BITS,BYTES&PIXELS

LIMA 99/4A USERS GROUP

EXPANDING YOUR EXPANSION SYSTEM CHEAPLY
by Charles Good

With the abundance of very cheap or free software for the TI Home Computer, there is a real financial incentive to expand your TI rather than put it in the closet and purchase an IBM clone for home use. The sound, graphics, and especially speech capabilities of the little old TI are usually better than those of the IBM clone at the office. With the $25 software package "PC Transfer" from Genial Computerware and a Myarc or CorComp disk contoller you can even take word processing ASCII files in IBM format home with you on a 5.5 inch disk, convert them from IBM format to D/V80 on your TI, and continue word processing at home with TI Writer or FUNNELWEB. You can then, still at home on your TI, convert these D/V80 files back to IBM format and take them to the office with you the next day. Sure, you can get cheap clones from ads in Computer Shopper, but you will spend a fortune on software. Usually for less money than the cheapest IBM clone you can expand your TI system so that it will do most things the big guys do. What follows are my personal recommendations for expanding your 99/4A into a powerful computer system for the least amount of money. Prices quoted were in effect in mid-December 1987. See also the aritcle "Hardware for the TI" by J. Peter Hoddie reprinted in the Oct. 87 issue of BB&P.

Genial Computerware
P.O. Box 183
Grafton MA 01519

THE FIRST STEP--A DISK SYSTEM:

If you are still living in the dark ages with just a console, tape recorder, and maybe a sidecar 32K, now is a good time to acquire a good used basic disk system. If you are already a serious TI user, now may be the time to acquire a backup system. I recommend the TI peripheral expansion box over the CorComp expansion system because the PE box really is expandable. You can't hook the Geneve or Horizon Ramdisks to the CorComp "expansion" system because there are no expansion slots. I also recommend the TI disk controller over those by MYARC and CorComp. The TI card is compatable with almost all 99/4A software (with the important exception of the above mentioned "PC Transfer") and it is RELIABLE. I have not heard of any TI controllers going bad (I am sure that some have, I just havn't heard), whereas I do know of MYARC and CorComp controllers that have been sent back for repairs.

With many former TI users moving on to IBM land there are alot of used systems available on the market, and prices are going DOWN. My preferred basic expansion system (PE box, 32K, TI controller, one SSSD drive) could be purchased for $275 at the Nov 1987 Chicago Faire. Locally, this equipment

AND a TI RS232 card AND a Gemini 10X printer sold for $400 in September of 1987. Check the classified ads in Micropendium, Computer Shopper, and the newsletters for availability of used systems from private sales. Although the cost may be higher, there is an advantage to purchasing used systems from a dealer. Dealers offer 30 day guarantees and check their systems out prior to sale. You can reasonably expect to have everything in working order if you buy used from a dealer. I recently got a used TI system (PE box, 32K, TI controller, TI SSSD drive) from Comptetition Computer only to find that the drive would boot BASIC, but not assembly software. I knew it was the drive itself that was causing the problem because when I put another drive into the PE box everything worked fine. "No problem," said Competition Computer over the phone, just send the defective drive back. One week later I received via UPS an exchange used drive. The only thing I had to pay was postage to Competition. You can not expect this kind of service with a private sale. Here is a by no mean complete list of dealers who will sell you a used TI systems. Phone for prices and availability.

Competition Computer
2629 W. National Ave.
Milwaukee WI 53204

L.L. Conner Enterprise 1521 Ferry St.
Lafayette IN 47904
317-742-8146

Queen Anne Computer Shoppe
6102 Roosevelt Way NE
Seattle WA 98115
206-522-6558

Armadillo Bytes
Box 1816622
Dallas TX 76218
214-328-9257

PRINTER AND PRINTER INTERFACE:

Once you get your disk system you automatically become a serious TI user. Your next peripheral should be a printer and printer interface. You can get a printer interface with built in cable from Tenex for $45 that plugs into the side of the console. This is by far the cheapest printer interface, but I don't personally recommend it. You can use the PE box with this device, but it adds to the width of your console and will not accept a modem. A PE box RS232 card is more expensive but preferable because it looks neater, and because it allows you to hook up both a printer and a modem. Tenex will sell you a MYARC or CorComp RS232 card for $80, a very good price.

