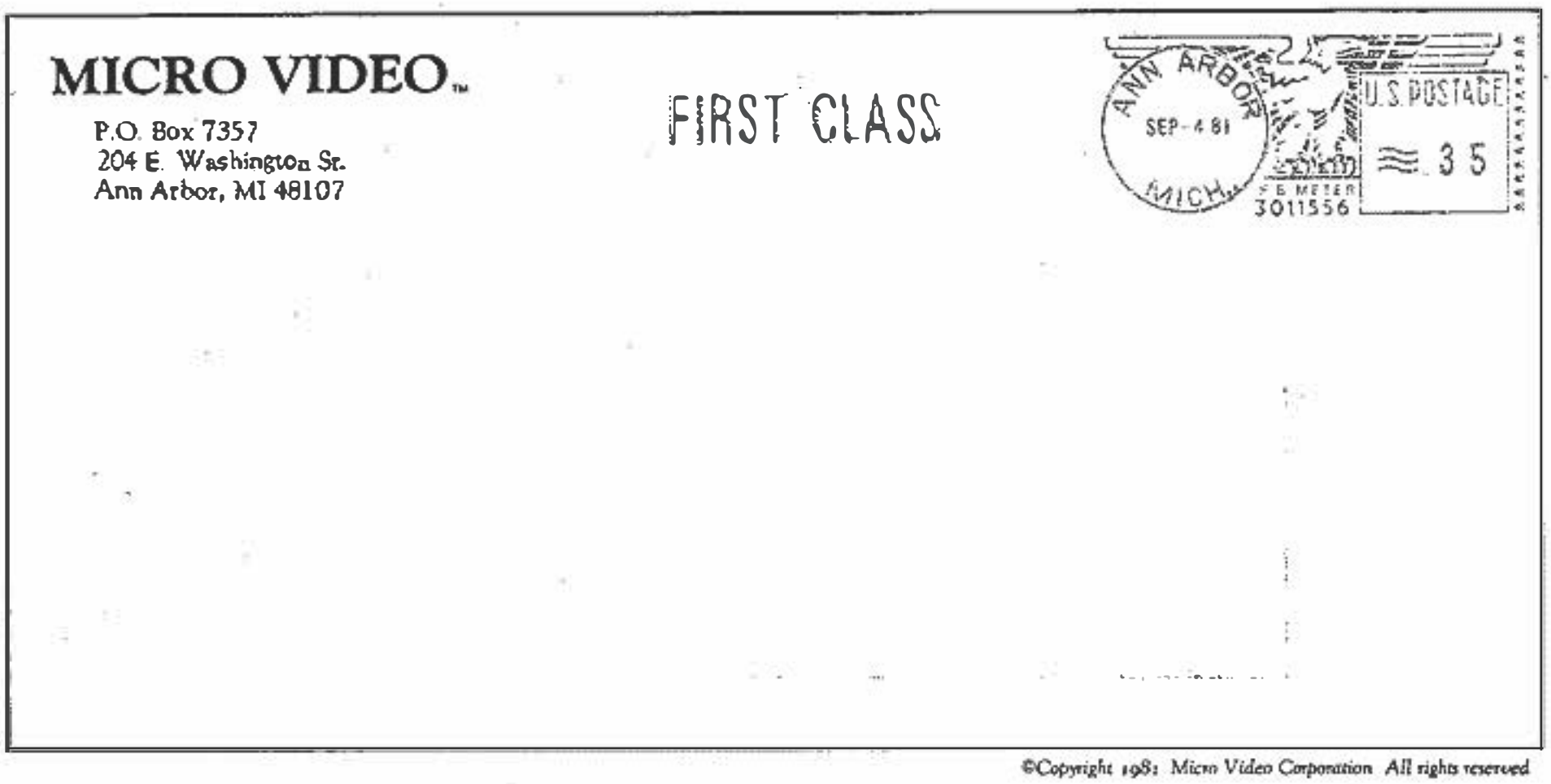
JOYSTICK PORT



Try following.

```
10 CLS
20 COLOR 3,0,0,7
30 PRINT" GOOD MORNING"
40 PRINT:PRINT:PRINT
50 L = POT(0)
60 IF L > 90 THEN GOTO 80
70 GOTO 50
80 CLS:COLOR 0,0,0,7
90 OUTPUT "GOOD NIGHT",15,35,3
100 L = POT(0)
110 IF L< 90 THEN GOTO 10
120 GOTO 100
```

When you run this program with the light cell attached, the computer can tell if the room is in light or in dark. So what? So a great deal. Think about all the other things you might do with a light cell. How about a carbon (resistance) mike? Many thermostats work with resistance. Now that your Interact can see, hear, and feel the world, what can you do with the capabilities? If this doesn't pique the experimentor in your soul, nothing will! ■



? FRE(0)-16314

continued from page 1

The added memory sits from 8000H to BFFFH

With the expansion, we now have a total of 32K contiguous memory After subtracting the screen and variable space, about 29K remains. With BASIC loaded, there is over 16K of program space, plus another 4K that can be used for USR routines.

The new 32K BASIC is an enhanced version of Microsoft that combines the faster graphics of 8K BASIC and the port access commands from RS232 BASIC. The I/O control for RS232 access has been improved for faster access to peripherals. A new graphics command, LINE, has been added; it lets you draw a line quickly between any two points on the screen The USR function has been modified for more direct access to machine language subroutines. Also available is a program to relocate BASIC programs written with other versions to the 32K environment

Unlike the Micro Video RS232 port, the expansion is not user-installable. A number of modifications to the Interact, including drilling holes for mounting, are required before the expansion boards can be put in place To ensure the best possible quality control, Micro Video decided to do custom installations, which includes extensive testing and burn-in Once installed, the memory board resides within your Interact's case. Aside from the extra AC adaptor, you'll notice no difference in its operation until you type ?FRE(0)

An Extra Word from Your Editor: This expansion is really a major change in our little Interact The added memory, plus the enhanced BASIC, will have its own column starting next issue. The rest of the issue will mostly apply to all users, but if you're really serious about programming, I suggest you give the expansion some thought For around $200, you can now have the power of a system costing much more, a great investment. Call Micro Video for further details and to schedule an installation appointment. ■

Feedback

Thanks guys!

I bought my Interact because of the price. Admittedly, I was a little skeptical of the ad: But I was dead wrong! The Interact is a wonderful, marvelous, beautiful machine—all the more so due to the low price! I can't say enough good things about it!

We play the TV games and love them I've written a TV game in BASIC and it works beautifully I've written educational programs for my daughter (first grade). She does math drills and also spelling (my tape recorded voice pronounces the spelling words over TV)

I'm a chemist by profession I've written complicated programs to help solve problems and prepare reports of analyses Apple, TRS-80, PET—they don't have anything more than Interact, so far as I'm concerned

For a while, I thought I must be the only Interact owner in the world Your newsletter and Interact info are like letters from a good friend—I just can't get enough of them And I'd be pleased to tell *everybody* how good your machine is! Just have 'em write or call!

Gary Baird
Carthage, MO ■

WIPEOUT!!!

A number of owners have encountered the infamous bug in Level II BASIC that can cause the loss of an entire program The symptom you'll experience with this bug is that when you try to run your program, the TV screen fills with a character pattern and all of RAM is wiped clean. This problem can occur if you reference a non-initialized string variable, either through a logic error or a mistyping of a string variable name There's nothing more frustrating than to lose an entire evening's progress to a single keystroke error. If you recognize the symptom and hit reset before the screen is filled, you can usually save the program If you use the older Level II BASIC, you should take extra precautions when working with strings, such as frequent CSAVEs, before testing changes or additions with the RUN command. The bug has been fixed in both Microsoft 8K and the new 32K BASIC. ■

Vol. II, No. 1 Spring 1982

MICRO VIDEO RAM Pages

More Memory Expansion . . . 92K?

Our requests have once again been noted. To really be able to utilize the capabilities of our computer, we felt we needed mass storage, i.e., disk. While Micro Video was aware of this, there were intrinsic hardware problems, and it looked as though the cost to the end user would be prohibitive.

They didn't give up on the idea, though, and a method of mating a relatively new product, the Exatron Stringy Sponge, to our computer has been developed. This device will give us up to 60K of mass storage with random access

Some time ago, Exatron began manufacturing a device they called the "stringy floppy." It was considered a low-cost alternative to a disk drive. The recording media was a "wafer," an endless loop microcassette, rather than a floppy disk. However, this device required a controller in the computer, and, it was therefore unusable with our computer without a major hardware change. Mass storage for our computer seemed to be unrealistic.

Until the Stringy Sponge. This device, manufacrured by Exatron, combines a stringy floppy with a smart controller that can be driven from an RS232 port. A resourceful owner, Mel Guiles, worked with Micro Video to develop the hardware and software access to this device, and, ta da! a new star is born! The Stringy Sponge uses interchangeable microcassettes (wafers) that sell in the range of $3-5, depending on the length. They can hold up to 60K of data. Access is at 9600 baud. (That's almost 8 times faster than the cassette drive!) The controller is built into the Exatron equipment, and the driver is in a PROM that fits into your Interact with no modifications required. (Yes, Virginia, there is a use for that empty ROM socket!) The Stringy Sponge stores files by number and can hold up to 255 separate files within its memory constraints. You access the system with a USR call from BASIC programs, in direct mode, or from machine language and you can call the commands READ, WRITE, REWIND (FFWD), and CERTIFY.

This product will greatly enhance the capabilites of your computer, and, coupled with the 32K memory expansion, will allow for truly serious applications. To use the new Sponge, you must have a Micro Video RS232

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Letter From the Editor

REMARKS

Your computer just keeps getting better and better! I remember just a short time ago buying mine and then finding out that Interact Electronics was going out of business. I bought what software I could then afford and tried to get all the information that was available. The lady at Interact tried to be helpful, but she just didn't have that much. The one thing she did give me, though, was a telephone number of a guy she thought might be able to help me.

That fellow was Dave Ross, and his company, Micro Video. I went and talked with Dave, and he indeed did have information and software not available from Interact Electronics. Remember, at this time we couldn't even POKE or PEEK in BASIC. Machine language was but a forbidden fantasy.

Shortly after that first meeting, Micro Video moved to larger quarters (something they have done twice since as they outgrew previous space). Since then, the company has done much to make the Interact a real and viable computer, forming the nucleus to bring together hardware and software talent for the machine. Information, software, and new hardware started bursting forth under Micro Video's direction. Abandoned owners now had a place to call with questions, a source for new products, a place to get service. Like the mythical phoenix, the computer rose from the ashes to become a living, breathing, growing, little giant among micros. If all this wasn't enough, Micro Video decided to produce this newsletter, at no charge, to keep all you owners better informed and aware of your computer's existing and new capabilities.

I'm glad I was there, because I was lucky enough to be asked to edit that newsletter, and I've enjoyed it. But,

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GAMESMANSHIP

What are the characteristics of a good game? Why are some games played endlessly, while others are played only a few times and quickly forgotten? You've no doubt seen and played numerous games on personal computers and in the arcades. You probably thought some of them were excellent. You've probably also dropped quarters on a few that were downright disappointing, a waste of time and/or money. Good games can sell computers (consider Atari's Star Raiders, for example) or can gross millions of dollars in the arcades (at its peak popularity, Pac Man grossed over $8 million a week!). Poor games seldom get past first base in sales, distribution, or use.

If you plan to design, develop, and eventually sell your own game, you may wish you had some guidelines to improve your chance of success. We very strongly feel that it's not so much the computer used to develop a game that determines its popularity, but the techniques that go into building and programming it.

We use the following guidelines to evaluate games that we buy from developers for inclusion in our product catalog. They are therefore somewhat slanted toward our environment. You'll find, however, that the same guidelines apply to games for the Apple, TRS-80, Pet, or other personal computers, and even to the specialized, coin-operated, arcade games. We've tried to keep the list general so that the suggestions apply to different classes of programs as well — action, strategy, adventure, or learning — all set in a game environment.

Game Operation

First of all, you must evaluate and understand the purpose of the game. Is it an action game, a strategy game, an educational game? Develop a scenario and fit your program into it. Lay out the whole structure of the game before you ever program byte one. Try to cover as many of the "What-If" contingencies as you can, and try to make the game as varied as possible. You can fit a surprising amount of complexity into a small amount of memory if you know how to squeeze your bits. (If you're programming in BASIC, see the more than 20 hints for "shoe-horning" in chapter 8 of *BASICALLY SPEAKING.*)

The game should have an *understandable objective.* You should be able to state the basic idea in a single sentence that an 8-10 year-old child can grasp. While the supporting rules and strategies may be significantly more involved, a player should be able to get the point of the game by watching the play or from a brief verbal summary.

A game should have *a set of clear instructions* built into it if possible, as well as detailed, written documentation. Viewing an embedded instruction summary should always be optional; repeated, enforced display of instructions quickly becomes an irritation to the player who understands the rules of the game. Use a clean, concise style with word placement on the screen that is visually attractive. Be clever — the instructions should act as an "appetizer" to the "main course" of the game. If you're crowded for space, however, the embedded instructions should always be the first to go. Don't ever sacrifice graphic effects, variety, or program operation for instruction screens. You can always document the rules of play on paper. You can't document how the screen would have looked, what message would have been displayed, or what other game features might have been present had the internal instructions not been included.

Scene from an upcoming game.

You might choose to document via a *demonstration mode* which can operate as a user-selected option or which "plays itself" when no player is present. Arcade games use this approach to provide visual program instructions and also to entice a viewer to become a player. Depending on the type of game you're developing, this approach may even require less memory than displaying text screens.

Flawless operation is a must. There should be no hidden "bombs" that cause the program to fail. Test all your contingencies, keeping in mind that first-time users especially will tend to try to do things that to you might seem totally illogical. This type of testing usually requires several hours play by different people at different skill levels. There's nothing worse than having a game abort unexpectedly in the midst of an exciting segment or after a long time investment in play has been made.

Plan for these seemingly illogical player moves with *data checking.* Always check inputs from the player and evaluate them. Don't, for example, allow any response but "Y", "N", or depression of the fire button to a yes/no decision in a game. Make sure the player's data fits what is to be done with it. Embed error messages in your program if possible to let the player know what's wrong.

The game should have *responsive action.* If the program often accepts input from the keyboard, make sure you check the keyboard frequently. The same goes for joysticks. In controller-based games, you must check for input from the controller almost continually for good responsiveness. It's terribly frustrating to know you reacted quickly enough to overcome an obstacle in a game, but still lose because the joystick wasn't checked quite often enough. On the other side of the coin, you don't want your program to accept input so often that the slightest touch results in reaction and loss of control. In general, the rule is that the less frequently you check for input, the slower-paced the game will be.

Pacing is another important factor in game operation. The desired pace will vary according to game type, and may even vary within the game itself. A car race game, for example, needs much faster visuals and reaction time than does a strategy game like Chess

EXPLORED

or Backgammon. You may wish to design your action games so that the pace steadily increases with the duration of play.

Random operation is also a requirement. In a player vs. computer game, the computer's starting move and play should not be readily predictable. In a math drill or other educational game, you certainly would not want to present the same set of problems or material each time the game is started. You can achieve this "randomizing" by internally using a random seed to start random number generation.

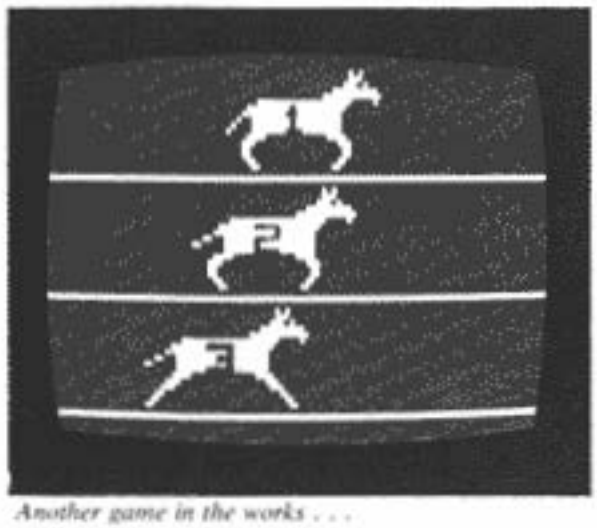
Allow the player to *save game status and data* on tape in lengthy, strategy-oriented games such as an adventure or board game. Players may want to continue games over multiple playing sessions or to review their play at a later time.

Simplify restarting at the conclusion of the game. The player should be able to choose to play the game again by pressing the fire button or the "Y" key. Use PLAY AGAIN (Y/N)? and SAME GAME (Y/N)? restart formats to allow player to respecify game options if desired. At no time should a player have to reselect game options to play the same game over again!

Game Options

An important feature in program operation is allowing the player to control some factors in the game.

Multiple skills levels should be employed to let the player decide the difficulty level at which play is to begin. These can be implemented in different ways. You can let the player select from a range of levels, each of which has limits determined by the program logic. Or, you can let players specify the variable settings of certain game factors and use those settings to define the skill level and game play. This method provides more flexibility and a larger number of skill level combinations in the game than does the first method. The lowest skill level in the game should be easily playable and beatable by novices, while higher levels may be nearly impossible to win. Inclusion of multiple skill levels in a game is important because it lets



Another game in the works . . .

players sharpen their skills at the different levels without getting tired of the game.

Provide for *increasing difficulty* within skill levels. Especially in action games, play should become progressively harder as play continues. This technique gives new players a chance to "get the feel" of a game and builds tension and excitement as a player's skill increases.

In strategy games, you may want to implement a *back-up option* that will allow the player to "take back" a move before completing the turn. Backgammon, for example, has this feature; it will let you revert to the beginning of the move at any time during your turn. Some games, like Chess, also include an *instant replay* option that lets you review the progress of the game.

Some games are well-suited for *multiple players*. Alternate players' turns in such games, rather than having each player complete a game before the other has a chance to play. Breakthrough is deficient in this respect. Alternating player turns at appropriate points in the play tends to breed more of a spirit of competition.

Identify players by name within multi-player games, or even single player games. People just love to see their names displayed on the screen, especially if there is a high score associated with it!

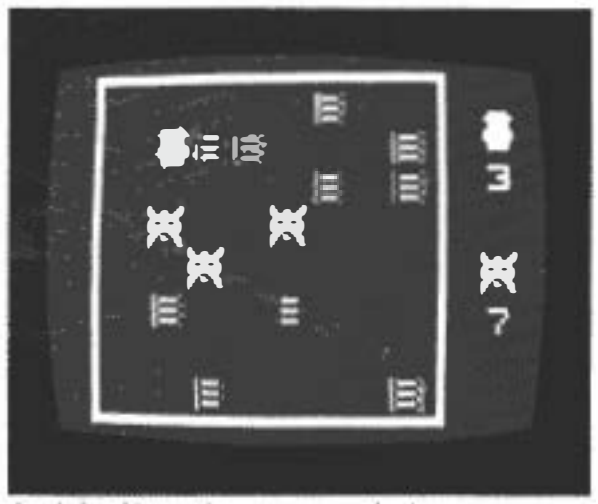
Consider allowing *skill level selection for each player* in a multiple player game. Particularly in educational games, such a format lets players at various skill levels compete without unfair advantage to any one player. You might vary game time, difficulty of play, number of chances, etc., by player.

Scoring and Rewards

How you score your games or reward players' achievements can be important in how well a game is liked. How and when you present a player's score can also add dramatic impact to the game.

Always *keep score* in some form. A game which offers players no feedback or measure of progress very quickly becomes dull. How you score will vary from game type to game type. You'll have to evaluate your game objectives and determine how to express degrees of having met those goals. Scoring may be relative to time elapsed, number of moves, number of "hits" or correct responses, etc., as appropriate to the individual game, but it absolutely should be included!

Display the score on the screen at some point in the game. In some programs, you may not want to show the



Look for this one in our next catalog!

score at all until game play has ended. In others, you may want to have the score continuously displayed and incremented on the screen. In some games, it may be appropriate to have the current score or status of game factors displayed graphically. You might, for example, have the number of "ships" remaining in a space war game displayed visually. In a simulation program, you might want to display fuel remaining with a graphic gauge, rather than as an actual number. There are many other ways to in-

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Program Notes

The amount of software that's coming out now is just overwhelming, so rather than run lengthy discussions of each, I though I'd just give you some highlights of a few of the many new items available. All of the new software I've looked at is pretty exciting, so I suggest you identify your own area of interest and explore programs that fit your bill.

First, near and dear to my heart . . . GAMES. Micro Video released three real blockbusters in their last catalog. **Alien Invaders** is the game most requested in the surveys. You asked for it, you got it. Hoards of invaders hover overhead, constantly moving from side to side and dropping lower and lower on the screen. Can you shoot them all before they destroy your protective bunkers and you? This game even has a bonus flying saucer. Joystick control is exceptionally smooth in this game and you won't believe how fast the visuals arc. If you're not aware of this game, you must have spent the last few years in a cave or on a desert island!

That applies to the second game in the trio also, **Packrat**. You chase round the playing field, collecting dots and avoiding the little beasties that chase you. Eat the "megabytamin" and chase them back for added points. Special bonus points in this one too.

The third game has my son's seal of approval. **Space Base** is an exciting, superfast war of nerves and the ultimate test of your reflexes. Ships appear randomly on the four sides of the screen and shoot missiles at you. You must aim and fire back before the missiles hit your space station. The better you get, the faster they come. It's fast and furious insanity for kids of all ages.

I can safey recommend all of these games. Each is like having an arcade in your home. I figure that, at 25 cents a game, I've paid for one in a single evening's play!

Now, on to more serious programs, but ones that are just as exciting to us computer nuts. The programming aid most asked for in the surveys, an Assembler/Editor, has arrived on the scene!

For those of you who don't understand the purpose of an assembler, a brief summary. An assembler/editor combination provides an easier way of writing machine language than through direct entry with the Monitor. Rather than using actual hex values, you enter Intel 8080 mnemonics. These are combinations of letters similar to functions in BASIC — each represents an instruction to the microprocessor. In general, learning and remembering these sets of mnemonics is far simpler than having to work with all the various hexadecimal combinations they represent. The mnemonics are processed and converted to machine (or object) code for you automatically.

With **Assemblex/Editex**, you write programs in two fundamental steps. First, you use Editex to enter the source code (mnemonic instructions). Then, you use Assemblex to convert the mnemonics to their hexadecimal equivalents. You can enter about 8K of text into a source file on a 16K machine. On a 32K, your source file can be considerably longer, up to 24K. The ratio of object code generated from a source file is roughly 1 to 4, if comments aren't used. You can use Assemblex on multiple source files to generate as much object code as your machine can handle, combining the files after assembly with the Micro Video Monitor.

Editex gives you a number of powerful editing features. It allows both line and character editing with commands like APPEND, ERASE, CHANGE, INSERT, and SEARCH. Its counterpart, Assemblex, is a full-fledged, multi-pass assembler that first generates a symbol table, then the object code. It supports, among others, the SET (equate) pseudo-op and allows you to locate your code anywhere in memory via ORG. Assemblex writes your assembled code to tape and lets you produce a full listing of the source and resultant object code.

Assemblex/Editex comes with full documentation, but it is a programming tool, not a tutorial on assembly language programming. The instructions assume familiarity with 8080 asssembly mnemonics. If you're new to this type of programming, make sure you have a good book on assembly language and READ IT!

Also in high demand has been more educational software. Along those lines, Micro Video now offers **CAPIT** (Computer-Assisted Personalized Instruction Technique). Originally designed for (and still in use by) the University of Michigan for continuing education courses. CAPIT is essentially an authoring program that gives

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Hardware Hints

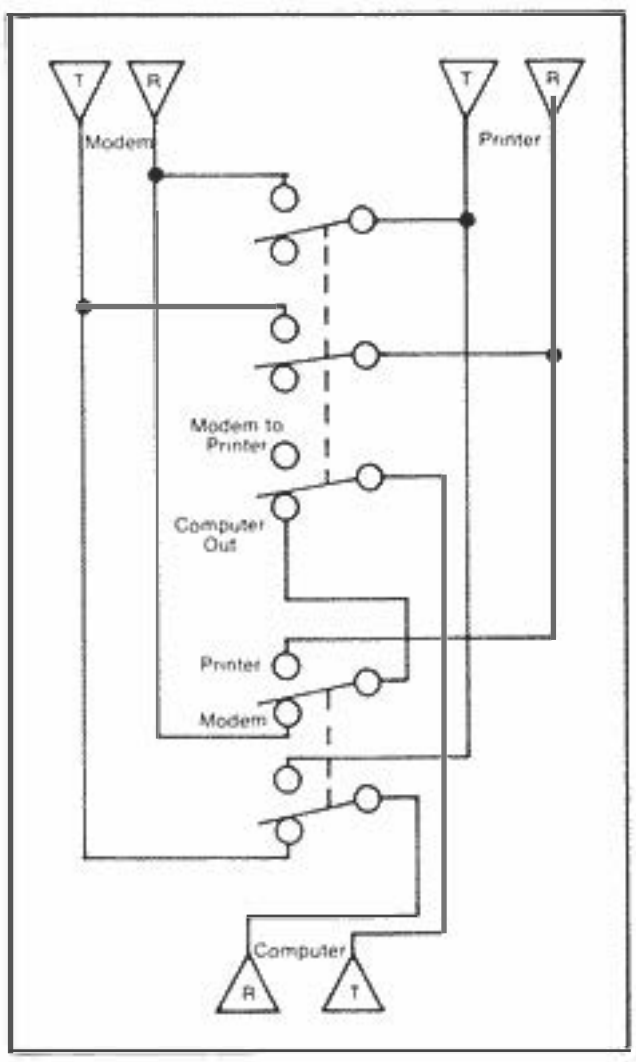
Printer-Modem Switch

This issue's Hardware Hints provides a reasonable solution to the problem of trying to run a printer and a modem simultaneously. This information was provided by my good friend, Russ Patten.

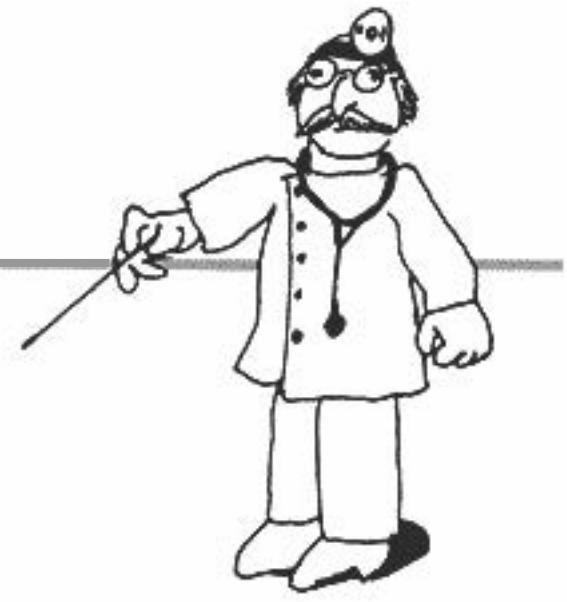
Many of our readers have asked if it was possible to run a modem and a printer at the same time from the RS232 port. The answer has been no, at least up until now. Check out the article on the Exatron Stringy Sponge and dual port option in this issue. Additional software will be required to use the dual port option with a printer and modem, so in the meantime, you can devise your own system.

The switch Russ describes doesn't actually allow for simultaneous dual use, but it will allow you to hook up both devices and switch back and forth without having to unplug either device.

You'll need a double and a triple pole double throw switch as per the schematic below. I'll leave the wiring and choice of a box to put it in up to you.



The Computer Doctor



SYMPTOMS:
Certain keys don't function properly.

The tape motor doesn't come on when I press "L".

DIAGNOSIS: Broken keyline

Rx: The first thing to do is load the Micro Video Diagnostic tape into your computer. When the menu appears, press key "2" to run the keyboard test. Perform the test by pressing each key on the keyboard. When all keys have been pressed, any that are inoperative will be evident. Use this information and the keyline chart below to determine which of the keylines are broken.

	9	10	11	12	13	14	15
8	Z	R	J	B		2	*
7	Y	Q	I	A	9	1	SPACE
6	X	P	H		8	0	CR
5	W	O	G	?	7	÷	TAB
4	V	N	F		6	.	↑
3	U	M	E	=	5	—	LOCK
2	S	K	C	;	3	+	SHIFT
1	T	L	D		4	,	CONTROL

As an example, let's say that keys X, P, H, 8, and 0 don't function when you run the diagnostic test. By looking at the chart, you can see that all these keys are controlled by keyline #6. This then is the line you will check for a break.

Open your unit by removing the six screws from the bottom of the case. Separate the top assembly from the bottom by carefully lifting the top up and disconnecting the keyline and power supply connectors. (Make sure your computer is unplugged.) You will then need to get inside the main electronics assembly casing. Remove the four large screws in the top of the housing and the six smaller screws on the metal connector panel. To move the connector panel down through the hole in the top housing panel, slide the housing panel slightly foward.

Now lift the connector panel up about an inch and gently maneuver it so that the front left corner can be passed down into the hole. Follow with the back left corner of the connector panel, then slide the whole connector panel through the hole and lift the top housing plate toward the back of the computer.

You're now ready to find and repair the line break. Look at the twisted, grey cable that runs between the connector panel and the main PC board. The line break is most likely to be on the underside of the connector panel. Counting from left to right, locate line 6 (or the line you have diagnosed as containing the break). If it is broken, carefully solder the line back onto the connector panel. If you did not find a line break at that end of the cable, follow the grey cable down to its connection on the main PC board. Then, counting from *right to left*, check the connection on line 6 and repair if needed.

If both connections are good, the problem is not a line break, but more likely to be a bad chip— either IC31 or IC32. You can try replacing either or both of these chips, or call the Micro Video Service Department to arrange for the repair.

After repairing the line break or other problem, reassemble the unit. Always run the diagnostic test again to determine whether or not your "surgery" was successful.

32K CORNER *On Converting TRS-80 Programs*

If you've upgraded your computer to 32K, you'll want to start exploring the capabilities all that extra RAM gives you. One of the advantages of the additional memory is being able to use many of the programs published in books and magazines, most of which are written to the 16K standard. Many of those programs are written for the TRS-80, so we thought you might like some hints on translating them to our environment.

Before you start to convert any program, make sure it requires no special hardware, such as printer or disk, that you don't have. Also look to see if the memory requirements fit what you have. Go through the program looking for unfamiliar commands, and check your *BASICALLY SPEAKING* (maybe BASIC has that command and you just don't know it). Try to follow what the program is doing each step of the way. If you can't get a part of it to work, see if you can come up with an alternative way of handling the operation. After a few tries, you'll find that you can usually determine which programs can be translated, and your job will become much easier. Meanwhile, you'll learn a lot about BASIC!

One of the first differences you'll encounter is in line length. Since TRS-80 computers have a longer line length, you may have to put the operation in multiple lines on your computer.

Then there are differences in graphics. The TRS-80 graphics screen is 128 on the X (or horizontal) axis and 48 on the Y (vertical) axis (and they say our machine has low resolution!) That means that their full screen picture will not fill our screen completely. Also, the origin of the TRS-80 screen (0,0) is in the upper left corner, just the opposite of ours. Their plotting command is called SET (format: SET (X,Y)). Because the TRS-80 has no color capability, only the two screen coordinates are needed. To erase a plot, they use RESET (X,Y).

We can easily emulate their plotting commands by using PLOT X, Y, color. To erase the screen, of course, just replot the coordinates in the background color. I've found that if I haven't seen the actual screen in a TRS-80 program, it often helps just to replace the SET and RESET commands with our PLOT command. Even though the result will be upside-down and won't fill the screen, it's then easy to see what the picture is supposed to look like. Just stand on your head. Seriously, you can then refigure the coordinates to flip the picture, add color, and stretch the graphics to fit the screen. Remember also to watch for commands that control movement — you'll have to reconfigure those operations to fit the "stretched" picture on our screen too.

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On The Inside

TWENTY QUESTIONS

This issue's "On the Inside" column features Dallas Maddox, Micro Video's new Manager of Customer Services. She's compiled a list of the 20 questions she's asked most frequently, along with the answers to each. She hopes she'll never have to answer them again!

Q1. Is all the software and hardware listed in the catalog available?

The software is generally always available because we produce it right here at Micro Video. Sometimes there is a delay in releasing programs. When there is, it's because we feel there are still ways to make the software better or bugs to be removed. This was the case with VideoCalc and DREAM, which I know some of you have waited patiently for. These are now finally available. We appreciate your patience and hope you'll find that, like fine wine, they're worth the wait. Some hardware items are not always on hand. The RS232 Peripheral Interface is often on a back-ordered status due to high demand — we just can't seem to keep them in stock! We recently began assembling more controllers, so they are back in stock. Controller extension kits will no longer be offered. We fill all back orders on a first in, first out basis.

Q2. Why do some programs require Microsoft 8K Fast Graphics BASIC instead of my Level II? Why so many BASICs?

This is a question I'm often asked. Microsoft 8K BASIC is an extension of and replacement for the older Level II BASIC. We developed it to correct a string handling error in Level II and to add faster graphics capabilities. We also took out the PEEK/POKE limits. All your Level II programs should run under 8K BASIC control with no problem. However, the reverse isn't true, and most of the BASIC programs in our catalog do require 8K BASIC. Trying to run them under Level II control will result in syntax errors, since the Level II interpreter simply does not understand or recognize the extended PLOT format.

Q3. Do I need RS232 BASIC if I am going to expand my computer to 32K RAM? Again, why all the BASICs?

You can still load and run RS232 BASIC on a 32K machine ro execute programs you've written using the RS232 interpreter or programs such as the Loan Evaluator, PRINT-A-SKETCH, and MicroText. You may also use the 32K Translator program to convert such programs to run under 32K BASIC control, then CSAVE the programs to create your own copies for use in the 32K environment. You'll understand why both BASICs

Visa or Mastercharge?

exist if you know the history. RS232 BASIC was developed as an extension to Level II BASIC that would allow printer access. It has no fast graphics capabilities because it was developed *before* Microsoft 8K BASIC. 32K BASIC, our "super-interpreter," combines all the features of the other BASICs for 32K-equipped machines. It not only has fast graphics, automatic PEEK/POKE initialization, and RS232 access commands, but also another graphics command, LINE. Different BASICs for different machine configurations!

Q4. I have a 32K computer, but my friends still only have 16K. What if I want to write programs to share with them?

You won't be able to share your 32K software with them until they've got 32K too. While you can convert programs written in other BASICs to run with 32K BASIC, we have no facility to translate in the other direction. Let me remind you that you can, however, load and run 8K BASIC in your 32K machine. Why not use that interpreter to create programs you can share with your friends?

Q5. Will you ship my order C.O.D.? Can you bill me?

We can ship your order C.O.D. only if delivery is by UPS. You must supply an address UPS can deliver to (no post office boxes). There is an additional shipping/handling charge for this service. The shipping/handling fee for C.O.D. orders is $4.50, with two exceptions. There is a $5.00 charge for shipping RS232 interfaces or Votrax Type-N-Talk units C.O.D. Shipping and handling on computers ordered on a C.O.D. basis is $10.00. We do not invoice individual merchandise or repair orders, because of the added bookkeeping it creates for us.

Q6. I just placed an order. How long will it be before I get it?

We try to process all orders within three days of receipt. Shipping varies on location, but will generally not exceed 5 days. Computer orders may take slightly longer, based on availability, but are usually shipped within 2 weeks of order. If you have not received your order within 2-3 weeks, you should call to report the problem.

Q7. Are you going to offer BASIC in ROM? And should I delay expanding my computer for this enhancement?

Many of you have asked for this expansion, and we are still considering offering it. Other items, such as the 32K expansion, Exatron mass storage device, and professional keyboard, have taken precedence in development. You can be sure that when it is offered, ROM-resident BASIC will be compatible with our other hardware upgrades, so you need not delay expanding your computer to 32K.

Q8. Are you going to offer the 32K memory expansion as a kit?

In an immediate sense, the answer is no. The upgrade is far more intricate than the RS232 installation.

which many users had problems installing. We've found that a variety of things can go wrong in the installation process — the added hardware tends to stress the weak points in any machine (chips, resistors, even the microprocessor). Our technicians have the training and diagnostic equipment necessary to pin-point and correct these problems quickly. We do, however, hope to get the procedures refined to the point that we will be able to offer the expansion in kit form.

Q9. I'm thinking about buying a printer. Is there any one that you particularly recommend?

We are very much impressed with the Epson MX-80 printer and have recently begun carrying it and the MX-100. Information on the Epson and connecting it to your computer is now being shipped with all RS232 ports shipped. If you want this information, send us a S.A.S.E. or request that it be included with your next order.

Q10. Can I access a timesharing system and run my printer at the same time with your RS232 port?

Although our RS232 board does have a dual port, only one of the ports has handshaking capabilities at this time. We will soon be releasing a modification to the RS232 board that will give the second port handshaking, so you'll be able to drive two devices simultaneously. Additional software control will be required. You'll first see the option implemented with respect to the Exatron Stringy Sponge, and by fall, we hope to have a Communicator-Plus program that will let you "dump" to your printer off a mainframe system. For an interim solution, see this issue's "Hardware Hints."

Q11. Must I have an RS232 interface to upgrade my computer to 32K?

Nope. The two expansions, while completely compatible, do not require one another. With both upgrades installed, a small driver board is needed and is included in the price of the 32K/RS232 expansion.

Q12. I've written a program I think is pretty good. Is Micro Video interested? How do I make sure you don't just steal it?

We're always happy to evaluate user-written programs for our catalog. Our policy is never to duplicate or distribute software that is sent to us for review, so you needn't worry about theft. If we're interested in the program, we'll contact you by phone if possible, or by letter. If we're not, we'll return the tape to you with our comments. We have made arrangements with programming enthusiasts in the past, so if you've written something you believe is marketable, by all means send it in!

Q13. Can I get schematics for the RS232 port and 32K memory expansion?

We've had numerous requests for these schematics. Unfortunately, our arrangements with our supplier do not permit us to release them.

Q14. My computer is broken. How do I go about sending it in for repair?

First of all, give us a call. There may be some adjustment you can make yourself, such as a tape head alignment, and you can avoid sending it in. If it's really broken, pack it up, in its original carton if possible, and send it to us at our street address. Include your name, address, a phone number where you can be reached during the day, and a brief description of the problem. If you're planning to pay by Visa or Mastercharge, you can also include your card number and expiration date. If you plan to pay by check, money order, or C.O.D., we'll call you with the repair charges when your unit is fixed. A $7.50 return shipping charge is added to all repair bills.

Q15. What if I want to try to repair my computer myself? Can I buy parts from you?

Yes. We usually have on hand any part you might need to replace. Call for pricing on the part you need.

Q16. Can I get a better keyboard for my computer? This one is so hard to program on!

You'll be happy to know that a professional-style keyboard is definitely in the works. It will be a snap-in, add-on you can install yourself. Because of long production lead times, this item won't make our upcoming catalog, but look for it in late summer or early fall.

Q17. Now that you offer an assembler, isn't the Monitor program I have obsolete?

Most certainly not! While the assembler-editor package provides an easier method of generating machine code, the amount of actual object code you can produce from any one source (or text) file is limited by the available RAM in your machine. The Monitor lets you "piece together" blocks of object code you've generated from multiple source files and save them as one complete program. You can also use the Monitor to correct errors or modify the program without having to repeat the entire assembly process.

Q18. Are you planning to come out with another Adventure game?

Good news for our adventure aficionados! An all-new adventure, The Haunted House, will be offered in our next catalog.

Q19. Will a floppy disk ever be available for our computer?

To be honest, a floppy disk expansion is unlikely. But, those of you who've been waiting for mass storage for your machine, check out the Exatron Stringy Sponge article on page 1 of this issue.

Q20. Who currently manufactures the computer?

Manu-Tronics originally produced the computer for Interact Electronics, and continued to produce machines after Interact's demise in 1979 to get rid of related stock they'd purchased. Micro Video now holds the only manufacturing license for the computer. We're in the process of getting more machines out into the marketplace — you'll see them advertised during the fourth quarter of this year.

Memory Expansion . . . 92K?

continued from page 1

peripheral interface. The memory expansion is *not* required, but it is fully compatible. Micro Video also will be releasing a method of adapting the RS232 port so that the second port on the board will have hand-shaking capabilities. This will allow you to use the Sponge and a printer simultaneously. The price of the Sponge is not yet firm, but the package, which includes the Stringy Sponge, operating PROM, connector cable, and complete instructions, is expected to sell for about the same price as the Sponge alone bought directly from Exatron.

Please do not order yet. The price and other details will be announced in your next Micro Video catalog; at that time, stock will be available for shipment. Meanwhile, start dreaming about all the things you can do with your computer and this exciting new hardware option.

REMARKS:

continued from page 1

because of increased demands on my time, this will be my last "tour" as your editor. I'm sorry to go, but I know the newsletter will be in good hands. I hope you've enjoyed my little pearls of wisdom that have graced the past issues, and I hope your computer is as good to you as mine has been to me. Keep reading, keep learning, and keep on computin'! As for me, well, I'll still be a computer freak just like you . . . waiting for more new goodies from Micro Video.

Sincerely,

Marv Long

Marv Long
Editor

GAMESMANSHIP EXPLORED

continued from page 3

corporate graphics into your scoring or status display — try to use them.

You can sometimes use *interludes* as a logical point in the action to display the current score. These can also contain clever graphic effects or animations that reward a player for having "hung in there." (Pac Man's cartoons are an excellent example of this technique.) Interludes can also provide a much-needed break and chance to relax for the player in a high-tension action game.

Store *the current high score and its player's name* within the program, and display it along with the current player's final score. This lets players evaluate their scores and adds the incentive of having a score to beat. Include code that accepts a new player name when a new high score is achieved.

Scale your scoring so that average play yields scores in the hundreds or thousands, rather than ones and tens. Points don't really "cost" you anything, so why not add an extra zero or two? A player will get far more satisfaction from a 3,700 score than from a paltry 37.

Put *strategy in action games.* Make missed points or bad maneuvers "cost" the player in lost points, reduced game time, or number of turns at play. It shouldn't be possible to set record high scores simply because of an ability to hit the fire button at a faster rate than other players.

Give players *bonus scoring opportunities* in the game. Let players exhibit more skill to gain higher scores, more turns, or increased game time.

Award mystery prizes for especially high scores or achievements. These may take the form of bonuses or special animations, graphic effects, or general fanfare. Special prizes should be awarded only for exceptional performance. Thus, they may be visible in only a very small percentage of the games played.

