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Dedicated to 99/4A and 9900 Computer Systems VER 16  
1986  
OCTOBER

## R/O COMPUTING NEWSLETTER

There are enough new products out - and now coming out - for the TI 99/4A to convince anyone that the computer is far from dead.

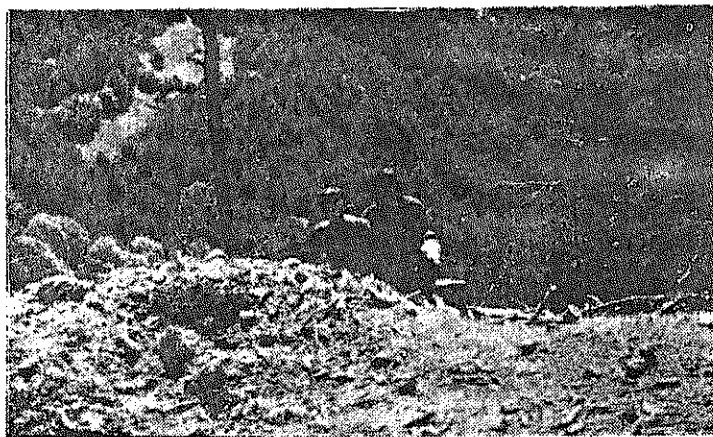
Yet, at the same time, it is quite difficult to get any space in any of the popular computer magazines about these products, the loyalty of TI owners and the upcoming 'Geneve'.

Speaking of which, according to Lou Phillips of Myarc, the Geneve is at completion stage with the circuit boards. The final design has been approved, memory mapper chips from Mitsubishi are being shipped, and the operating system is basically completed.

This last bit of information comes from the people who are working on the operating system. One thing that TI owners fail to realize is that the hardware is only part of the equation. You must also have a BIOS "basic input / output system" which tells the hardware 'how to act': routines to perform on power up, reading information from other memory locations - disk drives, setting up various vectors, screen image tables etc. In the old 99/4A most of this was done from an 8k ROM involving perhaps 15,000 lines of code. A big job in other words. Texas Instruments had the vast resources to hire an entire programming team to develop and maintain this code. Myarc is counting on the talent within the TI community - without the megabucks of a major corporation backing them up. Clear?

Lou stated that they would be able to ship units within the next "couple" of weeks. Good show!!!!

It does bring up a couple of points regarding the support that the new computer will receive. According to several software developers, many



I hope you all enjoyed my last article, and the program for the 99/4 light show. But I wonder how many of you successfully took up my challenge to figure out how to read the state of the ALPHA LOCK key without pressing any other key? I also wonder how many of you took up the challenge at all - let alone successfully? This, my fellow assembly language programmers, is the crux of my dilemma.

My dilemma is: who am I writing for, who is my audience? I'm not sure... This has perplexed me ever since I began writing articles on assembly language more than two years ago. Knowing who your audience is is the single most important thing one needs to know before putting fingers to keytops, and yet I don't have any idea as to the demographics of my readers. So I'm forced to work on assumptions.

One assumption is that the readers of this newsletter are significantly more sophisticated than those I wrote for in the "Enthusiast '99" magazine. That's a safe bet. However, I never knew the make up of that audience either, so it's of little help. This newsletter is to "Enthusiast '99" what chess is to checkers, but the ability of chess players runs the gamut from patzer to

GOTO F...

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software packages that take advantage of the system are under development. This is the primary factor that will make or break Geneve as a commercial success.

We are also very aware of the support that Myarc MUST PROVIDE for the computer. Open information about the technical aspects of the system are essential to achieve third party software and hardware support. We have an order placed to receive units as soon as available.

Mr. Phillips did state that "an IOU" for USDC Pascal will be issued with the first units shipped (said to be about 2300 in the production run). With the advent of Turbo Pascal from Borland International, the language is regaining some of the popularity it once enjoyed.

We also hear that Clint Pulley is porting C99 to the Geneve. Clint is slated to be at the Chicago TI Faire on November 1st. Other packages are slated to be released with Geneve: TI Writer, Multiplan, Extended Basic V3, a module dumping program etc.

As with the other innovative computers on the market, the productivity and application software is a critical factor. Industry trade journals have noted that the Macintosh, Amiga and Atari ST were first purchased by people who wanted the advanced technology. The lucrative business market, of course, waits for the application and productivity programs. In relation to this, the past year has also shown that the grip IBM has on the 8088 PC market has eroded significantly. It should be noted that during the past several months, the market share enjoyed by IBM has deteriorated. The onslaught of clones has reduced IBM's dominance in direct proportion to the number of clones sold. According to InfoCorp, the IBM compatibles have attained a 60% share of units sold while IBM has slipped to 40% - a direct reversal from year earlier.

In fact, IBM has posted a 27% drop in profits - while Compaq posted a 70% increase in profits... plus assuming the risk of introducing an 80386 based computer; effectively leapfrogging IBM

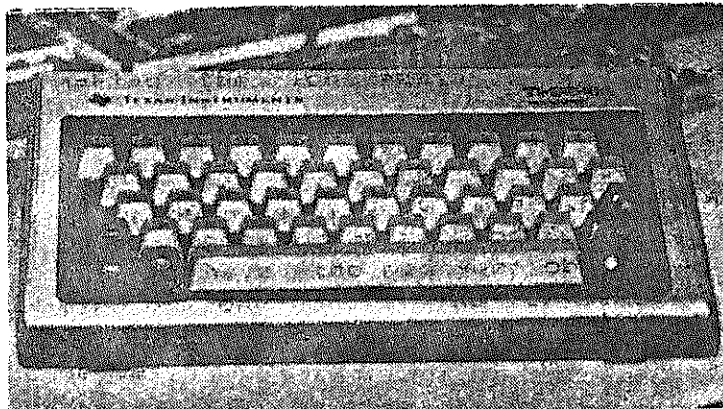
in the PC market. Care to play hardball anyone?

Other information relating to Myarc's computer, possible IBM compatibility and "future plans" underline the folly of competing in the clone wars. As Chris Bobbit of Asgard notes, TI owners want the power of IBM programs rather than the ability to run MS-DOS per se. One has only to look at the type of programs available for the Macintosh, Atari ST and Amiga to understand that the status quo is not necessarily the leading edge.