Back in 1983 the STAR GEMINI 10X printer became the defacto standard printer for the 99/4A. This was because it was sold for less money than the TI impact printer and offered more features. I remember paying $310 for mine and thinking what a bargain it was. Many TI users still depend on this printer, including famous TI names like Jim Peterson. Almost all good TI software was, and still is, written to be compatable with the Gemini 10X. This includes graphics, word processing, and screen dump software.

In selecting a printer, it is important to choose a dot matrix model that uses the same control codes as the Gemini 10X so that the printer is compatable with our software. Daisy wheel printers are not compatable with any of our graphics software. The very important question to ask when purchasing a printer is "Is the printer EPSON compatable?" This EPSON compatability standard is what was used in the now out of production Gemini 10X. I believe all EPSON and STAR dot matrix printers still have this compatability, as do some printers of other manufacturers. Printers designed for use with the Commodore 64/128 or IBM computers DO NOT have this Gemini 10X compatability.

Based upon my own experience with STAR printers, and what I have seen at the recent Chicago TI Faire, the STAR NX10 looks like it deserves very serious consideration. It is totally compatable with Gemini 10X control codes and will also print a superb Near Letter Quality type face that is good enough for most business use. You need a good magnifying glass to prove that this NLQ was done with a dot matrix printer. With the NX10 you can select NLQ or other type fonts from buttons on the front panel. On many other printers you need to send software codes or manipulate tiny out of the way dip switches to do the same thing. Tenex sells the NX10 for $190 and the required cable (between the RS232 card and printer) for $25 (5 foot) or $35 (10 foot). Triton has the 5 foot cable for $17. You need such a cable no matter where you buy your printer, unless you are using the above described $45 "plugs into the side of the console" interface with built in cable. Midwest Miro-Peripherals will sell you a STAR NX10 for $160. I have personally dealt with this dealer and was very impressed. Midwest is an authorized STAR service center. I know from personal experience that they will fix any STAR printer in or out of warranty, usually in just a few days. With many printers if they break you have to send them to the factory (in Japan?) for repair, and wait and wait and wait. If you do buy a printer from Midwest, you still need to get a parallel printer cable from a TI dealer such as Tenex or Competition.

Tenex Computer Express
P.O. Box 6578
South Bend IN 46660
219-259-7051

Triton
P.O. Box 8123
San Francisco CA 94128
800-227-6900

MidWest Micro-Peripherals
6910 US Route 36 East
Fletcher OH 45326
800-321-7731 (in Ohio)
800-423-8215 (outside Ohio)

EXPANDING BEYOND JUST ONE SSSD DRIVE:
You can do alot more with two drives than with just one and I recommend upgrading to a second drive as the next step in your system expansion after the printer. With two drives disk copying is automatic. You don't have to switch disks back and forth. When doing serious word processing or data base work you can leave your system disk in drive one and put a data disk in drive two. With FUNNELWEB, 2 drives allow you fast menu access to lots of user programs. Double sided is also nice. You can have immediate access to all the data on both sides of the disk (720 sectors in DSSD format) and you won't have to make any more flippies in order to use the back side of the disk. Flippies for the TI are a real pain to make because you have to punch out the index hole in addition to the write protect hole. For Apples and Commodores all you need for a flippy is a second write protect hole! You can almost always get away with using cheap SSSD rated disks with a double sided drive and the TI controller. This is because the TI controller only puts 90K of data on each disk side (IBM squeezes 360K) and is thus much more tolerant of disk imperfections.