Graphics and Animation

Color, graphics, and motion can be very important elements in maintaining player interest. Let's face it, games that are purely text display tend to be dull. While the use of color and sound can alleviate some of the textual tedium, graphics and animations will almost always make the program more entertaining.

Whenever you can, use *graphic representations* of the elements in your game. If your game involves rolling dice, show the dice on the screen graphically — use white blocks with black dots inside — rather than using standard numeric representation. If it's a card game, display the cards, with suits and values, on the screen.

Games that feature *creative graphic display* will invariably evoke more player enthusiasm and response than equivalent games without graphics. Who wants to play checkers as a series of coded moves? Wouldn't a graphic display of the checkerboard and pieces be more alluring? Simulation games, like a lunar lander, should have graphics that visually relate player decisions to performance. Watching your space craft crash into a planet because you used too little thrust has far more impact (if you'll pardon the pun) than seeing a text message that tells you you've crash landed. Graphics should always be appropriate and fit into the scenario of the game, however. Graphics for the sake of graphics only, if inappropriate, may achieve an undesired effect.

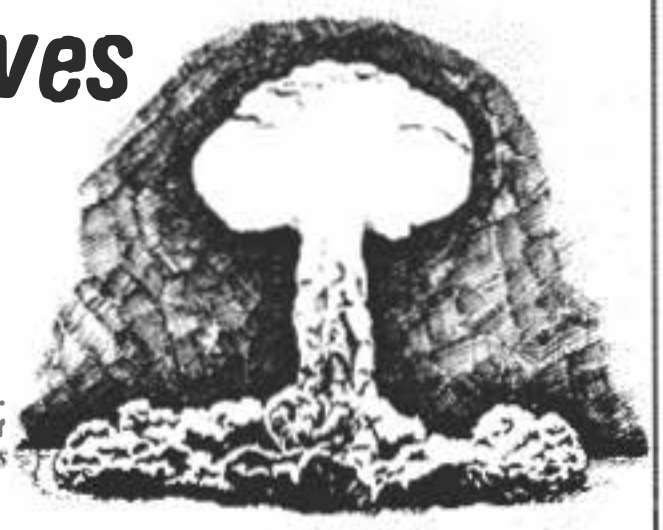
Animate your graphics when you can. Make the dice roll, the slot machine wheels spin, the playing cards snap down on the table, the propellar blades on a helicopter whirl as it flies, etc. Cute, related graphics never detract from a player's enjoyment of the game.

Use *sound effects* if the computer has the capability to create them. Sounds can add realism to the game (the roar of a car engine, the blast of a laser). Sounds can also be used as prompts, to acknowledge player moves, or as "warnings" in the game. Sound, if used, should be cute, relevant, variable, and, most importantly, non-irritating over long periods of time.

Color is a useful tool for adding variety and visual appeal to a game. Color can be useful in identifying players or teams, changes in game modules, special game status, etc. Simple color rolls, blinking, or screen flashing can add dramatic flair to any game. Select color combinations for your display which are not tiring to the eye, even after hours of play. Dark backgrounds (black or blue) with brightly colored foreground objects usually work out best. The game should also, though, be playable on a black-and-white screen.

What constitues a good game is, of course, highly subjective. What bores one person to tears may be another's passion. And, to each of these guidelines, there is undoubtedly a counter-example of a good game that violates the rule. However, few really good games violate very many. Probably the most objective way to evaluate a game's success or failure potential is to see how often it's played. Try your games out on your friends and find out. If they enjoy it, they'll want to play again, and again, and again . . .

Interact Survives Nuclear Blasts!



Paul B. Anderson of Norfolk, VA. supplied this story about an Interact that joined the Navy. I knew my computer was one tough machine, but nuclear blasts? ! !

Simulated ones, of course. The U.S.S. Kidd (DDG 993) and an Interact computer recently completed blast tests at a special range in the Caribbean. Three tests were conducted — one with 10,000 pounds of TNT and two others with 40,000 pounds. Each blast was subsurface, and all were at ranges of less than 1,000 feet.

During this time, my Interact was in its box, strapped to a workbench a mere three inches from a bulkhead (that's wall, for all you non-naval types) that faced the blasts. I'd protected it from falling objects with two layers of bubble wrap.

The largest/closest blast was tremendous! The above-mentioned bulkhead moved in about a half an inch. The space itself actually received a shock force in excess of 20 GRAVITIES!

Did anything survive? Yes, the crew had no personal casualties. The ship sailed on to Pascagola, Mississippi. And the Interact? Well, I had to realign the tape head, but then it was business as usual.

Incredible! Thanks, Paul. Can anybody out there top this one?

NEW CONTEST

A Better Mousetrap?

If you didn't get the goodies on your Small Bytes program, or you didn't get your entry in (shame!), then here's another chance. Send in your favorite hint or tip.

Have a clever idea that you've incorporated into your programming? Found a new way to protect your computer when you take it somewhere? Got your computer doing something special? Share your knowledge and win a prize. The only requirement this time is that the idea must be something you have already used with your own computer (no wild, untested dreams, please!) — software, hardware, underwear, what have you. Keep them brief (sorry), and don't worry about the writing. We'll take care of that.

The prize? $100.00 in Micro Video product credits. Take the loot from Captain Video. Send your idea in now!

Program Notes

continued from page 4

you a structure to work with in creating your own educational packages.

CAPIT uses the computer's tape deck as an audio source for lecture material that is recorded on tape. Within the recording are instructions to the student to access various screens the instructor has defined and stored. These screens may contain "blackboard" material used to reinforce the audio lecture material, or they may be used as a means to test student retention of the concepts presented. Automatic scoring of correct and incorrect answers is built-in. CAPIT makes it possible for instructors to format teaching programs without knowing how to program. The "skeletal" structure of CAPIT makes it flexible enough to be used with a variety of course material. And, of course, the material can be customized to the students' abilities and age groups.

Late Breaking News! The Dream and VideoCalc programs are finally available! Release was held off so that more new features could be added and the programs completely debugged. Each program includes extensive (40+ pages) documentation which is both entertaining and informative. More about both these programs in next issue's Product Notes.

NEW LOOK

Notice anything new about your newsletter? Yes, it has a new name, and this is only one of the changes now occurring at Micro Video. Normally, Micro Video is relatively silent about future plans until everything is assured (the best laid plans of mice and men, you know), but on this one occasion I'll take you on the inside.

Micro Video has increased their commitment to our computer, its users, and their needs. Many new software titles are currently being evaluated and prepared for the next catalog, so there will be no shortage of new materials in the coming months. In fact, you can expect to see at least 30 new programs by Christmas!

They've also increased their staff to better serve your needs. Good service made even better.

Many new hardware enhancements are also in the works. The Stringy Sponge is the newest to-date, but an add-on, professional-style keyboard is under development and will be available later this year.

Probably the biggest news is that, if all goes as planned, Micro Video will be manufacturing our little computer again by the end of the year. Again, under a new name, but with the same high-quality software and support services. Watch us grow!

Interact Gets the Business

Dennis Hermes of Houston, TX, alerted us to an article that appeared in *Computerworld* (March 29, 1982). On the front page of that issue, in the lower right corner, is a photo of a man and his computer. The man is Don Povejsil, Vice President of Corporate Planning, of Westinghouse Electric Corp. The computer is a 32K Interact. Although CW deigned to identify the computer in use, anyone who's familiar with our little machine would recognize those large characters! You may be interested in his application — he uses his Interact to perform discounted cash-flow calculations for value-based planning. He wrote the program himself. Serious business!

Do we have your correct address? Is your name spelled right? Please check your mailing label, and let us know if changes should be made.

FEEDBACK

September 22, 1981

Dear Editor:

About eight months ago I bought the cheapest home computer I could find called an Interact. My main reason for buying it was to see if I could use BASIC to devise a way of keeping records and selectively pull the records that I wanted. Then I would upgrade and buy a real good home computer.

There is a company out there staffed by a bunch of nuts that won't let me do it. It's called Micro Video. Every time I think of an excuse to sell my Interact and buy a different unit, Micro Video comes out with something that proves I don't have an excuse.

I wanted hard copy — Micro Video RS232 device

I wanted more memory — Micro Video 32K expansion

On the phone with somebody at Micro Video, I mentioned that I would like to have another recorder port. They are working on using the Exatron floppy string.

I'm still trying to think of an excuse, but I know those nuts at Micro Video will outthink me.

Don Brown
Midpines, CA

Dear Don:

Have you taken a look at DREAM? It will let you do record keeping of this kind. You'll also be interested in the article in this issue about the Exmron stringy sponge. We hope to keep you as an Interact owner for a long time to come!

M.L.

September 17, 1981

Dear Micro:

First I want to thank you for the newsletter you're publishing. Together they have done more for my programming ability than all the other books and magazines I've stockpiled in the last year. This ol' Level II gets funner all the time.

From the Editor's remarks in the Fall publication, I gather a lot of folks are writing to you and asking for a bunch of "freebies." People should understand you don't come across with the big corporate image because we are a relatively small community in the 'micro' market. This doesn't mean we're old pals and can indulge in swapping that kind of information. On the contrary! It probably means you need our individual support (financial and otherwise) more than most other companies in the field. Bravo! the editor's letter and thank you for your support . . .

. . . I bought this computer from a friend almost a year ago and am thrilled to pieces with it. It's not at all unusual to spend 30 hours a week glued to the keyboard. Three to six hours at a stretch has become the norm. This is particularly satisfying as my roommate, who spent big bucks on an Apple II with disk drive, gets cross-eyed after 45 minutes of trying to read those tiny characters. When somebody in the next room uses an electric razor or something, his display goes to hell in a handbasket while mine displays nary a quiver. Undoubtedly, for my purposes, this is the finest product on the market.

One more item before I succumb to writer's cramp. I am working on two action games in BASIC (Level II). One is at least similar to others already on the market. The other, to my knowledge, doesn't even have any remote cousins. How does one go about marketing something like this when everything I know about programming is self-taught in ten months? It's likely to be a while yet before I can handle assembly language. If you can point me in the right direction, I'd sure appreciate it.

Y'all take care and keep up the good work.

Yours,
Gordon Cameron
Elizabeth City, NC

Dear Gordon:

Thanks for your individual support! You're right, we do need it. As for marketing programs you've written, we encourage users to submit programs to us for evaluation and possible inclusion in our catalog. (Send programs ATTN: John Stout) You'll probably enjoy our "Gamesmanship" article in this issue; it outlines what we think makes a good program.

M.L.

32K CORNER

continued from page 5

Another command difference is PRINT @. This is the equivalent of our OUTPUT command. Watch this one, though, because our letters are a lot bigger than theirs. You may have to reword the text that appears on the screen.

TRS-80 programs use a lot of their special characters (CHR$). You can get a chart of what these look like at your local Radio Shack. They've also been printed in many magazines. I've found that it's difficult at best to convert these, so I try to get a look at how the character is supposed to look and design my own. You do have to modify the logic in the program if you do this, but then you'll probably have to do that anyway. I'd also suggest you take a look through your computer's non-standard characters and see if there isn't something similar.

Some of the published programs use packing. Line packing is essentially the process of POKEing machine language routines into the lines of BASIC code, and our computer doesn't have the facility to do this. Programs using packing will sometimes use character sets not available on our machine, and the line length differences can also make translation difficult. If the program description indicates that packing is used, you're better off to try writing your own program from scratch, based on the description.

Most of the BASIC commands are very similar to ours. Radio Shack published a card listing all their commands, which, because the Model I is no longer in production, you can usually find at a good price. I just bought a reference card at the close-out price of 30¢.

For those of your who want to go further, I'd recommend a very good article on graphics for the TRS-80, Apple, and Pet computers that appeared in the February 1982 issue of *Creative Computing*.

HELP ! ! !

Need help? Call (313) 996-0626

Q. *I bought a U80M RS232 port instead of the one Micro Video sells. Now they tell me they can't install the memory expansion. Am I being given the runaround just because I didn't buy their port?*

A. No, the U80M port is not compatible with the memory expansion, although Micro Video hoped that it would be. There are at least two reasons for the incompatibility. The first has to do with where the port resides in memory. The U80M port is not properly addressed to be usable with the Micro Video Expansion or the RS232 software: it "clobbers" all memory above C000H. The second reason is how the port is mounted internally. The U80M port sits vertically (front-to-back) on the main PC board, while the Micro Video port is mounted horizontally (side-to-side). The memory expansion was difficult to design and is a TIGHT fit (one reason it must currently be factory-installed). It just physically won't fit with the other port.

It's impossible for Micro Video to try to design for any eventuality or other products that might be produced by other sources. They do design all their products to be compatible with each other, including future hardware and software enhancements. A good thing to keep in mind when considering additions to your computer!

P.S. Many people have pulled the other port from their units and installed the Micro Video port and expansion.

Q. *I'd like to get audio from my computer and pipe it directly into my stereo. Is there a way I can do this?*

A. Yes, there is a way, but CAUTION —only those with some hardware experience should try this. If you're not sure, DON'T do it!

Look for jumper number J4. It's right next to the RF can in the back right corner of the main electronics assembly. This is a direct audio take-off. Run a ground to any convenient ground point in the computer. I also suggest you check the output level before deciding on an input to your stereo. It is probably high enough that you'll have to go in the AUX input. You should also consider isolating the line, but I'll leave that up to you. Note: Micro Video cannot accept any responsibility for this modification, or damage to equipment resulting from it, so you're on your own.

Q. *The Troll Hole adventure is a wonderful, fascinating, but FRUSTRATING game. Sometimes I need a little hint to help me solve part of the puzzle, but sending a letter to Micro Video each time is a real pain.*

A. Agreed! Answering those letters was more than Micro Video expected too. The Troll Hole has been a big seller, and the mass of mail asking for hints has been heavy. Sometimes it took quite a while to get answers back to you, and apologies for that. But, no more! A Troll Hole Hint Sheet is now available. Hints are provided for almost any question you might have, but are given in a way that getting one won't ruin the rest of the puzzle for you by giving away other secrets. To get a hint sheet, send a S.A.S.E. and request a hint sheet, or request that one be included with your next order.

MICRO VIDEO

P.O. Box 7357
204 E. Washington St.
Ann Arbor, MI 48104

002405

551 ELM ST
VERONA WI 53593

SMALL BYTES

At long last, the Small Bytes Contest draws to a close. Here are the final entries.

From Richard Bandalier in soggy Ft. Wayne, Indiana, a Level II program that creates a very strange screen display:

```
10  PRINT CHR$(8);:GOTO 10
```

Aashish Deshpande of Farmington Hills, MI. sent in this little program which he calls "Death of an Interact."

```
10  CLS:COLOR8,6,4,3:OUTPUT"I'M LOSING",31,55,2:OUTPUT"POWER",31,47,2
20  FORX=1TO100:FORY=1TO5:TONEX,X:NEXTY:NEXTX
30  SOUND4,20:FORD=1TO100:NEXTD:SOUND7,4096:PRINT"          UGH!":PRINT"I'M DEAD"
```

Who sez the Interact can only display 4 colors? Run this 8K BASIC small bytes, submitted by Anthony Watson of Woodland, WA, for a real surprise!

```
1   DATA6,193,5,194,2,78,0,0,50,0,16,61,194,0,78,62,8,0,0,0,0,0,0,0,195,0
2   FORA=19968TO19994:READB:POKEA,B:NEXT:POKE19473,0:POKE19474,78:DATA78
3   CLS:PRINT"COLOR DISPLAY BY ANTHONY WATSON":FORA=1TO2500:NEXT:CLS:J=USR(0)
```

Bob Alpert, of Delran, NJ, created this little program that computes a checksum on Microsoft 8K BASIC. It checks for damage from improper loading or errant POKEs, and it takes about 90 seconds to run. The only problem I had with it was that it always told me BASIC had an error, and mine seemed to run okay.

```
10  CLS:T=0:PRINT"COMPUTING...":FORI=24576TO32767
20  A=PEEK(I):T=A+T:NEXT:IFT<>1002200THENPRINT"BASIC BOMBED!!":END
30  PRINT"BASIC OK!"
```

Franklin, Ohio's Robert Morrison sent in this colorful Level II BASIC program. While the graphics are quite slow in developing, the final impact is dramatic.

```
1   CLS:FORX=0TO56:FORY=0TO38:C=SQR(X*X+Y*Y)/3:PLOT56+X,38+Y,C
2   PLOT56+X,38-Y,C:PLOT56-X,38+Y,C:PLOT56-X,38-Y,C:NEXT:NEXT:FORA=0TO255
3   FORB=0TO7:FORC=0TO7:FORD=0TO7:COLORA,B,C,D:NEXT:NEXT:NEXT:NEXT
```

The Winner's Circle

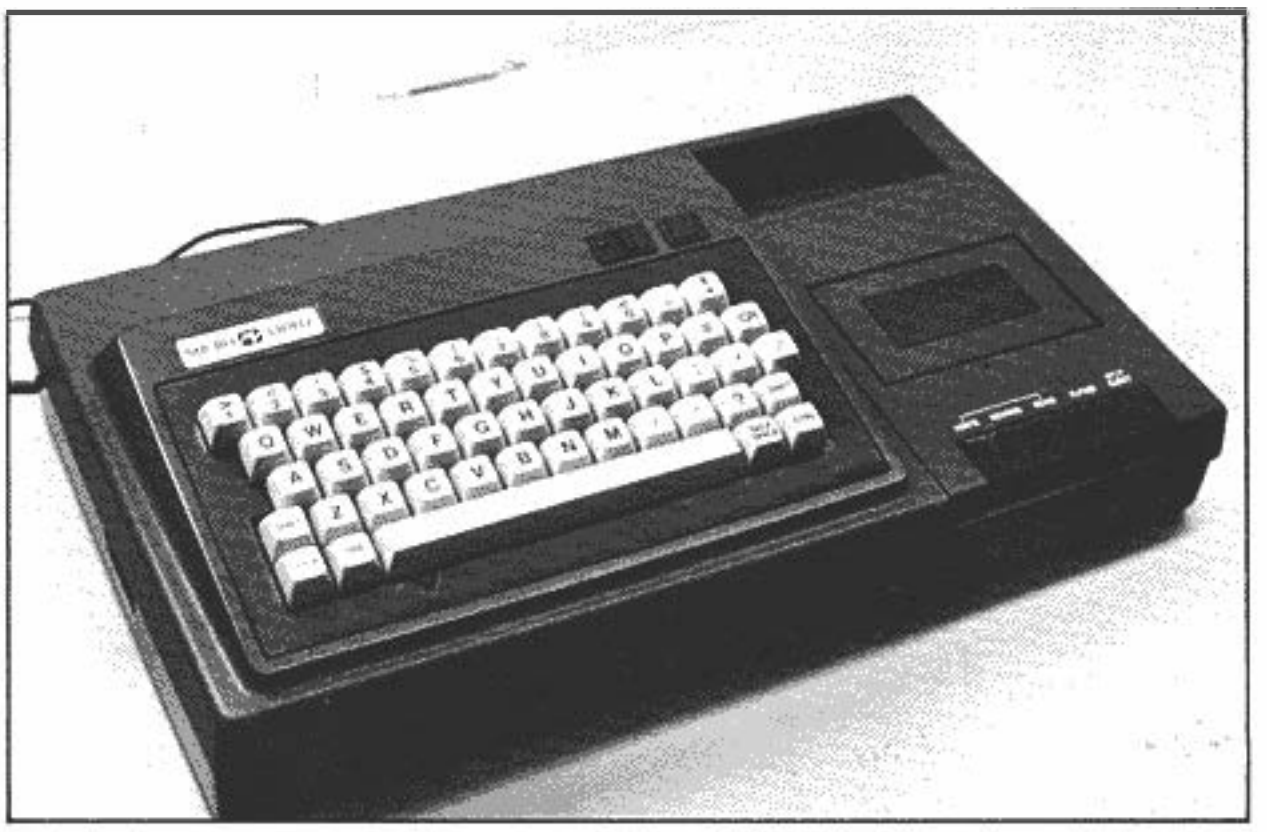
Our judges were split on which of the Small Bytes entries should be awarded the prize of $50.00 in product credits. One of the finalists submitted a program that did something very useful in a very small amount of code. The other candidate's program, while not terribly useful, really explored new areas of the machine. The obvious solution to this query was to award two prizes. So, (may I have the envelope, please), the winners are

LARRY JENSEN of Annandale, VA, for his "Pocket (?) Calculator"

ANTHONY WATSON of Woodland, WA, for his 8-color screen display

Vol. II, No. 2 Fall 1982

MICRO VIDEO® RAM Pages



The Keys to Success

We can't promise you'll never make another programming error. We can promise you'll make fewer typing errors while programming with our new, professional-quality keyboard.

Designed for Micro Video and the Interact by a well-known and highly respected keyboard manufacturer, this keyboard is similar to those found on Apple, Atari-800, and other computers. The colors are even coordinated to complement your computer's case. (Designer keyboards! What next?) Its light grey keys have dark grey legends for high contrast and easy readability (a handy feature for those of us who graduated from Hunt and Peck U.). Sturdy and compact, this 53-key, standard typewriter-style keyboard fits neatly into your Interact's case in place of the old, push button board.

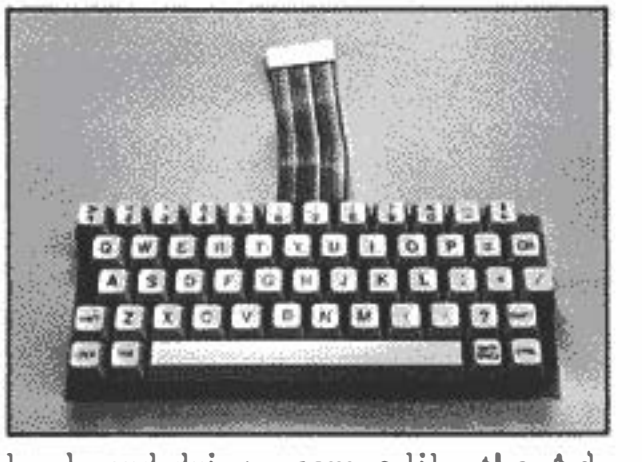
Installation is a simple matter. The Professional Keyboard Kit contains little more than the keyboard assembly and plastic mounting ring. The keyboard and PC board come assembled as a single unit, so you don't have to fuss with making sure you get all the right pieces in all the right places. All you do is remove the old keyboard assembly, PC board and all, then slip in the new keyboard unit. Attach the ribbon cable, reassemble the case, and you're off on the road to success. You've got the keys to take you anywhere you want to go!

You'll love the feel of the sculptured keys beneath your fingertips. The keyboard action is smooth and responsive — you won't have key bounce to kick around any more. No more double characters as you type, no more worn out contacts that give no response. The manufacturer reports that keyboards in actual use have lasted over 100,000,000 key cycles without failure. Your fingers will probably wear out before your keyboard does!

A couple of differences between the new and old keyboards (aside from the obvious, of course), while relatively minor, are noteworthy. Don't automatically reach to the upper right section of the keyboard to type a "1", for example. We've moved it to its traditional location, the leftmost key on the top row. Looking for the divide sign, or slash? It's still in the same place, but its key legend now bears the more recognizable "/", not "÷". We've also changed the twisted, grey ribbon cable to a plug-compatible, flexible, heavier-duty ribbon cable that is less likely to break.

Now that you're all hot and bothered over this newest hardware enhancement for your computer, I've got good news and bad news. The good news is that the price is only $79.95. The bad news is that the keyboards aren't in stock yet. We'll get our first delivery of 130 keyboards in early November. But, more good news — we've included a coupon in this issue of RAM Pages that gives you $10.00 off your keyboard purchase, when you order by December 15.

With the new Professional Keyboard, you've got the keys to success at your fingertips. Whether you're programming in BASIC, assembly or machine language, playing



keyboard-driven games like the Adventure series, or typing your data into a business program like DREAM or VideoCalc, you'll do it in style. What more could an Interact owner ask for? (I know, I know . . . higher resolution! Don't give up. We'll crack that nut yet!!)

Remarks

"The times, they are a 'changin' . . ." wrote Bob Dylan back in the early sixties, and his words still ring true. Micro Video certainly has undergone many changes over the past three years! As we head into our fourth year in business, I'd like to take a few minutes to reflect on where we've been and how we got where we are now.

When we started our support for the Interact, our intention was to provide a place where "abandoned" owners could get their computers repaired, questions answered, and back-up copies of the then available software. Oh, maybe we'd bring out a new program or two, but not much more. The Interact was, after all, a dead product! We never anticipated that you'd grow from a tiny group of users to an active community over 7,000 strong and that you'd want more software, more accessories, more of everything for your machines!

As you've grown, so have we. One by one, in response to your input on what you needed and wanted, we've pushed the Interact — pushed it far beyond what its critics said it could be! You wanted to be able to program in machine language, so we gave you the Micro Video Monitor and, more recently, assembly language capability with Assemblex/Editex. You asked for better BASIC documentation, so we got out our pens, and out came *Basically Speaking*. Your returned surveys told us that you wanted more memory, so we developed the 32K expansion. You've also indicated strong interest in a mass storage device. To add a floppy disk to the Interact as it is currently configured would require extensive (and expensive!) hardware modifications. However, we've been able to interface to the Exatron Stringy Sponge, a reasonable alternative, both operationally and economically. "More action games!" you cried. Have you checked out the three pages of action games in our recent catalog? And, as Adventure games became the rage, we added the Troll Hole, Mysterious Mansion, and Dragon's Dungeon. *RAM Pages*, I hope, speaks for itself.

That's a brief summary of where we've been, but you're probably more interested in where we're going from here. Well, folks, we've more surprises in store for you!

Tired of struggling to program on that blankety-blank keyboard? A real, professional keyboard is on the way, with deliveries scheduled to begin in early November (see article and photos on page 1 for more information). And, work is also in progress to solve our computer's other, major drawback. If our design works as planned, your Interact may be able to have more than one graphics mode and small(er) characters! Games your bag? More of those are under development, and several new ones have just been released, including a three-dimensional, D&D-style adventure. Stay tuned!

In closing, one final reflection. I look at how versatile our "dead" computer has become and where we're planning to take it, and I think it's truly remarkable. You, the owners, deserve a lot of credit for hanging in there. Your interest in and enthusiasm for the Interact has kept us motivated to support it. Together we've brought the machine back to life. A hearty thanks to all of you! We could never have done it without you. Keep up the good work!

Sincerely,

Sue Denim

Sue Denim
Editor

We've Moved

Program Notes

Programs, programs, everywhere . . . By now you've all received our summer catalog and the recent fall product update. Both are chock full of new games, and you're probably having some trouble deciding which ones you want. So, we'll examine a few of them in more detail than is possible in the catalog, to make your decision a little easier (or perhaps, harder!).

Heading the list of exciting new software is **Mazes and Monsters**, a complicated and challenging, Dungeons-and-Dragons-style game. After choosing your race and a set of characteristics that determine your fighting abilities and magical powers, you're off on an adventure unlike any you've ever had before. As you wander through the dungeon, which is a set of eight, 16×16 grid mazes, three-dimensional graphics let you see what's around you. Your quest is to reach the eighth and lowest level of the dungeon, where a vicious monster guards the Sacred Orb. You must wrest it from the monster and return it to the Castle to win. Danger lurks round many corners — 15 different types of monsters will try to stop you from reaching your goal.

Mazes and Monsters differs from traditional adventure games in two significant ways. First, it is graphic, rather than word, oriented. Also, there is no single solution to the game. A new maze layout is generated whenever the game is loaded or restarted with RESET-R. And, because it can take days or weeks to finish a single game, the program has a built-in "save game" feature. This one is a bargain at twice the price, since more than 65,000 different games are possible. I've seen all ages get enthusiastic about Mazes and Monsters — from six-year-old kids to senior citizens.

On the action game side of the picture, you can blast radio-active matter to smithereens, guide a butterfly on a perilous flight, rack up thousands of points on an electronic pinball machine, or challenge robots in a life-or-death battle of wits.

The most explosive game in our summer catalog, **Hot Rocks**, combines space battle with a lunar lander. In successive rounds of play, you must destroy all chunks of radioactive matter that float around your spacecraft, fend off attacks by an enemy saucer, then land on the lunar surface to refuel. The graphics in this game are superb, from the opening, planetary explosion to the lunar surface visuals. Skill levels in the game let you vary the difficulty of play — you choose how fast the "hot rocks" move through space and how often you can fire your half-life laser. Our critics agree that the hardest part of the game is figuring out how to control the spacecraft during the lunar landing sequence.

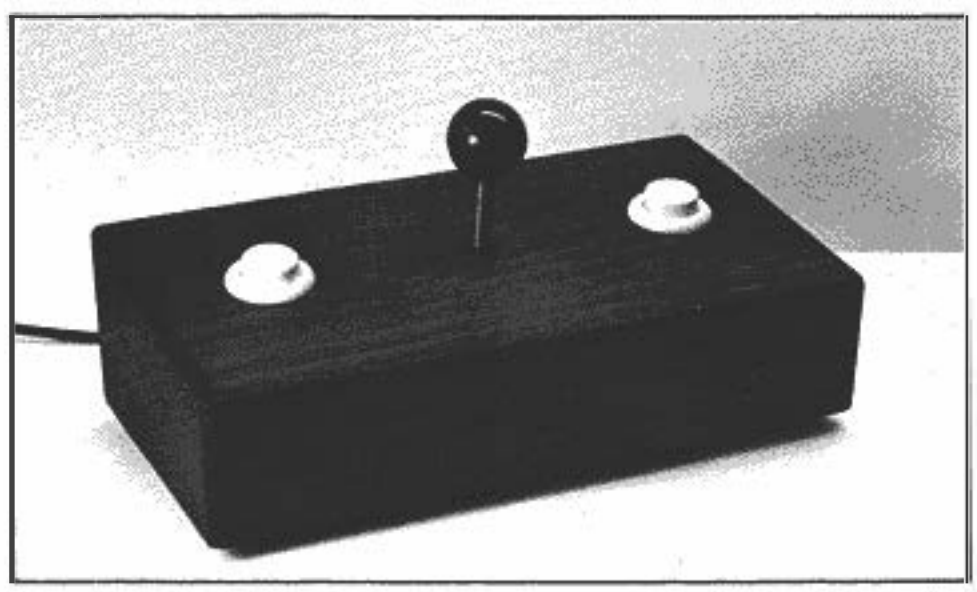
Tired of "shoot-'em-up" variants? **Wing It**, one of our newest releases, provides a delightful change of pace. The object of this game is to guide butterflies across a busy freeway and raging river to greener pastures. Don't be fooled by the gentle-sounding name — this one's full of fast-paced action and spectacular graphics that have the whole screen moving in opposite directions. Both adults and children can spend hours with this game. Children enjoy seeing how many butterflies they can safely escort to the other side of the screen, while adults are stimulated by the challenge of scoring maximum points per trip across. Micro Video's President and his 10-year-old daughter have given Wing It a real workout. Dave abashedly reports that she routinely trounces him when they compete!

Heads-Up Pinball is another action game guaranteed to appeal to all ages. The ball motion and joystick "flipper" controls are realistic and smoothly responsive. You'll swear you can "feel" the plunger pull back and release to launch the ball into play! Clever graphics increase the entertainment value of this non-violent action game.

Finally, a "dark horse" game you may have missed in our summer catalog, **Mega-Volts**. Although the rules are simple — your goal is to draw robots pursuing you into electrified fences before they can get to you — but it takes some thought to determine the most strategically sound pattern for play. Three skill levels let you vary the number of robots and electric fences for easier or harder play. Although it started out as a "sleeper," the game has received rave reviews from some surprising sources, and we expect its popularity to continue growing in the months to come.

There are, of course, many other excellent programs in our catalog. Just because they're not mentioned here doesn't mean they aren't fun — we simply don't have room to cover them here. If you'd like additional description of any piece of software, just give us a call. We'll let you talk to our resident "addict" of that particular game. Programs, programs, everywhere . . .

What's coming up?



The Micro Video Executive Controller for the down-to-business game player. Handcrafted in cherry or walnut, the controller features arcade-quality joystick and dual fire buttons. Watch for it in our Christmas catalog.

VideoCalc and DREAM — A Closer Look

Before the expansion to 32K RAM, it was pretty hard to take the Interact seriously for business applications. A program of any real complexity and utility would take up all the available memory, leaving no room to store or manage data in any appreciable volume. With the 32K expansion, that situation has definitely changed. The Interact now has the potential to be used as a small business machine. The proof? VideoCalc and DREAM.

Both VideoCalc and DREAM require a 32K RAM system. Both are designed to produce printed reports of data on an RS232-compatible printer, although a printer is *not* required to use either program. Each program is fully documented in a 60-page manual that includes a reference section, an entertaining walk-through of operation to get you started, technical information, and a complete program listing. They were both written in Microsoft BASIC for 32K, so you can modify them for your own specialized application needs.

The two questions most asked about these two programs are: 1) What kind of programs are they? and 2) What can I do with them? With those questions in mind, let's take a closer look at both programs.

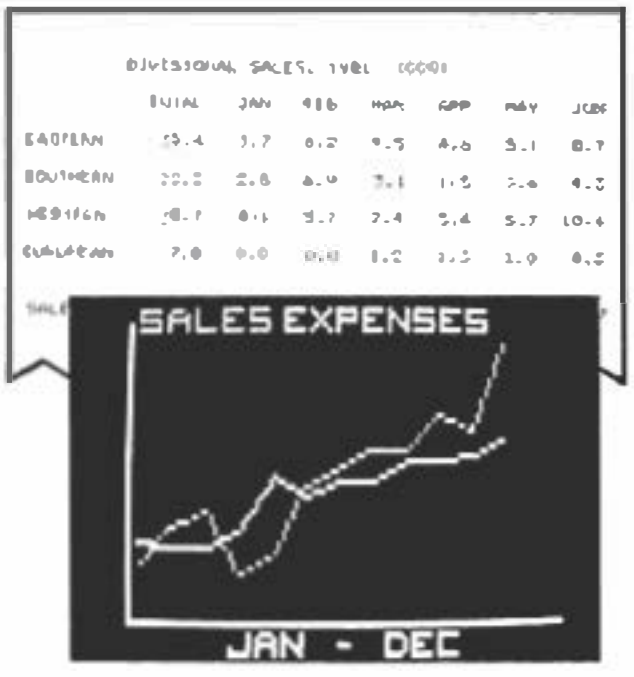
VideoCalc

VideoCalc is Micro Video's answer to VisiCalc, a popular data modelling program available for many computers. A program like VideoCalc has a multitude of uses; in fact, it was designed with just that flexibility in mind.

Although many other uses are possible, VideoCalc is most commonly used to manage and analyze time series data. What's time series data? Briefly, a time series is any group of data for which values are recorded at specific, periodic intervals, such as weeks, months, quarters, or years. You might, for example, use VideoCalc to track sales of products by month or to analyze the productivity of your sales force on a quarterly basis. Essentially, any set of numeric information that can logically be organized into a table, or matrix, format is a serious candidate for VideoCalc processing.

Once you've decided what data to work with, you enter it into the VideoCalc matrix, the size of which you define to meet your application requirements. Unlike VisiCalc, which has fixed row and column names, VideoCalc lets you assign names to the matrix that describe your data. The assigned names are then used in subsequent references to the data in the matrix, making manipulating and reporting the data convenient and self-documenting.

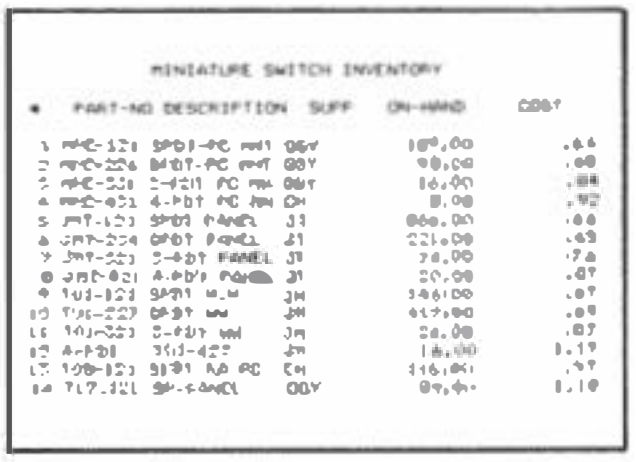
When you've entered an initial set of data, you can perform a number of operations on it. In the VideoCalc documentation, our hero, Joe Alonzo, types in only five columns of data for ten rows into his 13x18 cell matrix, then uses VideoCalc's CALCULATE function to compute values to fill the rest of the matrix. The program also has functions that let you change the data as needed, produce sorted reports on all or just part of the matrix, plot your data graphically to analyze trends, and store and retrieve data via cassette tape. And, if you want to perform computations on your data that are too complex to handle with the CALCULATE function, there's even the facility to formulate your own functions. VideoCalc can manage data in matrices containing up to 2,500 cells — that's a lot of numbers!



Although you can name the rows and columns for easy access to your data, VideoCalc is capable of managing *numeric* data only. If you need a program that will let you keep records that include string information as well, such as supplier names or item descriptions, then that's a job for DREAM.

DREAM

DREAM, an acronym for Data Record Entry And Management, is most useful for keeping your data in record format. While you might use VideoCalc to examine your sales of products by quarter, you might use DREAM to keep inventory records of those same products. The record for each product might contain fields in



which you describe the product, list the supplier, keep track of current inventory levels, record unit costs, etc. Like VideoCalc, we designed DREAM for flexibility. You define the record structure — how many pieces of data (fields) you want to keep in each record, what type of data each field will contain, and what each field should be called for data referencing purposes. DREAM then tells you how many records you'll be able to work with, given the defined format. With simple, short records, DREAM can manage approximately 200 records at a time; more often your record structure will give you a 70-90 record capacity.

In the DREAM documentation, Petronius Pepper picks the program to help with a persistent problem — keeping up with the consumption of food at his Pet Emporium. Petronius shows you how easily DREAM lets you add, update, delete, even sort and reorder the records, then view them on the screen or produce a printed report of all or selected parts of the data.

Whatever your business, one or the other of these programs will come in handy. In fact, you'll probably find you can use both programs to help organize and manage your financial, sales, inventory, or other business information. With DREAM and VideoCalc's flexible, powerful formats, your key data is there when you need it — as close as your fingertips!

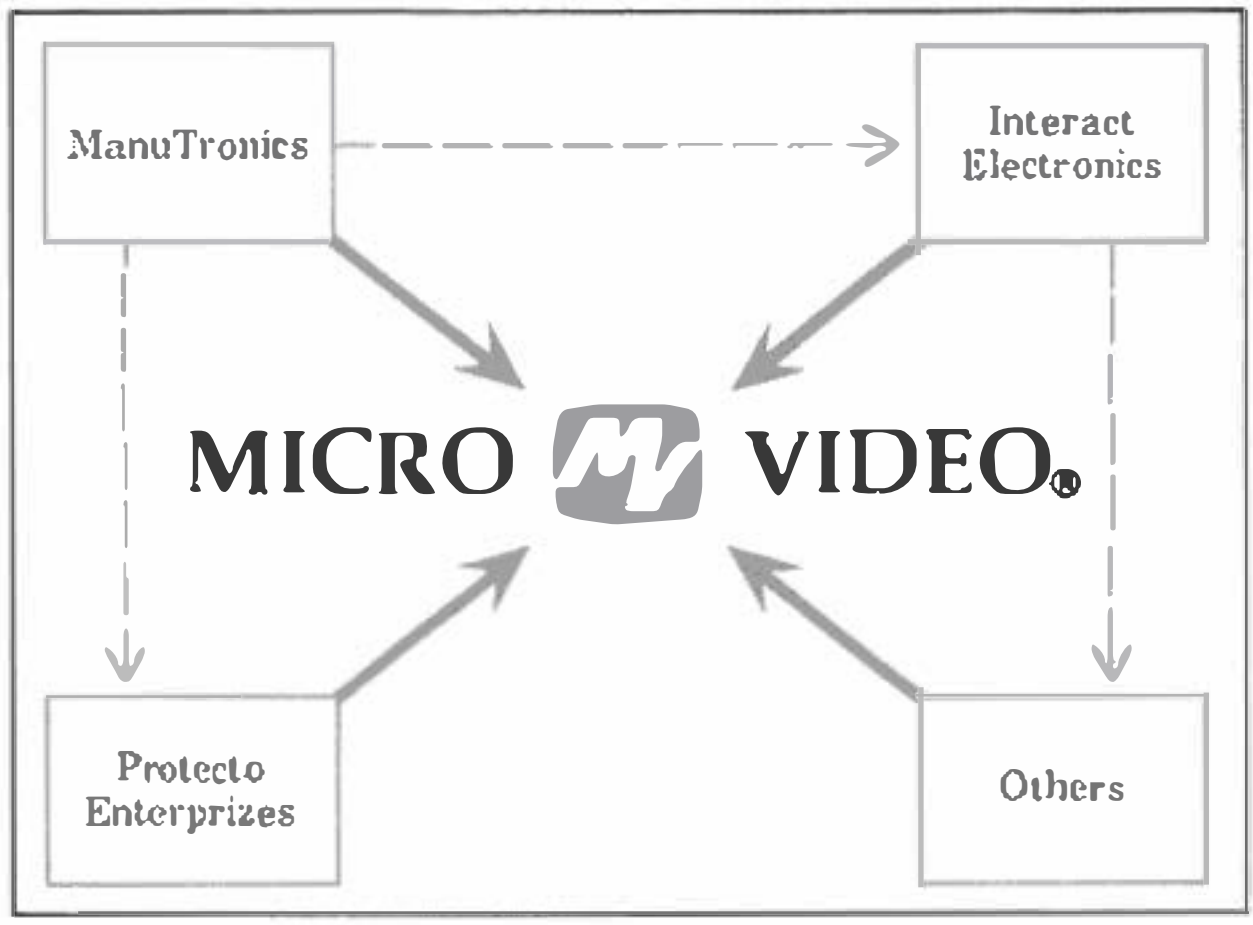
The Geneology of the Interact Computer?

Interact Electronics . . . ManuTronics . . . NCE/CHC . . . Protecto Enterprizes . . . Micro Video . . . No doubt you've heard at least one of these names before. A number of companies have played significant roles in the Interact computer's history, and many of you have expressed confusion as to the interrelationships between the various organizations. In fact, some people think the companies are all part of the same entity.

This "identity crisis" causes difficulties all around. For you, because you have trouble getting the service and support you need, and for us, because we end up "taking the rap" for other firms' failures to perform. We've had orders for products we don't offer in our catalog, angry letters demanding refunds on items not purchased from us, and complaints that we did not fill orders that turned out to have been placed with one of the other companies. One customer was furious because he'd sent his computer in four times for repair, and it still didn't work; our records, which we keep in detail for each individual customer, indicated that his computer had *never* been in Micro Video's repair shop.

