

MICROpendium

Volume 9 Number 11

December 1992

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See page 15



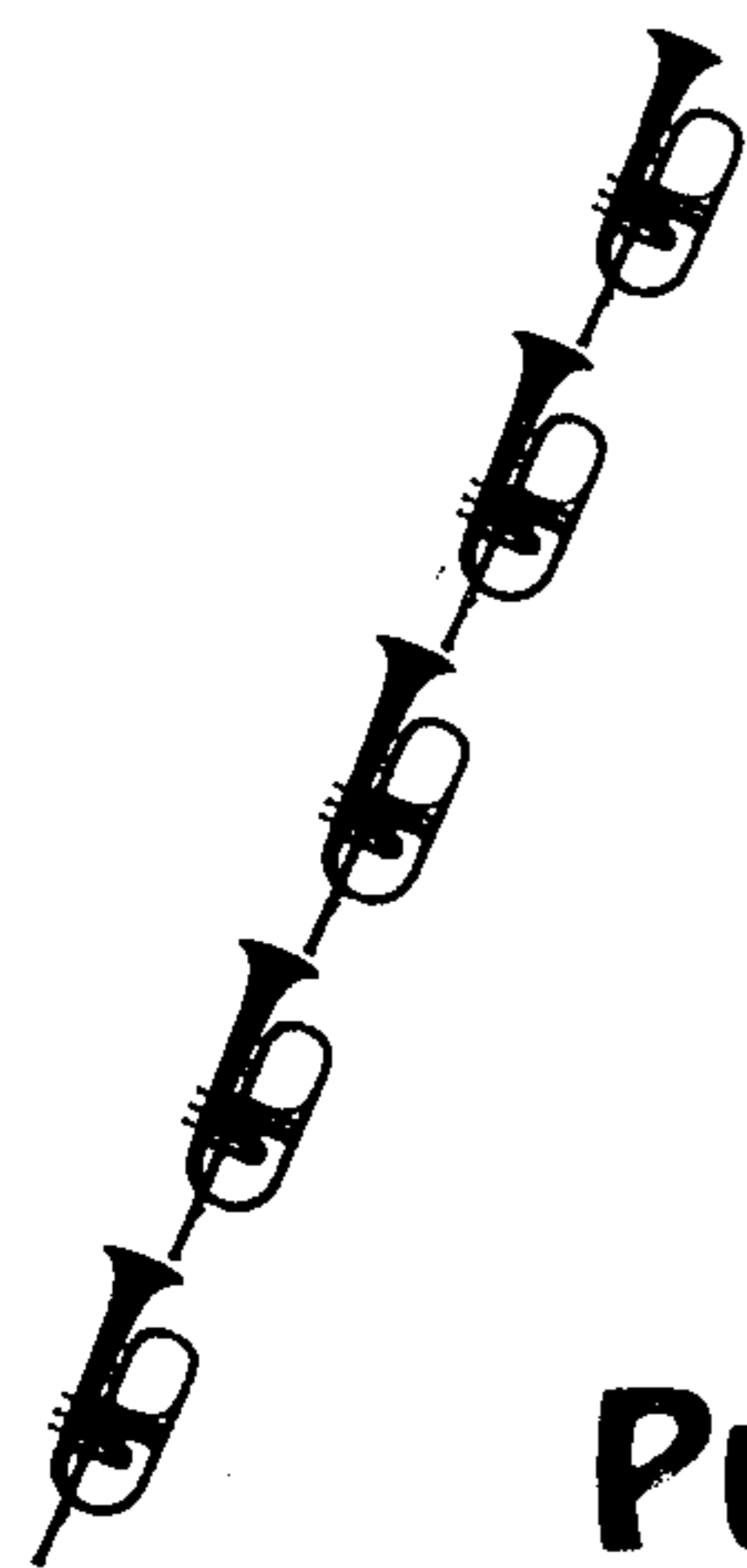
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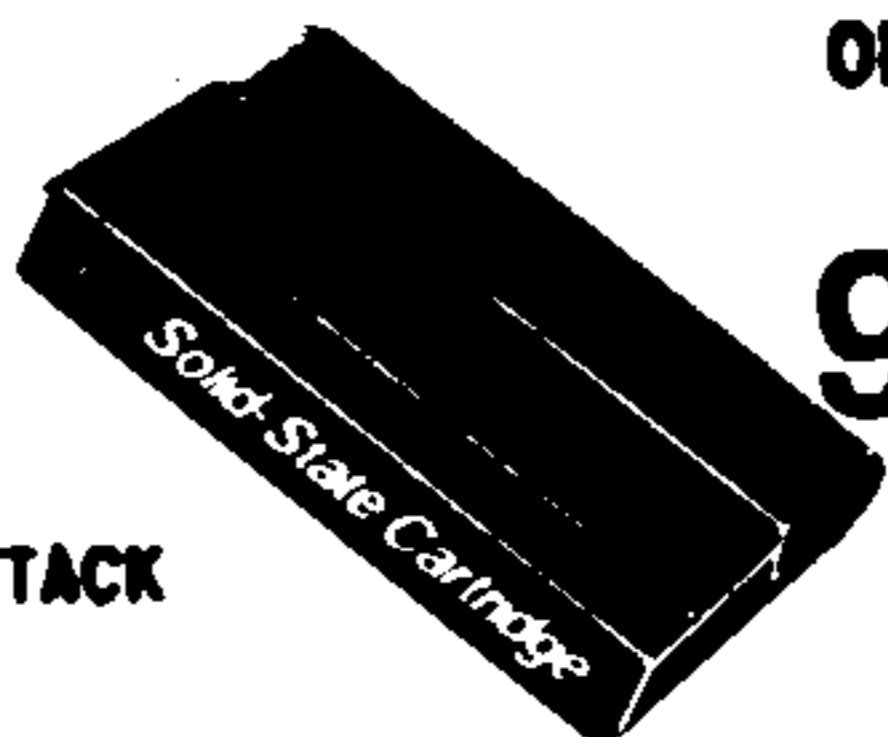
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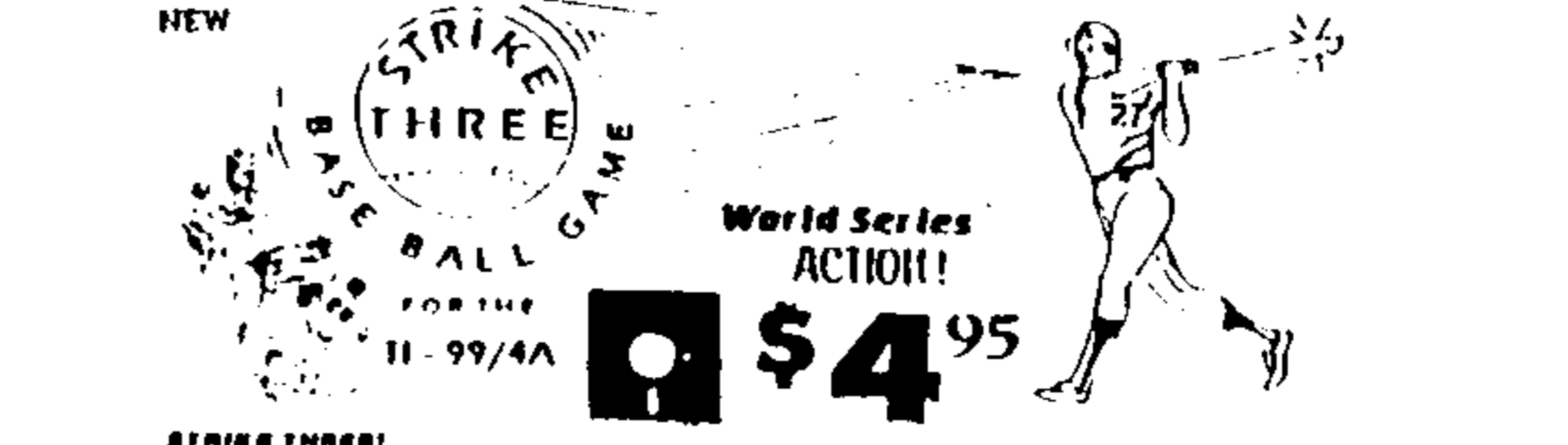
3D-WORLD

CAD (COMPUTER AIDED DESIGN) COMES TO THE TI-99/4A. UP TO NOW, 99/4A OWNERS COULD ONLY READ ABOUT THE WORLD OF COMPUTER AIDED DESIGN (CAD) SINCE THE LARGE AMOUNTS OF MEMORY REQUIRED MADE IT IMPOSSIBLE TO RUN ON SMALLER COMPUTERS.

3D-WORLD IS WRITTEN IN THE 9900 MACHINE LANGUAGE WHICH USES ABOUT 8.5K OF PROGRAM SPACE LEAVING ALMOST THE WHOLE 32K RAM FOR DATA-ARRAYS. ABOUT 14K OF THE VDP RAM IS USED TO CREATE THE SCREEN DISPLAY AND THE DSR ROUTINES. THE PROGRAM COMES WITH COMPLETE DOCUMENTATION AND REQUIRES NO SPECIAL PROGRAMMING KNOWLEDGE. TWO DEMO PICTURES ARE ALSO INCLUDED.

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*READ THIS

Here are some tips to help you when entering programs from MICROpendium:

1. All BASIC and Extended BASIC programs are run through Checksum, the numbers that follow exclamation points at the end of each program line. Do not enter these numbers or exclamation points. Checksum is available on disk from us for \$4.
2. Long XBASIC lines are entered by inputting until the screen stops accepting characters, pressing Enter, pressing FCTN REDO, cursoring to the end of the line and continuing input.

Comments

Looking ahead to 1993

We hope you have a happy holiday and plenty of time to use your computers. We're looking forward to 1993, which promises to see the introduction of some interesting hardware and software, including a Memex RAM expansion for the TI from Bud Mills.

Also on the horizon should be software designed to use the capabilities of Asgard's Memory System RAM expansion. I've got one of the cards with 128K running — it replaces any 32K RAM cards in your PEB — but without the software it's just like any other memory expansion. Chris Bobbitt expects the first program to be modified to run on the card to be First Draft/Final Copy. When this comes out, I'll be sure to review the card and the First Draft upgrade. (See below for late breaking news.)