### RUMOURS

Information that has been circulating about a hybrid 8088 / 9900 machine from Mechatronic are founded in fact. A prototype has been developed which will run both IBM and TI software. Franz Wagenbach reported on this development upon his return from Germany in mid-September. Keep in mind that no official word from Mechatronic has been received. The development is not ready for public discussion. Also note the word "prototype"... as we have all seen, it takes a long time to go from prototype to fully functional machine - particularly one that will run software for the TI and MS-DOS. A large number of the clones and "work alikes" don't run all IBM software.

Just for reference, anyone who watched the development of the AMIGA knows how long it took to go from fully functional prototypes to commercial production. That process was helped considerably by the vast resources (not to mention \$25 MILLION in capital funding) of Commodore International.



It all began on August 17, 1985 with a unique new graphics package that startled the 99/4A world with it's fresh approach, and was hailed by MICRO-pondium as the best value... ever. Thus was born GRAPHX Companion.

On June 1, 1986 we again introduced a package that all the "experts" said would never make it. GRAPHX Pictures is still turning heads and showing everyone that graphics can be useful as well as beautiful.

Now introducing something so fresh and new, that you would call it simply Asgard Software's logical next step...

## GRAPHX Companion III

This package is much more than just more of the same old thing. Don't even consider the fact that it contains the largest collection of clipart to date, or that it contains a vast library of all new fonts (most of which include complete upper and lower case with numbers and symbols). All you have to remember is that it is from Asgard Software, which means (as always) that it's software with a difference.

With this package you can now make pictures that border on the magnificent with our set of imaginative borders, or you and your computer can make beautiful music together with our music symbol library, and you can even play with moving pictures with our new animation sequence. The possibilities are endless as GRAPHX Companion III will help you explore the limits of TI-99/4A graphics, and GRAPHX.

If you have GRAPHX, you will not want to be without this latest addition to our growing collection of graphics oriented software. At only \$9.00 a copy, how can you not afford to be without it?

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grandmaster, and so, I am sure, the assembly language ability of RYTE Data readers. So what am I to write about?

In the "Enthusiast '99", I adopted the three pronged strategy of: (1) (try to) Be funny, (2) Write about advanced assembly language ideas, (3) Give an actual program or subroutine that a novice could put to immediate use. Conversely, this strategy had a three sided pitfall: (1) Many people are offended by my strange sense of humor, (2) Very few people understand the fundamentals of assembly language programming and even fewer understand anything more advanced, (3) Assembly language coding is voluminous and subject to typographic errors. Despite these pitfalls, I'm going to follow the same strategy in this newsletter.

Speaking of my strange sense of humor, I have received one (and only one) scathing letter deriding the content of my first article, and it was a doozie (sp?):

Dear Bill:

...I got some copies of the newsletter you are writing for, which included the one with your article. To be very honest with you, I didn't think the article was up to your usual standards. I also think your choice of adjectives was not in good taste for a paper with its subject matter. Leave such words as lust and orgasm to articles with subject matter where such words are commonly used. You should keep in mind that your articles are read by young and old, male and female, who are interested in computers. I also wondered how your Spanish companion felt about your description of your language lessons?...

Your Dad, Tony

Well, I don't think she'd want her mother to see it, but there's little fear of that, for her mother doesn't subscribe to the newsletter, own a 99/4 - or even speak English for that matter. As to your point about "Young and old...male and female": have you listened to any rock music lyrics lately?

Good thing dad no habla español, or I'm sure he'd have had even more to say about two of the Spanish phrases: "Que buena estas" and "Quieres joder?". The first literally means how good you are, but it has the connotative meaning "What a hot number you are!" The second phrase is an indecent proposition, the natural continuation to the first phrase.

The editor of this newsletter shouldn't be held responsible for the content of my articles, for one condition of my writing agreement is that I can write whatever I want. I queried Bruce Ryan, and he reports there was no adverse reaction to the article. I apologize to anyone who may have been offended by my language; it is all in jest. In Mike Wallace's (of "60 Minutes" fame) autobiography, "Close Encounters", he admits to having "A penchant for obscenity", so I'm in good company.

While I'm on the subject of reader mail, let me put my dos pesetas in on another topic that keeps popping up in my mail box: Charlie LaFara, former CEO of the International 99/4 User's Group. LaFara is catching a lot of spears about the events surrounding the collapse of the IUG, a hell of a lot more than he deserves. Charlie was my friend, and the only reason I put so many hours into enlightening 99/4 owners, hours that I could have spent in hot pursuit of la dolce vita, was because Charlie was a generous, witty, charismatic, dynamic individual who was fun to work with. When he left the 99/4 scene, it just wasn't any fun anymore, and I lost all interest in interfacing with other 99/4 owners.

I have largely kept my opinions on the IUG matter confined to those people who address me about it. But after reading the "Orphan Chronicle" book review in the March/April newsletter which contained the comment: "Albright fairly roasts the International Users Group", I decided it was time to give the 99/4 public a partial insider's view concerning the decline and fall of the IUG. Below are the partial texts of a copy of a letter to another 99/4 support agency that was sent to me by a

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highly knowledgeable 99/4 user, my reply to that letter, and the reply to my reply:

Dear ---

...It certainly feels good to be a member of a group again. Actually, I was reluctant to join a group for a while, due to a dreadful experience I had a couple of years ago.

It all started when I came across a copy of the Enthusiast '89 magazine. Looking through it, I discovered a highly entertaining and informative article by Bill Gronos. Since a subscription to the magazine was a membership benefit of the 99/4A International User's Group, I decided to join them. Unfortunately, publication of the magazine ceased. Upon investigation, I discovered that a butcher in Oklahoma [referring to LaFara, who owned a meat market prior to forming the IUG - BG] had taken my membership dues and was using them to harass and bring suits against groups providing goods and services to TI-99/4A owners. Since I found this situation altogether unsatisfactory, I wrote him a letter which outlined his legal position, and assured him that I was only one of a number of unhappy members. He responded by declaring bankruptcy...Thank you, T.

Dear T,

...I live in Spain now. I had to flee the US because I embezzled your IUG dues and about 30,000 other peoples, so there isn't some butcher in Oklahoma using your dues to harass and bring suits against groups providing goods and services to 99/4A owners, but there is a strange computer hacker using them to buy senoritas drinks so that he can loosen them up before he says, "Quienes joder?". Just kidding.