Now, we're human, and like all members of the species, we do make mistakes now and then. But, in each of these cases, the Interact's "identity crisis" was the root of the pro - lem. People were simply not sure who they were dealing (or not dealing) with!

So, once and for all, let's set the record straight. We'll try to show you, as succinctly as possible, that, although the companies did sometimes work in cooperation with each other, each has its own separate identity, mode of operation, and philosophies. Here's who's who.



Interact Electronics This Ann Arbor-based company was the originator of your computer. Their staff completed the design and development phases, then contracted ManuTronics to do the final assembly and production. Interact Electronics was largely unsuccessful in marketing their product and went out of business in December 1979. They sold the bulk of machines remaining in their inventory to two firms: NCE/CHC and Micro Video.

ManuTronics The original assembler of the Interact computer, this firm was left holding finished computers and parts to build several thousand more when Interact Electronics closed their doors. To recoup their losses, ManuTronics continued producing the computer, which was then distributed as the Interact Model "R". They sold some machines directly, but their primary outlet was Protecto Enterprizes. ManuTronics stopped making Interacts at the end of 1981. At that time, Micro Video bought a substantial portion of their remaining parts inventory and assumed warranty coverage for any units still under warranty.

NCE/CHC This firm, in association with Newman Computer Exchange, bought approximately two-thirds of Interact's final inventory. Through mail-order promotions, NCE/CHC sold the computers at "fire sale" prices. Most of the computers were sold "as is," with the understanding that no further service or support would be available, and most packages included all of the software available from Interact at that time. NCE/CHC referred their customers to Micro Video for post-sales support, repairs, and additional software.

Protecto Enterprizes This company served as the factory outlet for ManuTronics. They distributed the model "R", the original Interact software, and software they obtained from outside sources (including the Micro Video Monitor). Other than Micro Video, Protecto was the only firm to attempt customer support for the machine. However, when ManuTronics stopped producing Interacts, Protecto began selling other ty es of computers and turned over their customer lists to Micro Video.

Micro Video Although Micro Video purchased a quantity of computers during Interact Electronics' last days, the company has never been heavily oriented toward machine sales. Instead, the focus has been on supporting the existing computer owners. Micro Video's efforts along those lines have given Interact owners over a hundred tape titles, hardware expansions such as the RS2 2 port, 32K memory board, Exatron Micro-Sponge, and the soon-to-be-released professional keyboard, better programming devices, and, of course, RAM Pages. As dwindling machine supplies forced other firms in the Interact chain to move in other directions, Micro Video was there to smooth the transition. We're still very much in the Interact business!

Sounds Good!

Producing sounds in your BASIC Programs is fairly simple and straightforward. Generating sounds in your machine language software is an entirely different matter. To make life easier for you, here's a routine you can add to your programs to make sound generation less of a chore. The routine is called SOUNDL.

SOUNDL requires the same two parameters that the BASIC SOUND command uses to produce sounds, except, of course, that the parameters are expressed as hexidecimal, rather than decimal, values. Before calling the SOUNDL routine in a program, you must specify these two values, which are placed in the C, D, and E registers. The first sound parameter must be placed in the C register, which is the mixer control. It blends voices, determines attack and decay, turns the white noise generator on or off, and performs several other functions. The second parameter, which you specify as a single, two-byte number, is passed in the D and E register pair. This parameter, although loaded as a single value, is interpreted by the computer as eight, two-bit, control values for sound registers A and B, located at 2000H and 2800H, respectively. What happens next is fairly complex. If you want to find out more about how the sound generation circuitry works, examine the schematics in the Interact Service Manual (page 6, lower left corner of diagram).

To use sounds in your machine language programs, you'll first need to incorporate the SOUNDL routine into your code. Here is a listing of SOUNDL:

```
SOUNDL: MVI   A,40H     ;DISABLE SOUND DURING CHANGES
        STA   2802H     ;SONDB+2
        XRA   A         ;RESET ONE SHOT CONTROL >50
        STA   2801H     ;  MICROSEC BEFORE OUTPUT
        PUSH  H
        LXI   H,5FC0H   ;SELECT MIXER OUTPUT (SMISCO)
        MOV   A,C
        XRA   M
        ANI   07H
        XRA   M
        MOV   M,A
        STA   3000H     ;MISCOUTREG
        LXI   H,2003H   ;SONDA+3
        MOV   A,E
        CALL  LATCH8    ;LATCH SELECTIONS 00 to 07
        LXI   H,2803H   ;SONDB+3
        MOV   A,D
        CALL  LATCH8    ;LATCH SELECTIONS 8 TO 15
        POP   H
        RET

LATCH8: MOV   M,A
        ADD   A
        ADD   A
        DCR   L
        JP    LATCH8
        RET
```

Now, you can produce a variety of sounds simply by specifying the parameters for the C register and DE register pair, then calling SOUNDL. For example, the following routine will produce a high-pitched, rapid beeping that you might use as a "win" sound in a game. The first line places a value of 03H in the C register; the second line specifies that values 00H and 18H are to be passed to the D and E registers, respectively. You could produce this same sound in BASIC by typing SOUND,3,24.

```
MVI   C,03H
LXI   D,0018H
CALL  SOUNDL
RET
```

You can change the parameters and call SOUNDL again to produce a different sound, such as a "laser." (This is equivalent to SOUND 0,264.)

```
MVI   C,0H
LXI   D,0108H
CALL  SOUNDL
RET
```

Sometimes you'll need multiple calls to SOUNDL to create a desired sound effect. The following example combines two sounds that, taken individually, would not provide usable sound effects. However, if you put them together in a routine, separated by a short delay, you'll get a sound that will ring your bell!

```
MVI   C,0H
LXI   D,2042H
CALL  SOUNDL
LXI   B,0008H
CALL  DELAY     ;ROM SUBROUTINE AT 07F6H
MVI   C,0H
LXI   D,2CD2H
CALL  SOUNDL
RET
```

Other sound parameters, when used in combination, can produce other sound effects for use in programs, such as a gunshot:

```
MVI   C,01H
LXI   D,0200H
CALL  SOUNDL
LXI   B,0008
CALL  DELAY     ;ROM SUBROUTINE AT 07F6H
MVI   C,01H
LXI   D,0201H
CALL  SOUNDL
RET
```

Want a sound to go along with an explosion on the screen? Just modify the above gunshot routine slightly. Change the value passed to the DE register pair on line 2 to 0202H and on line 7 to 0203H.

Experiment with SOUNDL. Try combining parameters and delays to see what you can come up with. As with the SOUND command in BASIC, not all parameters will produce audible sounds. So, if you don't have success with one set of parameters, don't assume the routine is flawed — just try some different values.

Oh, yes. There's one other short routine you might need. This one turns the sound OFF.

```
MVI   C,07H
LXI   D,1000H
CALL  SOUNDL
RET
```

The Computer Doctor

Symptom:

My tape(s) won't load.

Diagnosis:

This symptom can result from a number of problems:

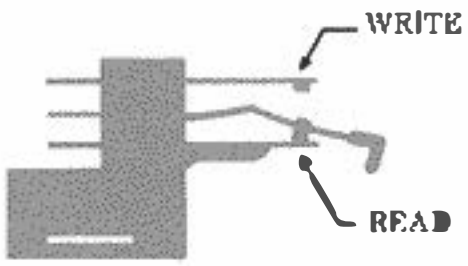
- Defective tape
- Tape head out of alignment
- Bad ground causing motor noise
- Bad mechanical connection in drive or frozen motor
- Failure in audio circuitry

Rx: Always try the simplest solutions first, I've found. So, the first thing to do is check and see if just one or a number of your tapes won't load properly. If the rest of your tapes load and run without problems, then the one tape is probably defective. The Micro Video tape warranty covers replacement in full for 90 days after purchase. Because we know that tapes can wear out or become damaged after the warranty expires, we have liberal post-warranty coverage as well. You can exchange any defective tape, regardless where you purchased it, for a new copy of the program at a 50% discount.

Now, the fun part. If many of your tapes fail to load, the problem is in your computer hardware. Again, try the easy solution first — check that your tape head is aligned to maximum signal strength. Insert the Alignment cassette into the tape drive, and press the RESET button. Press the "L" key to turn on the tape motor, then depress the READ cassette button. Just below the tape door is a small, circular hole. Insert your alignment screwdriver straight down into the hole, and turn it slowly to the left, then right. You should be able to hear the audio tone change from strong and clear to weak and "muddy". When you hear the loudest and sharpest tones, the tape head is aligned accurately. Now, try loading your tape again to see if the problem has been solved.

Still won't load? The next logical check to make is for "motor noise." Motor noise generally results from a faulty ground. Use RESET-L to get the tape motor going, then turn up the volume on your TV. If you hear a load, scratching sound, your computer's got motor noise. The culprit is usually a loose spacer. To correct this problem, you'll have to take the top off your unit, so grab a screwdriver and do so. Four screws hold the plate covering the main electronics assembly in place. Beneath each of these is a spacer. Remove the screw in the lower right corner. You will then be able to see the spacer that generally causes motor noise. Insert a flathead screwdriver into the hole and carefully tighten the spacer. When you've done that, try loading the tape again to see if you've cured your computer.

Still feeling ill? Don't worry, there's hope for your system yet. The tape drive contacts may be the source of your reading malady. To check this, you'll need to take the top off your comp ter again and turn it over so you can see the underside of the tape drive. Locate the read/write contacts, which are mounted on the metal frame directly below the cassette buttons (see drawing). You'll see that there are two sets of contact



Tape Drive READ/WRITE Contacts

switches. One or the other will always be closed. If no cassette buttons are depressed or if the READ key is down, the lower set of contacts should be closed. (Depress the WRITE cassette button to watch the upper contacts close.) For your computer to be able to read a tape, the READ contacts must be connecting. If they aren't, gently bend the metal strips so that the contacts are touching. Then, before putting your computer back together, make one other quick test to make sure the tape drive itself is functioning. To do this, take hold of the thin drive belt and rotate the drive shaft. The belt and drive wheels should move freely. If they don't, the tape motor is fro en. In this case, the only solution is to replace the motor or the entire tape drive. (We have parts in stock: call for current pricing if you want to perform this repair yourself.) Once again, reassemble your unit and try loading the tape.

With each of the above procedures, we've been trying to avoid the ultimate solution — surgery. However, if all other tests have failed, the problem is definitely in the audio circuitry on the main electronics board. This is one of the most difficult problems to trouble-shoot, as the workings of that section of the hardware are complex. If you want to try the surgery yourself, use the schematics in your service manual and investigate the following chips for malfunction: IC60, IC61, IC28, IC30, IC33. I recommend you try this only if you have an advanced electronic background. Otherwise, your best bet is to send it to our service department for repairs. Please remember to include a note describing the problem.

P.S. Two other items worth mentioning:

Your television may emit a strong electric field from its horizontal sweep circuitry. If your computer is directly in front of the TV screen, this field may interfere with tape loading. Interacts with 32K RAM seem to be particularly susceptible to this interference. The easiest way to determine if this is the cause of your load failures is to turn the TV off while loading the tape. If this solves the problem, you should consider changing your equipment configuration, moving the computer farther away or to one side of the TV screen.

Also, some people have returned their Microsoft BASIC tapes or called to complain that they don't work. If BASIC appears to load correctly, but you get an "OM ERROR" every time you try to enter a command, you do *not* have a defective tape, *nor* is there anything wrong with your computer. Remember that you must type "NEW" after loading BASIC to clear out the memory for new program storage!

Programming For Fun or Profit

Of course you like all the games you can play on your Interact. But the real reason you bought a computer instead of an Atari or other video game is that it is programmable. You're not just stuck playing games; you're thinking and learning and increasing your awareness about a field that is going to be an important part of all our lives in the future.

There are many budding programmers in the Interact user community, and the programming staff here at Micro Video gets a lot of calls. In addition to specific programming queries, we are also frequently asked two general questions:

1) What kind of software do you have for my programming interests and skills, and

2) I have a program I think you might be interested in putting in your catalog. How do I go about submitting it?

Programming Your Computer

There are a number of ways to program the Interact. We use many of the same tools available to you in creating our software, as well as some you probably don't have. We produce all our program master tapes using an Intel 8080 development machine with an ICE-80 interface that emulates the Interact's operation. This system has tremendous advantages over the Interact in memory size (64K) and program storage (dual floppy disk).

Now, an Intel development computer is a luxury most Interact owners don't have. It's got certain limitations for us, too — we've only got one of them, and only one programmer can use it at a time. So, our programmers also use tools like BASIC, Assemblex/Editex, and monitors to generate software. Which tools we use depends on the type of program we're writing.

Likewise, you'll find that the type of program you want to write and your own proficiency in programming will determine what tools you use to do the job. Use BASIC, for example, for programs that do "number crunching," especially if you want floating point capabilities. Machine language has no inherent ability to handle decimal portions of numbers, and to perform mathematical functions at that level, you'll have to write or acquire a floating point subroutine library. BASIC also has many built-in arithmetic functions, such as INT, RND, SQR, SIN, which let you easily compute values you need. You'd have to write your own machine code routines to use these functions in machine language programs.

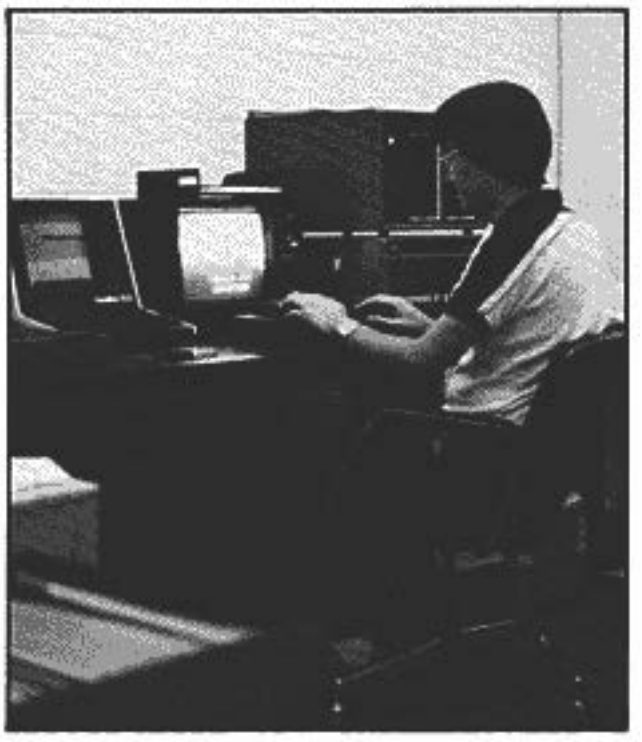
BASIC is a very good place to start if you're new to programming. It's fairly easy to learn, especially if you've got a good manual to help you along, like our *Basically Speaking*. This manual was designed to take the mystery out of programming your Interact. It begins with the assumption that you've never written a line of code before and takes you on a guided tour of BASIC, acquainting you with its functions and operation. If you're familiar with BASIC, but want a reference source for the individual commands and keywords, *Basically Speaking* will fit the bill for you too.

Machine language, while more complex to learn and use, does some things much better than BASIC. For graphic animation, machine language wins hands down, for example. Because there is no intermediate interpreter to slow the operation down — you program byte by byte, changing hexadecimal values in the computer's memory locations — you can produce games or programs that have fast-paced action and speedy, fluid graphics.

If you aren't quite ready to take the big step into writing programs entirely in machine language, you might start by integrating some machine code routines into your BASIC programs, calling them when needed with the USR function. That way, you can include fast-moving graphics in your programs without losing BASIC's ease of calculation.

There are two tools you can use to produce machine language programs or routines on your Interact. There's the Monitor-Plus, which puts you directly in touch with your computer's memory. You change hexadecimal values in various memory locations to get the results you want. This is the "nuts and bolts" level of programming. Your other option is the Assemblex/Editex pair. These programs bridge the gap between BASIC and machine language, providing an "interpreter" to make the generation of machine code a simpler process. With Editex, you write the program, drawing from a set of standard Intel instruction mnemonics. Then, you use Assemblex to convert the Editex source code into its hexadecimal equivalent values.

You can learn more about programming your Interact at the machine language level with books like Spracklen's *Z80/8080 Assembly*



Language Programming, which we carry, or other books available at your local computer store. Our *Guide to ROM Subroutines* tells you what routines are resident in the Interact ROM and how to access them from your programs. If you're learning assembly language, you may find the Dissassembler-Plus useful. With this program, you can convert hexadecimal code back to its assembly language source instructions and produce a printed listing you can study to learn how various operations are performed by a program. And, it can save you hours of time when you use it as a tool for debugging your own machine language programs. You can even disassemble the ROM or the Disassembler-Plus itself.

There's plenty more to say about each of these programming areas, but space is limited here in *RAM Pages*. If you want to know more about any of these programming aids or if you want recommendations about which will best meet your programming interests and skills, give us a call.

1982 FALL SUPPLEMENT

MICRO VIDEO™

Product Catalog

Exatron! Exatron! Exatron!

Mass Storage Pack

Mass storage with high speed access for applications requiring large amounts of data and updating facilities is now a reality on your computer! The Exatron Micro-Sponge, a digital storage device, provides convenient access to your programs or data from BASIC and machine language or through direct commands. You can selectively store and retrieve as many as 255 addressable files, a total data capacity of 60,000 bytes, on a single, continuous-loop "wafer" (microcassette). Data transfer at 9600 baud eliminates long waits for reading and writing tapes.

No RAM is lost to support this device —software in an easily-installed 2K PROM performs controller functions such as READ, WRITE, CERTIFY. The MicroSponge can be used with both 16K and 32K computers equipped with the Micro Video RS232 port.

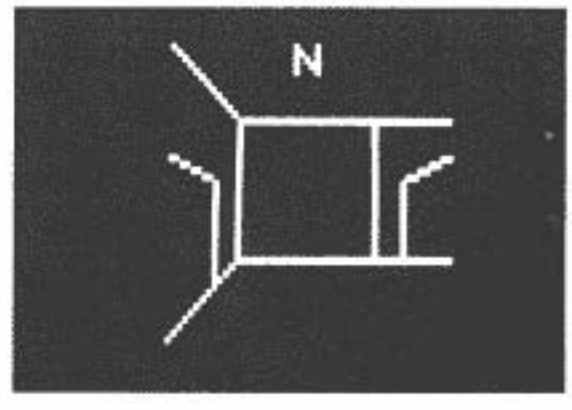
Ideal for your own data base applications or for scratch-pad storage during program development, the Mass Storage Pack includes the Micro-Sponge, 2 wafers, PROM-resident controller software, cable wiring diagram, and complete operating instructions with a sample BASIC program to illustrate use. **$429.95**

Compare against Exatron's list price of $399.95, which does *not* include controller software.

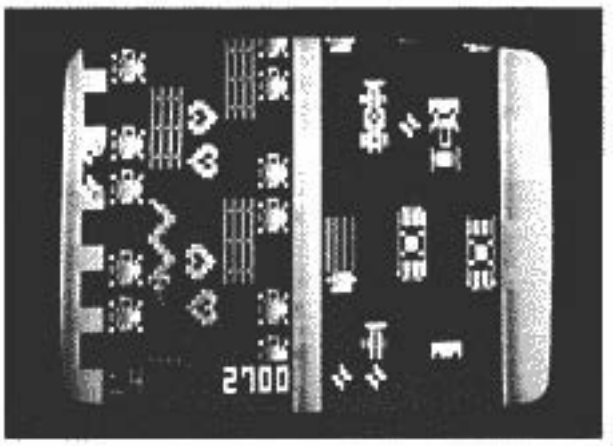
Mazes and Monsters™

Adventures in the Third Dimension

A D&D-style game with graphics that give you a three-dimensional perspective during play. Choose your race — dwarf, elf, or human. Then, select a set of traits that determine your strength, intelligence, magical powers, and more. Now, you're into a fantasy — the dungeon of a 7th century castle — searching its eight levels for treasures. Dangers lurk in the shadowy corridors — you may even come face to face with Death. Mazes and Monsters is a game you can play for the rest of your life! Each game has a new dungeon layout and your character traits can vary widely. There are over 65,000 possible game combinations.

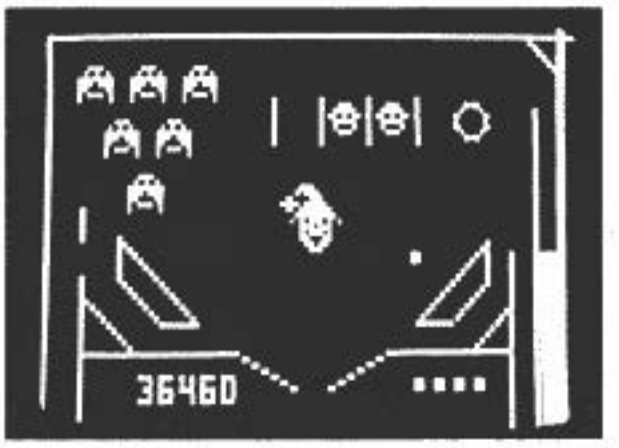


WARNING: The Video General has determined that Mazes and Monsters may be addictive! **$24.95**



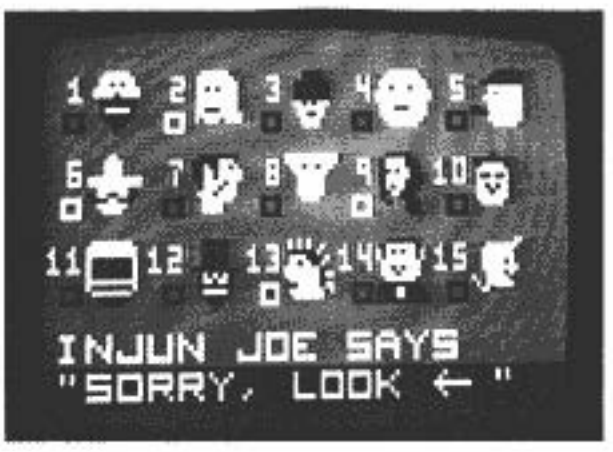
Wing It

A butterfly's flight, while free, is fraught with peril. In this single-player, action arcade game, you're a butterfly, trying to get to greener pastures. First, you must cross a busy freeway, avoiding being smashed by the fast-moving semi-trucks and cars. Then, flit across the river that runs alongside the freeway, landing on turtles, lily pads, rafts, and snakes that drift by. The longer you play, the more challenging the game becomes . . **$19.95**



Heads-Up Pinball

The original arcade game, the precursor of video games, goes electronic on the Interact. Yes, folks, your computer is a pinball machine with HEADS-UP PINBALL. Pull the plunger and watch the ball bounce into action. Be quick on your flippers to keep the ball in play, aiming it to knock out "heads" and score points. Hours of fun for the young and younger **$19.95**



Safe-Cracker

A terrorist group has infected the world with a deadly plague virus! Modern science has an antidote, but the terrorists have sealed it in a booby-trapped safe. You've rounded up a motley crew of suspects, three of whom can tell you the numbers in the safe's combination, and one of whom has a clue to their sequence. How sharp a detective are you? Can you crack the safe and save the world before it's too late? **$17.95**

One-Armed Bandit

You don't have to go to Las Vegas or Atlantic City anymore to play the slot machines. Save money all around by turning your TV into a One-Armed Bandit. Superb graphics in this assembly language program let you watch the wheels spin when you pull the handle down. You can borrow from the bank if you run short on cash, but don't quit before paying back your loan! . . **$17.95**

with complete, heavily commented source listing **$24.95**

Back in Stock!

Joystick Cable Extenders

This popular item is now back in stock! Extend your controller cables up to 8 feet for more comfortable gaming. Set of two, includes wiring instructions. Soldering is required **$11.95**

Prices, specifications, and availability subject to change without notice.

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Your Interact Connection

Do we have your correct name and address? Are you receiving all your catalogs and newsletters from Micro Video? Please check your address label, and tell us if we need to make any changes.

Submitting Your Software

Now, on to the second issue — software submissions. Some of our most popular games, such as Hot Rocks, were designed and developed outside Micro Video. If you've got a program you think we might want to include in our catalog, we welcome you to send it in. All software sent for evaluation should be sent to the attention of John Stout. But, before you send it in, ask yourself a few questions about the program. The answers to these questions will tell you a great deal about how marketable it is.

Is the program a variant of something already available for the machine? We're not interested in duplicating material we already have. We'd have very little interest in another Alien Invaders, for example. This is not to say, however, that it can't be a similar *type* of game. An action space battle, for instance, should be signficantly different, both in graphic display and operation, from software already in our catalog.

Does the program have a professional appearance? Compare it against other software we sell. Look at all aspects of the graphics — color combinations, speed and smoothness of motion, and design. Color combinations should be pleasant and easy on the eye. Moving graphics should not flicker. Also, pay attention to the general appearance of text in your program, evaluating placement on the screen, readability, spelling, grammar, and consistency.

Does the program appeal to a broad audience? Will a wide variety of people be interested in playing the game or using the program? A program that is so specific in nature that it will interest only a select few users is just not suitable for our small marketplace.

Does the program have enough features and variations to give it long-term playability? Our best games are those which a child can enjoy, but which increase in difficulty during play or have selectable skill levels, so adults are challenged as well.

Is the program a logical computer application? Not all activities adapt to the computer environment. A program that lets you play a solitaire card game is an example of an illogical application. What advantages would the program have over a deck of cards?

Finally, the most important questions you can ask yourself about your program:

Would I spend my hard-earned dollars buying this program?

And, if I did, would I be disappointed when I got it?

Your answers to these questions alone will give you a pretty good indication of how interested other users will be.

Before you send a game or program in for review, we recommend that you "play test" it extensively. Get as many of your friends and relatives as you can to try it out. Watch to see how long the game holds their interest. Ask their opinions and impressions, and look to them for suggestions on improving it. If you get consistently positive feedback, it's probably worth sending in for our response.

In general, we're far more intercsted in machine language programs, which almost always meet our software criteria better than BASIC programs, which can't compare in graphics speed and overall sophistication. A BASIC program must be of *exceptional quality* to be seriously considered for our catalog.

As you design a program with the intent of selling it to Micro Video, strive for consistency with our other software. For example, if the game

continued on page 15

Meet the Programmers

At present, Micro Video employs two programmers full time, with a third to be added in the near future.

John Stout is our programming manager, and, although he's only been on board since March 1982, he's had a hand in almost every new piece of software in our last two

John Stout

Tom Matulevich

catalogs. His latest masterpiece is Mazes and Monsters, an exciting, three-dimensional, graphic adventure. A music macstro turned programmer (he holds B.A. and M.A. degrees in Music Composition and Conducting), John has become instrumental in our program development. He not only coordinates our programming activities, but also has responsibility for reviewing software submitted from outside sources.

John spends a large part of his time outside Micro Video arranging music for the University of Michigan Marching Band (Go Blue!). In other spare moments, John does freelance musical composition, collects coins, and is an amateur film critic and would-be film maker.

Tom Matulevich, our other programmer, knows the Interact like the back of his hand. He worked in the repair area at Interact Electronics, and has also done service work for Micro Video, although he now programs almost exclusively. Although proficient in BASIC, Tom does most of his programming in hexadecimal with a monitor. Tom learned machine language by POKEing BASIC repeatedly to "see what would happen." He reports that this was often fatal to the interpreter, and claims to hold the record for crashing BASIC (a somewhat dubious honor!). Tom's newest creation for the Interact is the spectacular Wing It action game. Unfortunately, he doesn't have too much time for games, as we keep him busy with custom programming for commercial advertising displays.

Outside work, Tom makes a hobby of electronics repair. He enjoys music played on his high-powered stereo system and his car, a V-8 Sunbird that he describes as a "semi-racecar." He also dabbles in photography.

Still looking for a

Better Mousetrap

We've been very surprised at the limited response to the Better Mousetrap Contest. To date, we've received only a few entries. Maybe you've been too busy with your summertime fun to send yours in. There's still time, though. The contest expires 1/31/83, and we'll announce the winner in our Spring 1983 issue.

The rules are simple. What we're looking for are clever, innovative ideas involving the Interact. Do you have a really different computer application? A new approach to an old programming problem? The ideas can be hardware or software-based, but they must be your own. The prize is $100 in products of your choice from Micro Video.

Here are the entries so far.

Low Cost Protection

Steve Ward, of Carlisle, Ohio, built his own custom carrying case to protect his computer when he carries it to his friends' homes. He purchased an inexpensive, soft-sided suitcase several inches larger than his machine. He lined it with foam rubber, cutting the pieces to fit snugly and leaving a rectangular hole in the center so the computer will fit tightly. If the suitcase is large enough, Steve reports, you can also cut holes for joysticks and other accessories. His has pockets which serve well for transporting tapes and program instructions. It cost Steve about $25.00 to make his carrying case, and he feels it's "a small price for a lot of protection."

Graphic Line-Up

Drake Diedrich of Gig Harbor, Washington, sent in a subroutine that computes angles and draws lines between any two screen coordinates. You can add it to your BASIC programs for producing additional graphic effects. When you call it from your program, pass the two x, y coordinate pairs as X, Y, X1, Y1 and the color as C.

```
1000  AX=ABS (X-X1)
1010  IF AX=0 THEN AX=.0001
1020  AY=ABS (Y-Y1)
1030  IF AY=0 THEN AY=.0001
1040  IF AY>AX THEN 1160
1050  S=1
1060  IF X>X1 THEN S=-1
1070  A=AY/AX
1080  IF Y>Y1 THEN A=-A
1090  D=Y
1100  FOR B=X TO X1 STEP S
1110  IF B<0 OR B>111 OR D<0 OR D>76 THEN 1140
1120  PLOT B+.5,D+.5,C
1130  D=D+A
1140  NEXTB
1150  RETURN
1160  S=1
1170  IF Y>Y1 THEN S=-1
1180  A=AX/AY
1190  IF X>X1 THEN A=-A
1200  D=X
1210  FOR B=Y TO Y1 STEP S
1220  IF B<0 OR B>76 OR D<0 OR D>111 THEN 1250
1230  PLOT D+.5,B+.5,C
1240  D=D+A
1250  NEXTB
1260  RETURN
```

Typing Guidelines

Richard Bandelier, of Fort Wayne, Indiana, fashioned a device which he finds handy for typing in programs or data and also in graphics development.

He took a piece of scrap board, 5"×12"×¾" in size, and cut a lengthwise slot in it, about 20 degrees off perpendicular. He cut the slot about two inches from the front of the board, slanting it toward the rear. He made the slot wide enough that a clipboard slides in and out easily. He also cut a piece of plexiglass about the size of a clipboard and added a clip-clamp to the top, which he uses in graphics development. He places a piece of graph paper over a drawing, then uses backlighting to make tracing the picture for adaptation to the screen easier. He found that stretching a rubber band over a plastic ruler on the clipboard gave him a moveable guide to use when typing in programs or data. As an extra feature, he even routed a gully on the board for his pencils. He states that you can change the dimensions to meet your needs, but remember to cut the slot forward enough that the device won't be top heavy.

Cursors! Foiled Again!

Les Woolsey, of Ottawa, Ontario, originally submitted this as an entry to the Small Bytes contest. We ruled it out as an entry, because it was not a complete program. However, it's a good and useful idea, so we've entered it for him in this contest.

Les reports that he's used several methods of tracking a cursor across an area of the screen. Aside from the problem of writing and erasing the cursor itself, there are two major problems in following the joystick. One is converting the value returned by JOY into delta-X and delta-Y values; the other is checking that the values fall within the limits of the screen. He's come up with an efficient scheme for handling these functions, which you can incorporate into your BASIC program code.

```
10  PLOT X,Y,1:J=JOY(0):IF J=0 THEN 10
20  PLOT X,Y,0:X=X-((JAND1)AND(X>1))+(((JAND2)/
    2)AND(X<110))
30  Y=Y-(((JAND8)/8)AND(Y>1))+(((JAND4)/4)AND
    (Y<76)):GOTO 10
```

Password, Please

Don Dawson, of Park Forest, Illinois, puts password protection on his top-secret programs with the following routine.

```
1  CLS
2  COLOR 7,0,0,0
3  PRINT "A PASSWORD IS NEEDED TO USE THIS
   TAPE"
5  A$=INSTR$(2)
10 IF A$="two letters of your choice" GOTO 20
11 PRINT "YOU ARE NOT PERMITTED TO USE THIS
   TAPE"
12 FOR P=1 TO 480:NEXT
13 COLOR 7,7,7,7:END
20 PRINT "title of subject matter"
```

Feedback

Dear Micro Video:

Your equipment is a good introduction to computers (my 6 year old and 14 year old love it, and my 7 and 11 year olds enjoy it). I'm getting tired of seeing OM errors, though. I look forward to ROM BASIC, so we can get it and the 32K for more power. It does seem slow on some programs. We also would be interested in FORTH and PASCAL.

Robert Slaughter
Milan, Michigan

Dear Robert:

BASIC does some things well, but it is slower in some areas than machine language, especially in graphics motion. ROM BASIC won't solve this. You can effectively increase your programming space and reduce OM errors by employin program compaction techniques. (See Basically Speaking!*) If you really need more RAM. I'd recommend you upgrade to 32K, then add ROM BASIC later. Finally, I believe someone out there has FORTH —any info for Robert?*

The Editor

Dear Micro Video:

We are *really* looking forward to playing the new adventure game! We had so much fun with Troll Hole Adventure, we really felt a bit let down when we figured it all out. Once we got into letting our imaginations expand we were on our way, and all the laughs we had were worth the price and more!

The Dykstra Family
Racine, Wisconsin

Dear Dykstras:

I'm sure you've received the Mysterious Mansion by now and hope you've been enjoying it as much as I did.

The Editor

Dear Micro Video:

What I don't like is high prices! Why do you think we all bought Interacts instead of Apple II or III's?? I am sure I will someday, but I'll keep my Interact for playing games . . .

I do, however, appreciate your hard work at providing useful software that is compatible and generally flawless. Your free Newsletter is great, but does it allow free advertising or program exchange? . . .

Philip J. Davenport
Seattle, Washington

Dear Philip:

We don't like high prices either! Unfortunately, our suppliers keep raising theirs. Check our prices against comparable software for Apples or other computers to see how low our prices really are. As for as free advertising and program exchange, RAM Pages current format doesn't include advertising, free or paid. We're in the process of redefining the format now, and changes in upcoming issues may well include a user "bulletin board."

The Editor

Dear Micro Video:

About a year ago I purchased the Interact computer because it was the least expensive of all the computers I saw. I had planned to get to know a little about computers and then move up to an Apple or Atari-800, but I ended up very pleasantly surprised with all the new products coming out, the very low prices, and the newsletter. I have a feeling I will be sticking with the Interact for a long time.

Paul Davis
Levittown, New York

Dear Micro Video:

I just received my first copy of your newsletter, and I am very impressed. I, like several other people, purchased my Interact "R" in November last year only to find out in January that the Interact was no longer being manufactured and the company I purchased it from placed all their sofware on sale the next month. I was wondering what I was going to do with no support for my Interact when I came across your name and address in one of their club newsletters. I wrote immediately for your catalog only to find you had lots more software than they had carried, not to mention the 32K memory expansion and the Exatron Stringy sponge for openers. I am so HAPPY!!! I'm already trying to figure out the quickest way possible to get the money to buy them and the next $400 worth of software I've picked out and then, of course, there's the Type & Talk. All I need is more cash! . . .

Barbara Bridges
Badger, California

Dear Micro Video:

Thanks for sending the issue of RAM Pages and your catalog. I was ready to sell my Interact until you came along. Now I see that the only thing we Interact owners needed was someone to provide the hardware and software we required to make our computers do the things others were doing. Thanks again and keep it up!

Ryan Smith
Forest Grove, Oregon

Dear Micro Video:

I am a new owner of a used Interact . . . I want to compliment you on bringing personal computing to those who can't afford Apples or whatnot. I have two comments:

1) Your keyboard is quite atrocious, frankly. (Even the improved one). I type much faster and find it irritating to have to wait for the keyboard. I have been looking for a replacement keyboard and I wonder if you are considering one at any time.

2) Your stringy floppy is marvelous, but the price is somewhat high. For an extra hundred dollars, why not offer a floppy drive? Also, do you sell wafers separately?

One last note:

I know you have stated that we are stuck with the current text limitations of the Interact (11 × 17 characters). Have you investigated a separate graphics board? There are some available for Apple, for instance (40 chars/line — 80 chars/line).

Oh, well despite the above gripes, you seem to have something going here.

Brad Branham
Houston, TX

Dear Brad:

We agree with you! The keyboard is awful. You'll love our new keyboard (See article on page 1). Our price on the Stringy Floppy is only $30.00 higher than Exatron's list

continued on page 12

Great Restorations! *

BASIC has a feature we weren't aware of until recently. An astute user, Bob Morrison of Franklin, Ohio, passed this tidbit along to us. While we documented it in the last reprint of *Basically Speaking*, here are details for those of you who bought after the first printing of the manual.

As you probably know, the RESTORE command resets BASIC's internal data pointer to the first DATA statement in the program. This allows you to reuse sets of data as needed during program execution. But, to access data in the middle of the "data list," you must have some way to bypass data values you don't want to use. One way to do this is to use a "dummy read loop" to take in, then "discard" unwanted data. This can, however, be a cumbersome and time-consuming method of handling your data.

As it turns out, there's an easier and faster way to control BASIC's data pointer. The format of the RESTORE command allows you to reference a specific set of values in the program by including a line number on the RESTORE command, e.g., RESTORE 1350.

To use this form of the command successfully, you'll need to organize your data values into distinct sets. The data sets should be placed on separate DATA lines (or groups of lines), such that each set starts on a new DATA statement.

Here's how you might use this form of RESTORE in a program:

```
 10  DATA 110,55,110,55,110,55,139,216,BEETHOVEN'S 5TH
 20  DATA 97,247,131,61,117,68,131,61,HALLELUJAH CHORUS
 30  DATA 200,150,179,55,168,119,200,100,DRAGNET THEME
100  CLS:COLOR 0,1,3,7
110  OUTPUT "NAME THAT TUNE",10,60,2
120  OUTPUT "PRESS KEY",24,48,1
130  OUTPUT "1, 2, OR 3",21,40,1
140  A$=INSTR$(1)
150  IF A$="1" THEN RESTORE 10:GOSUB 300:GOTO 100
160  IF A$="2" THEN RESTORE 20:GOSUB 300:GOTO 100
170  IF A$="3" THEN RESTORE 30:GOSUB 300:GOTO 100
180  GOTO 140
200  FOR P=1 TO 1000:NEXT:RETURN
300  FOR P=1 TO 300:NEXT
305  FOR I=1 TO 4:READ A,B:TONE A,B:NEXT
310  GOSUB 200
320  READ D$
330  OUTPUT D$,56-3*LEN(D$),25,3
340  GOSUB 200
350  RETURN
```

Note that the program doesn't reset BASIC's data pointer until a key has been pressed. Then, based on the value of the key, it issues a RESTORE to a specific line number. You might try expanding on this idea to create a game with more tunes to name or one that randomly selects tunes from a list. In the latter case, you might want to put your RESTORE statements in a set of subroutines and access them using an ON . . . GOSUB construction. Thanks, Bob!

* *with apologies to Charles Dickens*

Feedback *continued from page 11*

price, which does not include the controller software required to use this device with your machine. You'd have to modify your computer hardware to add a floppy disk, so the cost would be considerably more than just an extra hundred dollars. Finally, we're working on the graphics limitations problem. Don't have any concrete details for you yet, but stay tuned.

The Editor

Dear Micro Video:

I would like to see a good program for sending Morse code, RTTY and ASCII with programmable messages that uses one joystick firebutton output to go to the transceiver audio circuit. Also, I'd like RS232 output for a printer with selectable baud rate that automatically selects receive speed and prints it on the screen. It should have a software debouncing and print on the screen. It should be able to receive while you type the text to be transmitted, using one line that goes to the tape record head through a keying circuit and then to the input of a transmitter. Keep up the good work and thanks for the catalog.

Richard Thompson
Santa Ana, California

Dear Richard:

Whew! A tall order! Can anyone out there help this man? I know we've got some hams in the crowd!

The Editor

Dear Micro Video:

When we first saw an ad in Popular Mechanics, I thought maybe the Interact was a fly-by-night company. But when my brother and I sent for it, we really enjoyed it.

For one or two years we were happy until a dreadful Tuesday, June 8, 1982, we awoke from sleep and to our horror, found our Interact computer totally under dirty sewer water, which had come up from our drain. There was no telling how long it was under or the damage, but we guessed at least a couple of hours. The first thing we did was to get it out of the water. We drained it out and then had it checked out. Nothing was wrong except the tape head needed cleaning. We are extremely happy to be Interact owners!!!

Faithful owners,

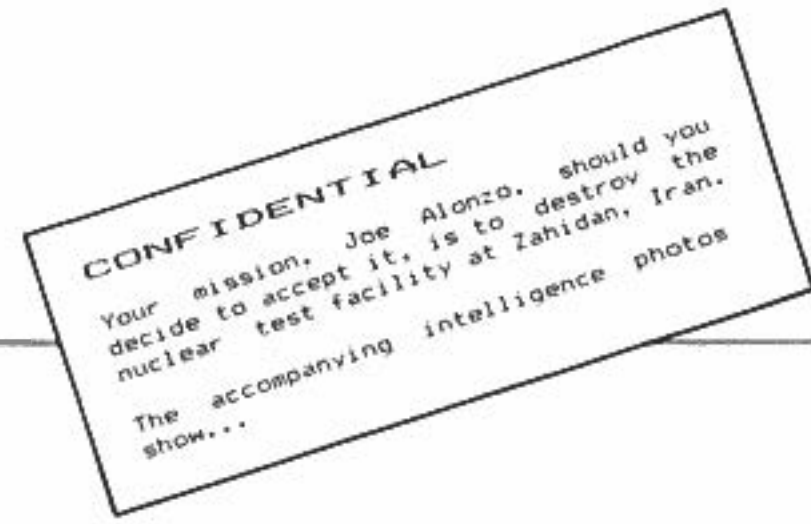
Mike & Dave Daugherty
Marshalltown, Iowa

Dear Micro Video:

. . . Here in Bayfield my dad owns the cable TV company. As you know the Interact comes out on [channel] 3. We got it changed to 4, so now we use the Interact to advertise items on TV. We have about 360 people on the cable. We also play games on it too! I should say I program and play games! . . . Two kids in our classroom have Atari video games and they told me that the Interact is junk, even though they'd never seen one! . . . When we got it on the cable TV I called them both up and told them to turn on channel 4! Well, they have both seen the games (Alien Invaders & Packrat), and they think the Interact is a good computer. In fact, they like some of the games better than Atari's!! I had a lady call me and ask me what kind of computer that I was using. She loved all the sound and graphics! I told her that it was an Interact and [about] some of the games you can get, and she sure was sorry that she bought a TRS-80! . . . Well, that's all the Interact news from up here in northern Wisconsin. I've seen a few people up here picking strawberries, and their shirts said "Ann Arbor, MI You'll like our style!" Well I do, and keep up the good work!

