TEXAS INSTRUMENTS

Randy's Ravings

by Randy Holcomb

This month we will take the FIRST look at the chip that just may give the TI 99/4A user a big shot in the arm and keep a user's investment in his machine around longer — the V9938-MSX-2 from Yamaha.

The 9938 is in a shrunk 64-pin DIP package (.07" pin spacing) making installation in the console more than a simple chip replacement. The 9938 is capable of addressing a total of 192K bytes of memory mapped as 128K of video memory and 64K earmarked as "expansion" memory. In terms of the graphic modes that the 9938 supports it supports all the present 9918 modes (text, multicolor, graphics I and II) and implements many new graphic modes that were available on machines that cost over $3000.

The 9938 can use either standard 16Kx1 or 16Kx4 DRAMS and is capable of NTSC, PAL, and RGB video as well as straight composite.

In addition to displaying graphics, the 9938 incorporates a rather powerful command set which allows the 9938 to move memory blocks in and out of the VDP memory space and within VDP, line drawing, memory searching, and pixel plotting. Finally, the 9938 can support a light pen and a mouse.

Command Registers. The 9938 has the same 4 memory locations for interfacing that the 9918 has: data read, data write, control register write and status register read. Unlike the 9918 however, with its 7 control registers, the 9938 has over 40 control registers, 16 pallette registers and 10 status registers. The registers can be accessed directly or indirectly via register 17; in addition, the auto-address incrementing feature can be enabled or disabled.

Add Graphics modes. The 9938's additional graphics modes are called TEXT 2, GRAPHIC 3, GRAPHIC 4, GRAPHIC 5, GRAPHIC 6, and GRAPHIC 7. The 9918's text mode is now called TEXT 1, Multicolor mode stays the same, and graphic 1 and graphic 2 modes remain unchanged. (For a description of the 9918 modes see the "Inner-Secrets of the TI 99/4A" reprint book from COMPUTER SHOPPER.)

TEXT 2 is the long-awaited 80-column mode and in many ways it is very similar to the standard text mode. TEXT 2 keeps the same pattern size and number of pattern table entries but increases the screen pattern count to 80 x 24 patterns or 80 x 26.5 patterns (the .5 in the 26.5 is the first 4 rows of the pattern requested). In addition, if the blinking mode is enabled, a possible 4 color is available (standard foreground/background, and blinking background; and the blink rate is variable, and is stored in the color table, which is the original text mode was not used).

GRAPHIC 3 mode is the same as the 9918's GRAPHIC 2 mode, with the notable exception that there can be up to 8 sprites on a line (sprite mode 2), versus the previous 4 sprites on the line (now called sprite mode 1.)

GRAPHIC 4 mode implements sprite mode 2 (8 sprites a line) but instead of using a color table uses the pattern name table and encodes 2 pixels per byte and treats the high and low order nybbles as the color value, yielding 16 colors per dot, yielding a 256x192 bit screen or 265x212 bit screen depending on the setting of register 9. Note that this mode differs tremendously from Graphics 2 and 3 modes in that the color table is eliminated and color information is available on each independent bit versus the on-bit and off-bit color value in graphics 2 and 3 modes. This mode requires a minimum of 32K bytes of contiguous VDP memory to operate. In a 128K byte memory system up to 4 independent segments can be allocated.

GRAPHIC 5 mode is laid out in the same mode as GRAPHIC 4 but doubles the horizontal resolution in trading-off the number of colors available down to 4, causing a byte to represent 4 consecutive pixel locations. Sprite mode 2 is available in this mode but invokes hardware tiling by breaking the color bits normally used by sprites into a separate color for the even bit positions and the odd bit positions. This tiling is also used for the background color. With a total resolution 512x192 or 512x224 in 4 colors per pixel, GRAPHIC 5 also requires 32K bytes for its display mode, so another 4 pages are available for use.

GRAPHIC 6 mode is laid out like GRAPHIC 4 mode in its pattern storage (4 bits per pixel) and gives you 512x192 or 512x224 with up to 16 colors, and requires a full 64K bytes of memory, giving you 2 separate pages of display memory usable in this mode.