Don't get the idea that LaFara got away with anything. To my utter sadness I watched as my good friend went broke; it wasn't a pretty sight. He tried to bail out the sinking galleon with his \$70,000 of personal savings. He did this to pay the people who had worked so faithfully for him for more than

four years. He should have cut his losses and run. Charlie was one of the best natured people I ever met, and I was amazed that he could take the collapse of his personal life so calmly. I went to his house one last time before coming to Spain. He was unable to make the payments for several months, and could expect eviction papers to come any day. He said to drop him a note when I arrived, and it's a testament to his character that he could laugh when I said, "I guess I'll mail it to this address - I'm sure they forward mail to the poor house".

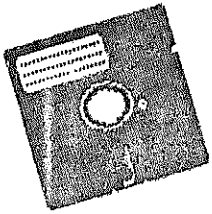
If that heart-wrenching anecdote isn't enough to cushion your \$10 loss, I've got another one. When I left he was being sued for \$1,050,000 by [a person (expletives deleted)] who claims he stole his program. And while bankruptcy may have kept him out of your clutches, it isn't effective against damages resulting from fraud. Charlie told me he couldn't afford to defend the suit, so in order to avoid a default judgement, he would have to ignore Abraham Lincoln's advice about "Jackasses for lawyers and fools for clients" and represent himself.

I never got a reply to the letter I sent him, so I don't know what has become of his life. Please tell me how you came to know so much about him, and if you have any current info, I'd love to hear it. I miss that big, lovable guy.

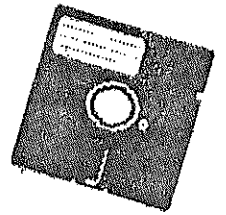
...May I have your permission to publish both of your letters, perhaps in full? I wouldn't give you any money for your consideration even if I were paid for the article: after all, T., there's a lot of senoritas in sunny Spain...Bill Gronos

Dear Bill,

...Concerning Charlie, all I know is what I've read. Unfortunately, I joined the IUG during the collapse. Since my joining had been prompted by reading the November 1983 Assembly Line, I acquired a basketball-sized chip on my shoulder. I would not be surprised if the suit you referred to



# RAPID COPY



If you're tired of waiting for your disk manager to copy or format your disks, Rapid Copy is here to help you. Rapid Copy is the only turbo copier specifically designed to take full advantage of the Myarc, CorComp, and Texas Instruments disk controller cards.

How fast is Rapid Copy? Copying a double-sided, double-density disk takes only 1 minute and 17 seconds, which includes formatting the target disk! On average Rapid Copy is six times faster than the disk copy functions of the Myarc, CorComp, and DM1000 disk managers.

Rapid Copy is simple to use, fully menu driven, and allows a multitude of copy and format options. Not only is Rapid Copy endorsed by Myarc Inc. for use with its disk controller card, a new modified version of the Myarc disk manager (included) allows you to load it from within its utility option for your convenience!

Rapid Copy is available for only \$14.95. Requires 32K memory expansion, disk drive system consisting of at least one floppy disk drive, and either the Extended Basic, Editor/Assembler, or TI-Writer command module.

## Texaments

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was unofficially related to the success of the suit which Charlie filed against the 99/4A program exchange in Torrance, California. After all communication from the IUG ceased, a rumor that Charlie was suing the Atlanta UG passed through local user groups like pork fat through a flock of geese. It was not unusual for user group libraries to contain a number of IUG programs. As members began wondering just who would constitute defendants in such a suit, Charlie reached a popularity level somewhat lower than a pod of fecal matter in a punch bowl. I could see no possible benefit for the IUG suing a non-profit organization, especially since Charlie himself was eminently qualified as a defendant in thousands of small claims. He was not grasping at straws, but at briars. I wrote him a brief letter which inquired about the rumor and asked several leading questions. His response was a brief apology, which may have been a form

letter, as it made no reference to the rumor or other issues raised by my letter. I filed it in a box...I suppose he was preoccupied with trying to feed his family, or some other frivolous endeavor...Your avid reader, T.

Well, this should give you some small idea of the magnitude of the effects that TI's decision to stop marketing the 99/4 had on the personal lives of so many people. I hope Bruce will lend me his copy of "Orphan Chronicles", as I'm sure it will be interesting. There are many aspects of the 99/4 story which I would like to observe as if I had been the proverbial fly on the wall. I'm sure the Apple Computer story is boring in comparison to the 99/4 corporate comedy/tragedy.

Now let's get back to assembly language programming, and answer the question: How does one read the alpha lock key?

PRODUCT ANNOUNCEMENT: Millers Graphics

Millers Graphics is pleased to announce the release of two new products for the 99/4A. The first is a new Utility Disk for GramKracker owners. The GK Utility I disk contains many new enhancements for TI Extended Basic and the Editor Assembler modules.

The second new product is a new set of PROMs for the CorComp Double Density Disk Controller Card. These PROMs correct a few bugs in the existing DSR PROMs and add a number of new CALLS for Basic, Extended Basic and Gram Kracker MSAVED programs.

The new PROM SET enhances the usefulness of the CorComp D/S DDC. The following NEW features have been added and can be accessed from TI Basic, Extended Basic and GRAM KRACKER MSAVED Basic programs. This will allow you to build a menu of all your favourite software and load it with a single keypress. These new enhancements will allow you to load any type of assembly program without using the Editor Assembler module. The new CALLS added to the card are:

1. CALL ILR - loads the standard E/A utilities into Low Memory.
2. CALL LR("DSKx.filename") - loads a DIS/FIX 80, compressed or uncompressed, auto start Assembly Language program. Same as E/A option 3, including the loading of the E/A utilities.
3. CALL LLR("startname") - this starts a non-auto start program. This is the same as option 4 - Run on the E/A menu.
4. CALL RUN("DSKx.filename") - this loads assembly PROGRAM IMAGE files like option 5 - Run Program on the E/A menu. This CALL also automatically sets up the E/A environment in VDP memory. (ie: characters, colours, registers etc.)
5. CALL RUN - this CALL without brackets or a filename automatically loads DSK1,UTIL1.
6. DELETE "XILR" - sets up the E/A utilities into Low Memory from a running Extended Basic program. It also sets up the Link names for the above CALLS and the other Tool Shed utilities so they can be access from a running program!

Some of the other enhancements include:

1. Removed "9900 Disk Controller" Title Screen - which eliminates the

problems with some of the modules like the lock up problem with E/A, TRII and Plato.