The fanciest way to expand, and the most expensive, is to install two half height double sided double density (DSDD) drives in the PE box. Lots of dealers will sell you half height drives, but it is important to also get the necessary cables for installation in the PE box. C & G Drives will sell you the drives and all needed cables to install in the PE box for about $240. TexComp has the same goodies for $190, the best price than I have seen anywhere .

The cheap way to expand is to purchase a bare full height DSDD drive and slide it right into the PE box in place of your original TI SSSD drive. Its easy! No additional cables or modificatons are needed, but make sure the dealer configures your drive as DSK1. Such drives can be had for $75 from L.L. Conner or from C & G Drives, and for $60 from L & M Systems. Then buy an external drive power supply box AND A CABLE to connect this power supply to the edge connector of your disk controller. CorComp controllers require a different cable than the one that is used for TI and MYARC controllers. Power supply boxes are $40 from TexComp. Competition Computer has the cable for $20. TexComp and C & G Drives also probably sell this cable. Slide your original TI SSSD drive into the power supply (its easy!), and plug your cable to the back of the disk controller in your PE box. Another way to go is to purchase a stand alone DSDD drive with cables. TexComp has them for $119. The disadantage here is that it is more convenient to have your DS drive as drive 1 rather than drive 2, and you have to modify your original drive to make it work properly with a second drive. You now have, for an investment of about $120 plus shipping, a two drive system with one of these drives double sided.

C & G Drives
1241 Landwehr Rd.
Northbrook IL 60062
312-272-0468

Tex Comp
P.O. Box 33064
Granada Hills CA 91344
818-366-6631

L & M Systems
2330 East Ave. J-8 #173
Lancaster CA 93535
805-948-1587

SUPER MEMORY EXPANSION:

After upgrading to multiple drives, I next recommend obtaining more PE box memory for program and file storage. A disk system is required to use the various super memory cards.

The way TI designed our computer, the largest memory expansion that is DIRECTLY accessable to the computer via the right side expansion port is 32K. Playing lots of tricks, this directly accessable memory can be stretched to 64K, but this requires hardware modifications. For most practical purposes, no software can access more than 32K of CPU RAM outside of the console. So what about the various 256K, 512K and even 1Meg memory expansions you have read about? These devices DO NOT expand your TI's RAM to the size of a fully expanded IBM PC. No matter what the size of your memory expansion, the 99/4A will not handle software larger than what it can handle with the plain old 32K memory expansion, and your TI cannot be made to utilize huge software of a size usable by an IBM clone. Large memory expansion devices for the TI allow you to use the extra memory as a RAM disk and/or as a print spooler. As RAM disks, these devices function somewhat like hard disks, only faster, allowing you to move software and data very rapidly into and out of the TI's rather limited active memory. With FUNNELWEB on a ramdisk, you can almost instantaneously boot FUNNELWEB, shift from a central menu to the editor, then edit and save your text to the ramdisk, load the formatter and print your text. Each time you move a block of memory takes only 1 or 2 seconds. This isn't quite as good as having the editor, formatter, and text buffer all in CPU RAM at the same time as you do with the GENEVE, but you will hardly notice the difference. The difference between instantaneous and 1 or 2 seconds isn't much.

CorComp and MYARC both make 512K expansion cards that can be used as 32K CPU RAM with the rest (480K) available as ramdisk and/or print spooler. These are currently $240 at Tenex. Both require an AC adapter, similar to a pocket calculator AC adapter, if you want to keep data in the card after the computer is shut down. The CorComp card needs such an adapter to work even while the computer and PE box are turned on. If the mains power is interrupted, or if the adapter jack slips out of the back of the card or out of the AC wall outlet, you lose all your data. This dependency on mains power to keep data after the rest of the system is shut down is the main limitation of these two cards. You cannot count on them safely holding data or programs for a long time.