GRAPHIC 7 brings the resolution back to 256x192 or 256x212 pixels, but in this mode yields a full 256 possible colors per pixel, making each byte represent a pixel. 64K bytes is required for this mode, making 2 screens available for this mode.

As can be seen, the 9938 offers some real powerful and very colorful display modes and is very usable in the 99/4A environment.

9938 Commands. The 9938 has 12 built-in commands that it can perform without the need of the host processor to perform the function: you just program the 9938 to execute the function and just sit back and wait for the 9938 to complete it! The functions are broken up into 4 high-speed memory move commands, 4 logical memory move commands, and 4 miscellaneous commands used for searching and line drawing. When programming the 9938 in these modes, all references made to

T.I. Net Info

by Dick Evans

Warning! Modems can be hazardous to your phone bill. Especially when you read that there are some pretty good programs on the local bulletin board a thousand or so miles away. Anyway, when I read about one in Austin, Texas that featured a bunch of programs for the TI Pro, I just had to go see what JimNet was all about. Jim Westbrook owns and operates this system. He works nights at TI but their user group headquarters, about 100 yards away, didn't know he existed. So I set my program to dial (512) 837-0953 using 1200 baud, 8-1-none and waited.

Beginners luck was with me. I was able to connect on the first attempt. Something I can't remember doing since. One of the first things I found there was a communications program called TERM. I downloaded a copy of the program and the document file. A little further down the list I came across a program called ARC and its document file. Since I still had enough of my 60 minute limit left, I downloaded those too.

After printing the document files, I started reading. TERM had many of the features of my existing $200.00 program and a few that mine didn't. So I tried it. The set-up was easy with the clearly written document and it performed as well going through a local network connection to a big multi-user service as it did when I went long distance to JimNet.

TERM is a piece of copyrighted, user supported software that is a work-in-progress. More about that later. I sent the author the $15.00 donation he requests. By return mail he told me that he had updated the program and that the version I had should be replaced. Back to JimNet. The size of the documentation doubled and the program features did too.

Not forgetting that I still had another program and file to read I pulled my TI's plug long enough to scan the information. Another copyrighted, user supported program. ARC, by the way is an archive utility program in MS-DOS that runs with equal ease on the TI, IBM and others. Somehow the plug got back into the socket and the door of the floppy drive inhaled the program disk. For starters I tried it on a disk full of old correspondence files. Before the LETTERS.ARC archive file, I might have gotten another page or two on the disk. After ARC finished analyzing, crunching and storing, I had well over half a disk of empty data space to play with. Needless to say, I mailed them a contribution post haste.

And on I went. Because I found both programs so useful I submitted them to the TI Information Network on DELPHI. Which brought me a few responses. One of them was from a friend of TERM author Greg Gilley. He provided me with another phone number (214) 557-1218. Texas again, but, this time the Dallas area. T.S. Pittman's service actually runs out of his home in Mesquite — but who's going to get technical.

Here I found a couple more noteworthy items. Both are by the same author, Greg Haley, and both are excellent. The first one is copyrighted and cannot be sold. Its name is REMOTE. This is a communications program for the TI PC family and supports internal or external modems along with ANSI graphics. There are no emulators in this one but two-way CRC error checking for Xmodem is there.

I haven't put TERM on the shelf with the first, now dust covered, communications program because I am trying to learn how to use the VT 100 emulator when I connect to DELPHI. But, I must recommend it if your needs are simpler and you are very price conscious.

The other program I found was the service itself. Pitt's TI computer is running Greg Haley's TI-HOST program. To the best of my knowledge this may be the first program written specifically for the TI PC. In fact, in the on-line document about the program Greg warns you that TI-HOST will not run on an IBM PC.