2. Improved error handling on ALL utilities.
3. Decrease error time out - ie: "Disk Not Initialized" now comes up faster.
4. The Disk Mangager will now auto load if you hold down the space bar on power up or reset.
5. For the advanced user we have also added a DIRECT CPU RAM SECTOR I/O ROUTINE for faster loading!!
6. For Gram Kracker owners we ha modified the Tool Shed Utilities to allow them to be used from a running MSAVED program!

GK UTILITY I:

This utility disk adds the following new enhancements to TI Extended Basic and the Editor Assembler Modules for GRAM KRACKER owners.

Extended Basic Enhancements:

- LIST.....now allows you to specify the column length (20,132 etc.)
- RES.....resequence all or just part of a program.
- TRACE.....the output from TRACE can now be sent to a printer or any other output device.
- COPY.....copies a block of program lines to another location in your program.
- DEL.....deletes selected blocks of program lines.
- MOVE.....moves blocks of program lines and automatically adjusts all GOTOS, GOSUBS etc to point to the new location.
- CALL LOAD...no longer checks to see if CALL INIT has been executed.
- CALL PEEK0..for peeking values from GRAM or GROM addresses.
- CALL POKEG..for poking values into GRAM addresses.
- CALL PEEKV..for peeking values from VDP memory.
- CALL POKEV..for poking values into VDP memory.
- CALL QUITON enables use of the QUIT key.
- CALL QUITOFF disables use of the QUIT key.

New cursor control for program Line, Inputs and Accepts At editing. Fetn=

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Shift and the Up & Down arrow keys now allow you to move up and down screen rows within a program line listing on the screen. Fctn-Shift and the Left & Right Arrow keys move you to the beginning and end of the program line listing on the screen.

All Error Messages are now in upper and lower case.

Auto-load of the file DSKI.LOAD can now be bypassed with the press on any key.

All of the XBCALLS from the MILK disk are still available (NEW, BYE, CLSALL, CLDCK, CLKOFF, CAT).

A new lower case character set with better ascenders and descenders is placed in GRAM 0.

### Editor/Assembler Enhancements:

For E/A input prompts, the Auto Repeat and Erase (Fctn 3) are now active. Clear (Fctn 4) will erase the input line from the cursor to the end of the line. Fctn-Shift Left and Right arrow will place the cursor at the beginning and end of the input line.

Automatic Filename Recall - the last filename input will always be retained (even after powering off).

Three new items have been added to the E/A menu:

- 6 - Extended Basic - directly executes XB without going through the Title Screen.
- 7 - Format RAMDISK - formats the MYARC RAMDISK by doing a CALL PART and CALL EMDK with a this option.
- 8 - Catalog Disk - catalogs a disk or RAM disk without leaving the E/A module.

The GK UTILITY I can be installed as Extended Basic Enhancements only or as XB - E/A (with the Editor and Assembler); your choice. Note: with the XB-E/A combo installed, CALL EA is active from XB to directly execute the E/A module without going through the Title Screen.

The package comes complete with 22 pages of documentation including Technical Information on the locations in GRAM modified by the new enhancements so you can still add your own routines.

Price: GK UTILITY I \$10.00 (US including shipping and handling)  
PROM SET \$34.95 (US including shipping and handling)

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\*\*\*\*\*  
\* HARDWARE IMPROVEMENTS & UPGRADES \*  
\* Other Secrets and Mysteries \*  
\*\*\*\*\*

To state that there are some things that TI never told you is a massive understatement! over the past year more innovative software and hardware has been introduced than when TI had total control over the machine. This is more a function of the remarkable design of the 99/4A than of redesign of the machines capabilities.

In many ways Texas Instruments "crippled" the potential of their machine. The reasoning will remain forever obscure - they certainly had the engineering capability.

The first subject we will tackle here is the barely adequate power supply of the TI Peripheral Expansion System. It was fine for up to eight expansion cards and one full height (full power) disk drive... but two drives will overload the power supply in most cases. With the expert assistance from Brian Kirby, it is possible to upgrade the power supply in your box to handle more equipment without any problems.

You will need the following parts:

- 2 7812HK 5A regulator chips
- 2 7805HK 5A regulator chips
- 1 7905T -5V 1A TO 220 regulator chip
- 5 .47 uF/35V tantalum capacitors
- 5 2.2 uF/35V tantalum capacitors
- 1 4700 uF/35V electrolytic capacitor
- 1 2,200 ohm 1/2 watt resistor
- 2 MR501 diodes
- 4-TO-3 transistor mounting sockets
- 1 set of TO-220 insulating mounting hardware
- 1 male and female 15 pin "d" connectors with hoods.
- an assortment of 22 gauge wire

8 Remove all cards and disk drive(s).



# PRODUCT ANNOUNCEMENT

## Module Emulator

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AT LAST! do away with all of those messy modules!

Some of Module Emulator's outstanding features:

- back-up your modules on a disk!
- run all of your modules through a single module!
- Saves wear and tear on your console
- no more module swapping or shopping!
- will support Myarc's 128 K or 512 K Memory Expansion Cards
- Costs less than just a couple of modules!

Module Emulator's requirements:

REQUIRED:

- TI 99/4A console
- 32 K Memory Expansion
- single disk drive
- 6000+ module
- Cartridge Port Expander  
("Widget" by Navarone Ind.)

OPTIONAL:

- Myarc's 128 or 512 K  
Memory Expansion Card
- multiple drives in any  
configuration

Software and 6000+ module

**\$69.95**

Software only

**\$25.95**

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Take the cabinet apart - usually about 15 screws. You may want to replace the fan with a quieter model at the same time. (Gil Tenant added a variable speed control to his!)

The PC board is mounted via a plastic holder that angles to the right on the bottom. There are two screws, one at each end of the holder. Loosen them but do not remove them. There are two connectors that lock onto the PC board at the rear. Push their tabs thru the board and pull the connectors off. There is also another connector on the front. Remove it the same way. Then slide out the PC board.

Locate the voltage regulator ICs (in the middle and center rear). Remove the regulator ICs.

Solder three different colour wires approx 6" long to the holes of the voltage regulator. Do this again for the other regulator.

Locate D3 and D4. Note the polarity of the diodes. Be sure that the cathodes go towards the transformer side. Solder the anode ends together. Solder a wire approx 8" long to the ends you just soldered on the diodes. Set the PC board aside.