I strongly recommend the Horizon Ramdisk in one of its several configurations. Horizon cards act EXACTLY like a floppy drive, but with lightning speed, and are backed up with rechargable batteries what automatically charge every time the PE box is turned on. With power off your data is safe for months and is not affected by a mains power failure. You can pull a Horizon card out of your PE box, put it in another PE box, and the data will still be there. Horizon cards are available as kits or already built in sizes ranging from 192K (emulating a DSSD drve) up to 1Meg. An assembled guaranteed 192K Horizon costs $195 from Horizon Computer. An assembled one megabyte card costs $450 from Midwest Engineering. Complete kits are available from Bud Mills Services. You can fill every vacant slot in your PE box with a Horizon card, giving you the potential of several Megs RAM program and data storage. With v7.1 of the Johnson-Ballman RAM based Horizon operating system (public domain, available from Miami User Group) a single Horizon card can emulate several floppy drives. With this operating system you can also get a menu, ON POWERUP, that will load programs from your ramdisk at the touch of a key. A similar, more secure Horizon ramdisk operating system is available as a ROM chip from Genial Computerware, and was reviewed in the Nov. 87 issue of BB&P. More than any other single hardware device, the Horizon ramdisk can turn your 99/4A into a real power machine capable of doing anything you want at powerup without messing with floppy disks. I have FUNNELWEB and 15 frequently used programs on my Horizon ramdisks. I load and save my word processing text and financial data files directly to and from the Horizon cards quick as a wink. I back up my Horizon files to disk every couple of weeks, just to be sure, but have great confidence in the ability of my Horizon ramdisks to securely hold my programs and data files.

Other products apparently similar to the Horizon ramdisk have been advertised by DataBioTics (the GrandRam) and Rave 99. As far as I know, neither of these products has been released. Neither was at the Chicago Faire. Horizon ramdisks have a proven track record of two years. I have not seen any bad newsletter comments about this product, and it exists NOW.

Bud Mills Services
166 Dartmouth Dr.
Toledo OH 43614
419-385-5846

Horizon Computer Ltd.
P.O. Box 554
Walbridge OH 43465
419-666-6911

Midwest Engineering Consultants
203 Arcadia Dr.
Vernon Hills IL 60061

AND ON AND ON AND ON:

Other hardware upgrades are available for our computer, but for the most part they seem to me to be quite expensive for what you get. The exception is modems. Some are cheap, and some are expensive. You probably get what you pay for. Since I am not into telecommunications I can't comment personally except to say that they plug into your PE box RS232 serial port. Check out Micropendium and the newsletters for comments on modem features and quality.

An IBM style keyboard is available from RAVE 99 for $200 complete. This keyboard allows single key entry of TI-Writer and Multiplan commands.

How about an 80 column display with TI-Writer and Multiplan? The Mechatronic 80 column "card" (it plugs into the side of the console, not into the PE box) available from Tenex, or the DIGIT Systems AVPC PE box card will both do this for "only" $220. You need either a monochrome monitor ($100, maybe less) or an analog (not an IBM compatable TTL) RGB color monitor ($345 at L & M Systems) in order to see this 80 column display. A TV or composite color monitor just don't have the necessary resolution.

Because of cost, I can't recommend the fancy keyboard or 80 column cards. Together with a new monitor their combined cost is at least $520. You can get an IBM clone complete with monochrome monitor, fancy keyboard, 80 column display, and 256K CPU memory for less than this from several dealers advertising in Computer Shopper. If you must have 80 columns and a fancy keyboard than go with a clone, but be prepared to pay big bucks for the software.

Double density controllers by MYARC or CorComp are available from Tenex or L & M Systems for $150. These allow you to store twice as much data on a double sided disk as the old reliable TI controller and are needed to transfer IBM ASCII files to TI D/V80 format. A MYARC quadrouple density controller costs $190 from L & M, and requires special 80 track drives to work in quad density. I still prefer the old TI controller.