This too must be classified as a work-in-progress. It is fully operational now and has all of the necessities as well as many of the "nices," like graphics, auto-reboot and the like. It is written in Pascal and Assembly so it is fast and clean. Greg's license allows you to use TI-HOST in a business application — such as running your own bulletin board system. I am looking forward to finding a few more TI bulletin boards

USA States And Capitals Game Description

The Game

USA States And Capitals gives you enjoyment plus a real educational value for your home computer. Playing the game is a fun way to learn all 50 states and their capitals. The game can be played by 1 or 2 players (or teams). The object of the game is to identify a state and its capital as indicated on the USA/Graphic map. Identification is accomplished by typing in the state or capital name as prompted by on-screen instructions. Points are given for each correct letter in the name and bonus points are awarded for an entirely correct entry. Perky musical tones accompany the evaluation of a state or capital name and flashing colors and more rewarding tones accompany bonus points. Score(s) and game status are kept on the screen. If an entry is incorrect, the first misspelled letter is highlighted, a buzzer sounds, and the correct answer is displayed along with slightly

TI-Care Plan Offers Reduced Costs, Guaranteed Uptime

As part of a continuing effort to lower the cost of computer ownership, the Data Systems Group of Texas Instruments Incorporated recently announced a new field service and maintenance program. The new program, TI-Care Plus, is available for the TI Business-Pro and Business System Series 100, 300 and 600. Highlights of TI-Care Plus include a guaranteed four-hour response to service calls within 50 miles of specified service locations, guaranteed system uptime and reduced rates compared to the previous service plan. TI-Care Plus is available in 25 major metropolitan areas in the United States and may be quoted in other locations on special request. The standard service contract is still available for the full line of TI products.

"TI recognizes the importance of containing computer maintenance costs, and TI-Care Plus represents our commitment to provide superior service while actually lowering costs," the service merchandising manager said.. "By offering TI-Care Plus to complement our other maintenance programs, TI can provide an extra level of service for all customers who require it."

With the guaranteed system uptime of TI-Care Plus, TI specifies that the system core--central processing unit (CPU), memory controllers and arrays, primary chassis housing the CPU, and primary disk drive and disk controller--will function 96 percent of the time during a three month period, represented by 2190 hours. The customer must maintain logs and report any downtime to TI. When TI has verified that the failures qualify under the guaranteed system uptime criteria, TI will credit the customer's account for 20 percent of the customer's standard monthly maintenance rate.

TI-Care Plus also guarantees four-hour response to service calls within 50 miles of the specified service locations, Monday through Friday during normal business hours. The plan also provides continuous remedial service, meaning that once TI personnel has arrived at a site, the service representatives will remain beyond normal business hours, if necessary, to complete the job. This helps ensure that systems are restored with a minimum of downtime.

TI-Care Plus offers customers substantial savings. The cost of TI-Care Plus also offers an option of 99 percent guaranteed uptime with four-hour response available 24 hours a day, seven days a week. This level of service is available for a 72 percent additional charge, compared to the previous 130 percent without guaranteed uptime.

TI-Care Plus was made available recently in the following metropolitan areas: Atlanta; Austin, Texas; Boston; Chicago; Cleveland; Dallas; Denver; Detroit; Fort Lauderdale, FL; Fort Worth, Texas; Houston; Indianapolis; Irvine, CA; Iselin, NJ; Kansas City, MO; Los Angeles; Minneapolis; New York City; Philadelphia; Pittsburgh; San Francisco; Santa Clara, CA; St. Louis; Seattle; and Washington, D.C.

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the control registers do not refer to real addresses, rather you actually state the x and y offsets when you load the values, the 9938 will automagically handle the proper addresses during command processing, freeing that function from the programmer.

High-Speed move operations consist of moves from the CPU to Video Ram (HMCC), Video Ram to Video RAM in the Y-axis only (YMMM), Video RAM to Video RAM (HMMM) and VDP to VRAM (rectangular painting) (HMNV). The logical operations allow bitwise operations (AND, OR, XOR) to be performed on data being moved from Video RAM to Video RAM, from the CPU to Video RAM and vice versa, and for rectangular painting.

The remaining 9938 commands (LINE, PSET, SRCH, POINT) provide some very powerful capabilities. LINE will draw a line between any two points in the Video RAM or in expansion RAM. POINT will plot a single point based on supplied x and y coordinates, while PSET will allow logical operations to be performed when plotting the point. SEARCH will search for a border color from a predefined point either from the right or left of the starting location. Any of the special commands can be programmactically aborted by using a special command called stop, which stops the function in process.