BARRY WILL BE BACK

You'll notice that Barry Traver didn't have a column this month. He got bogged down in writing code and didn't have enough time to fully debug it. He'll be back in January.

TELL US ABOUT YOUR SYSTEM

This was suggested to me by Rich Gilbertson at the Chicago TI Faire. And I think it's a good one. How about running a small item every month detailing a reader's TI or Geneve system? Including a photo if available. I know there are a lot of souped up systems out there and maybe this would be a good time to start showing them off. Or at least describing them and how they came to be that way. After all, we wouldn't be the first magazine to do something like this. Look at Stereo Review, which regularly runs a feature about reader's stereo systems. If anyone is interested in submitting an item for this feature, mail it to MICROpendium Systems, P.O. Box 1343, Round Rock, TX 78680. Be sure to include your name and address as well as a complete description of your system, including what's inside and what's connected to it. If you have a really unusual home-built card, etc. provide enough details so that readers will know what it does. Sorry, but we can't return photos.

FIRST FAIRWARE APPLICATION FOR AMS

I just got word that Asgard has announced the first fairware application for its Asgard Memory System 128/512K card. Called XB Packer, the program allows the user to have up to five Extended BASIC programs in memory simultaneously. Switching between programs can be done under program control or from a command line. The program runs under TI Extended BASIC.

FIRST DRAFT UPGRADED TO V1.1

Asgard has announced V1.1 of First Draft/Final Copy as well as a new manual. V1.1 is expected to ship before the end of December. (Version 1.0 is reviewed in this issue.) Current owners of First Draft will receive V1.1 at no charge, as well as an addendum to the manual. New purchasers will receive V1.1 with a new manual. The manual has already been updated twice.

According to Chris Bobbitt, Version 1.1 features enhanced support for hard drives by allowing full pathnames, which is not available with V1.0; full Geneve compatibility with all program functions; improved editing speed; and compatibility with the AMS. Users of Final Draft who have a 128K AMS card will be able to load up to 70K of text into the text buffer before the program pages to disk. Those with a 512K AMS card will have a huge 454K text buffer. Additionally, the First Draft manual has been revised. Contact Asgard at P.O. Box 10306, Rockville, MD 20849; 703-255-3085.

SUBSCRIPTION PRICE STILL DEBATED

The debate over a subscription price hike continues, as you'll notice from some of the Feedback this month. We're still not ready to make a decision about raising the price, but much of what we've heard is encouraging. Most of the readers who have called or written indicate a willingness — grudging for some, enthusiastic for others — to pay upwards of \$10 more per year in order to get an additional eight pages per month. We appreciate your recommendations and should put this matter to next month. Meanwhile, continue giving us your two cents worth.

—JK

BUGS & BYTES

GENIE SYSOPS CHANGE

Barry Boone is no longer an assistant sysop on GENIE. Barry, a full-time student and about to be married, no longer has the time to devote to GENIE. He's been replaced by two assistant sysops: Dan Eicher and Tom Tesch.

PUNN ELECTION CHOICES

Some user groups practically have to bribe members to run for office. But that's not the case with the Portland Users of Ninety-Nines. The PUNN ballot includes two nominees for each office. What's the secret?

CHRISTMAS SPIRIT

Here's a Christmas song by Wayne Garrison of the St. Louis

99ers that only a TI user could love.

Away with a T.I. (Away in a Manager)

Way back in a closet my T.I. was found.

Left there by some idiot 'til I came around.

I asked all my neighbors to find me T.I.s.

One told me of one up the street, I should try.

The guy said he got it at the grocery store.

He got it to come on but couldn't do more.

I offered him 20 and took it and ran.

Now I use it daily how happy I am.

Feedback

Would pay more

I just wanted to reply to your Comments column (October 1992) on 32 vs. 40 pages. I am quite pleased with MICROpendium. You and your staff do an excellent job of publishing a very interesting and useful magazine for a clearly limited clientele. I would be more than happy to pay \$35 for a 40-page publication should the opportunity arise. Keep up the good work.

Jim McCullough
Las Cruces, New Mexico

Loyal from 'day 1'

As you well know (I hope!) I have been a MICROpendium subscriber from "day 1." I would be willing to pay \$35 for an annual subscription even if you did not increase to 40 pages!

Best of luck for the *only* reliable and continuous source of TI information.

Stephen A. Justham
Kutztown, Pennsylvania

Concerned over future

Here is my feedback on the 32-page gridlock issue now being confronted by MICROpendium subscribers.

The lack of advertising is not something that is going to get better, it will only get worse as fewer and fewer people remain in the 99/4A community. As I see it, our only option is to pay more for more pages if a 32-page issue is not large enough. Personally, I will gladly pay \$35 per year for the privilege of having MICROpendium arrive at my door each month. I don't find that price unreasonable for a unique specialty product, which is the market that MICROpendium serves.

A much larger concern I have is the dwindling profitability of MICROpendium because of a decreasing subscriber base along with a drastic drop in advertising revenues. I've stated this before, but I feel compelled to do so again. If MICROpendium goes down the tubes, the TI99 community as we know it will cease to exist. An international forum is a must for discussion of issues, announcements of new products and the general exchange of ideas and information. If we are not willing to pay a few extra dollars to support the only

national and international publication we have, then the TI99 community will simply not survive. Let's support the people who have supported us since 1984 and ensure that they are able to provide that support as long as a TI99/4A Home Computer exists in this world.

Bill Gaskill
Grand Junction, Colorado

Keep it coming

Include me in support of your \$10 increase. However, if diminishing returns dictate only 32 pages or even 24, I still support your decision. Just keep MICROpendium coming.

Bob Zink
Naples, Florida

Heads in the sand?

I read with interest in your last editorial about your plight with getting back up to 40 pages. I for one would pay an additional \$10 for eight more pages. Why I would have to pay 40 percent more for only 30 percent more pages is one of the great mysteries of life. I would like to see the vendors have more ads. If you are serious and are making a profit, a 1/4-page ad at least six times a year is not too much to ask. I do buy from advertisements in MICROpendium. My question to you is "What are you doing to increase commercial ad subscriptions?" I don't see any emphasis that the November issue is the last issue before Christmas. The vendors might be at fault here in that they have their collective heads in the sand by not recognizing golden marketing opportunities. Good programmers are not necessarily good marketing people.

I do object to two of your statements in the editorial: 1) The fact that you give anybody a discount is very unfair. I for one do not like the idea of my money subsidizing anybody. We are a small community and everybody needs to pull his or her own weight in order to keep our trusty little machines going. 2) Your cry of poor us for declining classified ads is in my opinion disingenuous. When you started the Used Computer Club I saw an immediate decline in your classified ads. I saw this as robbing Peter to pay Paul and as a decline in the service MICROpendium offers its readers.

Now I have to pay an additional \$15 to get a large selection of formerly free classified ads. I have bought equipment through classified ads and found it satisfying. The above are just observations and I reiterate that I will support the \$10 subscription price increase.

Now that the Accelerator is dead (again) will Bud Mills and Western Horizon Technologies be bringing out the rumored replacement motherboard with a 99105 and a 9978? Or should I just shop around for a used Geneve? Keep up the good work and please take my comments constructively. You are the only glue left that holds the community together!

Frank Gehrling
Oakland, Maine

A few answers:

Most of the advertisers who have advertised in the past no longer support the TI. We periodically telephone those who have advertised in the past, so it is not as if we don't try.

Our non-commercial classified ads have been declining for several years and when we started National Used Software/Hardware Club we had exactly three of them. The others were commercial ads. But classified ads were never a major source of revenue. The major sources of revenue are subscriptions and display advertising. Incidentally, we started NUS/HC because we thought it would be a better and cheaper forum for users to buy and sell used equipment. It allows them to keep their equipment listed indefinitely, while classifieds usually appeared in only one issue of the magazine.

And, if I might add, the best way to insure continued advertising support of MICROpendium is by purchasing products from advertisers. This sounds self-serving, but it's true.

Bud Mills is expected to come out with a RAM board in 1993 that is supposed to provide the TI with megabytes of CPU RAM. At this point, we do not see a replacement motherboard in the works.

(See Page 7)

Feedback

Expand pages

With regard to your question about the number of pages in MICROpendium and the cost of a subscription, we in the Cin-Day TI User Group would be willing to pay any reasonable cost increase and would like you to expand to as many pages as possible. Keep up the good work!

Ross Kettering
Dayton, Ohio

'Starving student' votes against increase

In regards to the subscription increase, I would hate to see it raised by \$10. I am but a starving student and am saddened by the reduced size but able to accept it.

Dean S. Mah
Red Deer, Alberta, Canada

Harrison doesn't have V3 MIDI-Master 99

Some time ago, there was a letter in Feedback in which a reader suggested that we have Version 3 of MIDI-Master 99. We don't. The product has not been released, and so far as we can tell, no pre-release copies have gotten out. We *assume* that Mike Maksimik will let the world know when it is released. Like others, we've been waiting for a year and a half now.

Bruce Harrison
Harrison Software
Hyattsville, Maryland

Increase would mean parting of relationship

I just read the letters from your proposed increase to \$35. I know there are many will-

ing to pay the additional. However, I am now retired on Social Security, and found myself trying to justify spending \$25 this year. I know I speak for a minority, but if you raise the price \$10 we will be parting our relationship. I was a member of a group for a while, and we all had our own subscription. If these groups who are getting half price really want to keep it alive, why not see if they will pay full price? After all, they can divide the cost, I can't. This sounds like the government, they always take from the ones who have the least. The TI is still my main machine and I don't want to change now, but believe me, I cannot afford more, and I think there will be others that feel the same. It's not fair to us. There must be other ways. Although I like more pages, I would rather keep it the way it is than raise the price.

Name withheld
by request

READER TO READER

Butler M. Tyler, Box 32106, Raleigh, NC 27622, wants to know if Harrison Software's "Smart Connect" can be used via a modem to do all transfers. He also asks if a documentation book exists on how to get around on a bulletin board. He also asks:

In the September issue the article on "Speeding Up Your Console" gave a new crystal type to replace. It had bugs if you didn't keep the old one and switch between them.