How about a built in clock accessable with software. The CorComp Triple Tech card (provides calendar/clock, 64K printer buffer, speech synthesizer in the box connecter) costs $138 and the CorComp stand alone clock goes for $80, both at Tenex. If you have a Horizon Ramdisk, the MENU operating system can access these clocks with a single keypress from the BOOT menu. It's too bad there is no automatic way of dating files as they are saved to disk. Personally, I find that my $3 KMART cheapo quartz wrist watch is good enough for me. I just can't see paying $80 for a computer clock.

Rave 99
112 Rambling Road
Vernon CT 06066
203-871-7824

DIGIT Systems
4345 Hortensia St.
San Diego CA 92103
619-295-3301

SUMMARY-MY PREFERRED EXPANSION HARDWARE:
Console, extended basic, tape recorder--I assume you already have these items.
Used PE box, 32K, TI controller, SSSD drive-----$275
RS232 card for PE box, new------------- --------$ 80
Star NX10 printer, new------------ -------------$160
Double sided drive and box for second drive-----$120
Assembled 192K (=DSSD drive) Horizon ramdisk----$195
TOTAL EXPANSION COST-------------- -------------$840
plus any tax and postage.

!!DONE!!

GHOST TOWN WORD LIST

Here is a list of words accepted by the Scott Adams adventure Ghost Town. The computer responds to the first four letters of each word. The first word of each two word command is usually a verb and the second word usually a noun. I havn't solved the adventure yet, but maybe this list will help you in your quest for a solution.

FIRST WORD (usually a verb)	SECOND WORD (usually a noun)
APPLy	$200
BEAT	ANY
BREAk	AROUnd
BURN	BAG
CHECk	BELL
CLAP	BOARd
CLEAn	BOX
CLIMb	BRUSh
CLOSe	BULLet
COLLect	CANDle
CONNect	CASH box
COVEr	CHARcoal
CROSs	COIN
CUT	COMPass
DANCe	COUNter
DESCribe	CRYStal
descend	CUP
DIG	DERRinger
DROP	DOOR
DUMP	DOWN
EAT	DUST
EMPTy	EAST
ENTEr	ENTR ?
EXAMine	FIGUre
FEEL	FLOOr
FILL	FORK
FIND	FUSE
GET	GAME
GO	GHOSt
GRAB	GIDDy up
HEAR	GIDY up
HELP	GITTy up
HIT	GITY up
IGNIte	GO
INVEntory	GOLD
JUMP	golden
KICK	GRAVe
KILL	GUN
KISS	gun powder
KNOCk	HAMMer
LEAP	HAND
LEAVe	HAT
LIFT	HEAD
LIGHt	HELL
LIST	HILL
LOAD	HI

FIRST WORD	SECOND WORD
LOCAte	HOLE
LOCk	HORSe
LOOK	horse shoe
MAKE	HOTEl
MIX	HOW
MOUNt	INVEntory
MOVE	JAIL
OPEN	KEG
PASS	KEYS
PICK	LIGHT
PLAY	LOBBy
PRESs	MAGNet
PUSH	MAP
PUTOut ?	MAT
QUIT	MATCh
READ	match book
RIDE	MINE
REPAir	MIRRor
REMOve	MOUNtain
RING	MUSIc
SAVE	NAIL
SAY	NECKlace
SCORe	NORTh
SCREam	NUGGet
SEEK	OFFIce
SHAKe	ON
SHOE (shoe horse)	PAINt
SHOOt	PATH
SHOVe	PELT
SHUT	PIANo
SING	PILE
SLEEp	PLANk
SLICk	POWDer
SMASh	RATTle snake
SMELl	RAVIne
SPLIce	RIDGe
SPUR	ROAD
TAKE	ROLL
TAP	ROOF
TAPE	ROOM service
TASTe	SAFE
THROw	SAGEbrush
TOSS	SALOon
TOUCh	SHACk
UNLight	SHOVEl
UNLOck	SHOP
USE	SIGN
USED	SLEEp
WAIT	SLIMe
WALK	SNAKe
WAVE	SOUTh
WEAR	SPUR
WHISper	STABle
WITH	STORe room
YELLow	STRIp
	SULF ?