Mark Hadland
Bayfield, Wisconsin

MICROTEXT:
Extensions You Can Make



When we write a program such as Microtext, we try to make it as generally useful as possible. We try to anticipate all the ways that people might want to use the program. We also try to leave enough free RAM so that the program can process sufficient data at one time to make it worthwhile.

In a limited RAM environment, a program can actually have too many fancy functions. What good do all those nifty features do if the program can only process a few lines of data at a time?

With the 32K expansion, the RAM pressure is reduced. The extra memory gives Microtext the ability to handle 7-8 pages of text at a time, rather than just 1-2. And, there's room to play around with adding some extra features.

By adding only a few lines of code and changing a few existing lines, you can expand Microtext's processing capabilities to include automatic pagination, insertion of keyboard messages into the body of the text, and more. Instead of making these modifications ourselves and releasing a 32K version of Microtext, we'd prefer to tell you how to change the program yourself. Not only is this cheaper for you, but it lets you "pick and choose," implementing only those new features you want.

You can, of course, make these changes to the 16K version of Microtext. You'll lose a little RAM in the process, but the amount of text the program can handle won't be dramatically affected.

If you're operating on a 32K system, one thing you'll definitely want to do is create your own 32K version of the program. Having to run the program through the 32K Translator each time you want to use it is no fun. Creating your own version is easy. Just load Microtext, then the 32K Translator. Answer "RS232 BASIC" when the Translator asks for the originating language. When your program has been converted to the 32K environment, load Microsoft BASIC for 32K RAM. Incorporate any of the extensions given in this article that you wish, then use CSAVE to store your 32K Microtext program on tape. (To modify the 16K version, just add the patches using RS232 BASIC, then CSAVE the program.)

The Personal Touch Our first extension adds a new processing directive, *Z. *Z works just like *T in that it requests keyboard input for inclusion in the printed output. But, whereas *T processes the keyboard input by putting it at the beginning of a new line, *Z embeds the user-entered string within the body of the text. This can be useful for personalizing "boilerplate" letters or standard contracts such as leases or sales agreements. To implement the *Z feature, add the following four lines of code.

```
600   READ IS:CS=MIDS(IS,2,1)
605   IF LEFTS(IS,2)="*Z" GOTO 690
610   IF IS<>"ENDTEXT" GOTO 640
705   IF CS="Z" GOTO 910
```

The Bold Approach If you have an EPSON MX-80 printer, and you'd like Microtext to be able to take advantage of its emphasized text capabilities, add the following line to the program. This gives you a *E directive that you can use to put bold, extended headings on material you produce.

```
662   IF CS="E" THEN LPRINT CHR$(14);:GOTO 600
```

The following set of data lines show how these two features can be used. When the data statements are executed by Microtext, it pauses at line 40 to request keyboard input (*ZAGENT NAME). If you run the program with these data statements, whatever you type in response to the "AGENT NAME" screen prompt will be embedded in the processed output, as illustrated in our sample above.

```
10  DATA *E
20  DATA CONFIDENTIAL
30  DATA *L
40  DATA "Your mission,",*ZAGENT NAME
50  DATA "should you decide to accept it, is to"
60  DATA destroy the nuclear test facility
62  DATA "at Zahidan, Iran."
70  DATA *L
75  DATA The accompanying intelligence photos show...
80  DATA "ENDTEXT"
```

Page After Page You may also find it useful to be able to control the number of lines printed per page and the number of linefeeds between pages. Some printers are "smart." They know that they're supposed to skip several lines after printing a certain number of lines (usually 60). However, some printers are "dumb"; they need to be told when to paginate and how much. If your printer prints continuously, you may want to add this extension to Microtext. This modification puts a line counter variable (LC) in the program that forces pagination after 60 lines. To implement it, you'll have to add four new lines of code (1490-1510) and change five existing lines.

```
 720  TB=0:KS=IS:GOSUB 1500:IF SK=1 THENGOSUB 1490
 770  FOR I=1 TO C:GOSUB 1490:NEXT:GOTO 600
 895  IN=0:GOSUB 1490:GOTO 600
1030  TB=I:KS=IS:GOSUB 1500:IF SK=1 THEN GOSUB 1490
1370  TB=IN:KS=LS:GOSUB 1500:LS="":IF SK=1 THEN
      GOSUB 1490

1490  TB=0:KS=""
1500  LC=LC+1:IF LC<61 GOTO 1510
1505  LC=1:FOR T=1 TO 6:LPRINT:NEXT
1510  LPRINT TAB(TB);KS:RETURN
```

What if you want to print only 30 lines before invoking automatic pagination and you want to skip 10 lines

continued on page 15

Help!

Need help? Call (313) 996-0626

Q. Help! When I bought my computer from Protecto Enterprizes about a year ago, I received a Music Maestro tape, but I didn't get the plastic overlay the documentation describes. I called and asked about getting one from you, but was told they weren't in stock. It's pretty hard to use the program without the overlay. Is there any chance of my getting one, or am I stuck with a useless program?

A. You're in luck. We were out of the overlays, but we've recently had more made. They're now back in stock, and you can purchase one for $5.00.

Q. Help! I sent my computer in to you for repairs, and when I got it back, it didn't work! Who do you have working in your service department anyway? Chimpanzees?

A. It *is* frustrating to wait for your computer to be returned, then find it doesn't work! But, no, we don't employ simian types as technicians. Every computer that comes into our shop is thoroughly tested both before and after repairs. Then, it must pass a burn-in of at least 8 hours before we send it back to you.

However, this doesn't always mean it still works when it gets to you, we've discovered. We've got very little control over what happens to your computer once it leaves Micro Video, and, unfortunately, shippers sometimes treat our delicate packages roughly. If your computer box is dropped repeatedly or otherwise mishandled, damage can result. Solder connections can break loose, the RS232 port or a chip may pop out of its socket, or the tape head can become misaligned.

Occasionally, a unit may leave our shop in working order, but fails almost immediately when its owner hooks it up and tries to use it. *This doesn't mean repairs weren't performed!* Some parts of your computer are just particularly susceptible to failure. The A/D converters (joystick ports) and other parts that interface with the "outside world" are easily affected by static discharge, accumulated in a joystick or from your hand, for example. You can reduce static problems by grounding yourself (touching something metal) before you operate your unit. This is especially important during seasons when the air is very dry.

Power surges can also cause problems for your computer. They may intermittently affect tape loading, or have more dramatic effects. Any major appliance which draws a lot of current, such as a refrigerator, can cause surges through a power line, so you should avoid plugging your computer into a line that shares power with one. If you have no choice, you might want to invest in an electrical isolator. They're relatively inexpensive and eliminate power surge-related failures.

Whatever the reason, if you get your computer back from repair and it doesn't work, naturally you're unhappy with Micro Video. Believe me, when this happens, we're just as unhappy about it as you are! But, in any case, we *do* stand behind our repairs. Just send your computer right back to us (a cranky note is optional), and we'll put things to rights. At no extra cost to you, of course.

Q. I've got your Assemblex/Editex programs, but they don't seem to work on my computer. Could it be my port? Do I have a defective tape? Help!

A. You didn't describe *how* they don't work! The way a program fails can tell us a lot about what's causing the problem.

First of all, if you have a port other than the Micro Video port, the programs will not work on your machine, due to differences in I/O memory mapping.

You may be able to tell whether or not your tape is defective by how it loads. If your computer won't load the tapes at all, check your tape head alignment. If it loads, but no ">" prompt appears and the program does not respond to the keyboard, the tape may be defective, or your computer and printer may not be communicating. Check your cable connection and make sure your printer is on-line.

Initially, there were several bugs in Assemblex/Editex. In the first version, a printer initialization problem slowed output to one character every seven seconds. And, although you could set the baud rate in Editex, Assemblex would only run at 1200 bps. The programs displayed line numbers greater than 100 improperly, and they couldn't write more than 256 bytes of code to tape at a time.

Our second version corrected all these bugs, and the programs now operate correctly. We sent updated copies of the programs to everyone who had received the first, faulty version. If your tape exhibits any of these symptoms, perhaps we missed you. Give us a call to arrange for a replacement.

continued on page 15

Help *continued from page 14*

Perhaps Assemblex/Editex seem to work, but you've been unable to write any programs successfully. If a program you've written isn't operating as you intended, don't necessarily blame the assembler. Check your source code to make sure that all your commands are spelled correctly. Misspelled commands may be interpreted by the assembler as unaddressed labels. If Assemblex won't write a tape properly, check to see if you are using a DS pseudo-operator immediately before the END statement, which must be the final instruction in every source file. You should be able to solve this problem by reloading the source into Editex and adding a NOP between the DS pseudo-op and END.

If none of the above is obviously causing your difficulties, give us a call. Together we should be able to find a solution!

Software *continued from page 9*

focus is achieving a high score, include a routine that takes in and displays the record holder's name and score. At the end of the game, the player should *always* have the opportunity to play again at the same skill level or with the same game options ("SAME GAME?"), without having to respecify them. These fine points can make the difference between an excellent and a mediocre program.

You may design a banner, or front screen, for your program, although this is not required. We do request, however, that you include clear, complete documentation when you send your program to us. It will get a more favorable review if we have a clear understanding of the program's objectives, options, and operation.

We evaluate software submitted as soon as possible after receiving it. But, if your program arrives during one of our frantic times, such as during catalog preparation, it may take as long as several weeks before we can find adequate time to give it a fair review.

If we like your program and want to add it to our catalog, we'll contact you my mail to make purchase arrangements. If we like the idea, but feel the implementation could be improved dramatically, we may offer to buy the idea from you and do the implementation ourselves. An example of a program that reached our catalog this way is Video Derby. If the program does not meet our needs or general criteria, we will return it to you. We do not duplicate software sent in for review, so you need not worry about piracy.

Micro Video pays no on-going royalties for software. We do, however, pay reasonable fees for exclusive rights to programs produced by outside sources. The amount varies based on a program's quality, its relative completion (that is, how much work we'll have to put in to polish and get it into marketable form), and its overall appeal. Remember that a good machine language game will always be worth more that its BASIC counterpart. Also, remember that the relative worth of the program is proportional to our market size. You might get more for the same program for an Apple or Atari, because sales quantities are potentially much higher in those marketplaces. But, something's better than nothing, and besides, you get the satisfaction of having produced a marketable product!

In conclusion, whatever your interests — game, education, business, personal data management software, for profit or just for fun, get out there and program your computer! With a video game, you react to the machine — "dance to its tune." When you program your computer, you make it react to you. After all, isn't that why you bought it?

MICROTEXT *continued from page 13*

between each page, instead of 6? Simple. You'd change the line counter limit in line 1500 from 61 to 31. To increase the number of blank lines inserted between pages, you'd change the maximum value of the variable T in line 1505 from 6 to 10.

And More? Finally, you can even modify Microtext for use without a printer by changing all LPRINT statements in the program to PRINT statements with RS232 BASIC. The utility of this modification is highly questionable, however. With our current 17-character line limitation, you'll undoubtedly consider the resultant screen display to be unsatisfactory.

Maybe you've made some changes of your own to address needs we didn't envision. If you've got code you'd like to share with other Microtext processors, send them in! We'd love to do a follow-up article based on *your* ideas.

MICRO VIDEO.

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02465

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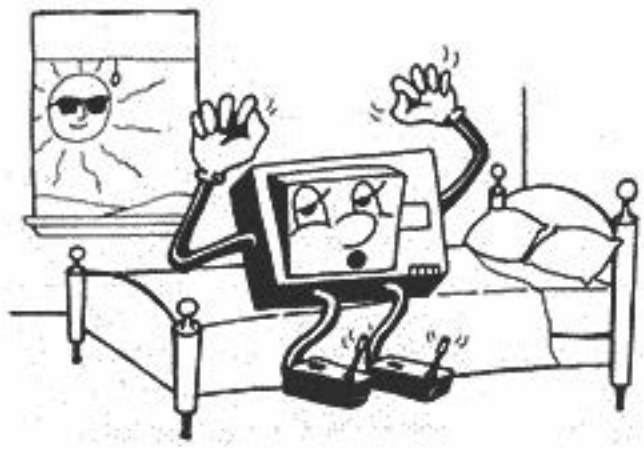
Wake-Up Call

You know that not all days in your life start out alike. Sometimes you wake up happy, and other days you may unexplicably awaken in a bad mood. But, did you know that this can happen with your computer, too? It's true. When you "wake up" your Interact with the ON switch, sometimes it "gets upon the wrong side of the bed." On those occasions, your Interact doesn't relate well to your TV set, and the quality of the screen display suffers.

Perhaps you haven'tnoticed these "mood swings" in your computer. All Interacts have them, but, depending on the sensitivity of your TV set and how its color and tint controls are adjusted, these changes in your computer's temperment may be slight and virtually impossible to detect visually. However, once you're aware of this potential problem, the difference between your computer's good and bad "moods" can be very apparent.

To experience your computer's mood swings firsthand, perform the following test. First, adjust the color control on your TV so that the background is a rich blue. Then, set the tint control to the approximate center of its range. (To find the range center on your TV, turn the tint control all the way left, then all the way right. At one end of the range, the background color on the screen will be blue; at the other it should appear red. If there is no significant color change, the brightness or color setting may be too intense. The center of the range is the point at which the background color changes from red to blue.) Now, turn your computer on and off several times, and look for differences in the visual appearance of the "DEPRESS L TO LOAD TAPE" message.

When your machine wakes up in "good spirts," the white color in the



What side of the bed did your computer get up on this morning?

"DEPRESS" lettering will have a slight reddish cast, while the "L TO LOAD TAPE" line will have a bluish tinge. This color difference in the text occurs because the two lines start on different, even/odd, pixel locations on the screen. If, on the other hand, you computer wakes up with a negative outlook, you'll see a reversal in the lettering tints — the "DEPRESS" line will have a blue tint and the "L TO LOAD" line will appear slightly red. The technical explanation for this phenomenon is rather complex, but you hardware enthusiasts may be interested in knowing that it has to do with the phase relationship between the color burst (IC20) and the first stage of the timing chain (IC16).

Although your computer's mood won't otherwise affect program operation, all your game displays are best seen when your computer has a good outlook on processing. For example, in one of our newest games, WING IT, the vertical red lines that form the rafts lose their width and redness if your computer is in "bad humor." Also, the vertical striping on the semi-truck becomes faint. However, when your computer is happy, the raft logs will appear a rich red, and the stripes on the truck, which are really alternating red and green vertical lines, look like "high resolution" white lines. You'll miss that marvelous optical illusion if your computer is feeling depressed.

If you try this test and don't notice any difference in the screen's appearance, then your computer and TV probably get along famously, and bad screen display isn't likely to be a problem for you. If you do notice changes, you may want to pay closer attention when you power up your system to get optimum visual performance. Fortunately, your computer's outlook is easily improved . . . just turn the power off and on until the screen display indicates a "good disposition." Think of it — your computer may never have an off day again!

Vol. III, No. 1 Spring 1983

MICRO VIDEO®
RAM Pages™

Interact Implicated in Birthday Plot

Smartees' Interact was the shadowy figure behind Sue Denim's birthday abduction. But as we savored the pizza, played the games, and watched the Interact's lively graphics (above), it was evident the plot had a fatal flaw.

It was Sue Denim's birthday. Our plot thickened, and then congealed. We decided to abduct her and stuff her silly with pizza at Smartee's, a new fantasy-land restaurant just south of the Border (Michigan's, that is).

Located in Toledo, Ohio, Smartee's is one of Micro Video's commercial clients. Smartee's is modeled in a style similar to the Chuck E. Cheese's Pizza Time Theaters. Its decor has a "firehouse" theme. There's a "stage show" with tall, mechanical, instrument-playing animals, game rooms, a children's area, and a special room for adults. As well as pizza, the menu offers: a salad bar, subs and sandwiches, and ice cream treats. And, a 16K Interact is the basis for their order ready displays.

It didn't take much to coax Sue into the van. The mere promise of food was enough. However, we learned later that we were all innocent victims of another sinister plot, hatched by President Dave Ross. He worked on our basic weaknesses, that we are all suckers for a good party. But, he really wanted us to see the commercial display part of the business in action, and this was his insidious way of getting us to go on this "field trip." His fiendish plan was admittedly clever, but as you'll see, it had one fatal flaw.

As we exited the van about an hour later, we got our first clue that we were there for more than a birthday party. Dave began to speak.

"Smartee's has perhaps the hardest-working Interact in the Midwest, maybe the entire universe," he said. (Editor's Note: This may be an exaggeration. But if you know of a harder working Interact,

continued on page 8

Remarks

Trying to tell valued readers that their beloved publication is no longer going to be free is a little like telling your boyfriend (lover, wife, husband, significant other, etc.) he has bad breath. It might put a temporary damper on the relationship at first but in the long run you'll both be better off for it.

Joking aside, after a great deal of deliberation by the Micro Video staff, we came to the decision that from now on we have to offer our pretty little (and getting bigger) newsletter on a subscription basis only. We are not going to pretend that money was not a major consideration— it was. But it was not the only one, by any means. And, in the long run, we believe you'll end up reading a better, more timely newsletter.

The financial aspect of this decision is, I hope, fairly simple to understand. The last three issues have jumped from 12 to 16 to 20 pages. Not only does this entail more printing costs, but more typesetting charges, more graphic arts costs, and more writing time (and time is something our staff has precious little of!). I'm sure there are several other increases I've forgotten. Since we don't carry advertisements for Vic Tanny or McDonalds (I can see it now, Micro McVideo), we have to absorb all these costs from our general business revenues. One option, which wasn't discussed for long, was to go back to a more affordable, 12-page format.

But that would be counterproductive. We wouldn't like it and we're sure you wouldn't either. We are committed to supporting your machines. Fewer pages of information, in our eyes, translates to less support for the Interact. This goes against our basic nature here at Micro Video. So, since we aren't backed by a conglomerate with endless financial resources, we believe this is our best choice in offering you our continued support.

That's the bad news. Let's take a look at the good news— all the good stuff you'll get for your $20 per year.

First of all, you'll get four information-packed newsletters at predictable times. Raise your hand if you've been wondering when this issue would hit your mailbox. Gotcha, didn't I? Among other things, when you commit yourself to the $20 subscription price, you get an increased commitment from us. The last RAM Pages was mailed in October, nearly six months ago, partly because we had to produce our Winter catalog. From now on RAM Pages won't get bumped for more important projects, because we won't have more important projects. RAM Pages will move to the head of our list. You'll know when to expect each issue.

Also, in the next issue we are instituting a new "Bulletin Board" section (see page 6). This will allow subscribers to communicate directly with other Interact owners, free of charge. Has your line printer gone to electronic heaven, and you'd like to replace it with a used one? Want to trade software you've written with other owners? Want to find out who has been able to computerize a hot tub with an Interact? RAM Pages subscribers can get answers to questions like these and more. Please, just don't try to sell your Kawasaki through RAM Pages.

Each issue of *RAM Pages* contains coupons for generous discounts on Micro Video products. For example, be sure to check out the catalog supplement included in this issue for some intriguing new software. You can take advantage of the coupons on page 19 for these exciting new products or any from our prior catalogs.

We will also continue our popular contests for free merchandise. There's a new graphics contest on page 15, and we expect you'll have a lot of fun with it. Got a suggestion for a new contest? Then send it to me.

And don't forget our standard features. The Compuer Doctor will tell you what to do when you dump beer down the tape drive. Feature stories, like Gamesmanship Explored, and articles like Hardware Hints, will tell you how to broaden your Interact horizons and get the most out of your computer. We won't forget you advanced programmers either — special columns will continue. If you like to see your name in print, send us a letter. Unless it's full of expletives which we'd have to delete (don't we have Richard Nixon to thank for that expression?), we will in all likelihood run it in Feedback. In addition, new products will be previewed in "Program Notes" before they appear in our catalog (for example, see page 12 in this issue).

And, of course, you'll learn as much about Micro Video as you ever wanted to know. (Maybe more?)

This decision to charge you for the newsletter is, we believe, a natural step in the evolution of both RAM Pages and Micro Video. We're committed to supporting you, because you've played such a significant role in the growth of our company. Our goal is continued growth for both of us, and we are convinced that this is the best way to achieve it.

Now, get out your pen and fill out the subscription form on page 18. As an added bonus, if you write the words, "Sue Denim, I want you", anywhere on the order form, you can order any Micro Video tape for *half price* along with your subscription. This is just the first of many ways you'll save when you subscribe to RAM Pages.

Sincerely.

Sue Denim

Sue Denim
Editor

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Program Notes

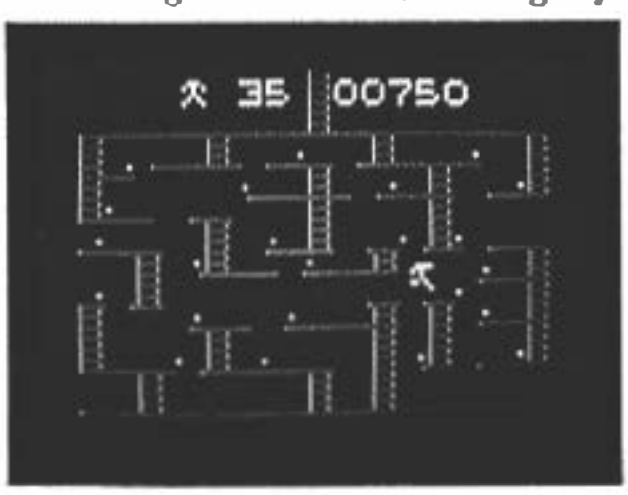
In our catalog supplement included in this issue, we have three new action games to titillate you, no matter what kind of game hits your particular fire button. And if you're like me, **Jumping Jack**, **Silver Dragon**, and **Pack Wars** will give you a good case of "joystick cramp." What more could you ask for?

What's that? Something for you more serious computing enthusiasts? Of course! Our new **Communicator-Plus** should really give you folks something to cheer about, too.

JUMPING JACK

Jumping Jack has entered a death-defying, one-of-a-kind competition to prove once and for all who is the best stunt man in Hollywood. The challenge is to scale two faces of a series of buildings. You have to rely on your considerable athletic skills to scramble through a ladder and scaffolding labyrinth in an allotted amount of time. The faster you climb, the more points you score. But that's not all. There are hazards to thwart your passage.

On the first side of each building, you have to jump over fast-rolling barrels or use finesse in your climbing to avoid them altogether. One slip and they will knock you off the scaffolding. You also need the agility

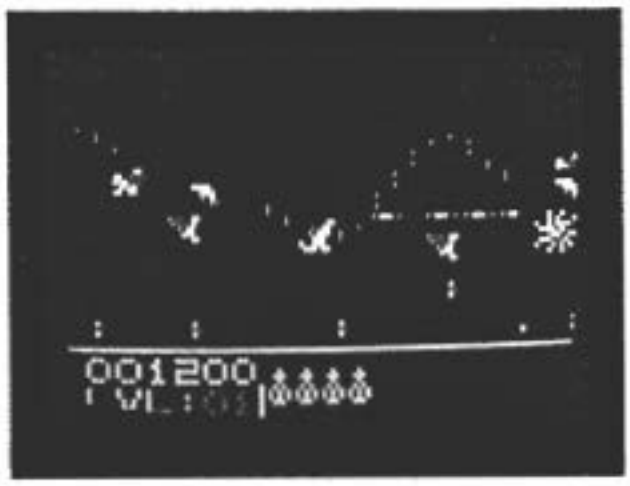


of an Olympic long jumper to leap over gaps in the platforms.

You encounter new, more intricate demands when you climb the second face of each structure. This time, barrels are being pushed from the rooftops, and there are few hiding places. The pattern is also more complex. There are more ladders and narrower platforms — which make your jumping far more treacherous. Jumping too soon or too far—which are easy to do — will send you plummeting to the pavement. You start off with three tries to climb the buildings, and you can earn a maximum of five additional "lives" as you progress. This game will keep you jumping and make you wonder how such an uncomplicated game could be so darned challenging!

SILVER DRAGON

GOODNESS, GRACIOUS, GREAT BALLS OF FIRE! In the imaginative *Silver Dragon*, a fantasy-action game, you, the flying dragon, must



protect the 10 beautiful sylphs who inhabit the base of the Scarlett Mountains from evil monsters. Fireballs are your only weapon.

Giant Eagles are the sylphs' only direct enemies. Other creatures are only out to destroy the dragon. Eagles can swoop down, grab the sylphs in their talons, and carry them off to their nests. There, the eagle and sylph mutate to form a hideous harpy. Harpies possess a deadly magnetic power — don't get too close. The elusive whirlwind genies can become invisible at will. The manticores, who shoot poisonous tail spikes in any direction, are probably your most formidable opponent. One hit from a tail spike or touch by a genie, harpy or eagle and you'll have to gulp a bottle of your magic regenerating potion. Beware! You start with only four bottles, but you earn one more with each "experience level" you complete.

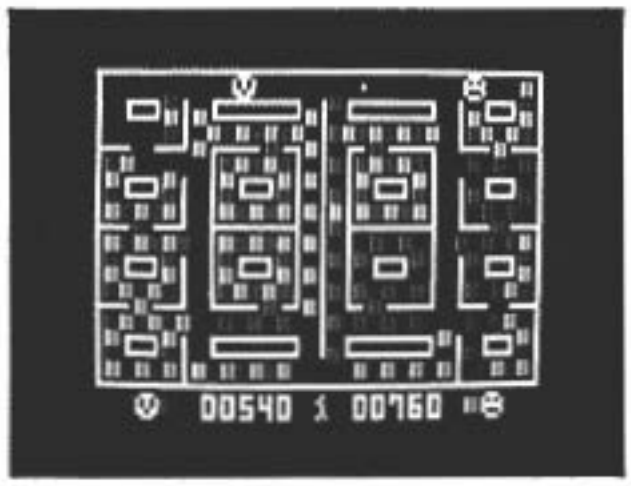
You score points for destroying the attacking monsters. You can earn bonus points by shooting down a sylph-carrying eagle, catching its prey in midair, and helping your sylph (sorry!) gently to the ground. The ferocity of the "monster waves" depends on the skill level you choose. With skill, luck and courage you'll reach "High Level Dragon," the ultimate goal.

PACK WARS

Both of these games are exciting, but if I had to choose only one of the three, I'd give the nod to *Pack Wars*. For me it has all the elements for video rapture — good graphics, fast action, and the opportunity to beat up on someone other than the computer. But if you prefer to stomp the computer, you can.

Pack Wars is also one of the few genuine two-player games available for the Interact. As its name suggests, it's in the Packrat family (*Eatcris Dadolteus*) but it's much more aggressive than its relatives. In the two-player option, the maze contains alternating squares of two colors. Your goal is to gobble all your color squares before your opponent eats his. You can also blast your enemy (in my case, usually my wife) with photons, which sends her flying to another part of the maze and scores points for you. I find it's the perfect way to get rid of my frustrations at the end of a long week.

When the computer's your adversary, the battle changes slightly. As you eat your squares (the computer doesn't have squares to devour), you leave your scent for the computer to track. The idea is to elude it until you eat all your squares. Again, you can blast your pursuer, but the computer is a sly tracker. You'll need a strategy, like leaving several trails, to throw it off. Through skill level selection, you can control how fast the computer moves, for an easy or hard game. Clear five screens and you'll win the war.



Of course, game reviews are highly subjective. All you have to do is check around Micro Video to see that. For example, some MV staffers prefer Silver Dragon for its graphics and rapid action. Others like Jumping Jack because it's more like a one-on-one sport (and often you are your own worst enemy!). And others, like me,

continued on page 20

MOVING PICTURES

Putting a picture up on the screen is no big deal. Getting it to move around quickly and smoothly is another matter altogether. In this article and its sequel next issue, we'll take a look at two Move routines, and show you how to pop pictures onto the screen and move them without the image flickering.

Most of you are probably familiar with the ROM subroutine RPLOT, which lets you output a picture as a bit pattern on the screen. RPLOT has its drawbacks, though. It only allows one color per picture and is also rather slow. Too slow, in fact, for complex, arcade-style games with fast moving graphics. (If you want to know more about RPLOT, see the Bombs Away! Programming Tutorial.)

The Move routine we'll examine this issue is BYTPIC. It is a byte-oriented routine that is very fast. Although it can be employed to move pictures on the screen, it is chiefly useful for moving a stationary image from memory to the screen. Next issue, we'll cover PIXPIC, which, though not as fast as BYTPIC, is more suited for moving images on the screen.

Before getting into specifics about BYPTIC, let's briefly review some of the basics of graphic display that are relevant to the use of the routine. As you know, the screen display is 32 bytes (128 pixels) wide, of which only 28 bytes (112 pixels) are visible on a typical TV screen, and 77 lines tall. The video RAM is mapped in bytes from 4000H to 499FH.

Graphically, each byte represents four pixels, and each pixel is controlled by a two-bit segment of the byte. The two bits represent a number, 0-3, which indicates the color that pixel is to be.

In our examples in this article, we'll assume a color set selection and represent the colors as follows:

color 0 = black

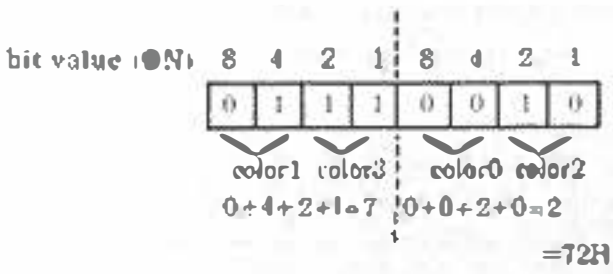
color 1 = red

color 2 = green

color 3 = white

If you need further information about manipulating the color set in machine language, see the *Guide to ROM Subroutines*.

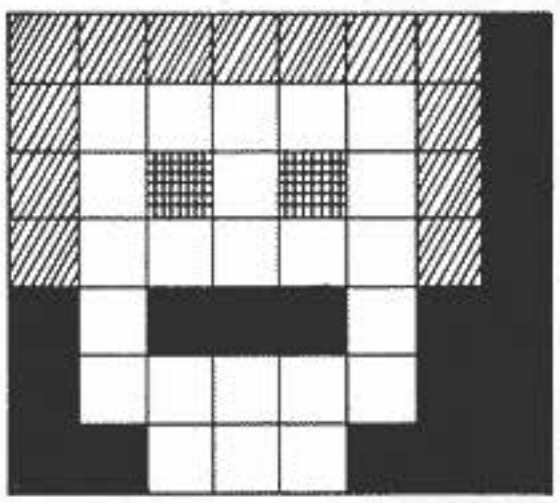
Also remember that a byte value is determined by the relative on-off status of each of its eight bits. Therefore, a byte containing all four colors in the color set might look like this:



Notice that the Interact reverses the bit pattern when it displays the byte on the screen:

It's important to keep this in mind when developing your pictures, or you may end up with some very strange looking images!

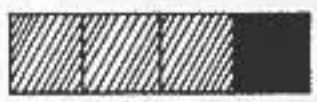
Pictures, then, are stored, byte by byte, in tables that are used by the Move routine. Let's say we want the following image to appear on the screen.



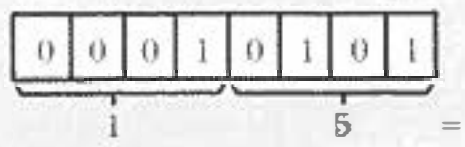
You can see that we've got a white face with a black mouth, green eyes, and red hair. You can also see that the picture is eight pixels (two bytes) wide and seven lines tall. That's a total of 14 bytes to be converted to hex for the table. In constructing pictures and tables, remember that your picture must be represented in full bytes — that is, it must be designed in increments of four pixels.

Begin at the upper left-most byte of the picture, and, moving left to right, determine the appropriate values to construct the picture table. In this case, the first byte is easy — four red pixels in a row.

The second byte is three red pixels followed by a black.



Reversed that becomes



The first line of the picture table, which we'll assign the label FACE, is

```
FACE:   55H, 15H
```

Continuing this byte conversion of our picture, we end up with the following table.

```
FACE:   55H,15H
        0FDH,1FH
        0EDH,1EH
        0FDH,1FH
        0CH,0CH
        0FCH,0FH
        0F0H,03H
```

Your picture table defined, you can now access and move it to the screen with the BYTPIC routine listed below.

```
BYTPIC: MOV   A,C       ;Set Up Counters
        MOV   C,B
        MVI   B,0
BYTP1:  PUSH  PSW
        PUSH  B
        CALL  BYTOUT
        XCHG
        POP   B
        PUSH  B
        MVI   A,20H
        SUB   C
        MOV   C,A
        DAD   B
        XCHG
        POP   B
        POP   PSW
        DCR   A
        JNZ   BYTP1
        RET

BYTOUT: MOV   A,M       ;Get Next Picture Byte
        STAX  D         ;Move It To The Screen
        INX   H
        INX   D
        DCX   B
        MOV   A,C
        ORA   B
        JNZ   BYTOUT
        RET
```

To call BYTPIC, you must first specify four set-up parameters:

register B = horizontal size of picture (in bytes)
C = vertical size of picture (in lines)
DE = screen address where upper leftmost byte to appear
HL = address of picture table

You'd pass these parameters to BYTPIC with the following series of instructions.

```
MVI   B,02H
MVI   C,07H
LXI   D,430H
LXI   H,FACE    ;address of picture
CALL  BYTPIC
```

This code sets the size of the picture (2 bytes by 7 lines) in the B and C registers, and tells BYTPIC to output the picture on the screen at address 4304H.

Notice that in this example, we have not identified the address of the picture table called FACE. You can put the table anywhere you like in memory, but remember to define FACE as an addressed label before you call it via BYTPIC or another routine.

The chief disadvantage with using BYTPIC for graphic animation is that, because it is byte-oriented, you cannot move the picture less than one byte, or four pixels, at a time. The result is motion that tends to be a little jerky. See for yourself with the following routine.

```
        LXI   D,4304H
MVFACE: PUSH  D
        MVI   B,02H
        MVI   C,07H
        LXI   H,FACE
        CALL  BYTPIC
        POP   D
        INX   D
        MVI   A,16H
        CMP   E
        JNZ   MVFACE
```

You'll notice one other problem with this routine — the picture leaves a trail as it moves across the screen. That's the fault of our picture table, though, not the routine itself. Next issue, we'll show you how to change the picture table and "cover your trail." You'll also find out how to get the flicker out with PIXPIC, our pixel-oriented Move routine. Stay tuned!

The Computer Doctor

Symptom: After pressing "L," the tape turns, but I hear no loading sounds and the program doesn't load in.

Diagnosis: Broken or loose wire on tape read head or read/write contacts.

Rx: This problem was brought to our attention by **David Stephen of Montreal, Quebec.** He reports that he's had the problem numerous times over the past year or so. The cause is generally a broken or loose wire in one of two places: the tape drive read head or the read/write contacts (described and illustrated in my last article).

If the wire contact at the read head is broken, the head can't pick up signals from the tape, and no loading will be achieved. To correct this defect, remove the cassette drive from the upper main housing, and the plastic cover from the drive. The read head is then exposed, and you can re-solder the connection.

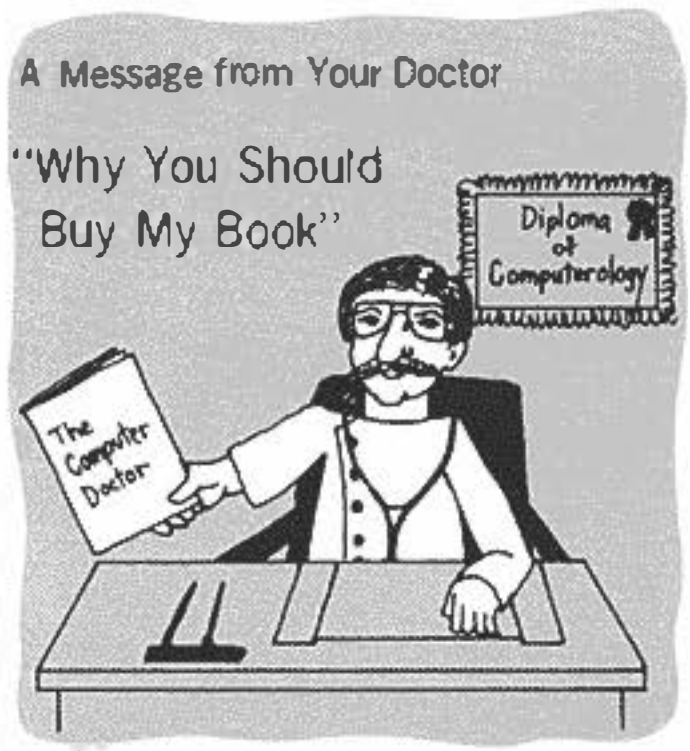
The second case, in which one or more of the six wires on the read/write contact switch are broken or loose, can create serious problems. Not only can this condition prevent successful loading, but, if a read wire and a write wire accidentally come into contact, your tape may be erased as you try to load the program. (!!!) The answer here is also soldering, but, because the wires on the read/write contact are close together, the operation can be tricky. Unless you've got a fine-tipped soldering iron, a steady hand, and experience doing this sort of thing, I don't recommend you try it.

Broken wires can cause a variety of operational problems, from a loss of power to strange patterns on the screen. Many of the wire contacts are fragile, so if you're in and out of your computer a lot, you may encounter difficulties related to wires connected to:

the RESET button
the ON/OFF switch
the keyboard
the tape drive

Don't panic. Just open your unit back up again and check your connections.

Thanks again, David, for sending us your input.



I'd like to talk to you for a moment about my new book, *The Computer Doctor*, and give you my professional advice: Buy it! I'll give you three good reasons why you should.

First of all, you can save money on computer repairs with my book. A number of units come in for repair that have relatively minor problems that could usually have been corrected by their owners. Secondly, you'll reduce the time your computer is out of service, since you won't lose days in shipping it back and forth. Finally, you'll learn more about your computer and how it works.

Unlike the old service manual, adapted from the one originally produced by Interact Electronics, *The Computer Doctor* does not prescribe "replacing the main PC board" for every failure. Instead, it takes you through Interact repairs from simple to complex. An easy-to-use "symptoms chart" provides quick reference to the prescription to cure your computer's ills. The "Common Colds" section reviews repairs that can be made with a few tools you probably have on hand. In the more advanced, "Major Surgery" section, I tell you how to trouble-shoot your unit for more complex ailments, with wave form diagrams and clear, redrawn, up-to-date schematics.

So, take your doctor's advice. Don't waste more time and money letting someone else repair your computer. Learn how to take care of it yourself. Bring the Computer Doctor home — at only $14.95, it's a smart investment in your computer's future and your own.

Product Update: Mazes and Monsters

Those of you who bought Mazes and Monsters and dedicated yourselves to mustering it also reported a few bugs to us. In a program of this size and complexity, testing all conditions that can produce a given failure can be an enormous task. Regardless, we've spent time with the program and believe that the problems you've experienced and reported are either fixed or can be explained.

1. Some users reported finding the Orb on levels higher than eight. That has been fixed.
2. When you find the Orb and return it to the Castle, the game no longer ignores the fact that you have the Orb. It is justly announced and the game ends.
3. A Thief sometimes said "Gotcha" when you had nothing he could get! They won't do that anymore.
4. Sometimes when you restarted the game after being killed, the screen went blank and nothing happened. This is one of those random glitches that's tough to reproduce, but I believe it is fixed on the newer versions of the tape.
5. Dwarves can now be Polymorphed. Occasionally, in the old version, you got the "Polymorph!" message, but no racial change occurred if you were playing as a Dwarf.
6. A couple of users told us about having a flawed maze (one-way doors, etc.) in sections after loading in a saved game. This is not a program bug but a bad tape save. I advise that you always save your game twice and on separate tapes to ensure successful reloading.

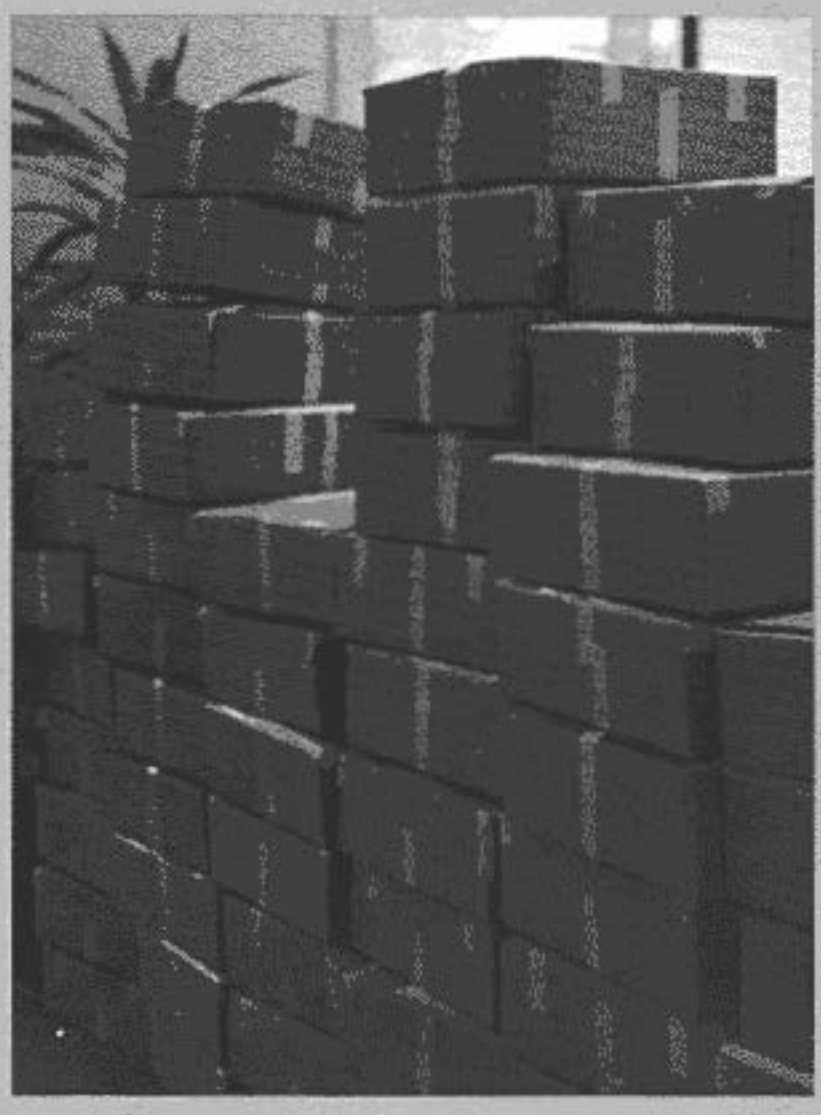
A few people have reported some strange things that occur inconsistently, like finding the Castle entrance on level 3. I've been unable to reproduce such problems. I suspect such occurrences may be the result of a bad tape save or confusion on the player's part, rather than a defect in the program code.