My question is what type of electronic data or whichever goes through this crystal circuit to require two different crystals. I need something more than just words. Give me the circuit lingo and maybe we could find something on the market that would handle it.

Ian J. Howle, 3707 S.W. Southern St., Seattle, WA 98126, writes:

I have a big problem; I am unable to utilize bit-map mode. I have read and reread the TI Assembly manual and have been unable to make progress.

I placed a value of >02 in VDP write-only register 0 and >06 in VDP write-only register 2, >04 in VDP write-only register 3 and > in VDP write-only register 4. The program does not function the way I intended.

I attempted to place a multicolor character at screen location >1804. The character value was >8040201008040201 and the color value was >63636F6F43434D4D. The program is as follows,

```
DEF START
REF VSBW,VMBW,VWTR
CHAR DATA >8040,>2010,>0804,>0201
COLOR DATA >6363,>6F6F,>4343,>4D4D
START LI R0,>0002 ACCESS BIT-MAP MODE
BLWP @VWTR
LI R0,>0206 CHANGE SCREEN TABLE
BLWP @VWTR
```

```
LI R0,>0304 CHANGE COLOR TABLE
BLWP @VWTR
LI R0,>0400 CHANGE PATTERN TABLE
BLWP @VWTR
LI R0,>0711 SET SCREEN COLOR TO BLACK
BLWP @VWTR
LI R0,>0000 PLACE PATTERN DEF.
LI R1,CHAR
LI R2,8
BLWP @VMBW
LI R0,>2000 PLACE COLOR DEF.
LI R1,COLOR
LI R2,8
BLWP @VMBW
LI R0,>1804 PLACE CHAR >00 IN COL. 4
LI R1,>0000
BLWP @VSBW
LOOP JMP LOOP
END
```

This program didn't crash, but created some interesting graphics. I attempted to initialize the screen with >00 through >FF three times, it did crash. I watched the images speeding across the screen, wondering if I could have ever done anything like that intentionally, then the screen went blank.

Please help. I am frustrated that the TI Assembly Manual does not have a demo program. Could you or anybody write one? Also, a demo program of using subprograms with the BLWP would be helpful too.

Reader to Reader is a column to put TI and Geneve users in contact with other users. Address questions to Reader to Reader, c/o MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

Saving loan records

By REGENA

Correction! I found an error in the "Loan Records" program in the September 1992 MICROpendium. Line 2150 should be 2150 IF COPY=0 THEN 2180

The program works okay when you get a printed copy, but if you only looked at a loan on the screen the interest would eventually be too great.

I have had a lot of response to this program, so I guess other people besides my family work with loans. The main revision needed was to be able to SAVE the data as you work with a particular loan. For example, the program needed to be able to load the loan each month as you make a payment — the past history would be the same and you shouldn't have to type in all in each time. So — here is the revision with a SAVE and LOAD option.

The main idea of this program is that you start with a loan balance at a certain date with a certain interest rate. You may enter a date and a new interest rate when the rates change. You may add to the loan at any time. When you make a payment, the daily interest is calculated, and you can see the interest due, the principal payment, and the balance of the loan. The computer calculates the number of days ND between the transactions.

If you change the interest rate or the loan balance between payments, the differences are calculated in the interest due. You may stop the program after any transaction and the total interest paid will be shown. The program automatically ends when the loan is paid off.

In this program revision, you may select the option to SAVE the data at the beginning of the program. Enter the device you want to save to and the title of the file. For example, you may use DSK1.TRUCK or DSK2.CINDY. The first time you do a loan, you will select "Work With New Loan." As you enter transactions, they are saved.

The next time you use the program you can choose "Retrieve Previously Saved Loan Information." Enter the device and the same title that you used before. The computer will read data in, one transaction at a time. After each transaction you will be asked to press the ENTER key if you want to keep the information as is or press C to change the information.

If you keep pressing ENTER after each transaction, the loan information stays the same. After the last saved transaction, the computer will go to the "New Transaction" section so you can add the next transaction.

If you choose to change the information, the loan will be the

same up to that point and not including the information on the screen. The computer will go to the "New Transaction" section and you add information as before.

You may update by saving a previously saved file (and adding to it or making changes). Choose the SAVE option at the beginning of the program. Be sure to use a *different* name than the name you used before (such as DSK1.TRUCK2). Then you select "Retrieve Previously Saved Information" and enter the name of the previously saved loan (such as DSK1.TRUCK). You may then choose whether to print the report or not.

Any statement with #1 is printing, anything with #2 is saving, and anything with #3 is retrieving. The OPEN # statement defines the device, and PRINT # prints or saves and INPUT # retrieves from the device.

I did not add an editing feature — although you could if you would like to. I was hurrying to meet this publication deadline. Just be sure to type things in accurately. You can always select the SAVE option (using different titles each time), then if you make an error entering data, simply end that program and start again, retrieving as much as you can from the saved portion. As soon as you select C to change, you need to enter data from that point on. The reason is that if there is a change, the interest due and balance would be different from then on (and I was too lazy to program an editing feature).

If you have already typed in the September program, you don't need to type in this whole program. I did not RESequence the line numbers in this program so you can more easily see the changes. Load the September loan program, then change Line 2150. Then change line 260, and add lines 105, 225, 227, 315, 762, 1592, 1822, 2142, 2475, 2476, 2477, and 2510 to the end.

If you wish to save typing effort, you may have a copy of this program by sending \$4 to REGENA, 918 Cedar Knolls West, Cedar City, Utah 84720. Be sure to specify that you need "Saving Loan Records" for the TI and whether you want diskette or cassette.

Also--use the above address to let me know if you are going to Fest-West North '93 and would like to stop by Cedar City on your way there. Fest-West is a great place to meet wonderful people involved with the TI and to get anything you need for your TI. We are going to ski Brian Head before Fest-West and the Salt Lake area the Monday after Fest-West, so plan to join us!

Looking for something worthwhile to do in 1993?

Attend a TI fair and get more out of your TI!

REGENA ON BASIC —

```

100 REM LOAN RECORDS !054
105 REM REVISED !236
110 REM BY REGENA !071
120 DIM M(12)!113
130 CALL CLEAR !209
140 PRINT TAB(5); "*** LOAN RE
CORDS ***" !212
150 PRINT : : : "ENTER DATE,
INTEREST RATE," !138
160 PRINT : "LOAN ADD-ON, OR
PAYMENT." !102
170 PRINT : : "THE INTEREST,
PRINCIPAL," !110
180 PRINT : "AND BALANCE WILL
BE SHOWN.": : : :!187
190 FOR J=1 TO 12 !108
200 READ M(J)!155
210 NEXT J !224
220 DATA 31,28,31,30,31,30,3
1,31,30,31,30,31 !110
225 GOSUB 2520 !049
227 IF CH=3 THEN 2475 !246
230 PRINT "DO YOU WANT A PRI
NTED COPY? (Y/N)" !006
240 COPY=0 !242
250 CALL KEY(3,K,S)!190
260 IF (K=78)+(K=110)THEN 31
5 !124
270 IF (K<>89)+(K<>121)=-2 T
HEN 250 !059
280 COPY=1 !243
290 REM PRINTER CONFIGURATIO
N !086
300 OPEN #1:"RS232.BA=600" !
222
310 PRINT #1:"DATE RATE
LOAN ADD-ON PAYMENT I
NTEREST PRINCIPAL BALA
NCE": : : :!146
315 ON CH GOTO 3000,320 !245
320 PRINT : : : "STARTING DAT
E": :!163
330 INPUT "YEAR ":Y !189
340 Y=INT(Y)!172
350 IF (Y>1899)+(Y<2101)=-2
THEN 380 !248
360 PRINT "PLEASE ENTER YEAR
FROM 1900 TO 2100": :!125
370 GOTO 330 !154
380 IF (Y=1900)+(Y=2100)THEN
410 !134
390 IF Y/4<>INT(Y/4)THEN 410
!135
400 M(2)=29 !168
410 PRINT : :!006
420 INPUT "MONTH NUMBER ":MO
!070
430 MO=INT(MO)!050
440 IF (MO>0)+(MO<13)=-2 THE
N 470 !200
450 PRINT "ENTER MONTH NUMBE
R 1-12": :!210
460 GOTO 410 !234
470 PRINT : :!006
480 INPUT "DAY ":DAY !238
490 DAY=INT(DAY)!182
500 IF (DAY>0)+(DAY<M(MO)+1)
=-2 THEN 530 !108
510 PRINT "DAY MUST BE FROM
1 TO ";M(MO)!249
520 GOTO 470 !038
530 CALL CLEAR !209
540 PRINT STR$(MO);"/";STR$(
DAY);"/";STR$(Y)!005
550 PRINT : : "ENTER ANNUAL I
NTEREST RATE IN PERCENT": :
!156
560 INPUT "INTEREST RATE ":R
!072
570 IF R>=0 THEN 600 !032
580 PRINT "INTEREST RATE MUS
T BE >= 0" !050
590 GOTO 550 !119
600 IF R<=100 THEN 630 !160
610 PRINT "INTEREST RATE MUS
T BE <= 100" !147
620 GOTO 550 !119
630 PRINT : : : "STARTING BAL
ANCE" !004
640 PRINT : "ENTER BALANCE DU
E IN DOLLARS": :!008
650 INPUT "BALANCE ":BAL !23
5
660 IF BAL>0 THEN 690 !057
670 PRINT "BALANCE MUST BE G
REATER THANZERO" !046
680 GOTO 630 !199
690 BAL=INT(BAL*100+.5)/100
!197
700 MONEY=BAL !021
710 GOSUB 2230 !014
720 BAL$=MONEY$ !093
730 GOSUB 2310 !095
740 GOSUB 2380 !165
750 CALL CLEAR !209
760 PRINT DATE$;" ";R$;"%
";BAL$: : :!143
762 GOSUB 2700 !230
770 IF COPY=0 THEN 790 !008
780 PRINT #1: :DATE$;TAB(16-
LEN(R$));R$;TAB(74-LEN(BAL$)
);BAL$ !033
790 PRINT : : : : "**** NEW TR
ANSACTION ****" !218
800 ND=0 !073
810 PRINT : : : "ENTER DATE":
: :!103
820 INPUT "MONTH NUMBER ":MO
2 !120
830 MO2=INT(MO2)!150
840 IF (MO2>0)+(MO2<13)=-2 T
HEN 870 !190
850 PRINT : "MONTH NUMBER MUS
T BE 1 TO 12": :!180
860 GOTO 820 !134
870 PRINT : :!006
880 INPUT "DAY NUMBER ":DAY2
!016
890 DAY2=INT(DAY2)!026
900 IF (DAY2>0)+(DAY2<M(MO2)
+1)=-2 THEN 930 !147
910 PRINT : "DAY MUST BE FROM
1 TO";M(MO2)!191
920 GOTO 870 !184
930 IF MO2<>MO THEN 970 !179
940 IF DAY2>=DAY THEN 970 !0
54
950 PRINT : "DATE MUST BE SAM
E AS OR LATER THAN LAST
DATE": :!144
960 GOTO 790 !104
970 IF MO2=MO THEN 1190 !207
980 ND=M(MO)-DAY !070
990 IF MO2>MO THEN 1130 !149
1000 REM NEW YEAR !021
1010 FOR J=MO+1 TO 12 !201
1020 ND=ND+M(J)!167
1030 NEXT J !224
1040 M(2)=28 !167
1050 Y=Y+1 !043
1060 IF (Y=1900)+(Y=2100)THE
N 1090 !049
1070 IF INT(Y/4)<>Y/4 THEN 1
090 !050
1080 M(2)=29 !168
1090 FOR J=1 TO MO2-1 !201
1100 ND=ND+M(J)!167
1110 NEXT J !224
1120 GOTO 1170 !229
1130 IF MO2=MO+1 THEN 1170 !
118
1140 FOR J=MO+1 TO MO2-1 !03
8
1150 ND=ND+M(J)!167
1160 NEXT J !224