Drill the TO-3 mounting holes on the rear of the expansion box; beside the blower going downward for three of the regulators and mounted the remaining below the blower above the fuse holder. You will have to take a razor blade and cut off part of the serial number tag. You need to do this so the chassis can be used for a heatsink. After drilling be sure to file the holes smooth.

Install the .47 uF capacitors to the inputs of the voltage regulator (pin 1) and install the 2.2 uF capacitor to the outputs (pin 2). Solder the negative side to the chassis ground lug on the mounting socket (this is only for the TO-3 devices.).

Mount the P-Box 5V and 12V regulators. Use a good grade of silicone heatinking compound when you install the regulators.

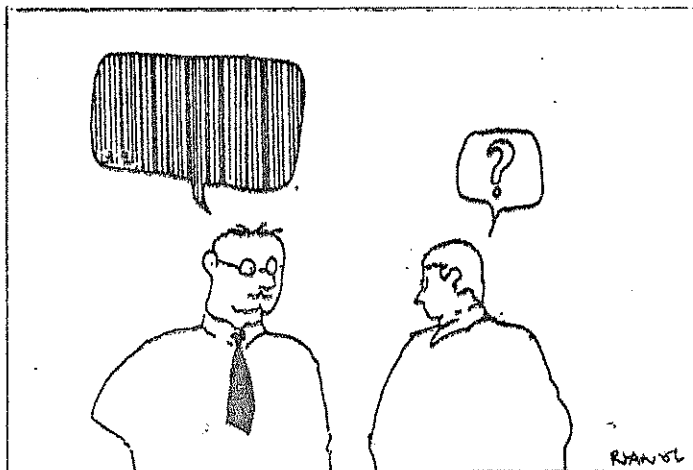
Solder the wires from the circuit board that went to the regulator that used to be on the board. Observe correct wiring.

Install the other two TO-3 regulators using heatsinking compound. On the 12V unit jump a wire from the 12V

regulators' input you just installed. Also jumper a ground wire. Install the capacitors, as before. Do the 5V regulator the same way. Solder a wire approx 15" long to the outputs of the second set of TO-3 regulators. Route these wires to go out the card cage, thru an unused P-Box slot or a new drilled hole in the shield and case. Install the TO-220 -5 volt regulator. Be sure to use insulating hardware. Solder a wire to the output terminal and solder 2 wires to the ground terminal, approx 15" long. Route the wires out, as above, with exception to one of the ground wires. Jumper it to a ground on one of the TO-3 regulators. Add the bypass capacitors as above but note the polarity. Solder another wire to the input of the regulator, approx 8" long. Route this wire to the front of the P-Box near the power switch.

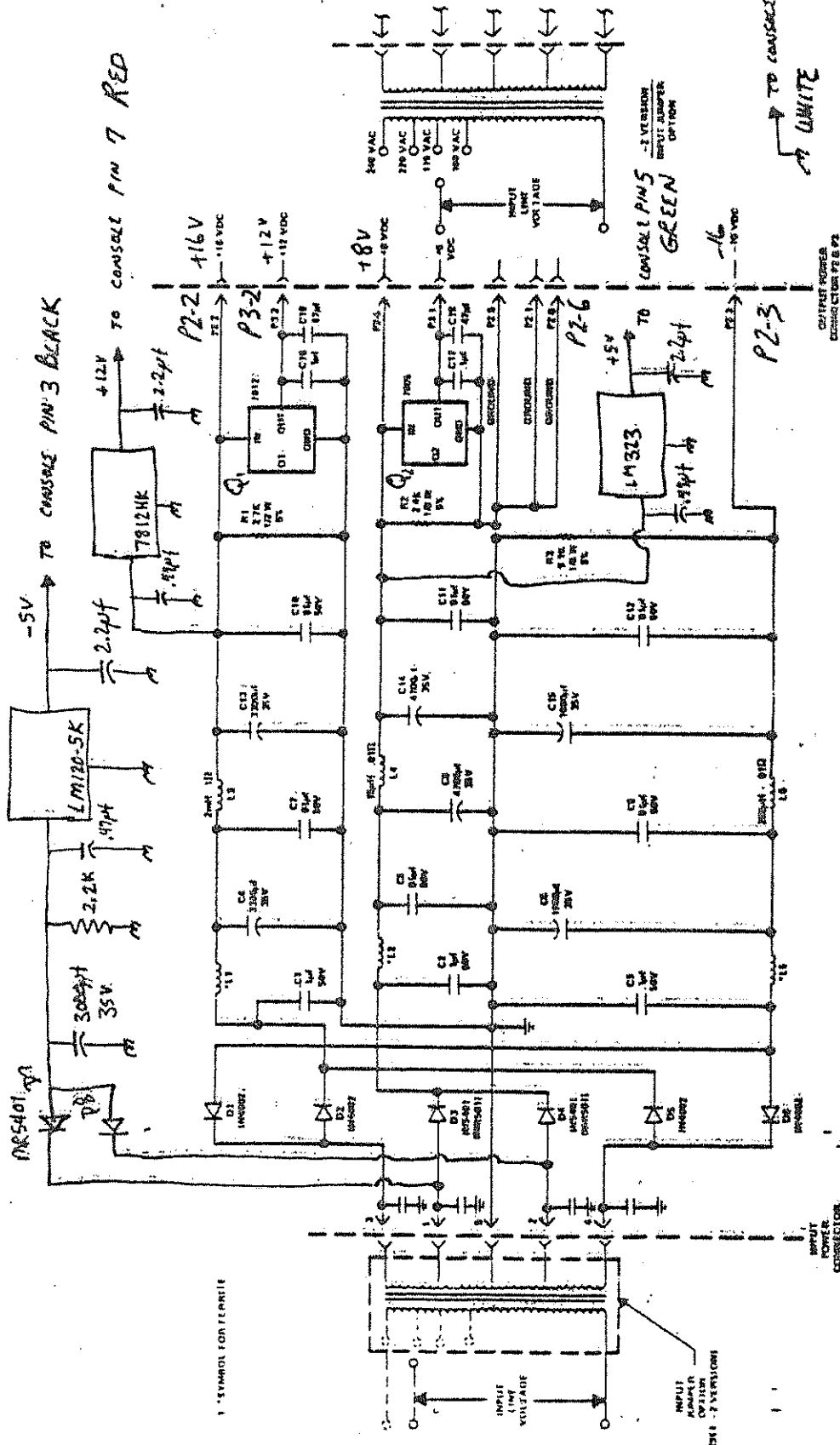
Install the PC board back in place. The wire from the rectifiers you installed needs to be soldered to the 4700 uF filter cap. The wire that came from the negative voltage regulator should be soldered to the same point. Install a ground wire from the filter cap to any ground point on the PC board. Again, observe polarity.