I want to thank those of you who pointed out problems and sent us your saved game tapes for testing and debugging. If you encounter what you believe to be a bug in Mazes and Monsters, I encourage you to report it. To assist us in identifying and resolving such problems quickly, please save the current game status on tape and send the tape to us. Sorry, but we cannot restore botched game tapes or make special characters (like Dwarves with super IQ and 1000 hits). We will, however, supply a new blank tape to replace the one you send to be checked.

If you have an older version of the game, we will replace with with the newest version at no charge. Simply return your old copy to Micro Video for replacement, and we will keep you posted on updates in the game. If you find the Orb and get back to the Castle with it, let us know! Not many have survived the quest so far!

Great Keyboard Response

Not surprisingly, the new professional keyboard was *the hot* item in our Winter catalog. Your response to the availability of this long-awaited upgrade was enormous, causing an almost immediate order backlog during our busiest time of year. And, of course, we didn't receive all the keyboards at once. Of the first three shipments we got, all keyboards were packed and sent the very next day. We now have keyboards in stock, however, for immediate delivery.



Tidbits

Mazing and Moaning?

If you are tired of wading through the 12 pages of Mazes and Monsters instructions, we have just the thing for you. **Jonathan Wright of Middletown, OH,** sent us a nifty, one-page condensation of the instructions. Featured are summaries of active keys, character traits, monsters, non-combat magic, combat magic, items, rank and miscellaneous features. If you send us a note with your next order, or a self-addressed stamped envelope, we'll be glad to send you a copy. Thanks, Jonathan!

Pardon me, Modem?

Tymshare is now selling reconditioned modems for $39.95 complete with a 30-day warranty. According to **Barbara Bridges of Badger, CA,** "Mine works great with the Micro Video RS232 port. Your printer cable can be adapted by inserting a switch between pins 2 and 3 in the cable." The modem is Tymshare model 900, 300 baud transmission, DDA compatible, RS232 interface, full duplex, originate only. You can order through Tymshare, Inc., 20705 Valley Green Drive, Cupertino, CA. 95014 or call 1/800-228-2028, ext. 558. Happy modeming.

Password Pique

According to **W.J. Moore of Pittsburg, CA,** the "Password Please" program entered in the Better Mousetrap contest can be defeated easily with the "LIST" command. He says, "If you go into BASIC's command words and change a letter or letters, then "LIST" will give a syntax error. In addition, if an incorrect password is used in the program, then line 11, changed to (11 NEW), will erase the program. Now that's security."

Lost in Haste

Robert Alpert of Camden, N.J., sent in two programs (one for 8K Graphics BASIC and the other for 32K BASIC) that will alleviate the problem of losing characters when typing quickly with the new professional keyboard. We've tried 'em both and they work well. They are as follows:

Fast Scroll for 8K Graphics Level II BASIC:

```
20 POKE24864,1:POKE24888,192
30 FORM=25264TO25284:READP:POKEM,P:NEXT
40 DATA33,32,73,62,2,245,62,143,54,0
50 DATA35,61,194,184,98,241,61,194,181,98,201
60 FORM=24851TO24862:READP:POKEM,P:NEXT
70 DATA205,176,98,0,0,0,0,0,0,0,0,0
```

Fast Scroll for 32K BASIC:

```
15 POKE24881,192:POKE24857,1
20 FORM=25408TO25428
30 READP:POKEM,P:NEXT
40 DATA33,32,73,62,2,245,62,143,54,0,35,61
50 DATA194,72,99,241,61,194,69,99,201
60 FORM=24844TO24855
70 READP:POKEM,P:NEXT
80 DATA205,64,99,0,0,0,0,0,0,0,0,0
```

Distinguished Characters

In addition, Bob Alpert submitted a program that lets you distinguish between upper and lower case letters on the screen when using Microtext. Upper case letters appear in white, and lower case in green. With this program, any text in data statements will be lower case by default. 1) Load 32K BASIC, 2) Load 32K Version of Microtext (See page 13, Fall 1982 RAM Pages to see how to create the 32K version of Microtext), 3) Type in the lines listed below, 4) Run the program. Any data statements containing text to be processed should be entered after line 110. Bob says that no RAM is taken from the program area because it resides in the space set aside for USR routines. We found this Microtext extension to be extremely useful. Here's his Distinguished Characters code:

```
10 POKE24656,0
20 POKE24679,95:POKE24678,0:POKE24677,195
30 FORM=24320TO24380
40 READP:POKEM,P
50 NEXT
60 DATA214,32,245,14,2,205,46,6,254,7
70 DATA202,208,96,254,13,202,246,96,254,10
80 DATA202,0,97,254,8,202,125,96,241,79
90 DATA213,42,6,76,62,68,189,197,220,236
100 DATA96,193,42,6,76,235,205,91,5,235
110 DATA34,6,76,14,3,205,46,6,209,225,201
```

Great Restorations Revisited

In the last issue of RAM Pages ("Great Restorations," p. 12) we detailed how you can control BASIC's data pointer with the RESTORE command and a line number. This allows you to enter a data list at a certain point, bypassing values you don't want to use. However, **Manuel Uson of Caracas, Venezuela** recommends caution when using EZEDIT with such programs. He reports that the RESEQUENCE command doesn't recognize the line number on RESTORE. It therefore does not change the referenced line number to reflect the new position when it renumbers the program lines; you'll have to change line references in those lines with SUBSTITUTE. Gracias, Sr. Uson, for passing along this tidbit.

Byte Bomb

In "Small Bytes" (Spring '82), one contest entry was a program that computes a checksum on Microsoft 8K BASIC, to check for damage from improper loading or errant POKEs. **Richard Thwing of Columbus, NC,** says the program will always report "BASIC BOMBED" because "the value of address 32767 under Microsoft 8K BASIC is 100236E + 06, which is bigger than the value given for validity."

He says that, due to rounding in scientific notation, the number 1002200 (given as the value to be compared in the checksum) is actually around address 32758 rather than 32767. If you change the value of T to 1002361, the program should run properly, and only indicate an error when there really is one.

Microtext Mishap

Several users found a typo in one of our Microtext Extensions article last issue that caused a syntax error. In the "Page after Page" section, line 1510 should read:

```
1510 LPRINTTAB(TB);K$:RETURN
```

Oops. Sorry 'bout that!

Help!

Need help? Call (313) 996-0626

Q. Help! My RAM Pages and catalogs are either arriving late or not at all. What can I do?

A. Unfortunately, we are both pretty much at the mercy of the US Postal Service when it comes to third class bulk mail, which is how those pieces are mailed. Unlike first class mail, there is no way to trace it. Also, third class mail takes last priority, and the mail delivery people pretty much deliver it when they can, or want to, get to it. According to the Ann Arbor office, delivery is supposed to be within three days of arrival at your local PO. However, they tell us it could take up to three weeks to make its way from the Detroit Bulk Mail Center (where all bulk mail from SE Michigan goes) to your local PO. Unfortunately, we have discovered that these times (three days, three weeks) don't always coincide with reality.

Also, there are certain occasions when the Post Office is not required to deliver bulk mail at all. For example, they will not forward it to a new address (please tell us if you move!). The same, of course, goes if they can't read the address (maybe the label fell off?), or the address is incomplete — i.e. no apartment number. If we have your correct address, and you regularly aren't receiving these materials, we suggest that you complain to your local PO. That probably won't locate what's missing, but it could help ensure deliveries are made in the future. If all else fails call us and we'll send another copy, first class.

Q. I'd like to hook up a line printer to my Interact, but I'm not sure what kind to get or what other equipment I need. Can you give me some advice?

A. First of all, you'll need an RS232 interface for your computer, which you can get from us and easily install yourself.

Then, you'll need to select a printer. Many different types are on the market now, with a variety of capabilities and price tags. You'll want to choose the one that fits your processing needs and your budget. The only requirement the Interact has is that it be a serial, or RS232-compatible, printer. We've tried a number of printers, and our favorite is the Epson MX-80 (or MX-100).

The third item you'll need is a cable so your computer can "talk" to your printer. We don't stock printer cables, because the required pin configurations on the cable connectors vary from printer to printer. Commonly, there are differences between the data lines used for send/receive and busy/ready signals. We do make custom cables on request, although you may prefer to do it yourself. Our RS232 documentation details the Interact pin configuration, and instructions for your printer should include its data transmission requirements.

Interact Plot

continued from page 1

please let us know. We'd love to prove him wrong!)

"Smartee's really one-upped the competition when they chose Interact for their order display system," Dave continued. "Rather than a dull, black-and-white, numeric display that merely announced orders ready, we worked with Smartee's to design continuously running software that uses the Interact's color and animation capabilities. You'll see a display that's fun to watch, as well as informative. It announces orders ready for pick up, welcomes special groups, sends birthday greetings, and advertises upcoming events or special deals."

He told us that the Interact, with the aid of RF splitters and amplifiers, broadcasts its messages on six color TV's mounted on the walls throughout the restaurant.

After we ordered, a couple of staffers immediately wanted to gravitate toward the game room, but Dave herded most of us into the dining area. His plan was working smoothly, so he thought. While we unwound from the trip and waited for our pizzas, he asked us to watch the monitor. It didn't take long for our orders to begin appearing on the screen.

"Here comes the first one," Dave informed us.

Before us, some of Tom Matulevich's programming magic came to life. His intricate video elephant, a rendition of one of the stage show characters, moved fluidly from the right of the screen to the center. It stopped and shot a blue spray of water from his trunk. As the water fell, it dissolved into a bright yellow order number, this time number 57, over the words "now serving." We all applauded, Tom took a bow, and everyone around us wondered what the heck was going on. At this point Dave was sure his plan was successful beyond his wildest dreams. Not only had we seen the display but we were enjoying it immensely.

"Hey, that's my number!" Sue bellowed with the enthusiasm of a 10-year old. She headed toward the counter.

"I know your order's ready, but please wait just a second before you get your pizza," Dave asked. "Good, here it is."

Up on the screen was Sue's name and age — superimposed over a video birthday cake, complete with flickering candles.

"Okay, who's the wise guy?" Sue asked, a little red-face. (No one confessed.)

Each of us applauded Tom's handiwork when our separate orders were announced, as if we all had our own personal elephants up on the screen. Soon we were munching on the hot, mouth-watering pizza. At that point it didn't matter why we were there. We were all having a great time.

As we ate, we found our eyes constantly returning to the colorful, active screen. We saw several more announcements of Sue's birthday, and a message welcoming "Micro Video of Ann Arbor" surprised us as it scrolled horizontally across the bright red owl logo, which appears periodically in the display. A multi-line, advertising message, surrounded by an eight-color scroll, announced a food special for the following week. And another screen that appeared frequently (which was especially handy for the couple of us who got absorbed in video games and missed our order announcements) displayed all orders that were ready but hadn't been picked-up.

As the day wore on, the fatal flaw in Dave's plan became apparent. He didn't know how to trick us into returning to Ann Arbor!

The Three Faces of AL

A programming language is probably the hardest type of program to test. That's because there are so many variables, so many ways the different parts of the program can be combined and used. A thorough test generally requires months of steady use in a number of application areas.

Many of you who purchased the Assemblex-Editex package have been disappointed with its performance. Frankly, we haven't been too happy with it either. There's been a direct correlation between our programmers' aspirin consumption and the correction of reported Assemblex-Editex bugs. Each fix seemed to generate more bugs. So, rather than buying stock in a pharmaceutical company, we've decided to "scrap" Assemblex-Editex.

But don't worry. We wouldn't leave you in the lurch, assemblerless. Allow me to introduce AL, our new assembly language programmer. AL completely replaces the Assemblex-Editex dynamic duo. Better yet, AL has more power, depth, and flexibility. He's an editor, assembler, *and* monitor, wrapped up in one petite package. Compatible with both 16K and 32K RAM machines, AL occupies only 4K of RAM.

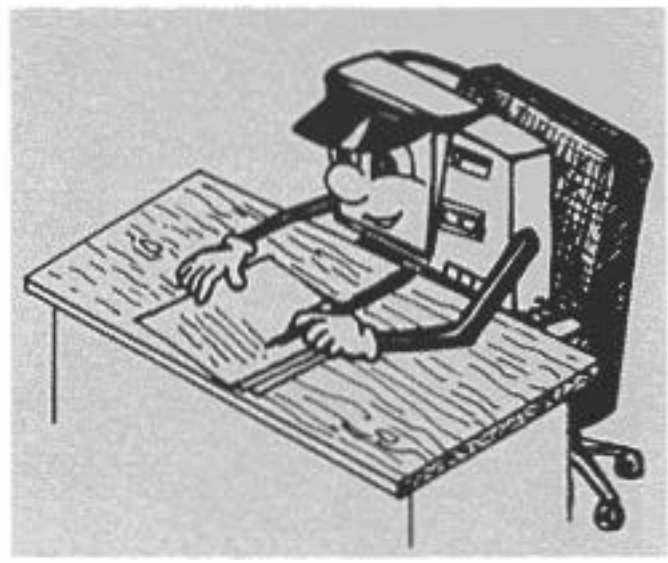
In addition to the conventional, decimal and hexadecimal numbering systems, AL can speak in other "tongues": octal, commonly used in larger, word-oriented computer systems; base 4, especially handy for graphics development (see *Moving Pictures*, p. 9); binary, for working with individual bits; and ASCII, for ease in text handling. And, he has various other capabilities you'd expect, such as being able to read and write tapes and to dump text, symbol tables, and the contents of memory to a printer.

Let's take a closer look at the three sides of AL's "personality."

AL, The Editor

To program in assembly language, you must have a way to get the mnemonic instructions into a form that can be processed. In other words, an editor. AL has that talent built-in.

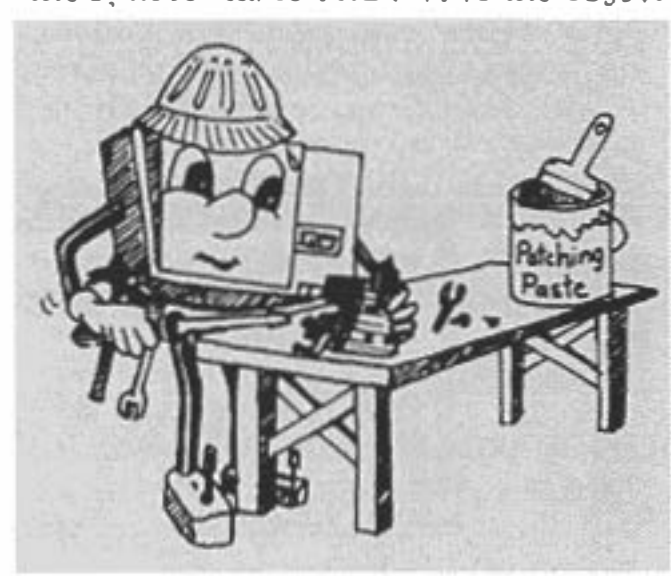
As does Editex, AL has commands for entering text, listing it, deleting and changing lines or groups of lines. But, AL can also do several things Editex couldn't. He's got a string handling feature that lets you easily



replace strings in a single line or across a specified range, even the whole program. AL will also let you relocate lines in your source file. In all his editing functions, AL will accept a label as the starting parameter, rather than a line number. This is convenient, because you don't have to remember what line numbers are associated with the various sections of your code. Finally, AL lets you decide where to locate your symbol table and text area in memory, giving you the flexibility to use its capabilities efficiently. Then there's . . .

AL, The Assembler

Once your source code is written, of course you must have some way to convert it to executable form, or object code. That's where AL the Assembler takes over. AL recognizes all standard 8080 mnemonics, plus a number of commonly-used pseudo-ops, like DS, ORG, and SET. In two (or more) processing passes that build the symbol table and create the object

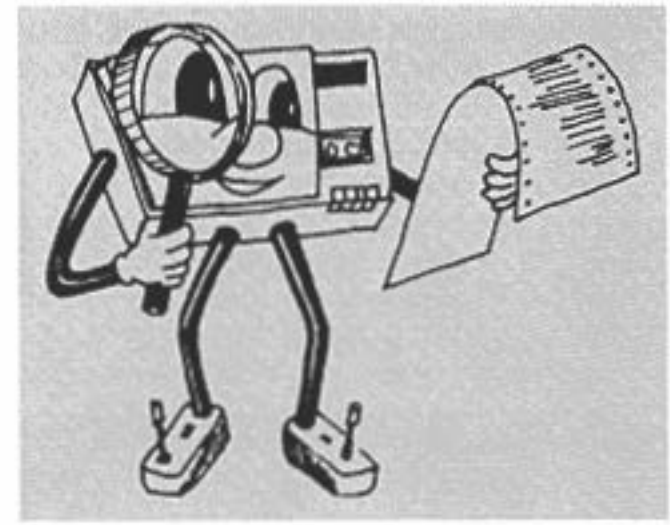


code, AL assembles your text file into a ready-to-run program. Find a mistake in your code, an undefined label in your symbol table? No problem. Just call AL The Editor, make the change, then hand the job back to AL The Assembler. It's instantaneous — no more endless reloading tapes to make changes in your code!

So far, that's a lot of processing power in only 4K, and you haven't even met . . .

AL, The Monitor

In program development, you may sometimes find it more convenient to change the contents of an individual location or two directly, rather than editing your source file and reassembling it. For those times when you want a close-up, detailed view of your program, you'll be glad you know AL The Monitor. While not a full-fledged monitor, AL has the primary features you'd want in such a program. AL will display the contents of memory or the registers for



you on command. He will let you substitute values in memory or set any one of the eight registers to a specific value. He'll even let you use a label as the register value! And, for your debugging pleasure, AL will assemble and run your code with multiple breakpoints and let you continue execution after the break.

As stated earlier, a programming language is hardest of all programs to debug. So, in light of the Assemblex-Editex snafu, you might well wonder how you can be sure AL is really in working order. We can guarantee it, because we've used AL internally for some time now. In fact, AL was the developer of several of our most popular action games, including Hot Rocks and Heads-Up Pinball.

Now, we're not saying AL will instantly make you a super programmer. But, with AL the Editor, Assembler, and Monitor at your side, you'll sure have a much easier time becoming one!

On the inside . . .

At Your Service

Micro Video's Service Department had humble beginnings. with one person working part-time in his basement. If you were one of the unfortunate few whose computer needed repairs at that time, then you probably remember how slow service could be.

However, that one-horse shop has since blossomed into a full-fledged Service Department. Technicians Tim Wilkins and Ed Segars handle computer repairs. joystick repairs and assembly, and custom modifications for Micro Video's commercial clients. as well as a significant number of 32K upgrades. In 1982. the upgrades accounted for nearly half the department's work.

"Ha! Ha!" you say, "that's why Micro Video hasn't offered the 32K upgrade as a do-it-yourself kit." Well. as you'll see, that's not quite accurate. When you dig a little deeper. you find out that the upgrade is a considerably more difficult procedure than the average Joe or Josephine would want to tackle. For instance. you'd probably not attempt to tune up your car if you have never worked under the

Tim Wilkins

hood before. although the mechanic is likely to tell you that a tune-up is fairly easy to do.

The addition of the extra 16K memory involves the rerouting of certain components from the main PC board. Also, installing the upgrade requires more than 40 separate solder connections. which just adds to the opportunity for an inadvertent mistake.

"Upgrades can take anywhere from an hour to a day to do," Tim says. "That's because when you add the extra 16K RAM. it puts more of a load on the system. When that happens. a component that's weak to begin with can be pushed too far and go bad. It's not the upgrade itself that's so difficult to do. it's everything else that can go wrong. One of the most common problems is that with the extra load the 12 volt or -5 volt power supply goes."

Before the upgrade even starts. the machine is tested thoroughly to

Ed Segars

make sure there are no apparent problems which could hinder the memory expansion. Then. after installation. each upgrade goes through extensive testing. The computer spends at least 12 hours on the "burn-in" rack to induce any RAM failure or other problem that might result from heat build up. Only after it "passes" this test is the computer returned to its anxious owner.

"We just figure that customers wouldn't be happy if they did the upgrade themselves and then something else went wrong that was not even their fault." Tim says. "They are a lot better off knowing that when the machine leaves here it is running properly. And if they get it home and something is not working properly. they can get a hold of us and send it back within 90 days. and we'll fix it free. That goes for repairs, too."

The other major part of the department's work is repairing ailing machines. On average. about 35 units a month pass through the department. Tim and Ed handle everything from simple head alignment problems to one machine that was on when the house was struck by lightning (so that's what happens when you hit 700,000 in Alien Invaders!). Actually, that was the only unit in the history of Micro Video that couldn't be repaired.

The hardest and most time-consuming problems to fix are those intermittent ones. the kind that only happen when your friend has driven halfway across the state to play Mazes and Monsters and then disappear as soon as he pulls out of the driveway. Often the key to solving these unusual problems is waiting for the computer to act up again. In those cases. the computer goes on the burn-in rack to be tested by a memory exerciser. a program that forces the computer to manipulate information continuously. Other specially developed software helps locate specific problems with colors. sounds. or joysticks. When the screen finally turns red. indicating a failure. Tim or Ed can locate the problem. However, if nothing happens within a reasonable amount of time ("Sometimes we've kept a computer running for a month or more without being able to duplicate the reported problem," Tim says), the computer will have to be returned. By far the easiest computers to repair are the ones that appear totally "dead". That's because the challenge is to make the unit do something, anything. They open it up and begin testing everything with their oscilloscope, volt ohm meter. and other fancy equipment until they find out what's wrong.

Which brings us to the topic of repair charges. Several of you have asked about repair charges. so we'll attempt to de-mystify them.

The average repair charge runs anywhere from $45 to $70. says our Customer Service Manager Dallas Maddox. But there are many exceptions. Some problems may cost only

How do I repair them? Let me count the ways. Ed and Tim perform routine to major repairs and a substantial number of 32K upgrades.

$20 to fix. On the other hand, if a power surge has blown a number of circuits in your computer, the cost may be substntntially more.

The main problem with trying to pin down repair prices is there are so many variables involved. This is true of any electronic component, such as your television or stereo system. For example, suppose your computer is missing a sound or sounds. You may think the sound chip has to be replaced. However, the problem may be just a capacitor, which could only be detected by an os illoscope. About the only way to tell for sure is for a qualified technician, like Tim or Ed, to examine the unit. That's why it doesn't mean much to publish repair prices.

Ed and Tim are always happy to talk with you on the telephone about your Interact frustrations. In fact, they encourage you to call before sending the computer in (or giving up on it all together!).

"It may be as simple as a tape head or sound tank alignment, or a matter of pulling out one RAM chip and putting in another," Tim says. "And if they want an estimate they should call us, too. We are always open for consultation (9 n.m. to 5:30 p.m. Monday through Friday)."

Hardware Hints

The Pause That Refreshes

Have you ever been in the middle of a serious game of Hot Rocks or Alien Invaders, and the telephone rings, or someone knocks at your door? How annoying! There goes the new world's record you were about to set! Wouldn't you like to be able to stop the game action at any time, then resume play from where you left off?

Well, it *is* possible. You can make this simple modification to your computer for about $1.00 and under an hour of your time. You will need:

- a utility knife
- a two-way switch* and mounting hardware
- 3 one-foot lengths of 22 stranded (or lighter) shielded wire
- a soldering iron and solder

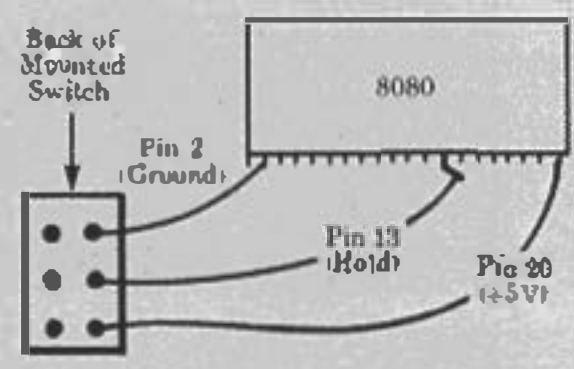
*Many types are available and can be used. We used a Radio Shack switch (#275-406), priced at only 2/69¢.

In normal Interact operation, Pin 13 (Hold) on the 8080A microprocessor is grounded, so the processor runs continuously. Operation can be halted by pulling the signal on Pin 13 high (to +5V). Therefore, you can add pause control to your machine by tying Pin 13 to a simple switch. One side of the switch will pull Hold to +5V; the other will ground it. By changing the switch position, you can start and stop the processor as you like, with no ill effects on program operation.

First, you'll need to mount the switch. A logical place is the left side of the ventilation area on the upper plastic housing. Use a stiff-backed utility knife to cut a hole to fit your switch, and mount the switch in it.

Next, open up your unit, and remove the 8080 chip from its socket. *Carefully* bend Pin 13 up so that, when the chip is replaced on the socket, Pin 13 does not make contact. Solder a wire onto the end of Pin 13, then solder the other end to the center post on the back of the switch. Solder the remaining two wires to the other two posts on the switch.

Then, solder the end of one wire to the foil pad located directly in front of Pin 2 (Ground) on the main PC board and the other to the foil pad in front of Pin 20 (+5V). Replace the 8080 chip, and you're ready to run.



Now, with the switch in the "Ground" position, your unit will operate normally. Flip it the other direction to stop the action instantly, and, when you're ready, move it back to restart the program. When you're in your fifteenth Galactic Clash battle round, and your hand is aching from clutching the joystick, flip the switch for the pause that refreshes.

FOUND: A BETTER MOUSETRAP

Last issue we complained that no one had entered the Better Mousetrap Contest. This issue we were inundated with entries. In retrospect, we probably should have had more rules, since this nearly turned out to be an "anything goes" competition. We received a refreshing assortment of entries, and we're gratified that so many of you took the time out from your busy lives to submit entries.

Our original intention was to print all submitted entries, but due to the heavy volume, we were forced to eliminate a number of them. Some, we discovered, just didn't work as claimed and were disqualified. Others were submitted without sufficient information or in such great detail that condensing the idea was next-to-impossible.

The Winner! ! !

We've evaluated all the entries, and our judges have reached a decision. They thought the Best Better Moustrap came from Dave Schwab of Ann Arbor (no, there's no home field advantage!) Dave has added a photo-digitizer to his system, and the results are pretty impressive. His entry is printed below. The rest of the entries we could squeeze into this issue follow, in no particular order.

A Little Light Reading

Dave Schwab's photo-digitizer reproduced the E.T. graphic accompanying this article. Using the suggestion detailed in *RAM Pages* (Vol. 1 No. 2, p.11), he bought a Radio Shack photoresistor 276-116 and connected it to the joystick port.He used part of the barrel of a ball point pen to house the light cell and attached the whole assembly to the head of his DEC-writer LA36 dot matrix printer. To begin the process, he attaches a photo, or other art that he would like to reproduce, to a section of printer paper, and feeds it into the printer.He then uses a BASIC program to move the photoresistor across the page and read the light intensity of the various sections of the photograph. The program stores each line on tape. He inputs the digitized image, via tape, back into the computer one line at a time. The printer reproduces the image, using characters of varying intensity. The program allows him to adjust contrast in the image by a "power-law intensity stretching function." He uses a 10-character gray scale ranging from a space for white to an H# overstrike for black. Dave says the digitizing and printing steps for an 8" ×10" picture each take about 45 minutes at 300 baud. He says he can even produce a negative image.

```
 10 COLOR7,3,4,0:DIMC(10),D(10),X(126)
 15 M=10
 20 DATA32,32,39,32,33,32,43,32,48,32,56,32,47,79,43,79,42,79,72,35
 40 FORI=0TOM-1:READC(I),D(I):NEXT
100 CLS
130 INPUT"O OR P";A$
140 IFA$="O"GOTO200
150 IFA$="P"GOTO5 0
160 GOTO130
200 INPUT"N";N:IFN>125GOTO200
210 X(0)=N
211 LPRINT:CLS
215 FORI=1TON
220 LPRINT"   ";:B=POT(1):K=0
230 A=POT(1):IFA=BTHENK=K+1
240 IFA<>BTHENK=0
250 B=A:IFK<5GOTO230
270 OUTPUTA,35,15,2:PLOTI,A/4.3
280 X(I)=A:OUTPUTA,35,15,0:NEXT
290 LPRINT:CSAVE*X
295 CLS
300 IFFIRE(0)<>0GOTO215
310 X(0)=0:CSAVE*X
320 GOTO100
500 INPUT"WHITE";W
510 INPUT"BLACK";B
515 INPUT"CONTRAST";E:E=1/E:C=W+(B-W)/2
520 CLS
525 LPRINT:L=77
530 CLOAD*X:N=X(0)
545 IFN=0GOTO100
550 FORI=1TON
555 A=X(I)
560 F=(ABS(A-C)/C-W))^E
565 IFA<CTHENF=-F
568 A=INT(M*(F+1)/2)
570 IFA<0THENA=0
580 IFA>(M-1)THENA=M-1
590 X(I)=A
600 A=INT((A+1)/3)
601 IFL>0THENPLOTI,L,A
602 NEXT
610 FORI=1TON:LPRINTCHR$(C(X(I)));:NEXT
620 LPRINTCHR$(13);
630 FORI=1TON:LPRINTCHR$(D(X(I)));:NEXT
640 LPRINT:L=L-1:GOTO530
Ok
```

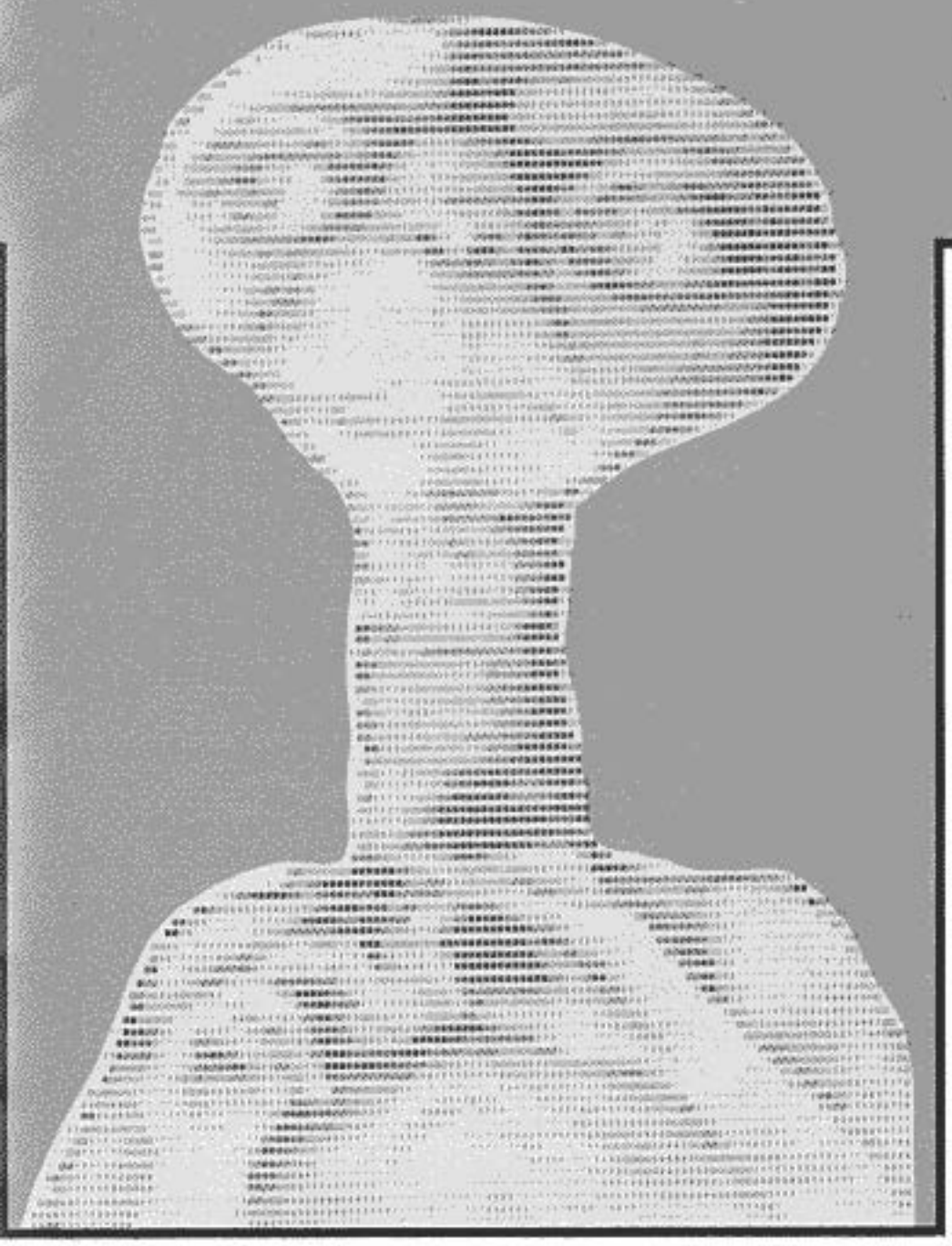
Wirth a Look

Terry L. Wirth, of Phoenix, AZ, rigged a way to use his Interact to turn on and off just about any small electrical device. He reports that he discovered the idea while trying to key his amateur radio transmitter with Morse code, using the computer as a keyboard. He simply put a relay across the tape drive motor. With the tape deck turned off, any commands, such as POKE, operate the relay instead of the motor and give an output. He uses timing loops to vary the signal lengths.

Reposition Proposition

Another modificationTerry Wirth devised solves the problem of having to type REWIND every time you want to reposition your tape. He installed a miniature toggle switch and mounted it just to the left of the "write" button. He says it does not affect the automatic operation of the computer when it controls the tape deck.

By referring to page 6 of the Interact's schematics, he found Q1, which is a transistor switch that t rns the tape motor off and on and completes the motor circuit to ground. He put his switch across the transistor switch. It is hooked between one side of the tape motor and ground. Terry says if you can't figure out which terminal of the tape motor to attach it to, simply hit reset-L to start the tape motor. Then, measure the terminal voltages with respect to ground. The terminal with zero, or near zero, voltage is the one to attach the switch to.



Sound Off!

Richard Fagley, of Sarnia, Ontario, fashioned a remote volume control for his Interact. He says, "the piercing sound of tape leads" is what prompted the modification. Richard replaced the audio output of the Interact with a 1.0M potentiometer (about $2 at Radio Shack) and used shielded cable to run it to the upper housing, next to the reset button. The Interact's audio output is located at the extreme upper left corner of the RF section, at the top of the main circuit board. The potentiometer replaces R109. If you don't want volume control, he reports, you can use an on-off switch instead.

Socket To Me

Jim Purcell of Milwaukee, WI, gained 2K of extra RAM in his Interact by inserting a 6164 static RAM into the empty ROM socket inside the Interact. With this modification he has "a nice little chunk of RAM sitting down at 800H that I can use to write auxiliary (machine language) programs." He took the static RAM and carefully bent pin 21 outward so that it wouldn't go into the socket when he plugged it in.

Then, he took a short piece of wire and tack-soldered it to "the foot that's stickin' out" and to the 80●W line on IC26, pin 14. In addition, he lifted the Read lines on both RAM and ROM and put them and the lines coming from 00●R and 80●R on a switch. With that arrangement, he copies the operating system from the ROM into the added RAM. By holding down the reset button, and throwing the switch, he can access the RAM operating system.

Game Stopper

Albert Narain, of Amsterdam, Holland, submitted a way to write an interactive program in BASIC that is time-limited and still allows input from the keyboard. If you are familiar with BASIC, you know that the INSTR$ function stops the program until a string the required length is entered. Everything grinds to a halt, including a program timer. Albert has found a way around this dilemma. His solution uses only 102 bytes of memory in its simplest form.

```
10  A$="":FOR I=0 TO 10: FOR J=14337 TO 14342: A=PEEK(J):
    IF A<>255 THEN 30
20  NEXT J,I:RETURN
30  A$=CHR$(90-8*(14342-J)-LOG(255-A)/LOG(2)):RETURN
```

Albert says that if you only need the number keys then you can either PEEK only at 14337 and 14338 or apply the VAL function to A$. If the CR key is needed than add:

```
15  IF PEEK(14336)=251 THEN A$=CHR$(13):RETURN
```

New Tricks For An Old Keyboard

Alex Kazim, of Houston, TX, has a great use for his old keyboard. He uses it to repair his joysticks when they can't handle Hot Rocks anymore. The only tools you need are a soldering iron, solder, and a phillips screwdriver.

First, you open up the joystick and expose the four small contact switches (silver plates) that correspond to the joystick's movement. Press each contact with your finger. If there's no spring to it, then it needs to be replaced. By the strangest coincidence, you can find more of these plates inside the old keyboard. Just remove the back, separate the keys from the board, and there they are. Use the soldering iron to melt and remove the old joystick contact. Then solder in a springy one from the keyboard.

Zappppppppppp!

Charles Cardwell, of Kingston, TN, submitted a program that, while not particularly useful, is a flashy demonstration of some string manipulations that are possible using BASIC. We enjoyed watching it and hope you will too. What follows is a slightly condensed version of his program.

```
 20 CLS:PRINT"       ZAP!":PRINT
 24 FORN=1TO12
 25 J=17
 30 FORI=1TOJ:PRINT"Z";:NEXT
 40 FORI=1TOJ-1:PRINTCHR$(8);:NEXT
 50 FORI=1TOJ-1:PRINT"A";:NEXT
 60 FORI=1TOJ-2:PRINTCHR$(8);:NEXT
 70 FORI=1TOJ-2:PRINT"P";:NEXT
 80 FORI=1TOJ-3:PRINTCHR$(8);:NEXT
 90 FORI=1TOJ-3:PRINT"!";:NEXT
100 FORI=1TOJ-4:PRINTCHR$(8);:NEXT
110 J=J-4
120 IFJ>=1GOTO30
130 NEXT
140 FORI=1TO204:PRINTCHR$(8);:NEXT
150 GOTO20
```

continued on page 14

Better Mousetrap

continued from page 13

Packin 'n Trackin

Daryl Biser of Warminster, PA, wrote a fast fast-forward locator program that allows him to store several programs on the same tape and find each one easily. It's a modification of the tape motor control program from our "Basic Examples Booklet."

Daryl's program, as written, uses 1500 as the counter for each program to be stored on the tape. He says this should accommodate any program written for the 16K Interact. However, he also gives the method to determine the precise program length to allow denser packing or to increase the counter for longer programs.

```
 10 REM BYTES * 0.235 + 390 (FOR LEADER) +100 = "COUNTER"
    FOR EACH PROGRAM
 20 CLS:PRINT"   PRESS F-FWD":PRINT
 30 PRINT"  PRESS ANY KEY":PRINT
 40 PRINT"   WHEN READY":PRINT
 50 AS=INSTRS(1):CLS
 60 PRINT" WHICH PROGRAM":PRINT
 70 PRINT"1 — FIRST PROGRAM NAME"
 80 PRINT"2 — SECOND PROGRAM NAME"
 90 PRINT"3 — THIRD PROGRAM NAME"
100 PRINT"4 — FOURTH PROGRAM NAME"
110 REM ALLOW ROOM FOR MORE PROGRAMS
120 REM ALLOW 1500 AS COUNTER FOR EACH PROGRAM
200 INPUT"WHICH NUMBER";N
210 FORI=1TO N:READ G
220 IFG=-1 THEN PRINT "NUMBER TOO HIGH":RESTORE:CLS:GOTO60
230 DATA 50,1550,3050,4550,-1
240 NEXT I
250 REM ALLOW ROOM FOR MORE PROGRAMS
350 REM MOTOR CONTROL
360 CLS:POKE 19215,25
370 POKE 4096,87
380 FOR X=1 TO G
390 NEXT X
400 COLOR 4,3,2,7
410 CLS:PRINT"   PRESS READ":PRINT
420 PRINT"  PRESS ANY KEY":PRINT
430 PRINT"  WHEN READY"
440 AS=INSTR$(1)
450 CLOAD
```

To use this program:

1) CSAVE the locator tape at the beginning of your multi-program tape.
2) Load in the multi-program tape.
3) Run the locator program.
4) Press F-FWD, then any key.
5) Press 1 (or number of program to be stored), then remove the multi-program tape, insert the first program to be transferred, and then press READ.
6) Reinsert multi-tape. Press READ and WRITE, and type CSAVE "Your program name."
7) Repeat steps 2-6 for each program to be stored.

For denser packing of programs on the multi-tape, Daryl determines the byte value of each program he wants to store by using the "PRINT FRE(0)" command. He subtracts this number from the total available memory, multiplies that number by .235, and adds 390 for the leader tone, and 100 for the counter. This calculation determines how much room on tape is to be allocated for a program (PVn). To calculate each program's tape position he uses 50+PV1, 50+PV1+PV2 and changes the values associated with G (line 230) to reflect them. It's a lot of work to get the multi-program tape built, but once done, the system provides fast access to your programs.

Congraphulations!

Michael Stolnicki, of Bloomfield Hills, MI, came up with a scheme to develop a graphics display for his graduation party. First, he loaded Compute-A-Color, created a picture, and saved it on tape. Second he loaded in the Micro Video Monitor and set a partial, 65-line window. Using the L command, he loaded the tape created by Compute-A-Color. Then, he moved the first 65 lines of the screen to the end of BASIC text area — 5700H — and wrote the moved memory on to tape. He reports that you can easily manipulate the saved picture from a BASIC program, such as the one listed below.