The light pen option allows the 9938 to detect the presence or absence of the light pen and can optionally return to the programmer the x and y locations where the pen was detected.

Finally, the horizontal and vertical positions can be programmed to start at any desired location which can be used for some very quick screen rotations in both the horizontal and vertical planes.

Summary. This is a very exciting chip and we have barely scratched the surface as to all of its potential. (As a side note, the documentation I have on the 9938 still as several sections missing especially when dealing with the color bus and the mouse interfaces.) The rumor mill says Myarc has acquired some chips and is playing around with them; of course we all know by now that we'll be lucky if we see their new computer anytime in the near future. Steve Borowiak of Top Radio has a few 9938's and is in the process of prototyping a new video board based on the 9938, so stay tuned to the COMPUTER SHOPPER for the latest news on this front.

To those of you who have sent letters asking for technical information: Unless the question is very specific, attempting to provide technical information on the 99/4A would cost some $35 in reproduction costs and some $25 in postage to mail it all out! I have received a number of letters asking for "technical information" and that was as far as it got. Hopefully in the next few months the reprints of my previous articles will be made available thru the COMPUTER SHOPPER and most of the letters will be answered. As I stated in a previous column if you need an answer QUICK send me MAIL on Delphi to username RANDYH.

Did your P-code card die? Chances are good that the 74C245 on the p-code card blew out-why TI used a CMOS chip when regular LS would have been better (and probably cheaper) is certainly questionable. Before you take your TI card to the exchange center to get it fixed try replacing the 245- a $2 chip is better than shelling out $20 or more on a replacement card!

Next Month: The TI year in review, a COMPLETE register breakdown on the 9938 and more from the TI world. ●

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around the country before much longer.

Before I forget to mention it at all, all three of the other programs mentioned can be downloaded from all three of the systems mentioned. TI-HOST is only available, prepaid, from the author. The program documentation can be downloaded from the Mesquite board only. That is also the test system for future enhancements and changes to the TI-HOST program. I should also mention that while JimNet in Austin is a free service, Mesquite requires a $10.00 per year fee and DELPHI is DELPHI. The TIIN is in the Groups & Clubs area and is not a surcharge service.

So long as I am just rambling around telling you about some of the better things that I have found for the TI PC, I should also mention one that TI published. It is a pretty, 1¼ inch thick, three ring binder with the title CADalog. In it are abstracts of many of the technical programs and hardware options used by architects and engineers. Most of the listings are not TI products. There is some duplication in the spreadsheet and graphics categories. The TI Software Journal has more of these listings. However, the third party hardware option listings are almost unique.

Ernie Halperin, the editor, freely admits that the technical areas are growing and changing daily and that his directory will remain current for only a limited time. Maybe that's why they put it in a ring binder. Good thinking!

For those of you who have gotten this far but don't own a TI, here's a gem I was given by the manager of the TANDY SIG on DELPHI. A nice, neat, public domain, MS-DOS program called STRINGS. It reads other program's code and displays the ASCII strings that it finds. So what? Well there are a few very smart but very sick individuals still on the loose. From time to time you will find their handiwork on a very busy bulletin board. I say busy because I have to assume that no responsible operator would knowingly put one of these programs up.

A warning was issued not long ago, again from Texas, that some of these were again making the rounds. I can't give you program names because they tend to change. I can tell you a little about what they do. One of them displays messages indicating that it is reorganizing your hard disk files to optimize space. What it is actually doing is reformatting your hard disk. Another one doesn't go to all that trouble, it just wipes out the FATs (file allocation tables). No data is lost but the addresses are.

All of these "Trojan Horse" programs insist on some type of "Arf, Arf, Gotcha!" message. And, herein lies the beauty of STRINGS. It reads and displays these messages BEFORE you see them while the program is running. I don't suspect every piece of donated software that shows up on my doorstep. I do however check everything that arrives from "sources unknown" or other donors who are not known to me.

I guess that's about all for now. I'll try and get back to you again soon with more notes on programs and people that I find while trying to be the sole support of a phone company and a discount long distance service. ●