At this point, the box should be wired. Check for proper wiring. Turn on power to the P-Box. Very quickly check the outputs of all regulators for proper operation (one +12 V and +5V for the drive, one +12V, +5V and -5V for the computer console.) If all voltages are OK, then procede with the next step. If you do not have proper voltages check the input to the regulator and work it back. Check for shorts and proper wiring.



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On the wires that you routed out of the P-Box, you will need to identify them and solder on a 15 pin "d" connector - female. Use a 15 pin "d" as you will not have problems with hookup. Solder pin 7 to +12, +5 to pin 5, -5 to pin 3 and ground to pin 1. Put your P-Box back together. Bring your system up with the computer to make sure its OK. Test a disk drive.



ORIGINAL: 500S TRUP	REGULATED
-11.9V	-5.08V @ 132 mA
+11.9V	+5.66V @ 940 mA
+21.5V	+11.73V @ 240 mA
-23.5V	

CONSOLE LOAD

\*\*\* MODULE HARDWARE MODIFICATION \*\*\*

Everyone has heard about the Widget (tm Navarone Industries). This device allows you to plug in more than one command module at a time and switch them in and out via a switch rather than unplugging them.

Well, I have mounted Multiplan, TI Writer, Disk Manager and the Editor Assembler cartridges into one cartridge. Here is how you can do the same for a cost of \$1.49!!!

The first thing you must do is find cartridges that have foil on one side of the board. [the E/A module is one]. Then buy a Single Pole Single Throw (SPST) switch for every cartridge you want to install. Radio Shack has some good one part number 275-647 for \$1.49 or 275-401 two for \$.89 - or you could use DIP socket switches 275-1304 for \$1.49. Next, you have to open the cartridges by inserting a screwdriver in to the slots. Remove the screw or push the tab in the middle to open the case.

Find the cartridge with the best contact. With a 25 watt soldering iron clear the solder from all the spare IC (integrated circuit) holes on the board. It helps to use a solder sucker for this job. If there is more than one GROM chip, solder the extras on top of the leftmost IC chip.

Remember to solder pin #1 to #1 (etc) onto the chip pins below. You can only mount 3 ICs on top of each other or the board will not fit back into the plastic case.

Next remove the other ICs from the other cartridges you wish to install. Insert the GROM into the next set of holes and resolder. When you have mounted all the ICs you want on the board; turn the board (see drawing A) to the foil side and find pin 15 on the edge connector that goes to the computer. With a knife break the foil pattern going from pin 15 to IC pin 14 after the capacitor. On some boards the capacitor may look like a diode, but it is a decoupling capacitor. Then break the foil between each pin #14 on each IC so that no two ICs pin #14 are connected. Not much is needed to make this break - a good score with a sharp knife will work. If possible, test for lack of continuity.

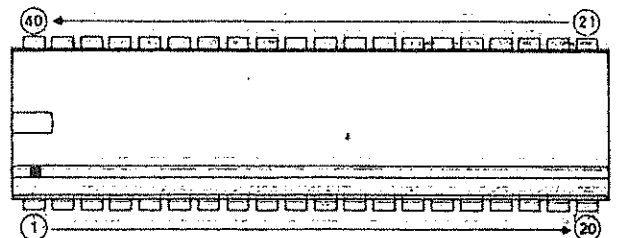
Now mount the SPST switches or the DIP switch on the shell of the cartridge. Solder a wire from one side of each switch to each pin #14 of each IC (or set of stacked ICs - as with Multiplan). Then solder a wire from the other side of each switch to pin #15 on the edge connector.

If a reset switch is wanted, there are two ways of doing it. First install a NO (normally open) or NC (normally closed) switch. Remove one side of the resistor going to pin #1. Solder this to one side of the switch. Then solder the other side to pin #1. The other way is to add a 100 ohm resistor from pin 1 to each IC pin 14. This way the computer will reset every time you throw a switch. Take your pick. Radio Shack sells a good switch for the reset circuit 275-1571.

When everything is done, check all your work. Make sure there are no shorts. It pays to double check. You may want to put tape between the switches and the board. Finally, close the cartridge case back up and try out your new "Master Module".