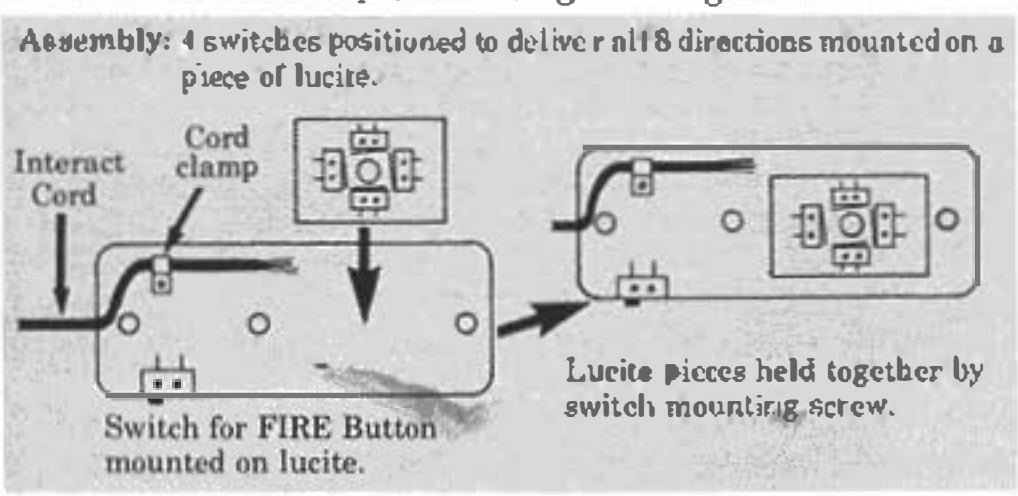
```
10  A=22272:B=16384:C=2079
20  CLS
30  COLOR 0,3,5,7
40  FOR I=0 TO C
50  POKE B+I,PEEK(A+I)
60  NEXT
```

Kidproof Joysticks

E. Hansen of Waukesha, WI, designed, what he calls a more "kidproof" joystick. The parts he used were:

- The top shell, cord, and three screws from the original Interact joysticks.
- Five subminiature N.O. SPST switches (four with flappers)
- A swivel mechanism
- Two pieces of lucite, ½ inch thick
- 5K pot and knob
- Compression spring
- Cord clamp
- Shell from felt highlighting pen
- Screws and nuts to mount switch

E. positioned four directional switches on a piece of lucite (see diagram). On the other piece of lucite, he mounted the fire button, and attached the two pieces with switch-mounting screws and nuts. He modified the shell so that the pot and swivel would come through the top, and the fire switch out the side. He housed the swivel in the pen shell and assembled the compression spring into the swivel ball. After soldering all connections, he mounted the lucite to the top shell using the original screws.



A Novel Plot

Chuck Yount, of Granite Falls, NC, could qualify for an honorary "Iron Man" award. He sent us a "short, three-dimensional function plotter I wrote for Level II BASIC." His "short" program is about 150 lines long, too long to include here, but it plots as three-dimensionally as the Interact's graphics resolution will allow. (Hint: stand back and squint.) He uses the DEF function to change the calculations for the image to be displayed. If you'd like a copy of his program, send us a S.A.S.E., or ask for one with your subscription to RAM Pages or next order.

continued on page 20

Far Out Graphics Contest!

This is a contest in nostalgia. Imagine that you and your Interact have been put in a time machine and, for some unknown reason, you wind up a party in Haight-Ashbury sometime in the 1960's. Jimi Hendrix blasting in the background. Strange smells in the room.

Then an idea occurs to you. "I bet I know what these space cadets would like," you say to yourself. You hook up your Interact to a nearby TV, turn it on, and run a program. Suddenly, everyone's eyes are transfixed to the screen. Then someone yells out, "Oh Wow man, look at that. Farrrrrrr Out!"

What would you have put on the screen to elicit that response? That's what this contest is all about. We want you to write a graphics program in BASIC that will make our staff say, "Oh Wow man, FARRRR Out." We'll limit you to 10 lines total for your special effects. Send your entry on cassette tape — not just a program listing — marked with your name and "FAR OUT GRAPHICS."

The prize for the best "far out" graphics display is your choice of a 32K expansion (installed) or an RS232 interface and a professional keyboard, and a package of incense.

Contest closes on Labor Day.

Interact Cache Unearthed, Hidden Treasures Discovered!

Mazes and Monsters comes to life! While exploring the microcomputer maze, Micro Video stumbled across a cache of 30 Interacts. These treasures had been hidden in a distributor's warehouse for many months. When we discovered these jewels, we quickly snapped them up and carted them back to the Micro Video Castle. Now we hope to gain experience points by exchanging them for silver.

Therefore, we have a limited quantity of new, 16K RAM Interact computers for sale. A lot of people have asked about the availability of more machines. If you're one of them, or you know someone who'd steal your Interact given half a chance, here's our while-they-last, "Hidden Treasure" offer. For only $379.00 ($439.00 with the new, professional keyboard installed), plus $7.50 shipping/handling, you get:

1) 16K Interact Model I with raised keycaps (add $60.00 for professional keyboard)

2) 2 Three-function Entertainment Controllers

3) RF Switchbox for TV Hook-up

4) Programming Tools:
   - Microsoft 8K BASIC
   - *Basically Speaking* Manual
   - BASIC Examples Booklet
   - Blank Data Tape

5) Service Aids:
   - *The Computer Doctor* Service Manual
   - Head Alignment Tape and Tool
   - Diagnostic Tape
   - Limited, 90-day parts and labor warranty

6) A Sampling of Available Software:
   - Breakthrough
   - Reversi
   - Star Track
   - Combat!
   - Earth Outpost I
   - Checkers
   - Beat the Clock
   - Computer Maze
   - Astro-Logic
   - Artillery Command
   - Superbowl
   - Showdown

7) Complimentary, one-year subscription to *RAM Pages*.

You'll get experience points in the microcomputer maze with one of these treasures. And, we'll make your silver go a little farther by giving you 20% off any software and accessories you order along with the computer.* (Don't forget that part of the treasure is your first year of *RAM Pages* free. Coupons in every issue are worth their weight in gold!)

*Sorry, this discount cannot be applied to the basic computer purchase. Quantities are limited. Machines will be sold on a first come-first served basis. Limit one computer per order.

Feedback

Dear Sue Denim,

This letter has nothing in particular to do with the Interact or even computers in general. All I want to know is how come you don't have a picture over your column like Dear Abby or Erma Bombeck? Since I'm a man, I never particularly cared what Mary Lang looked like. From your last column you sounded like a spunky young thing. Is there some reason you don't want us to see what you look like? Maybe you could have a contest where the closest actual guess to what you look like wins something neat, like a game or something. Here's lookin' at you, kid!!

Barry Blur
Cold Paws, Alaska

Dear Barry,

Not a bad idea, the picture I mean. I doubt if any of you could guess what I look like.

Sue Denim

Dear Editor,

I just thought I would drop you a note to commend both Micro Video and RAM Pages on their support of my computer. I was once ashamed to say I owned an Interact. Everyone would say, "A What?". It was really embarrassing to say that the company went out of business and there were only 4000 or so in North America. Lo and behold, Micro Video arrived on the scene and provided me with great software, a memory expansion (WOW), and now a keyboard. Now when people ask me what type of computer I own, I tell them with pride. When they say they never heard of it, I tell them it's an exclusive club.

Alex Kazim
Houston, Texas

Dear Editor,

Rush me your latest catalog which has the $10.00 off coupon for the new keyboard for the Interact Model R.

My wife tore it up and hid the pieces.

Yours sincerely,
Bert Cooper
Houston, Texas

Dear Bert,

Hope you keep your computer and tapes under lock & key!

Sue Denim

Dear Editor,

Thank you for sending me your spring 1982 edition of your RAM Pages. I would appreciate any more information on Interact computers for sale.

Apparently, the Interact computer I purchased from Protecto Enterprises went on the blink. This was my second one from them. Too bad I didn't know you folks earlier.

Sincerely,
B. Takaki
Honolulu, HI

Dear B.,

Before you decide to buy yet another machine, give Tim a call (see Repair story, page 10) to see if yours can be saved. We can get most computers up and running again. If it is totally shot, see the Interacts For Sale story on page 15.

Dear Editor,

My son has had his Interact computer now for a few years, and he not only enjoys it for its games, but has utilized its versatility as an educational aid. Prior to obtaining his own Interact computer, he was introduced to computers in his Project Potential class (a program for academically gifted children in the public school system). Since that introduction, he has developed his programming skills, and furthered his education substantially. I feel that the Interactcomputer helped make at least a part of all this possible.

A concerned parent,
Larry L. Burgener
Phoenix, AZ

Dear Micro Video,

The following are some passing thoughts.

1. Love the machine.
2. Greatly appreciate the RAM Pages—like a letter from a friend.
3. Format of RAM Pages is good—would like to see them become even more informative.
4. Feel more confident in Micro Video after learning of your continuing and expanding support for the unit. It's nice to know I don't own an Edsel bound for the junk yard.
5. Thanks for all your efforts.
6. Is the unit still being manufactured?
7. How much does a new unit cost?
8. Will there ever be a unit made (different model) that uses a disk drive?

Peter Klemish

Dear Peter,

1. *Thanks*
2. *Thanks again*
3. *Thanks again, again – we're trying. Any specific suggestions?*
4. *Good*
5. *You're welcome*
6. *Yes*
7. *See page 15*
8. *Probably not, for reasons discussed in past issues*

Gentlepersons,

A couple of years ago a very good friend purchased an Interact and

continued on page 19

BULLETIN BOARD

Here's your chance to interact with other owners absolutely free (postage, paper, and envelopes excluded) in our new "Bulletin Board" section of RAM Pages. You can think of the Bulletin Board as the "want ad" section of RAM Pages. The only catch is that you have to be a RAM Pages subscriber to take part. As I mentioned in Remarks, you can use the Bulletin Board to ask for or volunteer a variety of information. However, for our sanity we ask that you follow a few rules when you send your message to be posted.

1) Use 25 words or less.

2) The words "Bulletin Board" should be written on the message somewhere so we know what to do with it. Writing "c/o Bulletin Board" on the envelope would be greatly appreciated.

3) The message has to have something to do with the Interact. That's fairly broad when you think about it.

4) The message has to be legible. Please don't assume we can read your handwriting just because you can. Please type, if possible. If not, please print. And, please write in English whenever possible.

5) We reserve the right to reject any offensive material. We reserve the right to edit all submissions.

6) Messages have to be received by Micro Video at least 6 weeks before the publication date. **For next issue, messages are due 6-15-83.**

Here's What You'll Get When You Subscribe to

RAM Pages

- Four issues of RAM Pages
- Valuable discount coupons for Micro Video Products
- Contests

- Free access to the "Bulletin Board"
- Previews of new software, accessories
- Computer Doctor
- Hardware Hints
- Programming insights
- Inside information about Micro Video
- 50% off any tape of your choice when ordered at the same time as your subscription
- And much more!

MICRO VIDEO®

RAM Pages

SUBSCRIPTION FORM

Basic Subscription Rate: $20 per year (U.S. and Canada only.
All other countries $32.00)

Sue Denim's Subscription Special: With your subscription to RAM Pages you can order *ANY TAPE AT HALF PRICE* (One tape only. Cannot be used in conjunction with any other software coupon).

All you have to do is subscribe *AND* write in the magic words below that Sue Denim gave in the last paragraph of her column on page 2

"_____"

YES! I want to continue to be an active member of the Interact community. Send me the next four issues of RAM pages; published quarterly.

Name _____

Street _____ Apt. _____

City _____ State _____ Zip _____

(For prompt delivery, we must have your zip code.)

Yes! I want to take advantage of SUE DENIM'S SUBSCRIPTION SPECIAL.

Send me _____ at half price.
(list one tape)

☐ Payment is enclosed:
Check # _____ (U.S. Funds)
Money order

Subscription $ _____
½ price tape $ _____
TOTAL PRICE $ _____

☐ Please charge my:

☐ Visa # _____ Exp. Date _____

☐ Mastercard # _____ Exp. Date _____

Make checks payable to Micro Video Corporation. Mail in enclosed, postage paid envelope or send to RAM Pages, Micro Video Corp., 305 N. First St., Ann Arbor, MI 48103. To subscribe by phone with your credit card, call (313) 996-0626.

Tear along perforation

Feedback

continued from page 16

promptly hooked me. Since that time I've spent at least one weekend a month using it. After spending 14 months me, I'm not a meathead!) on the Troll Hole, the Mysterious Mansion was a two-weekend snap. He recently bought the Mazes and Monsters— Hot Damn! And to top it off, he sold me his Interact— Hot Damn again! Now, how do I get on your list to receive RAM Pages and goodie lists?

Sincerely,
Larry Bond
Phoenix, AZ

Larry,

You're on our list now—Hot Damn!

Sue Denim

Dear Micro Video,

I have just installed your new keyboard, and the results are truly outstanding. I have owned my Interact for three years, and this is the first time I can honestly say that I really enjoy programming. You deserve a hearty "Well Done!" with best wishes for your continued success.

Sincerely,
S.E. Novotny, Jr.
Hazleton, PA

Dear Micro Video,

Your fall 1982 RAM Pages was great!!! My tape drive had become very noisy. I tried the cure mentioned in the article "Computer Doctor" for correcting a bad ground, and it worked!! The tape drive has never been so quiet. It now reads all my tapes the first time with no problems. Thanks for the cure for the tape drive ills.

Also I wondered why sometimes the screen display was not as good as other times. Your "Wake-up Call" explained it correctly. I now watch my Interact's mood swings and enjoy it much more.

Keep up the good work. Now if you could only tell me how to get rid of the hum in the sound.

Albert Harsch
North Huntington, PA

Dear Albert,

Sounds like you need a sound tank alignment. Do you have the new Computer Doctor *repair manual? It describes and illustrates fixes for this and many other common problems.*

SueDenim

Dear Micro Video,

I own the Interact 16K. I did not purchase the unit for use as a sophisticated toy and therefore am not interested in "entertainment" programs. I am a professional biologist (weed biologist and botanist), and hope after learning to use the Interact I can use it in my work. I would like to see Micro Video develop software for use in biological statistical work, plant and insect distributional studies, etc. Such work is done, I realize, using much more sophisticated computers, but having only modest financial resources I hope to use the Interact.

I would like to compliment Micro Video for providing support for those of us owning Interact equipment. There is no microcomputer business here providing products for use with the Interact. Keep up the good work!

Sincerely,
Everett L. Hall
Phoenix, AZ

Dear Everett,

Since there are only a few thousand Interacts around and significantly fewer biologists in the Interact community we aren't likely to devote resources to this type of software. Have you considered writing your own? Or, perhaps there are other scientists out there who can help you out. Anyone out there have the bug for this kind of work?

Sue Denim

Dear Micro Video,

Thank you for the prompt reply concerning "Mazes and Monsters." I sent my old tape to you on Monday and received a new one on Friday. That's service. The new tape is much better, and I am thoroughly enjoying it. John Stout has really made a great game.

The reason I am writing is because I would like to know if you are going to have game tapes in the future for the 32K. I am thinking about the upgrade, but I am not into programming. I'll probably be sending for the new typing keys soon for sure.

I enjoyed the "RAM Pages" and am glad you have this newsletter.

I must compliment whoever types for Micro Video. It is a real pleasure to read the instructions, etc., that I receive and see everything spelled correctly, and the format is set up so nice. I am a secretary and appreciate this.

Sincerely,
Roberta Houtz
Watsontown, PA

Dear Roberta,

We've considered putting out a 32K adventure game. Most owners are still limited to 16K, though, and those who've upgraded their machines are generally most interested in programming or business applications, rather than games. We do have plans for more 32K software, but it will probably be business-oriented.

Sue Denim

Dear Friends,

First, I would like to give you my assessment of the new keyboard. In one word, it's excellent. Key bounce problems cleared up also. It is no longer a problem to enter a long program.

Sincerely,
W.J. Moore
Pittsburg, CA

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(313) 996-0626

JOHN PERKINS *02465*
551 ELM ST
VERONA WI 53593

Program Notes

continued from page 3

like me, prefer Pack Wars for all the reasons mentioned above. It all depends on your taste.

Communicator-Plus

So much for fun and games. Now on to more serious stuff. Our *Communicator-Plus* was developed simply because many of you have asked for its capabilities. It takes up where the old Communicator left off. Now, you can communicate with another computer or system (i.e., The Source, ComNet, or even another enterprising Interact owner!) and keep a permanent record of the event. With the old Communicator, all you have is the screen display. You either have to write quickly or be able to remember a lot. The Communicator-Plus can pull the information off another system and store it in a buffer in the Interact's memory. This gives you two options. You can unhook your modem, connect your line printer, and print the stored information (or you might try a simple switch such as the one described in Hardware Hints, *RAM Pages*, Spring 1982). Your other option is to store the information on tape for printing at another time. THE COMP TING WORLD IS YOURS, INTERACT OWNERS!

Better Mousetrap

continued from page 14

Just a Trace

Sani Crljen, of Mississauga, Ontario, devised a simple graphics tablet to draw pictures on the screen. He connected two pots to his joystick ports. One pot controls up and down movement, and the other controls sideways movement. He hooked them together with wood and metal, and extended a drawing arm from one of them. The arm is used to trace over the pictures that you want to transfer to the screen. He then wrote a "very simple BASIC program" to control the transfer of the image to the screen.

International PLOT

The Interact community spans the globe! The entry from farthest away came from Manuel Uson of Caracas, Venezuela. He's written a routine that adds extended PLOT capabilities to RS232 BASIC, that is, interprets five PLOT coordinates. The routine can be incorporated into an RS232 BASIC program or executed independently.

```
10 RESTORE:FORM=25443TO25499:READU:POKEM,U:NEXT:
   POKE30533,99:POKE30534,99
20 DATA126,254,44,194,0,6,122,50,117,75,121,50,115,75,205,123,
   119,50,114
30 DATA75,205,123,119,50,113,75,71,123,5,144,218,205,106,254,
   119,210,205
40 DATA106,50,116,75,243,229,1,113,75,205,162,5,14,3,205,46,6,
   225,251,201
```

True Grid

Bob Fett of Dearborn Heights, MI, says he's got the simplest way to produce a colorful game grid. He uses the following one line in his BASIC programs.

```
10 CLS: COLOR 0,3,2,1: PRINT CHR$(8):FOR T=1 TO 187:PRINT
   CHR$(1);:NEXT:A$=INSTR$(1)
```

The INSTR$ function in the line merely holds the resultant display on the screen for viewing. It would, of course, be removed when this grid is used in a game program.

Vol. III, No. 2 Fall, 1983

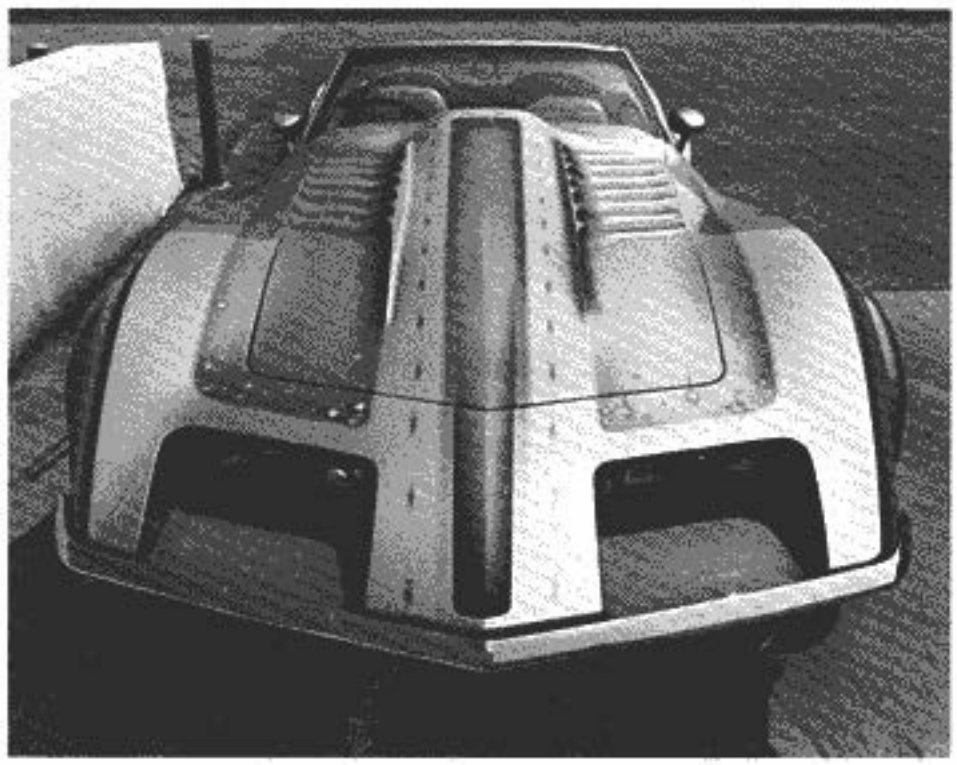
MICRO M VIDEO.
RAM Pages™

Computerized Corvette Stingray

What began seven years ago as a simple body repair to a 1968 Corvette Stingray has resulted in a computer-controlled vehicle worthy of James Bond. About the only thing missing is a bumper-concealed machine gun.

You might say that Don Stockton, a Ft. Lauderdale-based boat canvas maker, went a little overboard when he began to fix the paint job on his car. After spending more than $50,000 ("I lost track of the money a long time ago," Don reports), he now has the world's only Interact-controlled Corvette.

"My friends challenged me to make it into a show car," Don recalls. "For me, it's really a fantasy turned reality."



Electronic Protection

Even an accomplished car thief wouldn't stand a chance at stealing this one. The car is virtually undriveable by anyone other than Don or his "Einstein" assistant Jeff Mayes, who devised most of the computer hardware modifications. For instance, Don wouldn't stoop to anything as mundane as a key to start the engine. You have to enter the correct four-number combination from a keyboard on the dashboard, a combination Don changes from time to time. If you don't enter the right sequence in an allotted number of seconds, you'll see "PLEASE TRY AGAIN" on the dash-mounted, five-inch color monitor. A second errant try shuts down the system completely.

In order to type the four-number combination, though, you first have to figure out how to get inside the car, since there are no door handles. There are three ways to trip the door-latching solenoids, which are all controlled by the Interact. You can open the door with a ring, but only if you know where the hidden metal detector is. There is also a small "proximity switch" hidden in the door. When you move your hand near it, the door opens. But Don's favorite method is a beeper-transmitter system similar to a garage door opener, which can override both the metal detector and switch.

And that's not all. Don is installing a microwave scanning system underneath the fiberglass body that is activated if anyone touches the car, or even gets too close. When the system detects an unwelcome stranger, a message like "INTRUDER ALERT!" will blast repeatedly from a hidden car speaker.

"This whole project is an ego trip," Don candidly admits. "This car absolutely has to be one-of-a-kind because I've devoted a good part of my life to it, even though it's mostly a hobby."

Marine-Powered Menus

The computer, incorporated in the back of the console, runs around-the-clock on power it draws from two, modified 105 amp marine batteries. A custom PC board controls more than 30 specially-built relays. "The one major problem I haven't solved yet is what to do if I ever lose power in both batteries," Don says. "I don't want to have to reload tapes to be able to drive!"

Besides monitoring the car's basic electrical functions, the Interact uses a "simple BASIC program" to display a series of menus which Don uses to control gear shifting and other operations when driving. His "drive menu," for example, initially lists all gear positions in white. When he shifts into gear by pressing one of the buttons on the dashboard, the appropriate word lights up in red on the menu, letting him see at a glance which gear is in use. In all, more than 40 different functions are controlled in this manner.

"One of the major reasons we chose the Interact for this project was the character size on its screen display," Don states. "I can read the display without squinting, which wouldn't be the case if I had used a computer with smaller letters."

Eat Your Heart Out, 007

Bond would feel right at home if he could see Don's car at work in an auto show like the World of Wheels. Don's fiberglass creation sits on a rotating platform, while the Interact executes a program that shows off his handiwork.

The roof, mounted on hydraulic lifts, moves up and back like an airplane cockpit. The hood is also lift-mounted and opens to reveal the spotless engine. "Do-nothing dazzle lights," as Don terms them, are

continued on page 4

Letter From the Editor

Remarks

Dear Friends:

Summer is a lonely time for Interacts. They get locked away in closets or stuck on shelves, forgotten while their owners go out and frolic in the sun. As the days get shorter and the leaves start changing colors, people once again start to think about adventuring into mazes to fight monsters, zapping invading aliens, writing those great programs they conceived in the spring, etc.

Our production of *RAM Pages* has suffered from the summer doldrums, too, but we're back in the swing of things now. Thank you all for subscribing, and also for your patience in waiting for this issue to arrive. I promise you won't have to wait so long for the next issue.

As we expected, we have met some resistance to our conversion to a subscription format. Some people questioned the subscription price, and wondered if the maga ine was really worth $5 per issue. Perhaps some of you have had similar concerns, but I'm confident that, with discount coupons and other subscription specials alone, not to mention the content, you'll feel you got a bargain!

Get Involved!

With coupons, contests and so forth, we've tried to make *RAM Pages* more than just a newsletter. Our objective is for it to be *YOUR* forum for the exchange of information and ideas. We want it to contain the kinds of articles you want to read, with the kind of information you find relevant. We have lots of ideas for articles, but it doesn't do either of us any good if they aren't what interest you. It's critical that you let us know what you want.

Obviously, you cared enough about *RAM Pages* to spend your money on it. ow, take the next step and care enough to GET INVOLVED! Work with us to make *RAM Pages* truly your magazine. Share your knowledge and experience with other members of the Interact community. Got hints you think might help other owners? Send them to be published in the *Tidbits* column. Put a notice on the *Bulletin Board* if you want to contact other Interactophiles. We welcome article submissions, so pick up your pen if you're so inclined. Would your application interest other owners? Tell us about it — Don Stockton did, and that's how the Computerized Corvette article in this issue came into being. And, of course, there's always the Feedback column for voicing your opinions.

Every Vote Counts . . . Or Does It?

Naturally, positive feedback is a lot more fun than negative, but we welcome your criticisms as well as your commendations. Without it, we have no barometer to measure our success in providing you service and support.

I'd like to offer a few guidelines about complaints, however. You may find these useful not only in dealing with us, but other companies with whom you're dissatisfied. You're more likely to get the response you want from your complaints if you follow these simple rules.

1) Be specific and concise about the nature of your complaint. Avoid rambling, generalized verbalizations of angry feelings and focus on the real issue(s) concerning you.
2) Be specific about how your complaint can be resolved. Describe the action that could be taken to satisfy you. Don't make the company guess or try to read your mind, and you're more likely to get the solution you desire.
3) Be reasonable in your demands. Most companies are more than willing to work things out — we'd all rather have happy customers than irate ones. But remember that the resolution of problems must be equitable to both parties.

As a case in point, there's one Interact owner who seems to have nothing better to do with his time than to write lengthy, hostile, ra - bling letters condemning us for everything we do, have done, or might be planning to do. We try to sort through his vituperative verbiage, but he's never made it clear what he expects or wants us to do to resolve his ill feelings (aside, perhaps, from supplying him with everything in our catalog free of charge). His criticisms are neither constructive nor specific, his demands are unreasonable, and the result is that he's been labelled an impossible-to-please sort. His method of complaining certainly doesn't get him better service!

You can start giving us your feelings on various issues by completing and returning the survey form on the back page of this issue. Tell us what you want or don't want to see in the next issues of *RAM Pages*. Be as specific as possible. If you'd like more hardware information, let us know what technical information you're looking for. If programming is your area of interest, what kinds of articles would you find most useful? BASIC, Assembly language, hexadecimal? Let us know how you feel, and a better, more useful publication will result.

We'll analyze and publish the results of the owner survey in an upcoming issue, so you can see how what you want compares with what others are asking for. Until next issue . . .

Sue Denim

Sue Denim

Editor

MICRO VIDEO.
RAM Pages

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Program Notes

Featured this issue are three new programs from the upcoming catalog. There's a fast-paced single player game, a unique, two-player action strategy game, and a word processing program with true text handling capabilities.

Double Trouble

What gives this two-player game a special twist is that the players do not battle each other. Quite the reverse, in fact. Both must cooperate, or neither wins. The objective is simple — to clear the game board of all the pieces. But, there are two different kinds of pieces, and each player can pick up only one type. There are also separate rules for each player's movement, which can only be overridden through combined strategy. There is, of course, an adversary, but it is the computer, which controls an arachnid-like monster that chases whichever player is closest.

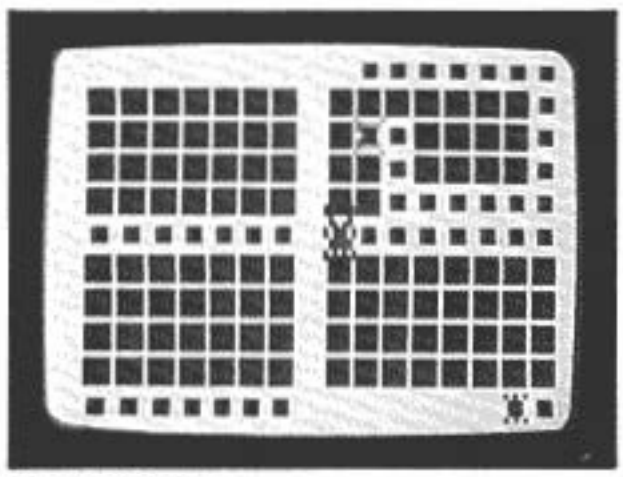
The game has four skill levels and nine speed settings at each level, so play can be as slow and methodical or frantic and frenzied as you like. Naturally, we were able to win more often at slower speeds, where there is definitely more control and working together is easier. However, at faster speeds, we had more fun. We'd end up laughing so hard it was nearly impossible to concentrate on our strategy. I think parents will approve of (and enjoy) this new approach to gaming, which teaches cooperation rather than confrontation.

Catacombs

A single player game, Catacombs combines very fast action with the appeal of an adventure game. The game takes place in, you guessed it, the Catacombs — a maze of 201 rooms. Your objective is to find the three lost treasures hidden there. Each room is heavily populated, however, with the spirits of ancient Roman warriors who resent your presence. You can banish them, but they return as soon as you leave the room, so be prepared to take immediate action as you venture through the labyrinth. Don't stay in any one room too long, or you'll attract the unwanted attention of the Seeker, who guards the Catacomb ruins.

Some areas of the maze are locked, so, to make it through all 201 rooms, you'll have to find the keys that fit the locks. Even if you find all three treasures, your troubles aren't over. You must then fight your way back to the entrance to escape.

Whether or not you'll like Catacombs will largely depend on your own preference for games. Personally, my taste runs to slower-paced games. I tend to crack under pressure, panic, and get zapped in the other sort. This game definitely calls for quick reactions, as well as the



Double Trouble

ability to think ahead. If you enjoy testing your performance in high tension situations, Catacombs will thrill and delight you.

Steinberg Text Processor

Finally, a word processor for the Interact that offers full screen editing! With the Steinberg Text Processor (STP), you type your text and desired format controls directly into a text buffer. If the printed result is not what you want, just go back to the text buffer and make the necessary changes. You can save your text file on tape and reload it later for further processing, of course.

On-screen editing is perhaps STP's most important feature. You can insert and delete characters as needed, and the following text automatically shifts appropriately. The cursor, which moves beneath the lines of text, lets you know exactly where you are in the text file at any time, and you can move it anywhere on the screen. The text scrolls both forward and backward, in response to your cursor commands.

A special character set gives you smaller characters — 11 lines of 25 characters each. Now, let me warn you. The characters look a little strange, especially the lower case letters. It's just a matter of symbol recognition, though, and the letters don't look that much different from what you're used to. I quickly adjusted to the appearance and had no trouble whatsoever reading information on the screen. And, of course, the printed output, the ultimate result, looks perfectly normal, reflecting the format controls embedded in your text file.

I did, however, have some trouble figuring out how to use the formatting codes. I suspect, though, that my difficulties arose more from the sketchy documentation (nee programmer's notes) I was given to test it with, than from any real deficiency in the program itself. (MV assures me the final instructions will be clear and more complete!) Once I deciphered use of the format codes, I was able to produce justified and non-justified copy, center titles, set tabs for columns of information, change margins to indent information between paragraphs, and more. STP also lets you set the baud rate and other I/O parameters required for your particular printer. If your printer has special capabilities, such as compressed or expanded text, you can also specify those formats for printing.

In general, I give STP a "thumbs up." If you liked the concept of Microtext, but disliked storing text in DATA statements and tediously slow print speed, you'll find this machine language word processor a more than reasonable alternative. While it's more complicated to use than Microtext, the on-screen editing features make it ultimately more useful, and well worth the challenge.

Coming Attractions

Also in progress is Dreamland, a real nightmare of an action strateg game from the developer of Mazes and Monsters. In the upcoming catalog, you'll also find Mega-Volts II, a two-player strategy game, the much-requested 32K EZEDIT, and other goodies. Watch for it in your mailbox!

Don's "platinum pet" – the world's first, and only, Interact-driven car – is a fantasy turned reality.

Powered by two marine batteries, the Interact, its tape drive, a secondary keyboard, and a 5-inch color monitor are mounted in the console. A custom PC board and special relays control more than 40 functions, which can be selected through a "simple BASIC program."

Corvette *continued from page 1*

m unted in the roof of the vehicle and give it an other-worldly air when they are flashing. Maybe he will install an ejector seat next!

Sit, Boy!

Imagine that you've just entered the World of Wheels show. There sits Don's platinum pet before you, apparently unattended. Curious, you approach it and the hood opens up. When you step forward to take a peek at the engine, the radio suddenly begins blaring. Startled, you move over to look at the interior and, without warning, the roof lifts up and back. You might well wonder what is going on!

Well, it could be Don, a hundred yards away, giving voice command to his fiberglass beauty with every move you make. He's been experimenting with a Voice Recognizer which will let him literally "tell" the car what to do next. The Voice Recognizer, hooked to the Interact through a joystick port, is programmed to recognize Don's voice and certain words, which he relays through a head set. It even informs him when each circuit has been completed. In essence, the Stingray will become obedient, like a perfectly train d d g.

"Like everything else we put in the car, in theory the Voice Recognizer works ju t fine, but there is always a lot of trial and error with everything

". . . we chose the Interact for the character size on its screen display," Don says. "I can read the display without squinting."

new we do," Don reports. "We do all the programming and testing on another Interact in the shop. Even though s mething may work outside the car, we can never be sure it will work inside. There are lots of factors t c nsider, such as the effects of road vibration."

In case you're interested, Don is willing to sell his pride and joy. Considering the amount of blood, sweat, and tears, not to mention money, he has put into the design and development, the price is a steal — $150,000. For a few extra bucks, he'll even teach you how to drive it!

The Right Printer for You

With the Interact's limitations in character display, you probably have contemplated buying a printer. If you've shopped around, you've certainly noticed that there is a wide variety of printers available, with an equally wide price range. Trying to pick tho right printer can be perplexing. People hnvc asked us which printer is best suited for the Interact, and there's really no definitive answer. We can, however, offer some guidelines to help make the selection process easier.

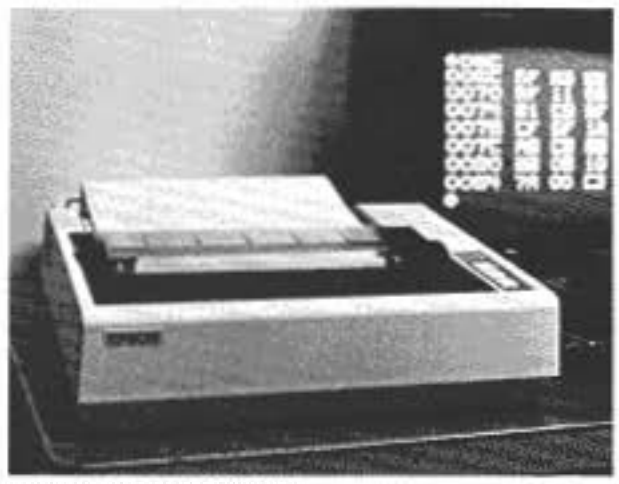
The printer investment is substantial, frequently more than the computer itself. Typically, you can expect to spend $500-800, although there are exceptions, both higher and lower. The price should only be one factor in your decision. You will also want to ta e into consideration how you will use the printer, what kinds of things you will want to print. The answers will influence your printer decision as much, if not more, than the actual price.

If all you want is an occasional program listing, you'll probably be happy with a basic, "no frills" printer, which can be had for under $400, sometimes as low as $300. If you need to print four columns of mailing labels or accounting spread sheets, you might want to consider spending a little more on a printer with a wider carriage. If your objective is to produce correspondence or documents in conjunction with word processing software, you might decide on investing in a more expensive, letter-quality printer.

Printer Characteristics

Most basic printers are fairly standard and close in capability. Many have compressed and extended print, bold face, and some graphics capability. Most printers use a "dot matrix" format for producing characters, where each character is composed of a group of dots, much as characters displayed by the Interact on the screen are made up of pixels. The dots are perceivable by not-too-close visual examination. Some printers use elements similar to those in electric typewriters to produce smooth, "one-strike" characters. You might easily spend $2500 to $4000 on this type of printer, probably not justifiable for typical home use, although some are available at substantially lower prices.

The Interact's only real requirement of a printer is that it be RS232-compatible, and you must, of course, have an RS232 interface installed in your computer. Many printers can be set up to run with either a parallel or serial interface, but the Interact's RS232 is compatible only with the serial type. Depending on the printer, you may also have to adapt your



The EPSON MX-80

printer cable to the appropriate pin configuration for data I/O, or you may have to set switches within the printer itself for correct operation.

We've worked with a number of printers on the Interact, and also have had feedback from users with various models. The following discussion of printers is, therefore, based on our direct experience with them as well as information and opinions supplied by others.

Epson Printers

There are many Epson printers to choose from, virtually any of which could be used with the Interact. We've selected three of them for discussion: the MX-80, MX-100, and FX-80.

The MX-80 is a widely known printer; it is perhaps the standard by which other printers of the same type are judged. We employ them almost exclusively here at Micro Video and definitely recommend them, as they are reliable and fast. The MX-80 is typically priced at about $550, but with the advent of newer Epson models, you should be able to find an MX-80 on sale for as low as $299.

The MX-100 is a good printer to consider if you need wider printout of information, such as financial statements or spread sheets. It is basically the same as the MX-80, except that its maximum print width is 136 characters. Expect to pay at least $200 more for the added print width.

One of the newer Epson printers is the FX-80, which is priced at $700. For speed, this printer has a definite advantage over others — 160 characters per second. Also, its character dot matrices are larger, and the resulting print is finer in appearance.

Any Epson printer, frankly, would be a good investment for your computer. Their only disadvantage is that they are designed as parallel printers and require a special board to convert them to serial operation. You'll probably pay $80 to $100 more for that conversion, which you can easily perform yourself.

NEC Digital LA50

On the "low-end" side of things, NEC is probably best known for the 8023A printer. However, the 8023A is set up for parallel interface operation and apparently cannot be adapted for serial use. Their Digital LA50 is, however, essentially the same machine, equipped with a serial port. This printer has a buffer in which it can store information arriving at a faster rate than it can print. While this is a useful feature on many systems, it is unnecessary for the Interact because you can control the baud rate via the software.

NEC has a reputation for high-quality hardware, so this printer would be a safe bet. You can pick them up at many dealers, even if they do not carry NEC computers. We were quoted a price of $699 for the LA50, and if it is truly as reliable as the 8023A we have used, it is worth the price.

Radio Shack Printers

We have no direct experience with Radio Shack printers; all the following information was obtained by phone conversation with dealers and feedback from owners who have them. Based on that, here's what's available in serial printers from Radio Shack.

For $399 or under, you can pick up an old DMP 500, although dealers usually don't recommend it. It is slow

continued on page 9

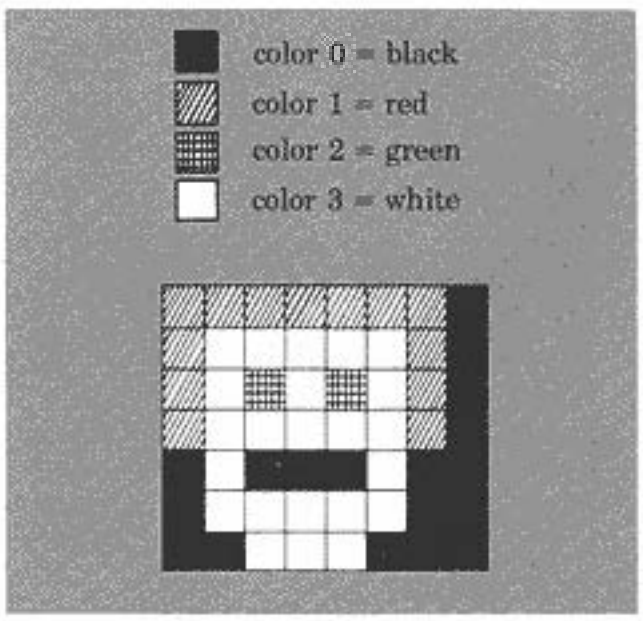
For advanced programmers only

MOVING PICTURES

When we left you last issue, we'd just described using BYTPIC to put a picture on the screen and move it. The result was generally unsatisfactory, though. The motion was jerky, and the picture left a trail behind it as it moved. This time around, we'll show you how to clean up your action and how to use PIXPIC, our pixel-oriented move routine, to put smooth and flicker-free animation into your programs.

Covering Your Trail

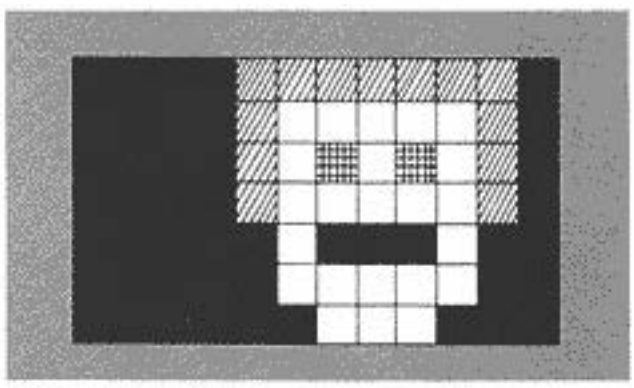
As you'll recall, we were working with the following picture and color set.



With the BYTPIC routine, we output the image on the screen four separate times, each time shifted one byte (four pixels) to the right. However, we didn't include any means of erasing each image before redisplaying it at the new location, so part of each picture — the leftmost byte — remains on the screen.

There are several potential solutions to this problem. You might call the ROM routine CLS to erase the screen before plotting each image, but this would have ill effects. It would erase other items that might also be on the screen, and would create a flashing effect as the image moves. You might also use the RFILL routine to erase each face before drawing the next. This would let you erase only part of the screen, but requires more code, as you would have to change the RFILL table itself each time. The image would also be wiped off the screen from left to right, which would make the image seem to expand and contract as it moves, probably not the effect you seek.