```

(See Page 10)

REGENA ON BASIC—

(Continued from Page 9)

```

1170 ND=ND+DAY2 !179
1180 GOTO 1200 !003
1190 ND=DAY2-DAY !000
1200 PRINT : : "NUMBER OF DAY
S =";ND: : !185
1210 MO=MO2 !040
1220 DAY=DAY2 !172
1230 GOSUB 2310 !095
1240 CALL CLEAR !209
1250 PRINT DATE$: : !072
1260 PRINT "CHOOSE:" !101
1270 PRINT "1 CHANGE INTERE
ST RATE" !107
1280 PRINT "2 ADD TO LOAN"
!185
1290 PRINT "3 MAKE PAYMENT"
!065
1300 PRINT "4 END PROGRAM"
!244
1310 CALL KEY(3,K,S)!190
1320 IF (K<49)+(K>52)THEN 13
10 !056
1330 CALL CLEAR !209
1340 PRINT DATE$ !222
1350 ON K-48 GOTO 1450,1650,
1880,2430 !174
1360 REM INTEREST DUE !134
1370 DAILY=R/36500 !018
1380 DUE=DAILY*ND*BAL !246
1390 DUE=INT(100*DUE+.5)/100
!227
1400 ITD=ITD+DUE !031
1410 MONEY=ITD !039
1420 GOSUB 2230 !014
1430 ITD$=MONEY$ !111
1440 RETURN !136
1450 PRINT : : "CHANGE INTERE
ST RATE": : !203
1460 INPUT "ANNUAL PERCENT "
:R2 !177
1470 IF R2>=0 THEN 1500 !217
1480 PRINT : "RATE MUST BE >=
0": : !186
1490 GOTO 1460 !008
1500 IF R2<=100 THEN 1530 !0
89
1510 PRINT : "RATE MUST BE <=
100": : !027
1520 GOTO 1460 !008
1530 GOSUB 1370 !175
1540 R=R2 !148
1550 GOSUB 2380 !165
1560 CALL CLEAR !209
1570 PRINT DATE$ !222
1580 PRINT : "INTEREST RATE =
";R$ !137
1590 PRINT : "PRINCIPAL BALAN
CE = ";BAL$ !248
1592 GOSUB 2700 !230
1600 IF COPY=0 THEN 1620 !07
3
1610 PRINT #1: : DATE$;TAB(16
-LEN(R$));R$ !049
1620 PRINT : : "PRESS <ENTER>
TO CONTINUE" !211
1630 CALL KEY(3,K,S)!190
1640 IF K=13 THEN 790 ELSE 1
630 !251
1650 PRINT : : "ADD TO LOAN":
!024
1660 INPUT "AMOUNT ":ADDON !
111
1670 IF ADDON>0 THEN 1700 !1
98
1680 PRINT : "ADD AMOUNT GREA
TER THAN ZERO": : !048
1690 GOTO 1650 !199
1700 ADDON=INT(ADDON*100+.5)
/100 !243
1710 GOSUB 1370 !175
1720 MONEY=ADDON !172
1730 GOSUB 2230 !014
1740 ADDON$=MONEY$ !244
1750 BAL=BAL+ADDON !131
1760 MONEY=BAL !021
1770 GOSUB 2230 !014
1780 BAL$=MONEY$ !093
1790 CALL CLEAR !209
1800 PRINT DATE$ !222
1810 PRINT : "LOAN ADD-ON ";A
DDON$ !095
1820 PRINT : "PRINCIPAL BALAN
CE ";BAL$ !153
1822 GOSUB 2700 !230
1830 IF COPY=0 THEN 1850 !04
8
1840 PRINT #1: : DATE$;TAB(27
-LEN(ADDON$));ADDON$;TAB(74-
LEN(BAL$));BAL$ !075
1850 PRINT : : "PRESS <ENTER>
TO CONTINUE" !211
1860 CALL KEY(3,K,S)!190
1870 IF K=13 THEN 790 ELSE 1
860 !226
1880 PRINT : : "BALANCE = ";B
AL$ !225
1890 GOSUB 1370 !175
1900 PRINT : "INTEREST DUE =
";ITD$ !201
1910 PRINT : : : "ENTER PAYME
NT AMOUNT": : !176
1920 INPUT "PAYMENT ":PAY !0
62
1930 PAY=INT(PAY*100+.5)/100
!251
1940 IF PAY>0 THEN 1970 !089
1950 PRINT : "PAYMENT MUST BE
GREATER THAN ZERO": : !0
42
1960 GOTO 1920 !214
1970 MONEY=PAY !048
1980 GOSUB 2230 !014
1990 PAY$=MONEY$ !120
2000 PRIN=PAY-ITD !132
2010 BAL=BAL-PRIN !087
2020 TOT=TOT+ITD !078
2030 MONEY=PRIN !127
2040 GOSUB 2230 !014
2050 PRIN$=MONEY$ !199
2060 MONEY=BAL !021
2070 GOSUB 2230 !014
2080 BAL$=MONEY$ !093
2090 CALL CLEAR !209
2100 PRINT DATE$ !222
2110 PRINT "PAYMENT = ";PAY$
!202
2120 PRINT "INTEREST = ";ITD
$ !018
2130 PRINT "PRINCIPAL = ";PR
IN$ !159
2140 PRINT : "BALANCE = ";BAL
$ !044
2142 GOSUB 2700 !230
2150 IF COPY=0 THEN 2180 !12
3
2160 PRINT #1: : DATE$;TAB(39
-LEN(PAY$));PAY$;TAB(49-LEN(
ITD$));ITD$;TAB(61-LEN(PRIN$
));PRIN$;!240
2170 PRINT #1:TAB(74-LEN(BAL
$));BAL$ !132
2180 ITD=0 !152
2190 IF BAL<=0 THEN 2430 !20
1
2200 PRINT : : "PRESS <ENTER>
TO CONTINUE" !211
2210 CALL KEY(3,K,S)!190
2220 IF K=13 THEN 790 ELSE 2
210 !065
2230 A=MONEY*100 !166
2240 IF A<>0 THEN 2270 !156
2250 MONEY$="0.00" !243
2260 GOTO 2300 !083
2270 A$=STR$(A)!172
2280 LA=LEN(A$)!242

```

(See Page 11)