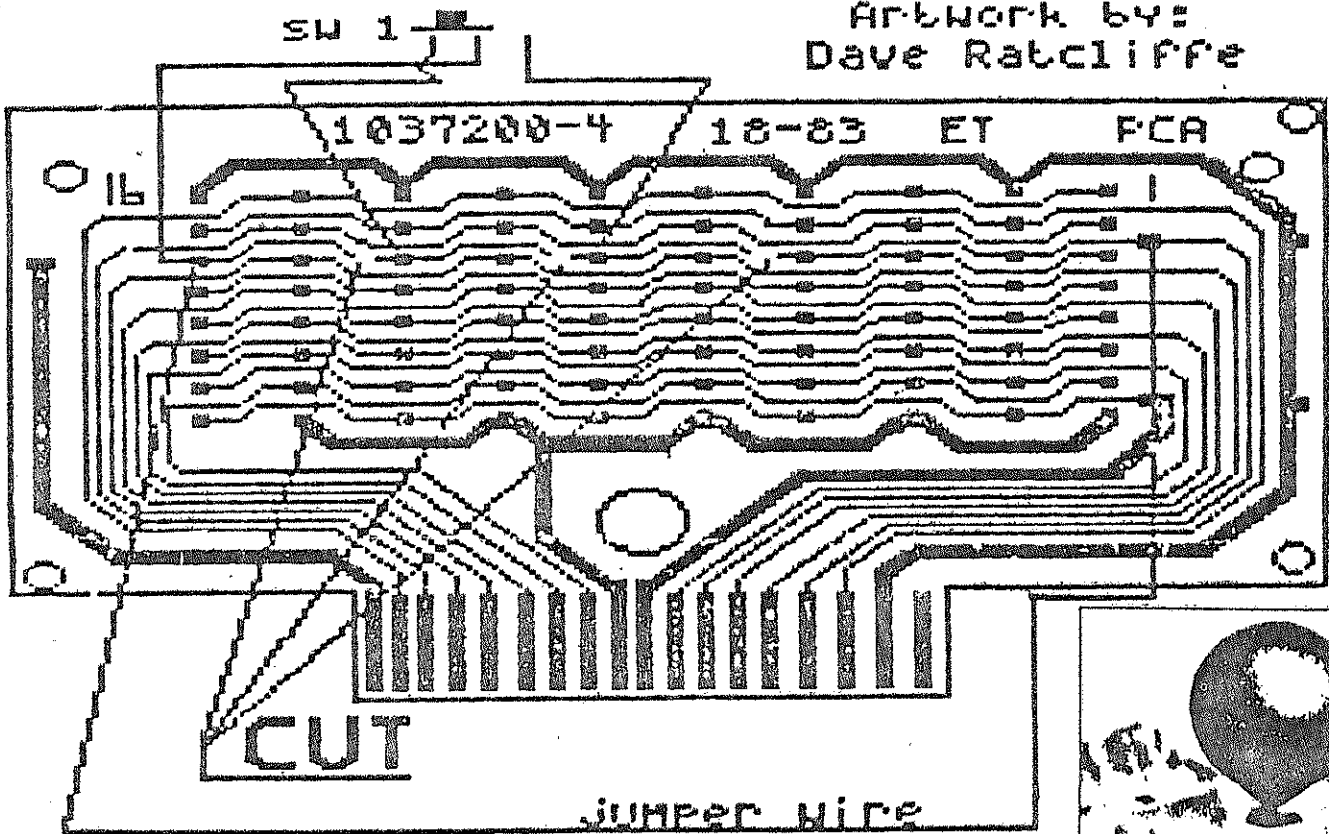
Any modifications that you make are, AT YOUR OWN RISK. As usual, it is a good idea to ask for help if you are unsure about any of these procedures. Follow good procedures when working with delicate ICs of any variety!

Following are two diagrams: one from Dave Poropofa (article author) and one by Dave Ratcliffe (TI Artist artwork).

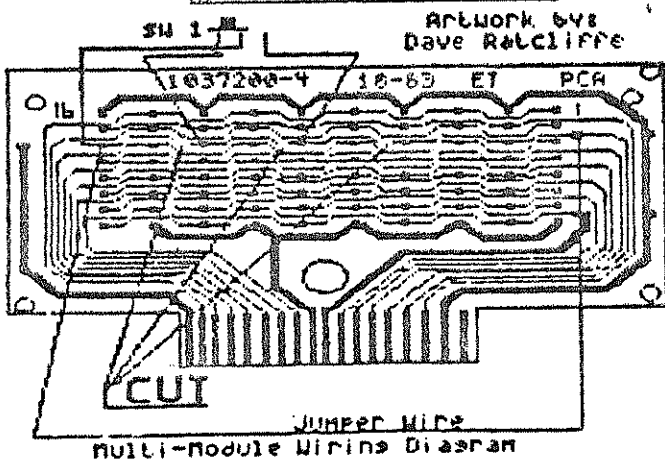
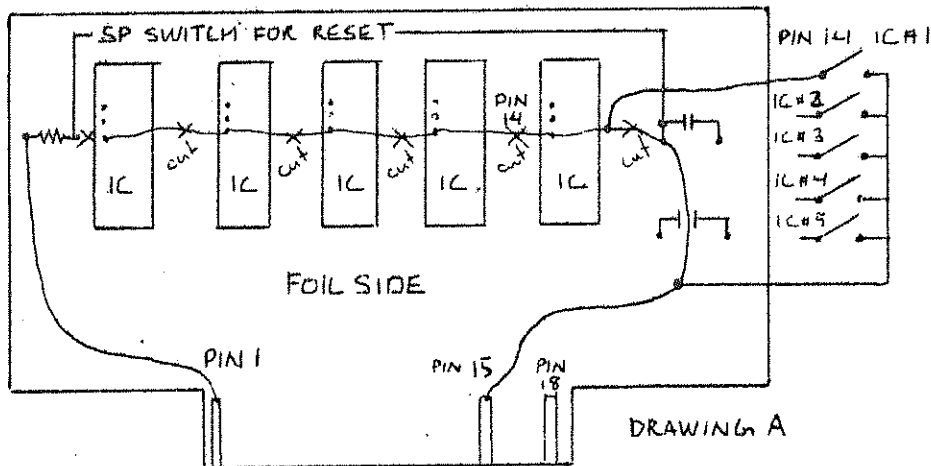


TO FIND PINS ON AN I.C. - LOOK FOR A DOT OR "U" SHAPE STAMPED AT ONE END. THAT PIN WILL BE #1. COUNT AROUND THE CHIP AS SHOWN ABOVE TO LOCATE OTHER PIN #'S - ie: PIN #14. GROM CHIPS HAVE 16 PINS TOTAL.

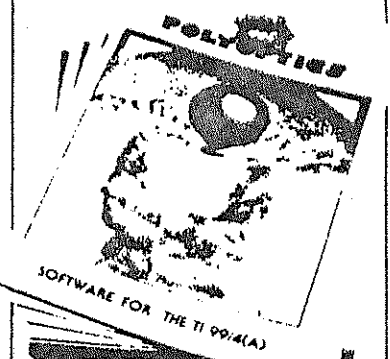
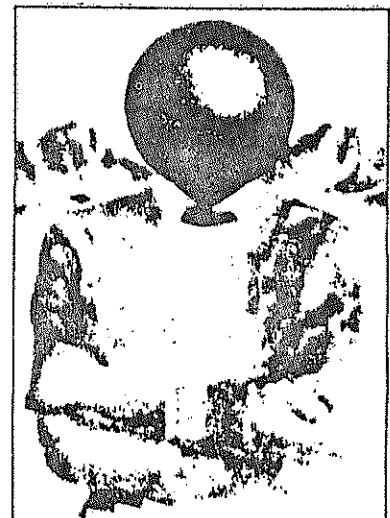
ARTWORK BY:  
Dave Ratcliffe



Multi-Module Wiring Diagram



Multi-Module Wiring Diagram



*absolutely!*  
**FREE**  
CATALOG  
POLYOPTICS  
13721 LYNN STREET, SUITE 15  
WOODBRIDGE, VA 22191

## R/D COMPUTING - 1986

I couldn't figure this out until Charlie got hold of a copy of the 99/4A technical manual. This was long before TI made it public. Not being much of a hacker, Charlie had little idea of the value of this document. But for me, it was the equivalent of 99/4 Rosetta stone.