MORE SECOND WORDS

TAPE
TEEPee
TELEgraph
TOMTom
TOPP ?
TOWN
TRAIl
TUMBleweed
UP
VAIN
WALL
WEST
WINDow
WIRE
WORM

MICROPENDIUM WARNS ABOUT RYTE DATA:

You read about it here first, in the November 87 issue of BB&P. Now Micropendium has published a warning to potential customers of RYTE DATA in their November 87 issue. "We've received numerous complaints about Ryte Data, of Haliburton, Ontario. The complaints range from failure to fulfill orders to extremely slow service. Ryte Data has stopped responding to inquiries from Micropendium, written as well as by telephone. Ryte Data advertised in Micropendium last year."

Do you suppose that Ryte Data is one of those unnamed advertisers Micropendium mentioned in their Sept. 87 issue who havn't paid for their advertisments? At least Ryte Data gives equal service to all. We can't get our phone calls or letters to them answered either.

##DONE##

THE MAGAZINE FAMILY & HOME OFFICE COMPUTING:

This magazine, effective Nov. 1987, no longer publishes type in software for the 99/4A. BUT, they still publish occational "news, opinions, quotes, and rumors" concerning the 99/4A in the "Orphans" portion of their regular "Machine Specifics" column. They also still publish classified ads targeted for 99/4A owners. We don't recommend a subscription just for the few 99/4A tidbits, but you might want to glance at individual issues as they appear on the magazine rack at your magazine retailer or at the public library.

##DONE##

THE MEANING OF "Xp" IN A FUNNELWEB DISK DIRECTORY:

Here is a little feature of FUNNELWEB v3.4 and v4.0 that I havn't seen discussed in the newsletters and only just ran into myself. If you bring up a disk directory with AID or SD, and then press EQUAL to check the nature of each PROGRAM listing, you will see either "BX", "EA" or "Xp" after each PROGRAM file name in the P column of the directory.

"Xp" is new to me, and means a protected extended basic program saved as SAVE DSK1.PROGNAME,PROTECTED.

"EA" as most of us already know means an FA85 program image assembly file.

"BX" means either a console basic, or an extended basic program. It is too bad there is no distinction here between the two kinds of basic, but you can't have everything.
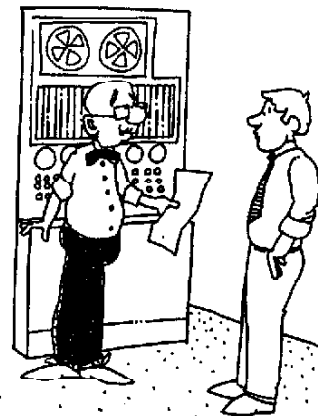
If a PROGRAM file shows none of these designations after pressing EQUAL, this means the PROGRAM file is some sort of data file such as the PRK or ADVENTURE modules create.

CORRECTION

In both the November and September issues of this newsletter we referred to a "J. Peter Hoodie" whose correct last name is Hoddie. We regret our error. As far as we know J. Peter Hoddie is not a gangster, and no such implication was intended. He is, in fact, a well known and very active programmer for the 99/4A and the Geneve.
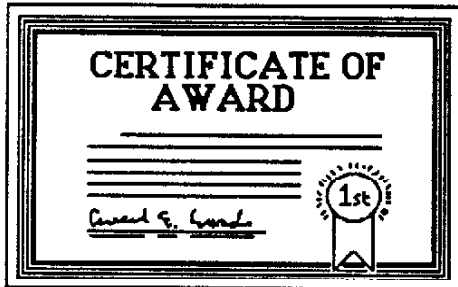

MEYLENSTEYN © 1984 OMNI MAGAZINE

THE ORPHAN LIVES ON

What do you mean my computer is obsolete? My father and grandfather didn't think so.