REGENA ON BASIC—

(Continued from Page 10)

```

2290 MONEY$=SEG$(A$,1,LA-2)&
". "&SEG$(A$,LA-1,2)!120
2300 RETURN !136
2310 M1$="0"&STR$(MO)!244
2320 M$=SEG$(M1$,LEN(M1$)-1,
2)!023
2330 D1$="0"&STR$(DAY)!045
2340 D$=SEG$(D1$,LEN(D1$)-1,
2)!252
2350 Y$=SEG$(STR$(Y),3,2)!12
6
2360 DATE$=M$&"/"&D$&"/"&Y$
!036
2370 RETURN !136
2380 R=INT(R*100+.5)/100 !20
3
2390 MONEY=R !152
2400 GOSUB 2230 !014
2410 R$=MONEY$ !224
2420 RETURN !136
2430 PRINT : : :!187
2440 MONEY=TOT !061
2450 GOSUB 2230 !014
2460 TOT$=MONEY$ !133
2470 PRINT "TOTAL INTEREST P
AID = ";TOT$ !021
2475 IF SV=0 THEN 2480 !022
2476 PRINT #2:"XXX",R$,BAL$,
",MO,DAY,Y,"", "", "",TOT !10
4
2477 CLOSE #2 !152
2480 IF COPY=0 THEN 2510 !19
8
2490 PRINT #1: : :TAB(5);"TO
TAL INTEREST PAID";TAB(49-LE
N(TOT$));TOT$ !057
2500 CLOSE #1 !151
2510 IF CH<>1 THEN 2515 !221
2512 CLOSE #3 !153
2515 STOP !152
2520 SV=0 !096
2530 PRINT "DO YOU WANT TO S
AVE THIS?": "(Y/N)" !215
2540 CALL KEY(3,K,S)!190
2550 IF (K=78)+(K=110)THEN 2
610 !124
2560 IF (K<>89)+(K<>121)=-2
THEN 2540 !054
2570 PRINT : : "ENTER DEVICE
AND NAME FOR SAVING, SUCH
AS DSK1.TRUCK":!134
2580 INPUT DEV$ !149
2590 OPEN #2:DEV$,INTERNAL,O
UTPUT,FIXED 192 !181
2600 SV=1 !097
2610 PRINT : : "CHOOSE:" !207
2620 PRINT : "1 RETRIEVE PRE
VIOUSLY SAVED LOAN INFORMA
TION" !227
2630 PRINT : "2 WORK WITH NE
W LOAN" !146
2640 PRINT : "3 END PROGRAM"
!168
2650 CALL KEY(3,K,S)!190
2660 IF (K<49)+(K>51)THEN 26
50 !120
2670 CH=K-48 !140
2680 CALL CLEAR !209
2690 RETURN !136
2700 IF SV=0 THEN 2720 !007
2710 PRINT #2:DATE$,R$,BAL$,
ADDON$,MO,DAY,Y,PAY$,ITD$,PR
IN$,TOT !182
2720 PAY$="" !147
2730 ADDON$="" !015
2740 RETURN !136
3000 CALL CLEAR !209
3010 PRINT "TYPE THE DEVICE
AND TITLE OF THE LOAN YOU
WISH TO RETRIEVE, SUCH A
S DSK1.TRUCK" !253
3020 INPUT DEVR$ !231
3030 OPEN #3:DEVR$,INTERNAL,
INPUT ,FIXED 192 !163
3140 INPUT #3:D3$,R3$,B3$,A3
$,M3,DA3,Y3,P3$,I3$,PR3$,T3
!062
3150 IF D3$="XXX" THEN 790 !
065
3160 PRINT : : :D3$ !086
3170 PRINT "INTEREST RATE =
";R3$ !007
3180 IF A3$="" THEN 3210 !17
6
3190 PRINT "ADD ON $";A3$ !1
29
3200 GOTO 3250 !013
3210 IF P3$="" THEN 3250 !23
1
3220 PRINT "PAYMENT = $";P3$
!136
3230 PRINT "INTEREST = $";I3
$ !210
3240 PRINT "PRINCIPAL = $";P
R3$ !096
3250 PRINT "BALANCE = $";B3$
!066
3260 PRINT : : "PRESS <ENTER>
TO KEEP THIS TRANSACTION."
!174
3270 PRINT : "PRESS <C> TO CH
ANGE.": :!183
3280 CALL KEY(3,K,S)!190
3290 IF K=13 THEN 3320 !056
3300 IF (K<>67)+(K<>99)=-2 T
HEN 3280 !246
3310 IF FLAG=0 THEN 320 ELSE
790 !114
3320 DATE$=D3$ !155
3330 R$=R3$ !221
3340 R=VAL(R3$)!000
3350 BAL$=B3$ !074
3360 BAL=VAL(B3$)!109
3370 ADDON$=A3$ !224
3380 MO=M3 !218
3390 DAY=DA3 !084
3400 Y=Y3 !163
3410 PAY$=P3$ !115
3420 ITD$=I3$ !099
3430 IF I3$="" THEN 3450 !16
9
3440 ITD=VAL(I3$)!134
3450 PRIN$=PR3$ !020
3460 TOT=T3 !060
3470 FLAG=FLAG+1 !173
3480 GOSUB 2700 !230
3490 IF COPY=0 THEN 3620 !03
3
3510 IF FLAG>1 THEN 3540 !17
8
3520 PRINT #1: :D3$;TAB(16-L
EN(R3$));R3$;TAB(74-LEN(B3$
));B3$ !044
3530 GOTO 3640 !149
3540 PRINT #1: :D3$;!076
3550 IF A3$="" THEN 3580 !03
5
3560 PRINT #1:TAB(27-LEN(A3$
));A3$;TAB(74-LEN(B3$));B3$
!008
3570 GOTO 3640 !149
3580 IF P3$<>"" THEN 3610 !0
18
3590 PRINT #1:TAB(16-LEN(R3$
));R3$ !236
3600 GOTO 3640 !149
3610 PRINT #1:TAB(39-LEN(P3$
));P3$;TAB(49-LEN(I3$));I3$;
TAB(61-LEN(PR3$));PR3$;TAB(7
4-LEN(B3$));B3$ !109
3620 ITD=0 !152
3630 PAY$="" !147
3640 ITD$="" !138
3650 IF BAL<=0 THEN 2430 !20

```

(See Page 12)

THE ART OF ASSEMBLY — PART 18

Whoa! Slow Down! Hold on a sec!

By BRUCE HARRISON
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The month before last, this column had some words about various delay loops, with the concentration on how to make those self-correcting when run on a Geneve or other faster machine.

Today we will concentrate on delays that do not need correcting, since they use the built-in VDP Timing, and so will work exactly the same on TI, Geneve, and "bus" modified TI. There are some things about the guts of the machine that we'll touch on first, after a short story.

Some years ago, your author was attending a "Computer Graphics" show, and saw a very nice computer driven display for showing the weather. It looked much like the kind of displays that are used today by every TV station, but this was before the era of the TI Home Computer. The guy demonstrating it was one of its design engineers. It really looked good until he told it to put a new display on the screen. While the new display was being formed, there was an effect on the screen like that caused by ignition noise on a TV set. Your author looked at this and said to the engineer, "I see you're stealing some of the display time to write to your refresh memory." The man's jaw dropped, and he replied, "I've been at this show two whole days and you're the first person who knew what caused that noise on the screen."

In the TI, we don't get that kind of effect because the TI synchronizes itself to the 60 Hz field rate of its video output, and writes to its refresh memory during the Vertical Interval, when the video output is blanked. The fact of doing things this way in the TI gives us some fringe benefits. It provides us a handy little "Timer" called the VDP Interrupt Timer, which counts time in 60th of a second intervals. (On models sold in Europe, we're told, it counts in 50th of a

(See Page 13)

SIDEBAR 18

* SOURCE CODE EXAMPLES

* BY B. HARRISON EXCEPT WHERE NOTED

*

* FIRST, A DELAY SUBROUTINE THAT'S CONSTANT ON TI, GENEVE, OR "BUS" TI

* THE CALLING PROGRAM WOULD LOOK LIKE:

```
LI R4,120      FOR A TWO-SECOND DELAY (MAX VALUE 255)
BL @DELAY     CALL THE DELAY SUBROUTINE
              (PROGRAM CONTINUES)
```

*

* SUBROUTINE LOOKS LIKE THIS:

*

```
DELAY CLR @>8378      CLEAR THE VDP INTERRUPT COUNTER
DLY1  LIM1 2          PERMIT INTERRUPTS
      LIM1 0          SHUT THEM OFF AGAIN
      C R4,@>8378     COMPARE VALUE IN R4 TO COUNTER
      JGT DLY1       IF R4 IS GREATER, REPEAT LOOP
      RT            ELSE RETURN, DELAY IS FINISHED
```

*

* SECOND VERSION OF SUBROUTINE NEEDS:

```
REF KSCAN      REFERENCE THE KSCAN VECTOR
```

* CALL LOOKS LIKE THIS:

*

```
LI R4,120      LOAD R4 FOR TWO SECONDS
BL @DELAY2     USE SUBROUTINE
              (PROGRAM CONTINUES)
```

* SUBROUTINE THEN IS:

*

```
DELAY2 CLR @>8378     CLEAR THE VDP INTERRUPT COUNTER
DLY2  LIM1 2          ALLOW INTERRUPTS
      LIM1 0          THEN STOP THEM
      BLWP @KSCAN     SCAN THE KEYBOARD
      CB @ANYKEY,@>837C HAS ANY KEY BEEN STRUCK?
      JEQ DLYX        IF SO, EXIT THE SUBROUTINE
      C R4,@>8378     ELSE COMPARE R4 TO COUNTER VALUE
      JGT DLY2       IF R4 IS GREATER, REPEAT LOOP
DLYX  RT            ELSE RETURN TO CALLING PGM
```

*

* DATA SEGMENT WILL NEED THIS:

*

```
ANYKEY BYTE >20
```

*

* FOLLOWING IS A KEY-ENTRY SUBROUTINE WITH FLASHING CURSOR

* ON ENTRY, R0 SHOULD BE SET TO THE SCREEN ADDRESS AT WHICH INPUT WILL APPEAR

* ON EXIT, R8 CONTAINS THE STRUCK KEY'S ASCII VALUE

* THE CALLING PROGRAM WILL HAVE TO DECIDE WHETHER TO PUT THE STRUCK

* KEY ON THE SCREEN, OR PUT THE OLD CHARACTER (ALTKEY) BACK

* (AS FOR A CURSOR MOVEMENT KEYSTROKE)

*

```
REF VSBW,VSBR,KSCAN REFERENCE UTILITIES
```

KENTRY

```
BLWP @VSBR     READ THE BYTE FROM CURRENT SCREEN POSITION
MOVB R1,@ALTKEY PLACE THAT BYTE AT ALTKEY
```

KI1

```
MOV @ON,R4     PLACE "CURSOR ON" DURATION IN R4
LI R1,>1E00    PUT CURSOR CHARACTER IN R1
INC @CURFLG    SET FLAG TO INDICATE CURSOR IS ON
```

KI1A

```
BLWP @VSBW    WRITE CHARACTER TO SCREEN
CLR @>8378    CLEAR THE VDP INTERRUPT COUNTER
```

KI2

```
BLWP @KSCAN   SCAN THE KEYBOARD
LIM1 2        ALLOW INTERRUPTS
LIM1 0        THEN SHUT THEM OFF
CB @ANYKEY,@>837C HAS A KEY BEEN STRUCK?
```

REGENA ON BASIC—

(Continued from Page 11)

```
1
3660 PRINT : "PRESS <ENTER>
```

```
TO CONTINUE" !211
3670 CALL KEY(3,K,S)!190
3680 IF K<>13 THEN 3670 !089
```

```
3690 CALL CLEAR !209
3700 GOTO 3140 !159
3710 END !139
```

THE ART OF ASSEMBLY—

(Continued from Page 12)

second intervals, to be compatible with the PAL video systems and 50 Hz power in use there.)