The simplest and most effective solution is to use the image itself to erase the previous one. To do so, though, we'll have to modify the picture and its associated code. Since we are limited to one byte at a time motion with BYTPIC, we must add a byte-wide band of black, the background color, to the left side of the picture.



The picture table must be redefined to incorporate the extra pixels, and the horizontal size of the picture, passed to the B register, must be increased to three bytes, instead of two.

```
FACE:   0H,55H,15H
        0H,0FFH,1FH
        0H,0EDH,1EH
        0H,0FFH,1FH
        0H,0CH,0CH
        0H,0FCH,0FH
        0H,0F0H,03H
```

Change the instruction that passes the horizontal size to the B register to

```
MVI   B,03H
```

and you're ready to roll. This time when you use BYTPIC to move the image to the right, a trail is still left behind, but is the same color as the background, so it is invisible.

That takes care of covering the trail, but the motion problem remains. The image still "leaps" from one position on the screen to the next.

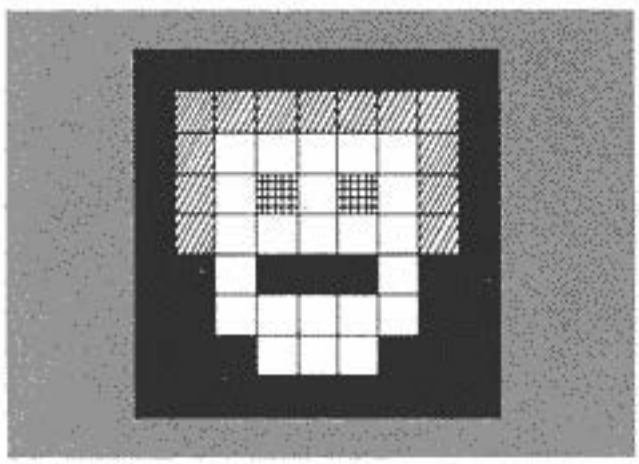
Smooth Moves

To achieve smooth motion, you need to use a routine that will let you move the image one pixel at a time. Our routine to do this is called PIXPIC. PIXPIC has the disadvantage of being slower than BYTPIC for getting the images to the screen, and its code is more complex. It has some distinct advantages, though, that make it ultimately better suited for graphic motion.

The primary advantage of PIXPIC over BYTPIC is that it lets you output a picture at any given (X,Y) screen location; therefore, you're not restricted to moving the image a full byte at a time. Another advantage is that you store the size parameters in the picture table itself, and PIXPIC retrieves them. This means you don't have to pass those values to the B and C registers before calling the routine each time.

Graphic development is easier with PIXPIC, too, because you don't have to reverse the pixels in the table, and your pictures can be designed in any width, not just increments of four pixels.

Since we have to modify the face picture table for use with PIXPIC anyway, let's kill two proverbial birds, and change it so that the picture can move in any of four directions — left, right, up, or down — without leaving a trail.



The black border around the picture changes its dimensions. It is now nine pixels wide by nine pixels high. Therefore, the first line of the picture table, which defines those parameters for PIXPIC, will be

```
FACE:   DB   09H,09H
```

Next, we must convert the picture to hexadecimal equivalents, using the same method as described last issue for BYTPIC, except that the bit pattern is *not* reversed. The first line is easy, as all the pixels are black.

```
FACE:   DB   09H,09H
        DB   0H,0H,0H
```

Notice that each line of the picture still consumes three bytes in the table, although the PIXPIC routine reads only the first two bits of the third byte in handling the picture, because we defined the width of the

picture as 9 pixels. Also note that the last byte in each line of the table is the same — 0H — which creates the band of black along the right side of the picture.

```
FACE:   DB   09H,09H
        DB   0H,0H,0H
        DB   15H,55H,0H
        DB   1FH,0FDH,0H
        DB   1EH,0EDH,0H
        DB   1FH,0FDH,0H
        DB   0CH,0CH,0H
        DB   0FH,0FCH,0H
        DB   03H,0F0H,0H
        DB   0H,0H,0H
```

The actual PIXPIC code is quite a bit longer and more involved than BYTPIC's.

```
PIXPIC: PUSH   B
        PUSH   D
        PUSH   H
        PUSH   PSW
        MOV    H,B
        MOV    B,M
        INX    H
        MOV    C,M
        INX    H
        PUSH   H
        CALL   52DH
        POP    D
SAVR:   PUSH   PSW
        PUSH   B
        PUSH   H
        PUSH   H
        XCHG
        MOV    E,C
        MOV    D,A
        MOV    C,M
PPIC0:  MVI    B,5
PPIC1:  DCR    B
        JNZ    PPIC2
        INX    H
        MOV    C,M
        JMP    PPIC0
PPIC2:  MOV    A,C
        RLC
        RLC
        MOV    C,A
        ANI    3
        PUSH   H
        LXI    H,CMSK
        PUSH   B
        MOV    C,A
        MVI    B,0
        DAD    B
        POP    B
        MOV    A,M
        POP    H
        XTHL
        XRA    M
        ANA    D
        XRA    M
        MOV    M,A
        MOV    A,D
        RLC
        RLC
        MOV    D,A
        JNC    PPIC3
        INX    H
PPIC3:  XTHL
        DCR    E
        JNZ    PPIC1
        INX    H
        XCHG
        POP    H
        POP    H
        POP    B
        MVI    A,20H
        ADD    L
        MOV    L,A
        MVI    A,0
        ADC    H
        MOV    H,A
        POP    PSW
        DCR    B
        JNZ    SAVR
        POP    PSW
        POP    H
        POP    D
        POP    B
        RET
CMSK:   DB     0,55H,0AAH,0FFH
```

PIXPIC requires two set-up parameter for use. You must supply the two-byte address of the picture table location in the B and C registers, and you must define the starting (X,Y) screen coordinates of the upper left corner of the picture in the D and E register pair.

Let's say you want to display the picture nine pixels from the left edge of the screen and 41 pixels down from the top. To do so, you would pass the values 08H and 28H to the D and E register , respectively. (Remember that, in machine language, the coordinate (0,0) is the top left corner of the screen.) The following code assumes you have already defined FACE as a label with an associated address.

```
LXI   B,FACE; address of picture table
MVI   D,08H
MVI   E,28H
CALL PIXPIC
```

Notice that PIXPIC preserves all the registers. This makes it much more convenient for moving the picture, our next step, because it maintains the coordinates and picture table address. This means you don't have to PUSH and POP the register before and after calling the routine each time.

Use a simple looping routine with PIXPIC to move the face on the screen. The following code displays the image beginning at coordinates 40H,28H and moves it left on the screen to location 10H,28H.

```
        LXI   B,FACE
        MVI   D,40H
        MVI   E,28H
LOOP:   CALL  PIXPIC
        DCR   D
        MOV   A,D
        CPI   10H
        JNC   LOOP
```

One of the most logical places you might want to use motion is in a game program, where the movement of the image is controlled by joystick input. Here then is a simple routine to move the face via the left joystick. The picture first appears at location 30H,28H. Thereafter, you can move it up down, left, or right using the left joy tick.

```
        MVI   D,30H      STARTING X COORD
        MVI   E,28H      STARTING Y COORD
        LXI   B,FACE
MOVPIC: CALL  PIXPIC
MOVP1:  LDA   0FF01H     READ LEFT JOYSTICK
        CPI   0FFH
        JNZ   MOVP2
        DCR   D          LEFT MOVE
        JMP   MOVPIC
MOVP2:  CPI   02H
        JNZ   MOVP3
        INR   D          RIGHT MOVE
        JMP   MOVP1
MOVP3:  CPI   04H
        JNZ   MOVP4
        DCR   E          UPWARD MOVE
        JMP   MOVP1
MOVP4:  CPI   08H
        JNZ   MOVP1
        INR   E          DOWNWARD MOVE
        JMP   MOVP1
```

A word of caution about this routine is in order. It does *not* check for the boundaries of the screen. We advise you not to move the image off the screen in any direction, as the results are highly unpredictable. You may inadvertantly destroy part of your code if you do.

There you are. You now have all the information you need to create your own moving pictures. Have fun, and let us see the results!

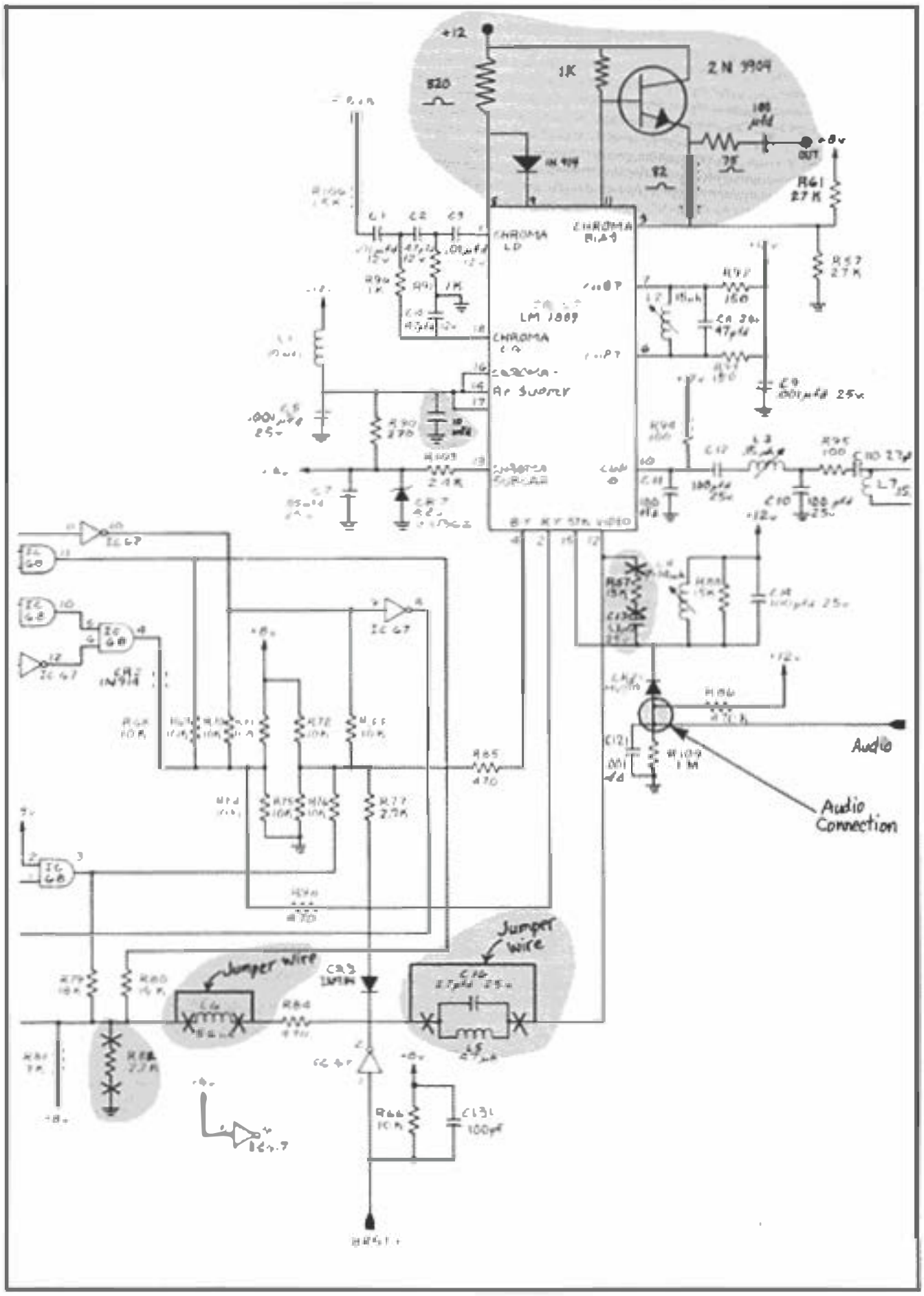
VIDEO OUT MOD

At various times, we've been asked about converting the Interact to video-out operation, so that it can be used with a monitor instead of a TV set. For those of you who may be interested in modifying your computer this way, here's how it's done.

Changing your Interact to video output is not a decision to be made lightly. To do so requires that various components in the RF section be removed and others rerouted. Once you have modified your computer for video out, returning it to standard RF operation is not a simple matter, although it can be done.

We have successfully implemented this modification on a number of Interacts, and, to the best of our knowledge, it will work on any Interact computer. It is, however, a complex procedure, and we do not recommend you try it unless you have a background in electronics. Micro Video makes no specific warranty of the operation of this modification on any particular Interact, nor will we assume any liability or responsibility for damage resulting from your own attempt to perform this conversion.

You will need several tools and one each of the following parts for the video out mod.



Parts

Resistors:	820 ohm 1 Kohm 82 ohm 75 ohm
Diode:	IN914
Capacitors:	10 microfared electrolytic 100 microfored electrolytic
Transistor:	2N3904
Other:	Small grid board (e.g., Radio Shack #276-158) Approx. 12" length 24 gauge wire RF cable (optional, for audio hook-up)

Tools

Soldering Iron and Solder
Needlenose Pliers
Phillips Screwdriver
Xacto Knife

Modification Instructions

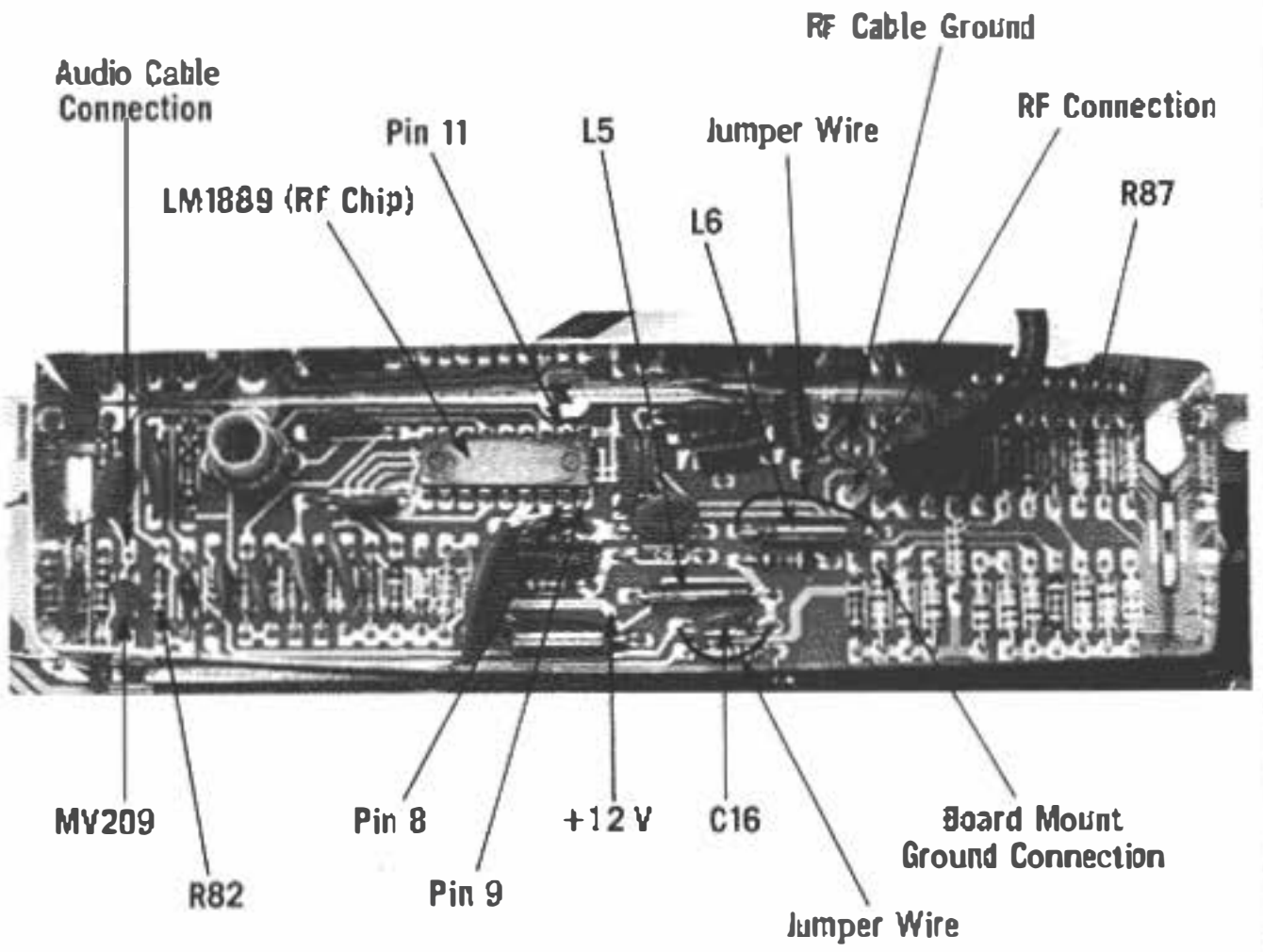
Remove the top of the main housing, then take off the top metal plate of the main electronic subassembly housing. You'll need to detach the metal connector plate, too, sliding it through the hole in the larger plate.

The RF canister is located in the upper right section of the main electronics board. It has a metal cover that may be soldered in place on both ends. Remove this cover to expose the RF circuitry, and you're ready to start on the modification itself.

The first step in the procedure is to take several components out of the RF section. Using your soldering iron, needlenose pliers, and Xacto knife, remove the following parts, which are identified in the photo of the RF can.

R82	— 2.7	Kohm resistor
R87	— 1.5	Kohm resistor
L6	— 5.6	microhenry coil
L5	— 41.7	microhenry coil
C16	— 27	pfd disc capacitor

When you've completed this part of the process, start reconstruction and replacement by installing two jum-



pers. One replaces L6, the 5.6 mh coil; solder it to the foil pads at either end of the L6 area. The other jumper replaces coil L5 and capacitor C16. Solder it between the foil pad on the left side of L5 and the foil pad on the right of C16. Both jumper connections are identified on the photo and schematic.

Next, solder the positive end of the 10 mfd capacitor to pin 14 of the RF chip (LM 1889) and the negative lead to ground. You may use either the foil along the top edge of the RF section or the side of the RF can itself as a ground.

Now the grid board comes into play. You'll have to build the transistor circuitry circled at the top of the schematic, using the parts defined earlier. Make your circuit design as compact as possible, as the grid board will be mounted inside the RF can.

When you've completed the transistor board, connect it to the main PC board and mount it. As shown on the schematic, you'll make six connections. Solder the appropriate leads to pins 8, 9, and 11 of the RF chip. Remove the RF cable from its original position on the board and attach it to the output pad on your grid board. Complete the installation by connecting the other two leads to the +12V regulator and ground.

Finally, mount the board inside the RF can. How and where you mount it is up to you, and there is certainly more than one way to approach it. Our method uses two pieces of stiff wire, such as resistor leads. Solder one wire between an empty hole on the grid board and the ground connection shown in the photo. Attach the other wire to the grid board, then solder it to the lower side of the RF can. This provides a firm, stable mounting.

The video out mod is now complete. You may also wish to have audio out, in which case you will need to run a second RF cable from the audio connection on the left side of the RF section (see photo and schematic), then out to your monitor.

If you really want to get creative, you might consider duplicating the RF circuitry on the grid board along with the transistor circuitry, to implement a switchable system that lets you select either RF or video out. This is extremely complicated, however, as it requires a number of sets of dual leads and a switch with as many as 16 positions! So far as we know, this has never been done.

Right Printer *continued from page 5*

and does not print some characters adequately, and a user who owns one reports that it is quite noisy. Its main advantage is price.

The newer DMP 120 is priced at $499, and for the extra $100 you get a notable increase in quality. It is fast, produces dot-matrix characters, and can be set to parallel operation for compatibility with other computer systems.

At $699, Radio Shack offers an ink jet printer which produces dot-matrix characters in up to five different colors. The colored ink comes in cartridges which you load into the printer.

Top-of-the-line is not top dollar, surprisingly. $799 buys you a letter-quality printer that uses a "daisy wheel" element similar to the circular attachments in many electric typewriters. Compared to the price of other letter-quality printers, this is a bargain you should consider strongly if superior print quality is one of your requirements.

Microline's Oki-Data

We have and use an Oki-Data printer made by Microline and are quite happy with it. The printer is widely available from dealers who handle RS232 printers, and can be mail ordered for under $500. It is also a dot-matrix printer, and its only disadvantage is that it is a bit noisier than other printers in the same general price range.

Comprint

We mention this printer only because it was originally introduced as *the* printer for the Interact by Interact Electronics, and we did carry it at one time. Some Interact owners may still have them. The Comprint uses a metallic paper which cannot easily e annotated and is now nearly impossible to order. It operates by burning the characters off the metallic paper and is painfully noisy. We have no recent information about the Comprint, but the last flyer advertised it at about $650.00. For the price, many other printers would be a better buy.

Other Options

There are other interesting printer options available to you. One of the most exciting is the typewriter-turned-lineprinter. This is an electric typewriter containing a board that allows it to be used as a printer. Of course, this gives you letter quality every time. We have no direct experience with these devices, but operation with an Interact is technically possible, and we have seen them advertised at reasonable prices.

New DIMensions in BASIC

If you've done much BASIC programming, you've undoubtedly tangled with an array or two. You might have used an array with a single dimension to organize a list of similar items, like notes on a scale, names, or counts. You may well have used a two-dimensional array to represent coordinates of a grid in a game program. The uses of arrays are many and varied, and it is not our intention to pursue a lengthy discussion of the whys and hows of using them in this article. Array concepts and handling are discussed in *Basically Speaking*, at least in their simpler forms.

When you get into handling higher-dimensional arrays, though, the situation gets stickier. *Basically Speaking* doesn't cover multi-dimensional arrays in much detail, although it does present a simple example of using a three-dimensional array for a 3-D Tic-Tac-Toe game. In that case, the BASIC statement

```
DIM A(3,3,3)
```

creates storage space for the contents of three parallel grids, each a 3×3 square. (Note that the above DIM statement actually builds a 4×4×4 array, but the zeroth dimension was apparently ignored for simplicity of explanation in that example.)

In BASIC, an array can have as many as five dimensions, or subscripts. Of course, the memory constraints of the Interact often preclude the use of four or five distinct dimensions, unless each of the subscripts is kept small. Even with small subscripts, however, memory consumption may be a problem. Consider the statement

```
DIM A(3,3,3,3,3)
```

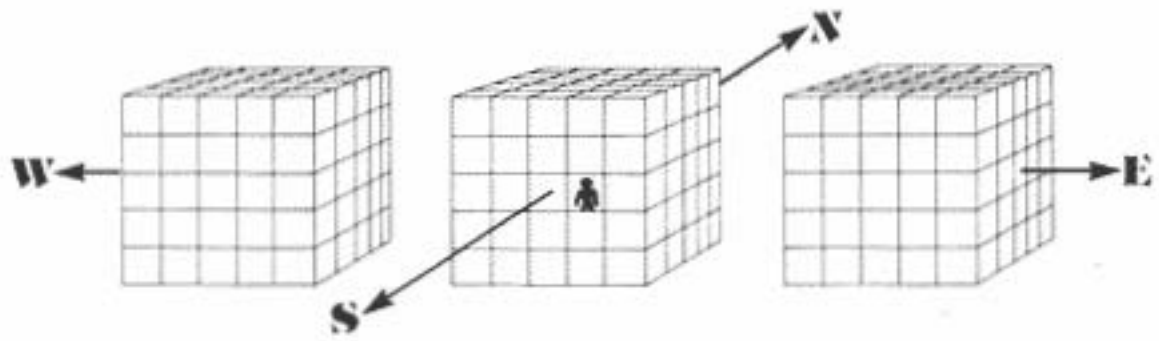
which creates a 4×4×4×4×4 array that contains 1,024 elements. Each element always consumes 4 bytes of memory, so this array would use 4,096 bytes of RAM. That doesn't leave much room for program code to use the array, especially in a 16K system, which only allocates 4,698 bytes to begin with. It is even memory-consuming in a 32K system.

This isn't to say that multi-dimensional arrays cannot be used on the Interact. They do, however, have to be dimensioned as efficiently as possible. To wit, we've devised a simple program that illustrates how you might use a multi-dimensional array in a game. The program uses an array with four dimensions to create the rudiments of an adventure-style game. The program hasn't been fully developed into a game, so you won't find it terribly exciting to play, but it does demonstrate the potential value of an array with several subscripts. You may wish to continue development to make a true game out of the concept.

In program line 20, the DIM statement sets up the array that acts as the game board:

```
DIM A(2,4,4,4)
```

Although you could assign any scenario you wish to the game, we have chosen to have this array represent three office buildings, each five stories high, with each floor a 5×5 grid. In the DIM statement, the first subscript represents the buildings, which are numbered 0, 1 and 2. The second subscript represents the floors of the building, which are numbered 0 through 4, where 0 is the bottom floor. (This is analogous to the European style of numbering floors, where the "first" floor is really one floor up, and the lowest floor is at ground level.) The third and fourth subscripts represent the (X,Y) coordinates of offices on the floor, where X(0) is the office farthest west in the building and Y(0) is the office farthest north.



The program references the dimensions in the array to give you your location at any given time. If you were on the third floor of the second building in the fourth office along the south wall (see graphic above) your location in the array would be

```
A(1,2,3,4)
```

In the game, you always start out in the first building, on the bottom floor, in the office in the northwest corner [A(0,0,0,0)]. The program displays your location, then asks you which way you want to move — up (U), down (D), north (N), south (S), east (E), west (W), or into the next building (*). Whenever you enter a new building, you always start on the bottom floor in the northwest corner.

Based on your response, the program executes one of several subroutines that control your movement (lines 300-590). Note that each subroutine includes data checking, to intercept and disallow bad move attempts, a feature that should always be present in a game, regardless of its type. You are not allowed to move up past the fifth floor in any building, nor can you move north if you are already on the northmost wall, etc.

As well as being able to move around in the array game board, you can also store things in the array, represented by numbers, to play a part in the action. Every good adventure game needs to have other elements present, and since ours is taking place in office buildings, we scatter desks and potted plants around in the offices. The program does this as soon as you execute it, using random number generation to determine what will be in each office (lines 30-130). Any given office may contain a desk, represented in the array by a "1," a potted plant, represented as a "2," or nothing at all (a "0"). Each time you make a move, the program checks the new location in the array to find out what its contents are, and displays, in addition to your location, what you see in the room (lines 200-260).

You might, memory permitting, even add a fifth dimension, one that represents a city the buildings are in:

```
DIM A(2,2,4,4,4)
```

The above array could hold information on three different cities, each containing a trio of office buildings. However, that array has 1125 ele-

ments (3 × 3 × 5 × 5 × 5). That's 4500 bytes of RAM, so such a game would really only be feasible on a 32K machine.

Of course, just by changing the associated text, the scenario can be dramatically revised. Instead of office buildings, you might have multi-floored caves populated by bats and trolls or pirate ships filled with cut-throat criminals and cannons. Add some fighting and scoring routines, an object to be retrieved or a damsel in distress to rescue, and you'll have an entertaining diversion for long winter evenings.

```
  1 COLOR 0,1,3,7
 10 CLS:PRINT "ONE MOMENT ..."
 20 DIM A(2,4,4,4)
 30 REM PUT IN DESKS AND PLANTS
 40 FOR B=0 TO 2
 50 FOR F=0 TO 4
 60 FOR X=0 TO 4
 70 FOR Y=0 TO 4
 80 Z=RND(1)
 90 IF Z<.4 THEN R=0:GOTO 120
100 IF Z<.7 THEN R=1:GOTO 120
110 R=2
120 A(B,F,X,Y)=R
130 NEXT:NEXT:NEXT:NEXT
140 CLS
150 REM SET STARTING COORDINATES
160 B=0
170 F=0:X=0:Y=0
190 REM WALK AROUND IN BUILDINGS
200 PRINT:PRINT:PRINT "BUILDING=";B
210 PRINT "FLOOR=";F
220 PRINT "X=";X;"  Y=";Y
230 PRINT "YOU SEE ";
240 IF A(B,F,X,Y)=0 THEN PRINT "NOTHING":GOTO 270
250 IF A(B,F,X,Y)=1 THEN PRINT "A DESK":GOTO 270
260 PRINT "A PLANT"
270 PRINT:PRINT "WHICH WAY?"
280 PRINT "N,E,S,W,U,D,*"
290 X$=INSTR$(1):IF X$="" THEN 290
300 IF X$="U" THEN 400
310 IF X$="D" THEN 430
320 IF X$="N" THEN 460
330 IF X$="E" THEN 490
340 IF X$="S" THEN 520
350 IF X$="W" THEN 550
360 IF X$="*" THEN 580
370 GOTO 290
390 REM UP
400 IF F=4 THEN 610
410 F=F+1:GOTO 200
420 REM DOWN
430 IF F=0 THEN 610
440 F=F-1:GOTO 200
450 REM NORTH
460 IF Y=0 THEN 610
470 Y=Y-1:GOTO 200
480 REM EAST
490 IF X=4 THEN 610
500 X=X+1:GOTO 200
510 REM SOUTH
520 IF Y=4 THEN 610
530 Y=Y+1:GOTO 200
540 REM WEST
550 IF X=0 THEN 610
560 X=X-1:GOTO 200
570 REM NEW BUILDING
580 B=B+1:IF B=3 THEN 160
590 GOTO 170
600 REM CAN'T GO THAT WAY
610 PRINT "*CAN'T*":GOTO 200
```

The Computer Doctor

Symptoms: My computer has an exceptionally loud background hum which sometimes makes real sounds virtually inaudible.

The screen appears to be slightly out of focus, and the text seems to be wavy, rather than sharp and straight.

Diagnosis: Sound tank coil may be out of alignment.

Rx: **Sound Tank Alignment**

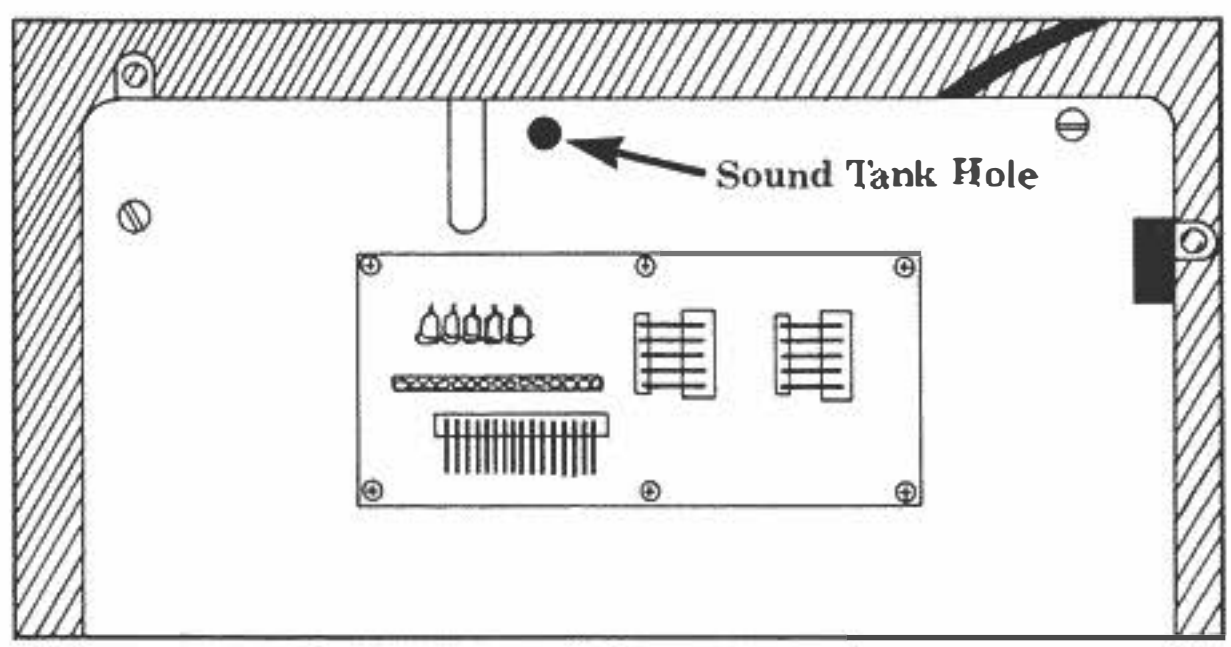
Aligning the sound tank is a simple procedure that is very similar to performing a tape head alignment. You'll need only a screwdriver and a small non-metallic hex tool.

There is an adjustable coil in the RF section of the Interact called the sound tank coil. The sound tank circuitry is connected to an input (pin 15) of the RF chip. When the coil is not adjusted properly, one or both of the symptoms above classically occur.

To cure this ailment, you'll need to remove the six screws that hold the top plastic housing to the bottom. Then, lift the top of the computer up slightly and pull it back toward you. Leave the power and keyboard lines plugged in, as your computer must be on to perform this adjustment. You won't have to pull the top back very far before you expose the main electronics housing. There is a hole in the top of the casing, approximately halfway across. The sound tank coil is located directly beneath this hole (see diagram).

Now, take your hex tool and insert it into the hole, seating it in the coil lug. Raise the volume on your television set so that the hum is clearly audible. Then, adjust the alignment of the coil by turning the hex tool slowly left to right and back, as you would do for a tape head alignment. As you turn it, you should notice the hum grow louder, then softer. You should also see a related distortion of the screen image as you do this. Unlike a tape head alignment, where the goal is the loudest signal possible, to adjust the sound tank properly, you will want the hum to be at its lowest level and the characters on the screen to be sharp and still.

After performing this adjustment, you should experience a noticeable difference in the quality of sounds in games and other programs. There are, however, occasions when a sound tank alignment will not cure these symptoms. If you still experience the loud hum after aligning the coil, your computer may have problems caused by faulty circuitry in the RF or audio section. Solutions to these more major problems can be found in *The Computer Doctor* repair guide. And, if you need additional help, call Micro Video to talk to me directly.



Far Out Graphics Contest!

You Be The Judge

We've decided to do something different with this contest. Instead of judging it ourselves, we're throwing it open to you. You've heard of a jury of peers? Well, you've been appointed.

Try the programs submitted by Interact owners, and tell us which one you think is the prize-winning entry. Fill in the Ballot Box on the survey form to cast your vote. You can vote only once (no stuffing the ballot box allowed!). Vote for one program only, giving the programmer's name and the title of the program as it appears here. Please vote before December 15, 1983. We'll tabulate the votes and announce the winner in the next issue.

In presenting these programs, we've deliberately made no judgements about them. That's up to you. However, in some cases, we felt a little commentary was necessary to help you use a program or know that it is running correctly. Note that some programs are slow in developing to the final effect; we recommend you let them all run to conclusion before making your decision.

Notice to Contestants

Some of you sent in multiple entries, which is perfectly fine — we didn't restrict the number of times you could enter. We have printed all the entries we could here. If you don't see your entry, there are two possible reasons.

We simply could not get some programs to load, even after repeated attempts and tape head alignments, and were therefore unable to get program listings. (Remember that you should never write over a tape containing old programs or even standard audio recordings without erasing the tapes completely first!) Some multiple entries were merely minor variations on a theme, for example, ending the program with GOTO instead of END so it would run continuously. In those cases, only the continuously repeating or more complex version is printed here. If you supplied a name with your program, we used that name. If you didn't, we gave it what we felt was a descriptive title.

Ballot Box on page 20.

COLOR SPIN

Programmer: Bart Henderson
Georgetown, CT

Adjust the value added to A in line 20 to get different effects with this program (e.g., A=A+.08).

```
10 CLS:C=7
20 A=A+.8
30 X=14+F.*COS(A):Y=(4+F)*SIN(A)
40 X=X+56:Y=Y+38
50 IF INT(A)=60 THEN A=0:C=C-1:F=F+1
60 IF X>112 OR X<0 OR Y>77 OR Y<0 THEN20
70 IF C=4 THEN C=3
80 IF C=0 THEN 80
90 PLOT X,Y,C:PLOTX+1,Y,C:PLOT X,Y+1,C:PLOT X+1,Y+1,C
100 GOTO 20
```

CIRCULAR MOTION

Programmer: Bob Fett
Dearborn Heights, MI

```
10 CLS:COLOR0,1,2,4:FORR=1TO38:C=C+1:IFC>3THENC=1
20 FORT=0TO6.28STEP.05:PLOT56+R*COS(T),39+R*SIN(T),C
30 Y1=10*SIN(X):NEXT:NEXT
40 COLOR0,1,2,4:FORT=1TO30:NEXT:COLOR0,2,4,1:FORT=1TO30:NEXT
50 COLOR0,4,1,2:FORT=1TO30:NEXT:GOTO40
```

STAR STRUCK

Programmer: Tom Doerr
Cambridge, OH

```
10 CLS:A=55:B=38:FORT=0TO1:FORU=0TO4:FORV=0TO6:COLOR0,T,U,V
20 D=INT(55*RND(1)+1):E=INT(38*RND(1)+1):C=INT(3*RND(1)+1)
30 N=0:IFE>DGOTO60
40 F=A:G=A:FORO=1TOD:PLOTF,B+N,C:PLOTG,B+N,C:PLOTG,B-N+1,C
50 PLOTF,B-N+1,C:F=F+1:G=G-1:N=N+E:O:NEXT:GOTO100
60 F=B:G=B:FORO=1TOE:PLOTA+N,F-1,C:PLOTA+N,G+1,C
70 R=INT(A+N)-A:S=INT(A-N)+1:IFR<>STHENR=R+1
80 PLOTA-R+1,F-1,C:PLOTA-R+1,G+1,C:R=0
90 F=F+1:G=G-1:N=N+D:E:NEXT
100 NEXTV,U,T:GOTO10
```

TUNNEL VISION

Programmer: Jim Loots
Ann Arbor, MI

```
10 CLS: COLOR0,0,0,0
20 FOR Z=1104
30 READ Q,O1,R,R1
40 FORX=11010:FORY=1TO7
50 C=X:IFY>XTHENC=Y
60 OUTPUTCHR$(1),Q*X*5+R,O1*Y*5+R1,C
70 NEXT:NEXT:NEXT
80 DATA 1,1,45,35,1,-1,45,40,-1,-1,50,40,-1,1,50,35
90 FORC=1104:COLORC,C+1,C+2,C+3
100 FORN=110=100:NEXT:NEXT:GOTO90
```

Change line 100 to

```
100 FOR M=1105*POT(0):NEXT:NEXT:GOTO90
```

and you'll be able to use the left joystick pot knob to control the speed.