The schematic diagram showed how the keyboard was interfaced to the communications register unit (CRU), and the chips used to decode the key matrix. Now it was clear why the logic state of the alpha lock CRU bit did not change when the key was depressed; it was an output pin, not an input. Once you have a rough idea of how the keyboard hardware works, with a little experimenting the secrets of accessing the keyboard directly reveal themselves.

Reading the state of the alpha lock key takes three steps: set CRU bit 21 to zero, set CRU bits 18, 19 and 20 (the keyboard select bits) to allow reading the alpha lock key, test the status of CRU bit 7. If CRU bit 7 is a logic state one, the alpha lock key is off. Here is how it is done in assembly language instructions:

```
CLR 12 (THIS SETS THE CRU BASE TO 0)
SBZ 21 (ENABLE ALPHA LOCK GATE)
SZO 18 \
SBZ 19 -(SELECT APPROPRIATE KEYBOARD)
SBZ 20 /
TB 7 (TEST FOR ALPHA LOCK)
JEW OFF (JUMP IF AL IS NOT ON)
```

These instructions can be used in a routine that prevents a game using joysticks from starting until the player releases the alpha lock key, thus avoiding a loss of points; I'm sure we have all experienced the effect of our joystick not responding in all directions because we failed to release the alpha lock prior to beginning play.

Or the alpha lock detect can be put to more devious uses! How so?, well that is up to the deviousness of your imagination, but let me give you a couple of examples. You can write a program that begins executing in two different ways, depending on whether

the alpha lock is up or down. If it is a game, you could discreetly release the lock when it is your turn, and then have the program give you an easier game than your opponent had. Another puzzler would be to have an innocuous program that responded opposite to the normal state of the alpha lock key; if the lock is on lower case letters are entered, and if it is off upper case letters appear.

Besides its uses in practical jokes (or fraud, should you use it to cheat others out of bets), the alpha lock detect can be put to practical purposes. One example would be to use it as a control that determines if data appearing on your monitor screen is echoed to a printer. Another use is to extend the range of key controlled function commands, for now your programs can differentiate between SHIFT uppercase letters and ALPHA LOCK uppercase.

Even if you never put the alpha lock detect to any use, I hope it demonstrates one thing: there are a lot of things about your computer that TI never told you. If any of you have ever seen or heard of this method of detecting the alpha lock status, I would be very interested in hearing the source.

ONE FINAL CURIOSITY BEFORE I SIGN OFF:  
Did you know that there is a way to make a protected disk when you use the disk manager to first initialize a disk? When you have gone through all the prompts, and the disk manager is waiting for the PROCEED key stroke, hit FUNCTION X ten times. Nine of the times will give you the error tone, but the tenth will produce the accept tone and an hour glass-looking character will appear on the screen. Now when you hit PROCEED, the disk will initialize as a protected disk. HASTA LUEGO, AMIGOS!

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WANTED: TI99/4A CONSOLES

Have a spare console? Know anyone who would sell theirs? We only want the console - no software or peripherals needed. Will pay 50% of current, new replacement cost for each console. Must be in working condition. Looking for old TI disk drives, the SS/SD variety...

Contact: RYTE Data

MAIL LIST.

Mail list stores up to 400 records. Sort by name. Search by part of last name. Print labels and listings. Entire program loaded into memory eliminating numerous disk changes. Requires TI 99/4A, XBasic, disk drive, 32k mem. Printer optional. Write: K.G. Mori, 181 Atlantic Avenue, Winnipeg, Manitoba R2W 0P7 Canada.

Where is the following subscriber:

CHRIS EISENHART  
32283 BOCK  
GARDEN CITY, MI 48135

Two others, Yvonne Brunet of Quebec and Jim Doris of North Carolina are sought as well...

HOME^COMPUTER^"JOURNAL"

Oh boy. The flak, static and uproar caused by the "new" HCJ (formerly Home Computer Magazine - 99er) is amazing. We were subscribers, but didn't even get the latest issue. We also had spent advertising funds for ads which never ran. So far no one has anything good to say. HCM/J seemed to believe that all ended when TI pulled out... no new products, no new information, fewer programs et al. They COULD have made a go of it with the extensive mailing list they had, decent coverage, good advertising policies and users group support.

Oh well. Survival of the fittest and all that.

It certainly isn't easy to produce a publication... as many of the users group editors within the TI community have lamented. We're finding that more subscribers and contributors are making the job easier. Now we are growing in size again... you'll notice the number of pages is up. From the standard 12 pages that we started with this year, it's up to 16 at this point. Given legendary Great Good Fortune, we should have the mid year objective on line by year end. The crystal ball forecast for 1987 is even bigger and better!

**SUBSCRIPTION COST:**

\$14.00 (US) for 12 issues \$20.00 Cdn. all via First Class Mail.  
\$19.00 (US) overseas Airmail Delivery.

**BACK ISSUES:**

Back issues are available for \$2.00 each, subscribers only for these issues —

- V1.2 - sold out.
- V1.3 TMS 9995 Memory Map & specs numeric keypad project.
- V1.4 XB II plus by Mechatronic, Myarc 128k card, Autofire joystick project.
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- V1.7 Maximem review, EEROM programmer, Sense and control card.
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- V1:10-11 Double Issue: LA TI FAIR, Bill Gronos on Assembly, Super load switch, EPROM programmer.
- V12.5 Myarc 640k Geneve, Console speed upgrade, Video monitor filter, Gramcracker review, ATRONIC products.
- V14.5 Expansion Box 8k 'module,' Super Clock Support, Basic Compiler, 9938 Video Chip.
- V15 Video upgrade @ 15MHz, Quad. Density TI Disk Controller, 80 Column Display preview.

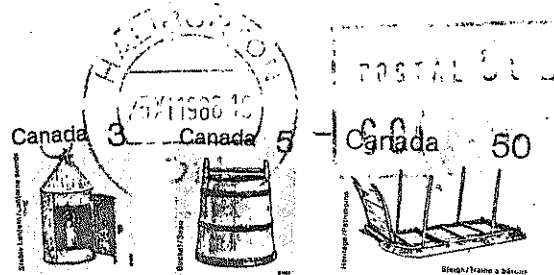
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