In today's sidebar, we start with a very simple delay loop that uses the VDP Interrupt timer to create a delay. This might be used to allow a couple of seconds to view a title screen, or any such simple delay to stop the computer for a known period of time. The parameter you need for this delay is simply a number in 60ths of a second. As shown, one could set the delay to two seconds by placing 120 in register 4 before entry to this loop. The counter affects only the single byte at >8379, so this loop will not work for numbers more than 255, or about 4.25 seconds. If there's a familiar ring to that number, it's because 4.25 seconds is the maximum duration for a CALL SOUND in BASIC or Extended BASIC. The timing of sounds uses the same counter, which is just one byte, and thus limits to the same 255 60ths duration.

Please note that in all cases where we have shown LIM1 2 followed by LIM1 0 in today's source code, these are essential to the operation of the code. Without those, the delay loops become infinite.

The second version in the sidebar is for those cases where you want the user to be able to abort the delay by pressing a key. This simply includes a KSCAN in the delay loop, so that any keypress will make the loop terminate before the counter times out. You can introduce slight variations on this theme so that, for example, only the ENTER key would terminate the delay.

Another use that can be made of the VDP interrupt timer is to blink the cursor during an input cycle. Some time back we showed a method for doing that without using the VDP Interrupt Timer, but in that case the flashing rate of the cursor would be faster on Geneves. The version shown here will have the same flash rate on either TI or Geneve. The values you put in the data for ON and OFF will determine how long the cursor stays on and off the screen. A value of 20 will give about one-third of second, for example. It will of course be slightly different on European models, because of their 50 Hz vertical sync, but that should keep it close enough to the "ball

(See Page 14)

```

JNE KI3          IF NOT, SKIP AHEAD
MOV @KEYADR,R8  ELSE PLACE KEY'S VALUE IN R8
RT              THEN RETURN
KI3  C  R4,@>8378  COMPARE VALUE IN R4 TO VDP INTERRUPT COUNTER
JGT  KI2          IF R4 IS GREATER, SCAN KEYBOARD AGAIN
CHNG
MOV  @CURFLG,R8  CHECK TO SEE IF CURSOR IS ON
JEQ  KI1          IF NOT, JUMP TO PUT CURSOR ON
MOV  @OFF,R4     ELSE PLACE "CURSOR OFF" VALUE IN R4
MOVB @ALTKEY,R1  MOVE THE CURRENT SCREEN CHARACTER TO R1
CLR  @CURFLG     CLEAR TO INDICATE CURSOR IS OFF
JMP  KI1A        GO BACK TO CONTINUE LOOP
*
* DATA SECTION NEEDS THE FOLLOWING:
ON   DATA 15     ABOUT 1/4 SECOND CURSOR "ON" TIME
OFF  DATA 25     LONGER TIME FOR CURSOR "OFF"
CURFLG DATA 0
ANYKEY BYTE >20  THE SPACE CHARACTER FOR COMPARISONS
ALTKEY BYTE 0    BYTE TO STORE THE CURRENT SCREEN CHARACTER
*
*
* THE FOLLOWING CODE SUPPLIED BY MERLE VOGT, CONVERTS A WORD TO ASCII STRING
* ON ENTRY, R12 POINTS TO A WORD LOCATION IN MEMORY
* ON EXIT, R12 POINTS AT THE STRING'S LENGTH BYTE
* THE SIGN BIT IS IGNORED, SO DECIMAL RANGES FROM 0 THRU 65535
* R10 IS MODIFIED BY THE SUBROUTINE
*
BINASC CLR @ASC      CLEAR FIRST TWO BYTES AT ASC
MOV *R12,@>835E    MOVE THE WORD TO >835E
BLWP @GPLLNK       USE GPLLNK
DATA >2F7C         WITH THIS ADDRESS DATA
MOVB @>8361,@ASC   GET LENGTH BYTE FOR STRING
MOVB @>8367,R10    GET LOW BYTE OF STRING ADDRESS
SRL  R10,8         RIGHT JUSTIFY
AI   R10,>8300     COMPLETE THE ADDRESS
LI   R12,ASC+1    POINT AT FIRST CONTENT BYTE
LOOP MOVB *R10+,*R12+ MOVE ONE BYTE AND INCREMENT POINTERS
CI   R10,>8367    ARE WE FINISHED?
JL  LOOP         IF LOW, KEEP GOING
LI   R12,ASC     POINT R12 AT STRING
CLR @>837C       CLEAR GPL STATUS BYTE
RT              RETURN TO CALLER

* DATA SECTION NEEDS FOLLOWING:
EVEN
ASC  BSS 6
*
*
* FOLLOWING CODE IS FROM HARRY WILHELM
* USE FOR DISPLAYING STRINGS OR OTHER STUFF IN EXTENDED BASIC ENVIRONMENT
*
* CALLING SEGMENT FOR A STRING WOULD LOOK LIKE THIS:

LI  R1,TSTR      POINT R1 TO THE STRING'S ADDRESS
LI  R0,11*32+3   POINT R0 AT DESIRED SCREEN LOCATION (E.G ROW 12, COL 4)
BLWP @PRSTR      BLWP TO THE SUBROUTINE
(PROGRAM CONTINUES)

* SUBROUTINES ARE SET UP AS BLWP VECTORS
*
PRSTR DATA >2038,PRSTR1
VMBW60 DATA >2038,VMBW61
*
PRSTR1 BL @>24CA   USE A SUBROUTINE TO PASS PARAMETERS FROM CALLING WS
MOV *R1+,R2      GET STRING LENGTH BYTE INTO R2
SRL R2,8         RIGHT JUSTIFY
JEQ VMBW6X      IF ZERO, SKIP THE STRING, IT HAS NULL LENGTH
JMP VMBW62      ELSE JUMP INTO VMBW62
VMBW61 BL @>24CA   USE SUBROUTINE TO GET PARAMETERS
VMBW62 MOVB *R1+,R3 MOVE A BYTE INTO R3
AI R3,>6000      ADD THE OFFSET FOR XB
MOVB R3,@>8C00   PLACE AT VDPWD LOCATION
DEC R2          DECREMENT CHARACTER COUNT
JNE VMBW62     IF NOT ZERO, SEND ANOTHER CHARACTER
VMBW6X RTWP    ELSE RETURN TO CALLERS WS AND CODE
*
* NOTE - WE ADDED THE LINE JEQ VMBWX JUST IN CASE THE STRING YOU POINTED TO
* BEFORE CALLING THE SUBROUTINE HAS ZERO LENGTH
*
* SAMPLE DATA THAT COULD BE USED WITH THE ABOVE
TSTR  BYTE 21    LENGTH OF THE STRING

```

THE ART OF ASSEMBLY—

(Continued from Page 13)

park" that it won't be annoying. Our preference in such situations is to have the cursor on the screen less than half the time, and that's why we've shown different values for "OFF" and "ON."

Way back when we were first learning Extended BASIC, we learned a technique from Millers Graphics to use CALL SOUND statements as timers in our programs. That can also be done in Assembly, by dumping a sound list into VDP ram and starting a loop that waits for the sound processing to finish. The sound itself can be "silent" if you like. Again this times in 60ths of a second, but by making the sound list itself longer, one can exceed the 4.25-second limitation. Of course one can also do that by double-looping the first example we showed, running multiple passes through a single delay loop.

Now let's switch gears for a moment, and catch up with some things our readers have told us about. In number 10 of this series, we showed, among other things, a routine to put a one word integer on the screen in decimal notation. Our thanks to Merle Vogt for passing along an undocumented feature that can be accessed through GPLLNK. This will take a one-word integer and convert it to a string in decimal notation for you. The sign bit is ignored, so the resulting string will represent a number as 0 through 65535. A sample source code section for using this GPLLNK feature is shown in the sidebar. Both Harry Wilhelm and Mr. Vogt have pointed out the screen scrolling feature using GPLLNK. Moving the current screen contents up by one row and producing a blank bottom row can be done this simply:

```
BLWP @GPLLNK
DATA >4D00
```

This can only be used in the normal 32-character screen mode, but works equally well from E/A or Extended BASIC environments, provided GPLLNK is available. You may have noticed that we have not used screen scrolling in any of our examples, but that's just our personal choice. We prefer a "Display At" kind of operation rather than a scrolling.

While we are on other subjects, let's skip backward a bit again. In an early number of this series, we showed a method we

```
TSTRC TEXT 'THIS IS A TEST STRING' FOLLOWED BY ITS CONTENT
```

* IF THE LENGTH IS A CONSTANT (NON-ZERO) VALUE, YOU CAN DISPLAY IT THIS WAY:

```
LI R0,11*32+3 R0 POINTS AT DESIRED LOCATION (E.G. ROW 12, COL 4)
LI R1,TSTRC R1 POINTS AT TEXT
LI R2,21 R2 CONTAINS LENGTH OF TEXT
BLWP @VMBW60 BLWP TO SUBROUTINE VECTOR
(PROGRAM CONTINUES)
```

*

* FOR THE CURIOUS READER, HERE'S WHAT'S AT >24CA, WHICH WE JUST USED ABOVE
 * THE CODE ENTRY POINT AT >24CA IS LABELED HERE AS GETWRT
 * THE CODE ENTRY POINT AT >24D0 IS USED FOR READ OPERATIONS, AND IS SKIPPED
 * OVER FOR WRITING OPERATIONS (SHOWN HERE AS LABEL GETRD)
 * WE HAVE ASSIGNED LABELS TO MAKE IT EASIER TO FOLLOW

```
GETWRT LI R1,>4000 WRITING OPERATION MASK TO R1
      JMP PARSET SKIP AHEAD
GETRD CLR R1 READING OPERATION
PARSET MOV *R13,R2 MOVE CALLERS R0 INTO SUB'S R2
      MOVB @>203D,@>8C02 SEND LOW BYTE OF SUB'S R2 TO VDPWA LOCATION
      SOC R1,R2 PUT THE MASK ON R2 FOR READ OR WRITE OPERATION
      MOVB R2,@>8C02 SEND HIGH ORDER BYTE TO VDPWA
      MOV @2(R13),R1 GET CALLERS R1 INTO SUB'S R1
      MOV @4(R13),R2 GET CALLERS R2 INTO SUB'S R2
      RT RETURN TO MAIN ROUTINE
```

* THE ABOVE IS USED WITH ITS TWO ENTRY POINTS BY ALL FOUR OF THE VXBX ROUTINES,
 * NAMELY VMBW, VSBW, VMBR, VSBR
 * IT IS SHOWN HERE FOR REFERENCE ONLY, AND SHOULD NOT BE COPIED INTO YOUR SOURCE

used for displaying a string to the screen with the "offset" for XB added to each character. Our friend Harry Wilhelm has passed along a more compact version, that works as a BLWP subroutine. (Harry is the author of the astounding "Missing Link" that Texaments sells.) His uses the workspace at >2038, which is used by VMBW and VSBW in XB. It also uses a subroutine that's part of the XB utilities area to set the VDP Write address and to get the parameters from the User's workspace. We have shown this with two entry points, one for the normal "string" setup, at entry point PRSTR, and another where the number of characters to display has been preset in the callers R2. This second entry point (VMBW60) works exactly like a normal VMBW, except that it adds the offset for you. Please bear in mind that this only works if you entered through Extended BASIC. Our sincere thanks go to Harry for these little gems, and for giving us permission to pass them along to you. We'll certainly use them, and hope some of our readers will find them useful too.