NEW! FROM THE CREATORS OF JOY PAINT '99 AND BANNER '99..........

CERTIFICATE '99!

CREATE CERTIFICATES, AWARDS,
DIPLOMAS & LICENSES FOR YOUR SCHOOL,
CLUB OR BUSINESS!

EASILY MAKE FLYERS FOR THAT
UP-COMING EVENT.

PRINT ADVERTISEMENTS, SIGNS
AND NOTICES.....

CONGRADULATE AN OUTSTANDING
ACHIEVER.

This all new 100% assembly language program is a wonderful way to recognize the efforts and achievements of someone special. CERTIFICATE 99 gives you everything you need to create exciting certificates awards, diplomas, licenses, signs and advertisements. Parchment paper and gold foil seals are included to get you started making professional looking-

certificates and signs. Comes with six text fonts in two sizes, twelve different borders, twenty-four pre-designed graphics as well as signatures and seals! Prints to any EPSON/STAR GEMINI or compatible printer in single or double density. Requires 32k memory, disk system and one of the following: Ext-Basic, Ed/Assm, Mini-Mem or TI-Writer. From GREAT LAKES SOFTWARE. $19.95 plus $1.00 shipping.

GREAT LAKES SOFTWARE
804 E. Grand River Ave., Howell, MI 48843

THE TIGERCUB NUTS & BOLTS DISKS

What are they? The Nuts & Bolts disks are collections of 100 or more subprograms in merge format, ready to merge into your own programs.

And what does that mean? Well, TI-99/4A Extended Basic allows the use of user-written subprograms. And what are subprograms? You know them well. CALL COLOR, CALL SOUND, CALL HCHAR - those are all subprograms which are built into the Basic language. You can write your own subprograms, to do anything that Extended Basic is capable of, and tack them onto the end of your program to be CALLed whenever you need them.
To put it in another way, using a subprogram is almost like running one program from another - except that you can access it much faster, you can pass along any values that you want to, and you can return to where you left the first program.

Also, with a disk drive you can save programs in MERGE format and then MERGE them into a program in memory. Providing that the line numbers are different, the program which you MERGE in will be added to the existing program.

The variables used in a subprogram are entirely separate from those used in the main program, therefore libraries of utility subprograms can be developed in MERGE format, and MERGEd into any program without conflict.

The Nuts & Bolts disks are libraries of such subprograms. The first disk contains 100 such subprograms, plus a tutorial on using them. Disk No.2 contains 108, and No.3 contains 140 of them in 114 files. Nothing like them has ever been offered by anyone else for the TI-99/4A computer.

These 348 subprograms have been consecutively line-numbered with high line numbers so that they will not overwrite your program line numbers, and so that any number of them may be MERGEd into a program without overwriting each other.
Advanced programming techniques have been used to make these routines as compact as possible, averaging hardly more than 3 sectors each, so that a hundred or more could be crammed onto a disk and so that they would add very little to the length of a program. If you are learning to program, you might learn a great deal by studying these subprograms.

Each disk is accompanied by several pages of printed documenation, explaining the use of each subprogram and giving a short demo routine which you can key in, run, and experiment with.

Many of these subprograms can be used by persons with almost no programming knowledge, to modify existing programs. For instance, a program written in Basic, which crashes with BAD VALUE when run in XBasic, will run with a simple CALL BXB, and CALL KILLQUIT will disable the infernal QUIT key. Many different screen character styles are available, as well as colorful wipes to replace CALL CLEAR.

However, it is the programmer who will find these disks truly invaluable. Even if you have the skill and ingenuity to develop these routines for yourself, wouldn't you rather just pay fifteen cents apiece for them?

The three Nuts & Bolts disks are available for $15 each, postpaid, from Tigercub Software, 156 Collingwood Ave., Columbus OH 43213.