OPTICAL ILLUSIONS

Programmer: Peter Finch
Tigard, OR

Use the pot knob on the left joystick to change the illusion.

```
1 X(0)=0:X(1)=4:X(2)=3:X(3)=7:PLOT0,39,1,57,39:
  DEFFNC(Z)=X((J+Z)AND3)
2 PLOT57,39,2,56,39:PLOT57,0,1,56,39:PLOT0,0,2,57,39:FORH=0TO8:C=8-H
3 H=37-I*4:PLOT57-H,39,C,H,H:PLOT57,39,C+1,H,H:PLOT57,39-H,C,H,H
4 PLOT57-H,39-H,C+1,H,H:NEXT:FORI=1TO37STEP2:H=(I+1)/2:C=14
5 PLOT56-I,39+1,C+1,J,39-I:PLOT0,39,C+3,57-I,H:
  PLOT57-H,39+1,C+2,H,39-I
6 PLOT57,39+I,C,I+1,39-I:PLOT57,39+1,C+3,H,39-I:
  PLOT57+1,39,C+2,56-I,H
7 PLOT57,0,C+1,I+1,39-I:PLOT57+1,39-H,C+3,56-I,H:
  PLOT57,0,C+2,H,39-I
8 PLOT56-I,0,C,I,39-I:PLOT57-H,0,C+3,H,39-I:
  PLOT0,39-H,C+2,57-I,H:NEXT
9 PLOT56,38,3:PLOT57,38,2:FORI=0TO1STEP0:C=POT(0)-80:H=SGN(C):
  C=70-H*C
10 J=(J-H)AND3:COLORFNC(0),FNC(1),FNC(2),FNC(3):FORK=0TOC:NEXT:NEXT
```

STRANGE VIEW

Programmer: Mehal Patel
Chiefland, FL

How this program looks will depend on what was loaded into your computer before you enter and run it.

```
1 CLS:COLOR7,6,5,4:POKE24887,10:POKE24886,10:POKE24885,11
3 FORI=1TO47:POKE24889,I:PRINT:NEXT:POKE24887,46
```

Or, for a different effect:

```
0 WINDOW72
1 CLS:COLOR 7,6,5,4:POKE24887,10:POKE24886,10:POKE24885,11
3 FORI=47TO1STEP-1:POKE24889,I:PRINT:NEXT:POKE24887,46
4 FORI=1TO300:NEXT:CLS:A$=INSTR$(1):COLOR0,1,2,3
5 POKE24889,0
7 WINDOW77
```

SAILING ALONG

Programmer: Peter Finch
Tigard, OR

This 8K BASIC program uses a machine language routine, which is encoded in DATA statements in line 1-3. (Note this program will not run under 32K BASIC control unless you first change the POKEs identifying the routine and the USR call.)

```
1 DATAPDCBAMFFCCPDFPPLHGMOAIFFBBAABACBAAAAAOHIHOCDKGC
  DKGAPBHBHAPBHBHOGAH
2 DATADCAABAANMCBEFFCBABCGOFCBHKAAODODPBBPBPBPPFOGAH
  BCPGAAPGAAAACLHMLFMC
3 DATAOBFFOOAHDNDGAHDCEFFFMCHBABOBCCCJFFCBBAFFHOMGAPH
  HMOHCAB
4 CLEAR100:COLOR6,3,0,1:CLS:FORI=217601TO21852:
  IFX>=LEN(C$)THENREADC$:X=1
5 POKEI,16*ASC(MID$(C$,X,1))+ASC(MID$(C$,X+1,1))-1105:X=X+2:NEXT:
  X=19473
6 POKEX,0:POKEX+1,85:PLOT0,42,2,11,4,36:FORI=0TO50:X=5+109*RND(1):
  L=RND(1)
7 PLOTX,44+31*L,0:NEXT:FORI=0TO4:PLOT24-I,16+I*3,52+I*2,1:NEXT:
  FORI=1TO12
8 X=16*SQR(1-I*I/169):PLOT50-X,57-I,1,X*2,I*2:NEXT:PLOT51,21,3,1,37
9 FORI=24TO56:X=43+18*SQR(1-((I-40)/18)↑2):
  M=54+27*SQR(1-((I-30)/27)↑2)-X
10 PLOTX,I,3,M,1:NEXT:FORI=1TO29:PLOT51-I,54-I,3,1,L:NEXT:E=USR(0)
```

MANDALA

Programmer: Dick Ricker
Cornville, AZ

Now we know what people in rural Arizona do for entertainment at night. (Actually, Sue Denim, a former resident of Jerome, just a hop, skip and a jump from Cornville, sez she already knew!)

```
10 CLS:COLOR4,1,2,3:POKE19215,25:DIML(961):J=0:
   A=17517:B=17677:C=17678
15 O=17518:E=96:F=32:PRINT" LIGHT IT UP !!":PRINT:PRINT:PRINT:PRINT:
   A$=CHR$(1):B$=CHR$(8)
20 PRINT" ":FORI=1TO9:PRINTA$;:NEXTI:FORX=2TO11:
   FORY=1TOX-1-INT(X/9)*(3*X-25)
25 FORI=0TO2:L(J+1)=A+X+E*Y+F*I:L(J+2)=A+Y+E*X+F*I:
   L(J+3)=B+X-E*Y-F*I
30 L(J+4)=B+Y-E*X-F*I:L(J+5)=C-X-E*Y-F*I:
   L(J+6)=C-Y-E*X-F*I
35 L(J+7)=O-X+E*Y+F*I:L(J+8)=O-Y+E*X+F*I:J=J+8:NEXT:NEXT:
   PRINTB$;:NEXT:CLS
40 B=1:C=2:O=2:E=24:V=255:FORI=BTOJ:IFC>ETHENC=B:
   I=I+INT(RND(B)*D)*E
45 POKEL(I),V:C=C+B:NEXTI:A=0:C=25:O=3:F=85
50 FORI=BTOJ:IFC>ETHENC=B:V=F*(INT(RND(B)*O)+B):
   IFV=PEEK(L(I))THENV=A
55 POKEL(I),V:C=C+B:NEXTI:GOTO50
```

PATTERNS/SNOW BLIND

Programmer: Anthony Watson
Woodland, WA

Two entries in one — you'll see a different effect depending on which of the two modes you select.

```
10 POKE19474,80:POKE19473,0:FORA=20480TO20510:READB:POKEA,B:NEXT
20 CLS:OUTPUT"SELECT MODE",23,60,1:OUTPUT"1 OR 2",38,40,2
30 A$=INSTR$(I):IFA$="1"THEN70
40 IFA$="2"THENCOLOR0,0,7,7:GOTO60
50 GOTO20
60 POKE20486,158:POKE20488,158:FORA=20496TO20501:READB:POKEA,B:
   NEXT
70 A=USR(0)
80 DATA205,115,5,33,160,73,174,43,174,119,124,254,63,194,6,80,58,239,95
90 DATA50,0,24,58,240,95,50,0,16,195,3,80,1,0,80,205,246,7
```

CRISS-CROSS

Programmer: Bob Felt
Dearborn Heights, MI

```
 5 CLS:COLOR0,1,2,4:B=0:FORC=1TO3:A=1:B=B+1:FORY=BTO77:
   FORX=112TO0STEPA*-1
20 PLOTX,Y,C:NEXT:A=A+.5:NEXT:NEXT
50 B=0:FORC=1TO3:A=1:B=B+1:FORY=8TO77:FORX=0TO112STEPA:
   PLOTX,Y,C:NEXT
60 A=A+.5:NEXT:NEXT:B=77:FORC=1TO3:B=B-1:A=1:
   FORY=BTO1STEP-1
65 FORX=0TO112STEPA:PLOTX,Y,C:NEXT:A=A+.5:NEXT:NEXT
90 B=77:FORC=1TO3:B=B1=:A=1:FORY=BTO1STEP-1:
   FORX=112TO0STEPA*-1:PLOTX,Y,C
95 NEXT:A=A+.5:NEXT:NEXT
100 GOSUB150:COLOR0,4,1,2:GOSUB150:COLOR0,2,4,1:GOSUB150:
    COLOR0,1,2,4
110 GOTO100
150 FORT=1TO100:NEXT:RETURN
```

SPIRAL

Programmer: Dave Oatley
Georgetown, OH

```
10 CLS:R=1
20 C=C+1:R=R+.05
25 IFC>3THENC=1
30 T=T+.05
40 PLOT50+R*COS(T),35-R*SIN(T),C
45 Y1=10*SIN(X)
50 A=A+1:IFA=712GOTO60
55 GOTO20
60 A=INT(RND(1)*6)+1:B=INT(RND(1)*6)+1:D=INT(RND(1)*6)+1:
   COLORA+B+D,A,B,D
70 GOTO60
```

THE DRAGON

Programmer: Peter Fox
San Jose, CA

```
10 CLS:COLOR4,7,1,7:FORI=1TO10:OUTPUT"(",57+I,39,3:
   OUTPUT",",57+I,43,3
20 OUTPUT"(",52+I,45,3:NEXT:FORI=1TO19:FORJ=1TO2*I:
   PLOT70+I,58-I+J,3
30 PLOT88-I,39-I+J,3:PLOT65-I+J,17+I,3:PLOT45-I+I,36-I,3:NEXTJ,I
40 PLOT59,44,0:FORI=-1.866TO1STEP.07:FORJ=1TO13:X=J*COS(I):
   Y=J*SIN(I)
50 PLOT88-X,23+Y,3:PLOT78-X,30+Y,3:NEXTJ:FORI=1TO8:FORJ=1TO7
60 OUTPUT"+",65+I,21+J,3:NEXTJ,I:OUTPUT"+",78,18,3:
   OUTPUT"+",56,42,3
70 OUTPUT"+",55,42,2:OUTPUT"+",56,42,2:PLOT55,38,3:PLOT65,57,3
80 OUTPUT">",65,59,3:OUTPUT"V",45,39,3:PLOT47,40,3:
   FORI=0TO1STEP.05
90 PLOT79-20*COS(I),35-20*SIN(I),0:NEXT:OUTPUT"__",68,21,3
100 OUTPUT")",73,21,0:OUTPUT"(",68,14,3:OUTPUT")",71,17,3:A$=INSTR$(1)
```

continued on page 15

Tidbits

Remote Keyboard

Walter Parker of Las Vegas, NV, didn't want to lose the overlay capabilities for Compute-A-Color and Music Maestro, so he didn't install his professional keyboard directly in his computer. Instead, he built a slender oak case with a masonite base and rubber feet to house the keyboard. He ran an extra 15 pin connector out the back of his Interact and connected his keyboard with a 10-foot long piece of ribbon cable. He reports that it "works 100%," and he can sit away from his computer with the keyboard in his lap.

Brave New Controller

Daniel Thompson of Logan, OH, rebuilt his own joystick when one of his was irreparably damaged. He went to Radio Shack and spent $6 on a small box, five push button switches, and a potentiometer. Following the connections on the standa djoystick, he wi ed in the various parts. He says that the problem with the controller is that it works so much better on the games that he had to go right out and spend another $6 to build a second one!

Better Better Mousetrap?

Marc Wilson of La Mesa, CA, says he has a simpler and faster solution to the problem of maintaining a progr m timer while accepting keyboard input than the one offered by Albert Narain of Holland (last issue). He states that it is faster because it doesn't use the LOG function, and that it will read any key, including CR, shifted and control keys, with the exception of LOCK. You can determine whether or not LOCK is in effect by PEEK(24530) — a value of 255(FF) means lock is engaged, while a value of 0 means it's disengaged. To disengage it, POKE a value of 0 into that location.

```
10 POKE 19215,25:A$="":AD=24528:CH=0
20 IF PEEK(AD)>0 THEN CH=PEEK(AD+1):POKE
   AD,0:A$=CHR$(CH)
30 IF CH>96 AND CH<123 THEN CH=CH-32:
   A$=CHR$(CH)
40 RETURN
```

A*A + B*B ≠ A² + B²

C. J. Woodward of Sun City, AZ was quite confused about the operation of his BASIC program. His idea was to identify and report integers between 1 and 50 that equal the sum of two squares.

```
10 PRINT "INTEGERS THAT EQUAL THE SUM OF
   TWO SQUARES":PRINT
20 FOR N=1 TO 50
30 FOR A=1 TO 7
40 FOR B=1 TO 7
50 IF A*A+B*B<>N THEN 80
60 PRINT N;"=";A*A;"+";B*B
70 GOTO 95
80 NEXT B
90 NEXT A
95 NEXT N
99 END
```

Woodward reports that the program takes approximately 40 seconds to run and identifies 18 sum answers. He found, however, that if he substituted exponentiation (A↑2 and B↑2) for multiplication in line 50, the program takes more than five minutes to run and only reports six sums.

Yes, C.J., there is an explanation. The program runs more slowly with exponents used because BASIC's exponentiation routine is slower than its multiplication routine. The reason it only reports six sums is a combination of rounding differences due to BASIC's 7-digit precision and the fact that you're testing for absolute equality with N. For example, the program wouldn't consider 4.001 to be equal to 4, when, for all practical purposes, it is. You can solve this by performing an Epsilon test of how close the two numbers are, rather than for absolute equality. Substitute the following for line 50, and you'll find that both versions of the program will identify the same 18 sums.

```
50 IF ABS((A↑2+B↑2)-N)<.001 THEN 80
```

Diamonds Are Forever

Richard Thompson of Santa Ana, CA, asked us to share his 32K BASIC program with you. He uses the LINE command for some spectacular graphic effects. You can use Control-S to stop and restart the program as it runs.

```
10 CLS
20 COLOR0,1,3,7
22 XW=68
23 YW=68
30 XL=118-XW/2
40 XH=0+XW/2
50 XL=77-YW/2
60 YH=35+YW/2
70 C=1
80 FORN=1TO100
90 LINEXL,35-57,YH,C
100 LINE57,YH,XH,35,C
110 LINEXH,35-57,YL,C
120 LINE57,YL,XL,35,C
130 C=C+1
140 IFC=4THENC=1
150 XL=XL+1
160 XH=XH-1
170 YL=YL+1
180 YH=YH-1
181 IFXL=118THENXL=XL-1
182 IFXL=0THENXL=XL+1
183 IFXH=118THENXH=XH-1
184 IFXH=0THENXH=XH+1
185 IFYL=77THENYL=YL-1
186 IFYL=0THENYL=YL+1
187 IFYH=77THENYH=YH-1
188 IFYH=0THENYH=YH+1
190 NEXT
202 FORA=0TO7:FORB=0TO7:FORC=0TO7:
    FORD=0TO7:COLORA,B,C,D
204 NEXT:NEXT:NEXT:NEXT
1000 RUN
```

Aircraft Lander Enhanced

L. Shelton Allen, formerly an "Ann Ar or-ite" and now residing in Japan (Saitama Ken), has made some modifications to the Aircraft Lander program that make it more challenging and give you additional options for control.

With his changes, the program allows you to change between Manual and Auto Pilot at any time. It also lets you choose a blind instrument landing, in which the upper part of the screen is blank. Through keyboard input (A=Auto, M=Manual, V=Visual Approach, I=Instrument Approach), you can select your desired operating mode whenever you like. Visual mode automatically returns after a successful landing in Instrument mode. Change and add lines as follows:

```
102 I=3 (Default operation=Visual and Manual)
108 GOTO 130 replaces GOTO 200
124 PLOT X,Y,J, replaces PLOT X,Y,3
130 ZZ=PEEK(24529)
132 IF ZZ=97 THEN OC=1
134 IF ZZ=109 THEN OC=0
136 IF ZZ=105 THEN J=0:COLOR 0,0,0,7
138 IF ZZ=118 THEN J=3:COLOR 0,4,2,7
314 GOTO 130 replaces GOTO 200
332 IF V<20 THEN J=3:COLOR 0,4,2,7 replaces
    IF V<=0 GOTO 342
334 IF V<=0 GOTO 342
```

He was also frustrated with the program's stall warning indicator, which only told him he was stalled when it was already too late to recover. So, he added the following changes and now gets a warning before he stalls.

```
289 OUTPUT XS+BS+CS+DS+YS,8,31,3:
    F=INT(V*SWNO)):KS="V":
    IFF>0THENKS="I"
290 A=INT(682*V):IFA<110 ANDH>8THEN
    TONE100,500
291 IF A<100 AND H>8THEN O=O-.3
```

Shelton also got tired of what he calls "the same ultra-simple approach" when BASIC and the program are first loaded, so he added a randomizing factor with the line

```
10 A=RND(-PEEK(24559))
```

He says he's also made other changes that allow increased maneuverability, such as stalls, 90-degree turns, rolls, and inverted flight. If he makes a bad approach, he can even turn around, head out, and come back in for another try. He'll be happy to share these other changes with anyone who's interested.

Keyboard Comment

John H. Peters of Wayland, MI, told us that he found step 6 of the instructions for installing the new professional keyboard unnecessary. He was able to angle the keyboard into black without first removing the prescribed five keys. Although anyone who has the new keyboard has undoubtedly already installed it, you may find this information useful if you ever have to take it back out.

By Popular Demand — A Novel Plot

We've had so many requests for listings of Chuck Yount's (Granite Falls, NC) three-dimensional plotter program that we decided we'd made a mistake in not printing it in the first place. Here it is!

```
 50 PI=3.141592656
 60 BX=112:BY=77
 70 COLOR4,3,3,7
100 DEF FN Z(X)=SIN(X)+SIN(Y)
101 RH=75: PH=.13:TH=.4:D=400
102 YE=30: XE=30
103 NX=-5:XX=5:NY=-5:XY=5
108 CLS
110 PRINT"3-D PLOTTER":PRINT
115 PRINT"BY CHUCK YOUNT":PRINT
120 PRINT"TO CHANGE FUNC.- TOOL OUT PRO-
    GRAM AND DEF FN Z"
130 PRINT"DELINE 100.":PRINT
140 PRINT"DO YOU WISH TO  CHANGE THE DE-
    FAULT VARIABLE  VALUES?":
145 AS=INSTR$(1)
150 IFAS="N"THEN420
160 CLS
170 PRINT
220 PRINT"SUGGESTED VALUES IN ()'S. CHANGE
    AS YOU WISH.":
230 PRINT
240 INPUT"MIN. X(-5)";NX
250 INPUT"MAX. X(5)";XX
260 IFXX<=NXTHENPRINT"MAX <= MIN!":
    GOTO240
270 INPUT"MIN. Y(-5)";NY
280 INPUT"MAX. Y(5)";XY
290 IFXY<=NYTHENPRINT"MAX <= MIN!":
    GOTO270
300 INPUT"X EVALUATIONS  (15)";XE
310 INPUT"Y EVALUATIONS  (15)";YE
320 XE=ABS(INT(XE)):YE=ABS(INT(YE))
330 INPUT"THETA ANGLE (.4)";TH
340 INPUT"PHI ANGLE (1.3)";PH
350 INPUT"RHO (75)";RH
360 INPUT"D (400)";D
370 RHO=ABS(RHO):D=ABS(D)
380 IFTH<0THENTH=TH+2*PI:GOTO380
390 IFPH<0THENPH=PH+2*PI:GOTO390
400 IFTH>2*PITHENTH=TH-2*PI:GOTO400
410 IFPH>2*PITHENPH=PH-PI*2:GOTO410
420 DIMYN(BX),YX(BX)
430 FORI=0TOBX:YN(I)=BY:NEXTI
440 ST=SIN(TH):CT=COS(TH):SP=SIN(PH):
    CP=COS(PH)
500 CLS
505 X=NX:SI=1
510 IF(TH<=PI/2ORTH>=3*PI/2)AND(PH<=PI)
    THENX=XX:SI=-1
520 IFTH>=PI/2ANDTH<3*PI/2ANDPH>=PITHENX=XX:
    SI=-1
530 IF(SI=-1ANDX<=NX)OR(SI=1ANDX>=XX)THEN600
540 SEC=0
550 FORY=NY TOXYSTEP(XY-NY)/YE
560 Z=FNZ(X)
570 GOSUB1000
580 NEXTY
590 X=X+SI*(XX-NX)/XE:GOTO530
600 FORX=-10TO10:PLOTX,2.2:PLOTX,7.5/2:NEXT
610 FORY=2TO7.5:PLOT2.1/2:PLOT11.1/2:NEXT
620 A$=INSTR$(0,END
1000 REM PLOTTERSUB
1010 EX=-X*ST+Y*CT
1020 EY=-X*CT*CP-Y*ST*CP+Z*SP
1030 EZ=-X*SP*CT-Y*SP*ST-Z*CP+RH
1040 SX=D*(EX/EZ)+BX/2
1050 SY=D*(EY/EZ)+BY/2
1100 IFSEC=0THENSEC=1:OYN=0:GOTO1240
1110 DX=OX-SX:IFDX=0THENDX=1
1120 SL=(OY-SY)/DX:YP=OY
1130 S2=SGN(SX-OX)
1140 FORXP=INT(OX+1TOSXSTEPS2
1150 OS=1
1160 YP=YP+SL*S2
1170 IFXP<0ORXP>BXTHENOS=0:OW=0:
     GOTO1220
1180 IFYP<0ORYP>BY THENOS=0:OW=0
1190 IFYP<=YN(XP)THEN1300
1200 IFYP>=YX(XP)THEN1400
1210 OW=0
1220 NEXTXP
1240 OX=SX:OY=SY:RETURN
1300 YN(XP)=YP
1310 IFOS=0THEN1330
1320 PLOTXP+.5,YP+.5,3
1325 IFOW=0THENOW=1
1330 IFYP<YX(XP)THEN220
1400 YX(XP)=YP
1410 IFOS=0THEN1220
1420 PLOTXP+.5,YP+.5,3
1430 IFOW=0THENOW=1
1444 GOTO1220
```

Chuck's program uses a DEF FN statement in line 100 to calculate the Z coordinate of the F(X,Y) function. The variables are common mathematical symbols for 3-D graphing: theta is the counter-clockwise horizontal angle (in radians) at which the viewing point is located; phi is the vertical angle; rho is the distance from the viewing point to the origin (0,0,0); and d is the distance from the viewing point to the projection screen. He calculates screen points using similar triangle formulas.

He has suggested several other functions to try that yield interesting plots. Change line 100 to one of the following:

```
100 DEF FN Z(X)=SIN(X+Y)
100 DEF FN Z(X)=4*SIN(X*X+Y*Y)/(X*X+Y*Y)
100 DEF FN Z(X)=COS(X*Y)
100 DEF FN Z*X=SIN(X)+COS(Y)
```

Contest *continued from page 13*

ELECTRONIC SATURN

Programmer: Bob Fett
Dearborn Heights, MI

```
 10 CLS:COLOR0,1,2,4:C=1:FORR=38TO28STEP-1:
    FORT=-.55TO2.26STEP.03
 20 PLOT56+R*SIN(T+Z),38+R*COS(T-Z),C:NEXT:C=C+1:IFC>3THENC=1
 22 NEXT:C=1:FORT=0TO6.28STEP.01:FORR=11TO27:
    PLOT56+R*SIN(T),38+R*COS(T),C
 26 NEXT:C=C+1:IFC>2THENC=1
 28 NEXT:C=1:FORR=38TO28STEP-1:FORT=2.27TO5.73STEP.03
 30 PLOT56+R*SIN(T+Z),38+R*COS(T-Z),C:NEXT:C=C+1:IFC>3THENC=1
 32 NEXT:COLOR0,4,1,2:FORT=1TO50:NEXT:COLOR0,2,4,1:FORT=1TO50:NEXT
 34 COLOR0,1,2,4:FORT=1TO400:GOTO32
```

CHARACTER SPLATTER

Programmer: Bob Fett
Dearborn Heights, MI

```
 10 W=0:PRINTCHR$(8):CLS:COLOR0,1,2,4
 20 W=INT(RND(0)*3)+1:A=INT(RND(1)*255):IFA<10RA>255THEN20
 22 B=INT(RND(1)*255):IFB<10RB>255THEN22
 24 C=INT(RND(1)*255):IFC<10RC>255THEN24
 26 FORY=7TO16STEP-5:FORX=1TO112STEP2:W=W+1:
    OUTPUTCHR$(A),X,Y,1
 28 OUTPUTCHR$(B),X,Y,2:OUTPUTCHR$(C),X,Y,3:COLOR0,W+1,W+2,W+4
 30 IFW>3THENW=0
 32 NEXT:NEXT:GOTO20
```

That's all, folks. What's your vote? Which one of these programs made you say, "Oh, wow . . . FAR OUT ! ! ! "?

Feedback

Dear Micro Video:

Thank you for honoring the coupon for the keyboard and the "AL" deal. After my last purchase in November 1981, I didn't hear from MV, I assumed you were no longer in the business of supporting the Interact. I'm glad you still are, and the best of luck!

Sincerely,
Martin Gilbert
Milwaukee, WI

Dear Micro Video:

Greetings . . . I think your support of the Interact is fabulous. I own two of them. The new keyboard is fantastic now if we had ROM BASIC. The Computer Doctor is great. I had one computer down, and once I got the book it took 20 minutes to get it back on line — a bad voltage regulator. Keep up the good work and keep the programs coming.

Gerald L. Reno
Wurtsmith AFB, MI

Dear Micro Video:

I have enjoyed the *RAM Pages* I have and look forward to receiving more. Keep up the good work.

Last but certainly not least, be sure to send Sue Denim with my order. I know you probably have had a lot of people tell you "I want you" but, I hope I am the only one to tell you to send her out here. So for that reason my request takes precedence over all others.

Thanks for your help to the Interact community.

Sincerely,
Franklin Sevier
Riverside, CA

Dear Frank:

Sorry! but all our boxes are the wrong size. Besides, I get claustrophobic! Also, who would do RAM Pages *if I were there?*

Sue Denim

Dear Micro Video:

Thanks for the great work you do in supporting the Interact. I aim to order a new keyboard as soon as I get my income tax refund check. Hot damn!

Cal Ledford
Franklin, OH

Dear Micro:

The new keyboard is tops!

Jerome Butler
Babylon, NY

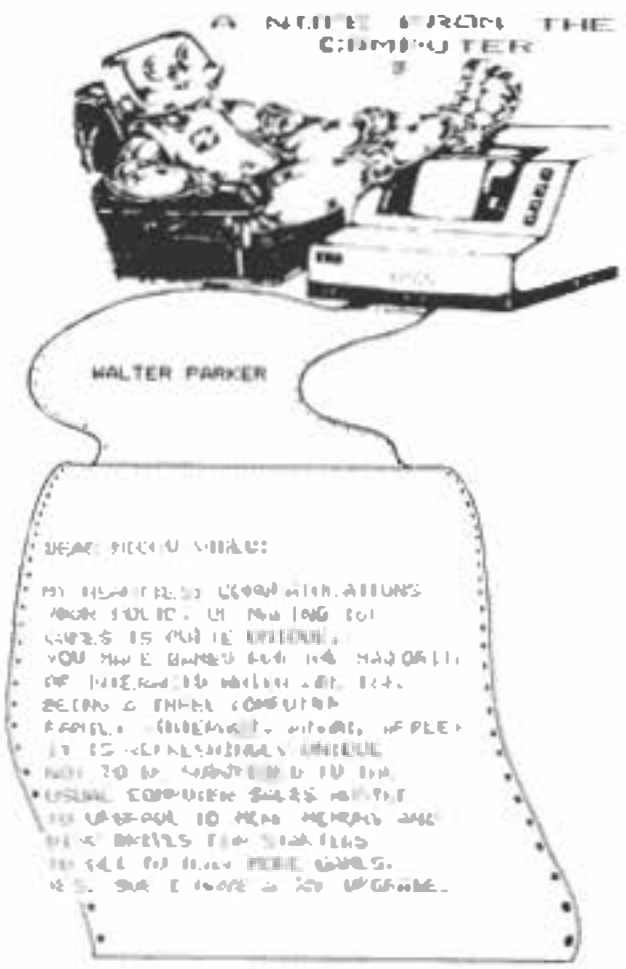
Dear Micro Video:

I received my AL replacement tape recently and, after my hassle with Assemblex, I've given AL a thorough workout and was very pleasantly surprised with its performance. It's a winner. But the tape I received is defective . . . Will you please correct this situation?

Howard Baker
Urbana, OH

Dear Howard:

With pleasure! We'll always replace a defective tape. Just return it with a note, and we'll ship another right out. (You should have gotten yours by now.) Glad you like AL!



Dear Micro Video:

Your computer is great! I bought it because I didn't want to give up the ability to program, and now that I have the professional keyboard, I don't have to. But I'm only 14 and I can only program in BASIC. Could you make an 8K BASIC with a Compiler? So when I'm done with a program, I could compile it (with one command) and change it to Machine Language.

Timothy Sallume
Santa Maria, CA

Dear Tim:

Unfortunately, there's no room left in 8K BASIC in which to add a compile feature, without reducing the programmable RAM even more. Perhaps you should think about learning to program in assembly language – there are many good books on the market to learn from, and it sounds like you're ready for that step.

Dear MV:

I just got my VideoCalc and all I can say is WOW! I never would have believed my Interact could do all that.

Thanks,
Ryan Smith
Forest Grove, OR

Dear Micro Video:

I love my Interact and *RAM Pages*. Keep up the good work! I would like to have a booklet describing what each memory location holds and what each possible POKE combinatin would do. Those listed in *Basically Speaking* are helpful but the list isn't very extensive. A large table listing all locations giving the results of all possible POKEs would be quite an undertaking, but I think the results would be worth the trouble.

. . . It appears that Interact Electronics had planned lots of goodies for our computer. An old product catalog and price list shows the 16K Model One Standard (what we've got), a 16K Model One Professional (the standard plus 2-port RS232 printer and communications interface) and a 16K Model One Professional-Plus (the Professional with an additional 14K ROM containing Level II BASIC, program editor, printer and communications software. The "Professional" models were to be available in the winter of 1979. Will Micro Video's ROM BASIC include editor, printer, and communications software?

How is work coming along on to decrease the character size in the TV display?

Chester L. Williams
Dayton, VA

Dear Chester:

A complete listing of the POKE locations is more than quite an undertaking! One of our programmers actually sat and POKEd all the locations to find out what would happen. It took him weeks, he reports, and he found that POKEs in many locations simply bombed BASIC, forcing him to reload. I will investigate the feasibility of making the notes he took available to you and other owners.

Interact Electronics promised a lot of things they didn't deliver before they went out of business in the winter of 1979. We've made some of them available, such as the RS232 port. (In an upcoming issue, we'll publish how to convert the RS232 to a true dual port.)

ROM BASIC, however, is not likely to become a reality at this point. The cost of producing it would be in excess of $12,000, so, given our small market size, the price tag would be high. I doubt many owners would be willing to pay the price we'd have to charge. No new news on decreasing the

character size to report. I don't know if no news is good news or bad news in this case.

Dear Micro Video:

My youngster Chris is taking over the computer. Orders will come from him in the future.

When you want to replace AL with another assembly system program, mine is available. It is written around the Selbi assembler, my edit program and your monitor. It takes about 8K in the 16K machine.

Stanley Hechman
Monmouth Jct., NJ

Dear Stanley & Chris:

First, I'd like to welcome Chris to the Interact community. As for replacing AL, I don't think we'll need to. It's been very well received after Assembler, works just fine, and only occupies 4K in a 16K system.

Dear Micro Video:

You sell two kinds of games: BASIC games and machine language games. I know almost all about BASIC, but don't know much about machine language. Could you help me?

Josh Kirkpatrick
Berkley, MI
P.S. Age 8

Dear Josh:

We don't really have any books or programs that are designed specifically to teach someone to program in machine language. Our Bombs Away! *program shows how to combine BASIC and machine language routines. I'd suggest you get that and the Monitor, or try assembly language programming with AL. Visit your local computerstore to see what kinds of books they have for learning about assembly or machine language programming.*

Dear Micro Video:

On Goofy Golf, what is the lowest possible score? The best I've done on 18 holes is 76, though the total of my best performance on each hole is 54. It seems to me that may be the minimum possible score. Is it?

Tom Slaughter
Milan, MI

Dear Tom:

Frankly, I don't know. I would think that the lowest possible score on 18 holes would be 18. However, some of the holes are complex, and a hole-in-one may be impossible. Has anyone out there beat 54?

Dear Micro Video:

Sorry, guys, this is not a subscription to *RAM Pages*. I've got better things to do with $20. Did you know that $20 is the price of a year's subscription to *Compute!* magazine? How can you charge the same price for a 20-page newsletter that only comes out 4 times a year?

Although the Guide to ROM Subroutines was welcome, it fell short in several key areas. I bought this hoping to find some explanations of the Interact's tape routines. But no, not a word. I had to first disassemble the monitor, then Level II BASIC to find out what I needed to know.

If you turn to page 14 (of the Guide), you find a description of a routine called SNDPAS which is supposed to control the pass-thru of tape input and sound output. But it doesn't do it at all! If you look at a disassembly of the routine you find that the calling parameters are wrong and the routine doesn't do anything for the tape sounds. Any explanations?

Marc Wilson
La Mesa, CA

Dear Marc:

Sorry you don't feel RAM Pages *is worth the price. If we had as large a subscriber base as* Compute!, *we wouldn't have to charge so much per issue. And, does* Compute! *give you discount coupons on software and other products for your Interact? In fact, does* Compute! *ever even mention the Interact?*

The reason you didn't find information about the tape routines in the ROM Guide is that they are not controlled via the ROM, but rather through routines in RAM, as you probably found out in your disassembly. We'll publish tape read/write information in a subsequent issue of this magazine.

No, I don't have an explanation for the SNDPAS routine. People forget that Micro Video didn't write the ROM. Interact Electronics did. We merely identified the routines existing there in the Guide. I presume Interact Electronics simply over-

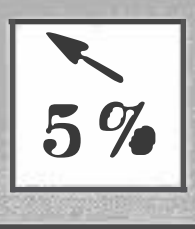
continued on page 18

A Simple Solution to the Compute-A-Color Keyboard Overlay Problem

Those of you who have the new professional keyboard have probably discovered that the keyboard overlay for the Compute-A-Color program no longer fits. If you use the program for creating front screens or developing graphics for your programs, you've probably found that trying to remember all the directional keys can be frustrating. Would anyone really want to trade the feel and response of the new keyboard simply for the ability to use the keyboard overlay? Probably not, but its absence does make the program more difficult to use.

A simple solution to this is to create your own keycaps for those keys which need identification. We've done this on some of our computers here, and it works perfectly well.

Use ½" wide self-adhesive labels and cut them into squares ½" wide. Then, using a felt tip pen or other nonsmearing ink, mark the squares with the characters that currently appear on the keyboard and the appropriate directional arrow, using the old overlay as a guide. For example, your keycap for key 5 might look like this:



When you're done, position the keycaps on the affected keys and press down firmly to seat them. Remember that, on the new keyboard, the "1" key is on the left side of the keyboard (where it belongs), rather than on the other side by the "0" key. This means that the "→" directional arrow position will also be different from the keyboard overlay.

You can mark the paint box colors and other key functions too, but we've found that unnecessary. They're easy enough to remember since there are only a few of them.

This solution is certainly not the most elegant possible, but we think you'll agree that the price is right!

looked it in debugging the ROM, which, incidentally, was produced in 1977.

Dear Micro Video:

I think you should know that Kathe Spraklen's book and your AL and Bombs Away explanations are horrible ways to learn Assembly Language. The writers assume too much and explain too little. One pretty good book that I found is for Z-80 programming only, but when coupled with the above two can lead to some sort of rapid success. It's called "Machine and Assembly Language Programming" by David C. Alexander (Publisher — Tab Books Inc., Blue Ridge Summit, PA 17214).

Maybe when I learn the lang age well, I'll write a really good book for you ! ! !

???

Dear ? ? ?:

Your note reached me with only a scrawled initial as a signature, so I couldn't identify you for our readers. Care to identify yourself?

Thanks for suggesting another book owners might find useful in learning assembly language.

Dear Micro Video:

No, I haven't decided not to subscribe, and no, it didn't slip my mind either. Nor do I have a friend who has subscribed (nearly all my computer friends have Atari's). I fully planned to subscribe, but I was rather upset after the results of your "Better Mousetrap" contest came out.

Very briefly: you mentioned Terry Wirth's entry which was the same as mine (?) except I sent pictures and included a clock timer program to make it useful. But not even a notice. That's your choice, but an explanation would have been nice.

Irv Woelfle
Morton, IL

ear Irv:

Apparently, your Better Mousetrap never reached me! I've searched through the files containing all the entries, and could find nothing with your name on it. If you'd like to resend it, I'll be happy to include it next issue in the Tidbits column.

Dear Micro Video:

In yo r editorial last issue, you stated that the size of *RAM Pages* in number of pages was continuing to grow, but that does not mean that the quantity of useful information passed along to the reader has increased. You now are charging $20/year . . . or $3/issue, yet this issue of 20 pages has only 5 pages of useful information and many pictures. If you continue to charge $1/poge of information, you better make sure it is good, reliable, accurate information or some u er group will drive you out of business.

I ask you, wouldn't u slightly less professional publication at a more reasonable cost benefit both Micro Video and your customers? Sincerely a subscriber because I need you.

R. Rex Reid
Houston, TX

How about it folks? Do you agree? Fill in the survey form and help us tailor RAM Pages to your needs!

Dear Micro Video:

I am not sure whether there is a typo or you changed Zip Code number, but in the Publication box on page 2 and on the Subscription form (page 18), the Zip Code is stated as 48103 and the other places as 48107. Which is right?

Carl R. Schriver
DuBois, PA

Dear Carl:

Both are. It has to do with postal regulations. Our street address and post office box are actually in two different Zip code areas. The Zip code used depends on which line appears immediately above the City line in the address. Our POB is 48107; street address is 48103. Crazy, huh?

Dear Micro Video:

If *RAM Pages* were more substance and less style it would be worth half the price. So cute! So slick!

Henry A. Morgan
Llano, TX

Dear Micro Video:

I have enjoyed all of the past articles in *RAM pages* . . . I for one would like to see many technical articles on the internal operation of the Interact . . . This I think would help all owners to diagnose some problems that they may encou ter. I for one have been very lucky in repairing mine, but it took me quite a while before I solved it. Now for the first time in two years I enjoy using it.

Angelo Ippolito
Bloomfield, NJ

Dear Micro Video:

What is the overlay for Packrat and how does it work? Will you be coming out with a game similar to Donkey Kong? Is your game Caterpillar like Trailblazers? I enjoy Jungle Run very much and my whole family enjoys playing on the computer!

Scott M. Buigener
Phoenix, AZ

Dear Scott:

The Packrat overlay loads in after Packrat, and offers you 20 different game boards on which to play. The new game board you select overwrites the existing one, and you can change boards as often as you like. Our Jumping Jack program is similar in nature to Donkey Kong. Caterpillar has similarities to Trailblazers, but it is not at all the same game. The object is to gobble up the other player rather than box him in, and personally, I think it's much more fun to play than Trailblazers.

BULLETIN BOARD

I would like very much to meet or correspond with Interact owners in the Michigan area. Leland Gasper, 2471 Clayward, Burton, MI 48509, (313) 736-0808

Four screen space laser game. 8K BASIC required. $5.95. Write for free catalog. MGH Software, Dept. RAM, Bayfield, WI 54814

Are there any other Interact owners in San Francisco? Please call Ben Lee, 731-6339 or write 1566 9th Ave., 94122

For Sale or Trade: Dogfight, Level II BASIC, Concentration. For Sale: PYTHON game, $10 each, 2+ $7 each. Anthony Watson, Hayes Rt. Box 12A, Woodland, WA 98674

QST (12/82 issue) had BASIC radio propagation prediction program for Textronix computer. All lines using SEG, USING, IMAGE cause syntax errors. Any suggestions? D.A. Seastrom, 14 Skysail Ct., Sacramento, CA 95831

Amateur Radio Operators and SWLs: Morse and RTTY software available for the Interact. Written in machine language for speed & efficiency. Send SASE for details to J.A. Miller, N4BE, POB 455, Melbourne, FL 32901

INTERACTS FOR SALE

Going away to school, must sell. 16K RAM, 28 programs, manuals. $350. Brad Olsen, 2830 Belaire Dr., Arlington Heights, IL (312) 255-8229

16K RAM with RS232 port. Joysticks, service manual, schematics, parts list, 35 programs. Albert Harsch, 13667 Loretta Ct., North Huntingdon, PA, (412) 863-5760

Unused, used Model "R". Joysticks, 7 programs, new cassette deck. Asking $250. Shawn Brockman, 14503 118th Ave. NW, Gig Harbor, WA 98335

16K RAM with joysticks, switchbox, 8 tapes and assorted manuals. Perfect condition, original packaging. Best offer. Carlos Ruiz, 5402 Renwick #794, Houston, TX 77081

Retired, have spare Interact formerly used for business. Any reasonable offer. Ray Erickson, 9911 Berkshire Lp. S.E., Olympia, WA 98503 (206) 491-8949

RAM Pages Subscriber Specials

3-4-2

Buy 2 Tapes Get 1 Free!

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Coupon Expires 12/15/83

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Install it yourself and SAVE!

$99.95 regularly $119.95

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With buffer board for RS232 por operation

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RAM Pages Subscriber Survey

To help us keep abreast of what you want and need from your computer, we'd appreciate your letting us know your thoughts and ideas on RAM Pages and other aspects of Micro Video's support, as well as some information about you and how you use your computer.

How many Interact computers do you own? _____

How long have you owned it/them? _____

Where did you get your computer(s)?

- ☐ Interact Electronics
- ☐ Micro Video
- ☐ Local Dealer
- ☐ Protecto Enterprizes
- ☐ Manutronics
- ☐ Used, from a friend, garage sale, etc.

What is the memory capacity of your machine(s)? _____

Do you have an RS232 interface? ☐ YES ☐ NO If YES, what type? _____

Have you had any problems with it? ☐ YES ☐ NO

If YES, please describe _____

Do you own a printer? ☐ YES ☐ NO If YES, what kind? _____

Do you own a modem? ☐ YES ☐ NO

If YES, what other systems do you access? _____

_____

Is the Interact the only microcomputer you have or use? ☐ YES ☐ NO

If NO, what others do you own/use? _____

How many people regularly use your Interact? _____

Into what age group(s) do the users of your Interact fall?

- ☐ 3-7 years
- ☐ 8-12 years
- ☐ 13-17 years
- ☐ 18-25 years
- ☐ 26-35 years
- ☐ 36-50 years
- ☐ 51-65 years
- ☐ 65+

In what profession and/or educational level do the users of your computer fall?

_____

Has your computer ever broken down? ☐ YES ☐ NO

If YES, did you:

- ☐ Fix it yourself
- ☐ Have someone else fix it
- ☐ Send it to Micro Video for repair

If you sent it to Micro Video, please rate the service you got.

Slow, terrible ➤ 1 2 3 4 5 ◄ Fast, good

Are you generally satisfied with the software available for the Interact? ☐ YES ☐ NO

Please rank your interest in the following types of software and products.

	Not Interested				Very Interested
Action Games	1	2	3	4	5
Strategy/Adventure Games	1	2	3	4	5
Simulation Programs	1	2	3	4	5
Educational Programs	1	2	3	4	5
Personal Applications (home budget, record keeping)	1	2	3	4	5
Business Applications	1	2	3	4	5
Scientific Applications	1	2	3	4	5
Hardware Upgrades	1	2	3	4	5
Programming Languages/Aids	1	2	3	4	5
Programming Manuals	1	2	3	4	5
Peripheral Devices	1	2	3	4	5

For any of the above which you ranked 4 or higher, please identify specifically the types of programs or products you would find useful. (E.g., if you want educational software, what area, grade level, type of program would you like to see?)

_____

_____

How do you use your Interact?

- ☐ Playing Games
- ☐ Children's Education
- ☐ External device control
- ☐ Business Record Keeping
- ☐ Scientific Analysis
- ☐ Learning to Program
- ☐ Programming _____
- ☐ Personal Record Keeping
- ☐ Access to Other Computer Systems
- ☐ Other (please specify) _____

Do you program your computer? ☐ YES ☐ NO

If YES, do you use:

- ☐ BASIC
- ☐ Assembly Language
- ☐ Machine language
- ☐ Other (please specify) _____

What sort of programs do you create? _____

How many hours per week is your computer in use? _____

Are there any particular areas of programming that interest you and that you would like to have more information about? _____

_____

continued on page 20

MICRO M VIDEO®
305 North First St.
P.O. Box 7357
Ann Arbor, MI 48107
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FIRST CLASS

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Survey *continued from page 19*

Please tell us how you feel about the overall focus of RAM Pages and the amounts of space dedicated to the following areas.

	Too Little		Just Right		Too Much
Hardware	1	2	3	4	5
BASIC Programming	1	2	3	4	5
Machine/Assembly Language	1	2	3	4	5
Product Information	1	2	3	4	5
Contests	1	2	3	4	5
User Information Exchange	1	2	3	4	5
Interact Applications	1	2	3	4	5
Program Listings	1	2	3	4	5
User Feedback	1	2	3	4	5
Editorial	1	2	3	4	5

Please rank your interest in seeing the following types of articles or regularly featured columns continued in RAM Pages.

	Not Interested				Very Interested
BASIC Programming	1	2	3	4	5
Machine/Assembly Language	1	2	3	4	5
Hardware Modification/Repair	1	2	3	4	5
Interact Applications	1	2	3	4	5
Contests	1	2	3	4	5
Product Reviews/Updates	1	2	3	4	5
Feedback from Other Users	1	2	3	4	5
Information Exchange	1	2	3	4	5
Discount Coupons	1	2	3	4	5

Are there other areas not included in the above list that you would like to see covered?

_____

_____

In general, how would you describe RAM Pages articles in terms of how well or much you learn from them?

Too Elementary ➤ 1 2 3 4 5 ◄ Too Technical

In general, how well does RAM Pages meet your needs in terms of its content?

Not Relevant ➤ 1 2 3 4 5 ◄ Very Relevant

Do the pictures and graphics in RAM Pages add to your enjoyment or understanding of the newsletter or its articles? ☐ YES ☐ NO

Do you wish we would
- ☐ Print more photos and graphics
- ☐ Print the same amount
- ☐ Print less graphics and more words

Please give us some specific feedback as to the articles you'd like to see in upcoming RAM Pages. If you're interested in more hardware information, for example, what aspects of the hardware would you find relevant?

_____

_____

_____

Comments
Please add any other comments you feel would be useful to us in considering your particular needs.

_____

_____

_____

_____

(Optional)

Name _____

Address _____

City, State, Zip _____

Phone _____

BALLOT BOX
Far Out Graphics Contest

Here's my vote for the winner of the Far Out Graphics Contest.

The program I liked best is _____
program name

by _____
programmer name