We suspect that there may be hundreds of undocumented features available in our machines, like the one Merle Vogt kindly offered. If any of our readers know of more such "goodies", we'll promise to pass them along in this column if our readers will send them to us at 5705 40th Place,

Hyattsville, MD 20781. We will check them out first to be sure they work as advertised. It takes time, because we work so far ahead of publication dates, but we will work those things in.

Several months ago we had a letter from one of our more avid readers asking about information on using the Joysticks and Sprite applications in Assembly programs. We sent that reader some sample source code from Scud Busters, but the thought occurred to us that we had not covered either subject in this column. Next month's column will delve into those two subjects, and provide the rest of our readers with similar source code, abridged somewhat so as not to fill up a whole issue with Harrison's Sidebar. After all, if there weren't room for the ads, we'd all have to do without our favorite mag! See you next month.

1993 TI FAIRS

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Fest West "North" 93, Feb. 13-14, Howard Johnson Hotel, Salt Lake City, Utah. Contact Fest West "North" 93 Committee, 1396 Lincoln Apt. B, Ogden, UT 84404 or Salt Flats BBS, (308) 394-0064.

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Northeast TI Fair, April 17, Waltham High School, Waltham, Massachusetts. Contact Ron Williams, 14 East St., Avon, MA 02322.

This TI event listing is a permanent feature of MICROpendium. User groups and others planning events for TI/Geneve users may send information for inclusion in this standing column. Send information to MICROpendium Fairs, P.O. Box 1343, Round Rock, TX 78680.

Sonata for TI

A musician's view of electronic music

By **DOLORES P. WERTHS**
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There has been some criticism from musicians as to the legitimacy of the computer and electronic sounds in the world of music. It has been said that we do it because we can't play real instruments.

Pierre Boulez, who had succeeded Leonard Bernstein as music director of the New York Philharmonic, went on to open the Institute for Electronic Music in Paris in which conventional instruments, synthesizers and computers are used together to create new sounds and new techniques.

The whole idea of programming music on a computer at first seemed absurd to me, too, when Bruce (Harrison) first told me people were doing it. (That was seven years ago.) He then played the "Bach Mini Concert" on the TI, and while I thought it was neat, I seriously wondered what use it had. Later, I was reminded of the story I read about how Baron Grimm asked the same question about the first balloon flight in Paris, 1783. Ben Franklin answered, "What good is a new born baby?"

Not long after hearing the "Bach Mini Concert," our daughter, Karen, entered the Prince George County Music Festival, and she decided

to perform an aria of which there were no recordings, only a photocopy of the autograph score which was in the Library of Congress.

I transcribed and hand-copied scores for piano accompaniment for Karen's teacher, and copied the mezzo soprano's part from soprano clef to treble clef, so Karen could read from it. The next day, with Bruce's and Karen's help, I transcribed my first music program on the TI sound chip. It was awful! But, it served its purpose, which was to aid Karen through the difficult passages. Karen went on to tie for first place in the music festival, and quietly made history by singing the aria's first known revival since 1786 when a guy named Tenducci last sang it. I learned then what good a new born baby was, and I became a champion of electronic music.

Consider the history of the pianoforte: Over a century passed before someone finally recognized it as a legitimate concert instrument. He was Johann Christian Bach. Before that it was considered a novelty.

Classical music is my personal preference in programming music for a couple of reasons: First, the compositions are better composed, therefore more challenging; and secondly, the works I program are public domain, so I don't have royalties and copyright disputes to worry about. I also like folk, military, and early music. Contemporary music has enough champions out there. It doesn't need me.

What I intend to do here is to share some of the techniques I used on the sound chip and continue to use on the MIDI, point out the limitations and pitfalls of both, and share some of the problems I encountered (and still do) while programming music. None of it should be taken as Gospel, since music arranging and interpretation is as varied as the musicians who play it.

KNOWING YOUR INSTRUMENT AND ITS LIMITATIONS

The sound chip is essentially a built-in miniature synthesizer waiting to be programmed. It produces a sound all its own, and regardless of how you manipulate it, it still has some quirks and traits that cannot be ignored. Therefore it must be treated as if it were a distinct instrument, different from any conventional one. When you play a chord on the sound chip, it produces very pure sounds at exact frequencies. The average conventional instruments, a Steinway piano, a Martin guitar, or even a modern flute, have certain imperfections which affect the tuning, thereby the frequencies it produces in each note may or may not always be right on the money. Those little imperfections are as much a part of their character as the wood or metal they are made from. A lot of hours of trial and error can be saved by learning to "hear" the work in your mind before keying it in, but this takes practice. It's a matter of learning to know your instrument. The sound chip has difficulty playing a dissonant chord. It sounds really sour. I usually avoid them because they deceive the listener into thinking there is an error in programming. Of course there are exceptions.

(See Page 18)

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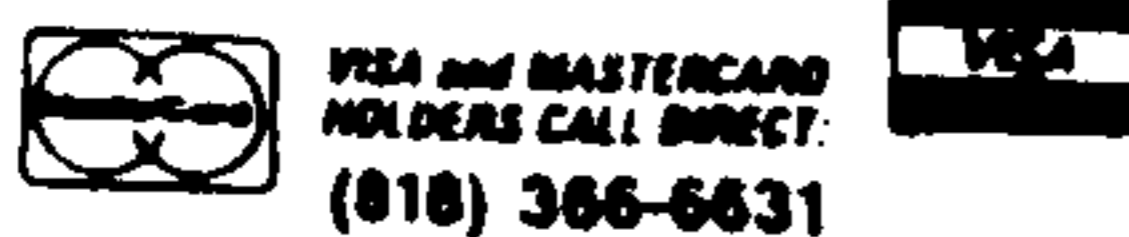
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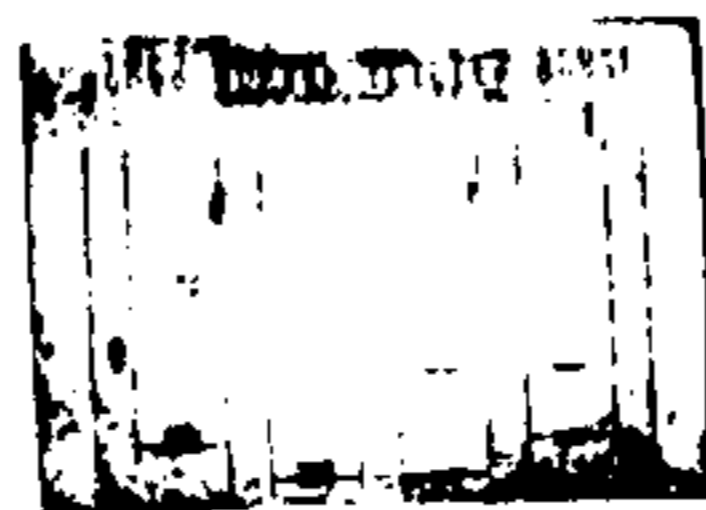
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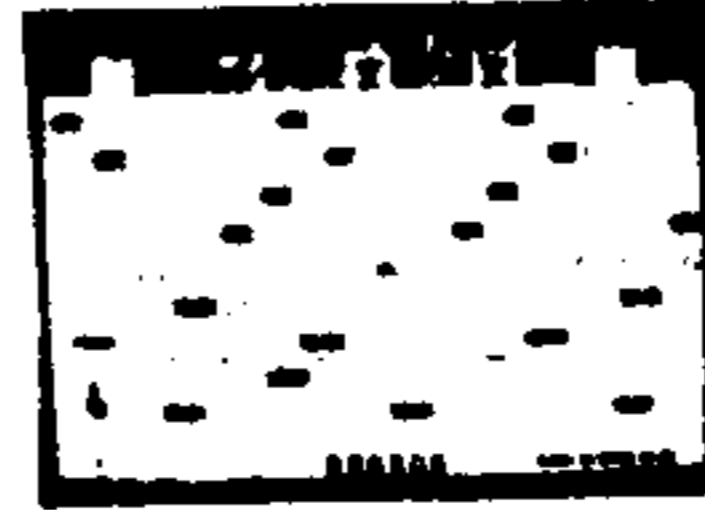
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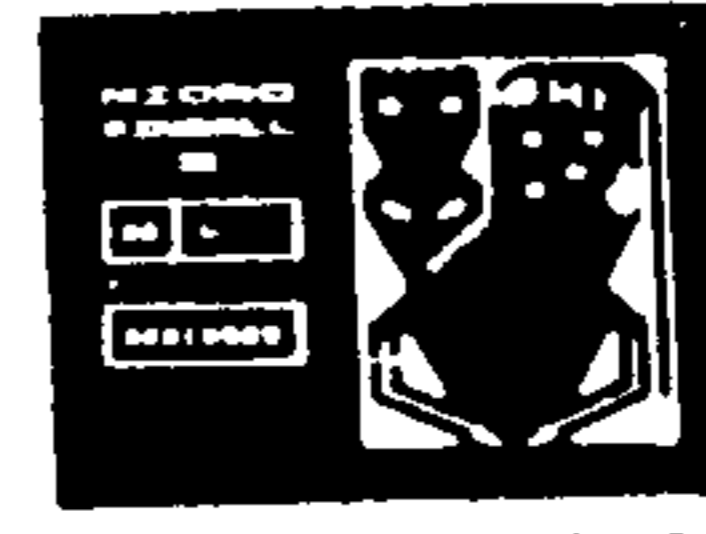
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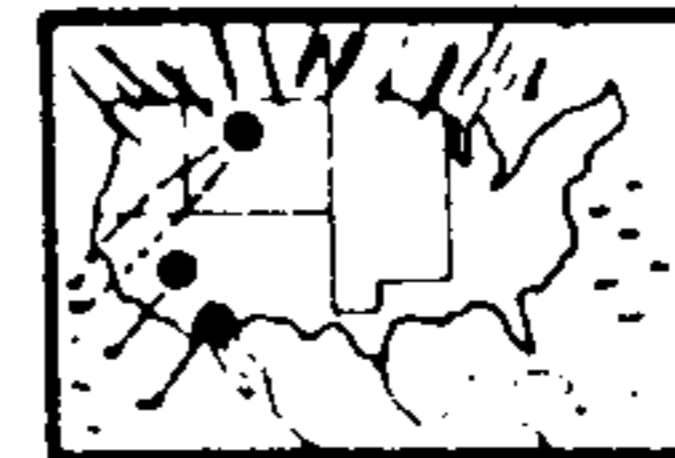
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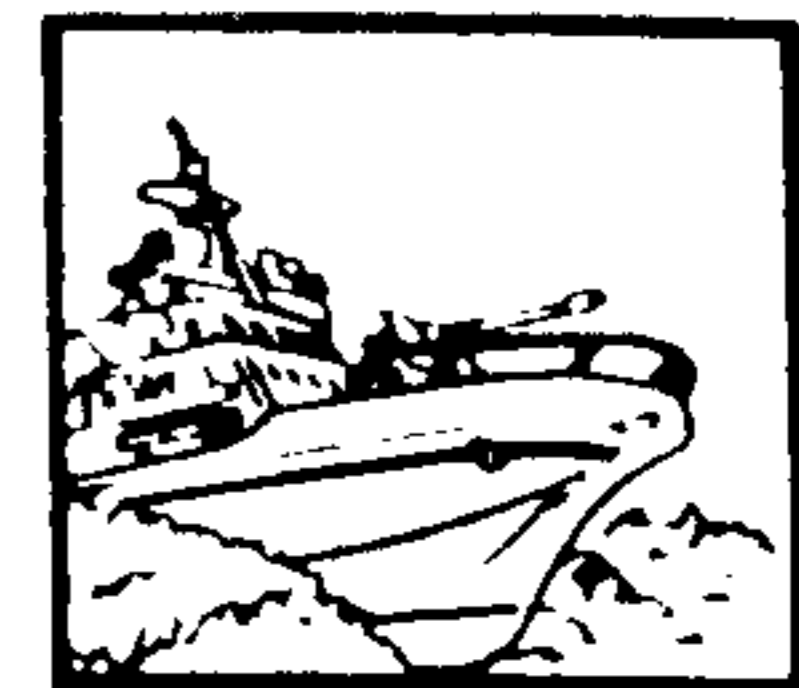
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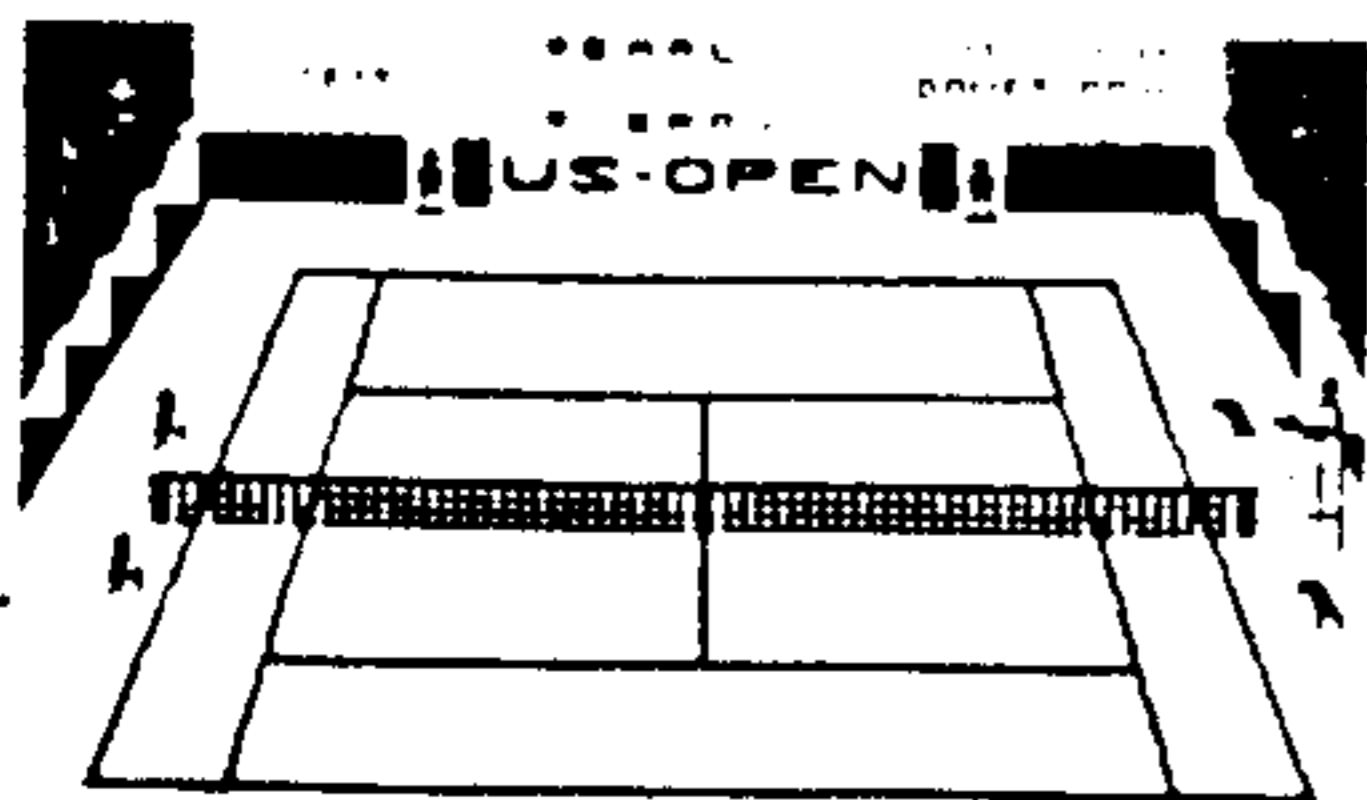
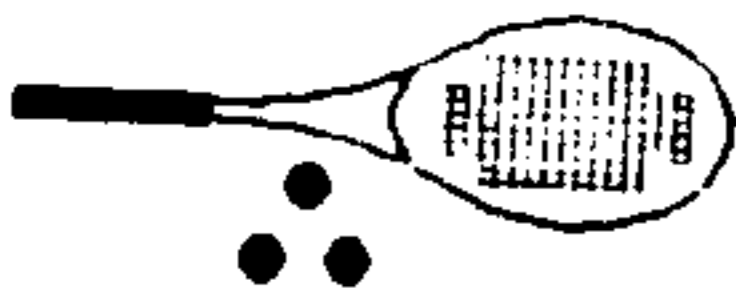
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MUSIC, SOUND CHIPS AND MIDIS—

(Continued from Page 15)

Almost anything goes in MIDI music, but the current version of MIDI-Master is limited to five octaves, so one must bear that in mind when programming for it. A Chopin piano piece might be difficult to transcribe, since he wrote for a piano with seven octaves. Know your synthesizer, its assets and its limitations, and you will have less trouble getting it to do what you want it to do.

MIDI-Master allows for the full range of dynamics, but it is limited to a single volume for all channels, unlike Cakewalk (for the PC) which gives individual volume control over each track for a careful balance between instruments.

The major problem I have with MIDI-Master is keeping every track properly synchronized. A single typo and the whole thing sounds like one of the musicians got up late and is running to catch the bus! I keep each track as a separate entity and I label each measure, thereby making it easier to track down synchronization errors. It also makes it easier to add or discard a track, as the case may be. Longer works require multiple files which I sort out by track numbers, but since MIDI-Master doesn't allow for multiple files, I use a file-combining "tool" designed by my partner, Bruce Harrison, to handle that. (Those of you MIDI-Master owners who would like to have and still don't own a copy of this marvelous file-combining "Tool," stay tuned, and I'll tell you where you can get your P.D. copy at the end of this article.)

THE GOSPEL ACCORDING TO TI

This is for new MIDI programmers who used to get some nice sounds out of their sound chip. I have heard numerous complaints that some of you are now having considerable difficulty getting your MIDI numbers to stop sounding like they were programmed by a Klingon. You are otherwise computer smart. Perhaps your musical training came from the Gospel according to TI. Musical octaves start at "A." Right?

Sorry, TI believers. The octave changes on "C" not "A." If you are one of these unfortunate victims, don't feel embarrassed. You're not alone. Try making these little changes in your MIDI program and see if it doesn't suddenly sound a little more down to earth.

CHOOSING THE APPROPRIATE MUSIC FOR THE SOUND CHIP

The choice of music should be appropriate for the "instrument" you intend to play it on. The sound chip's synthesized instruments resemble toy pianos, flutes, organs and drums, because of the 110 Hz bass limit. Music should be chosen so that music and sound chip compliment each other. It's that way with any instrument.

You wouldn't play Bach's entire "St. Matthew Passion" on a single harmonica. It would sound comical. For this reason I don't recommend works for large orchestra to be done on the sound chip. Most of them will sound ridiculous unless, of course, the ridiculous is what you are after. Otherwise it would probably be best to save those ideas for a MIDI.

If you still insist on trying, then keep in mind the obstacles you will be facing. The following advice should be heeded before you attempt orchestral works. A good score is a must. Then, a realistic vision of what to expect from three parts will

help. Take advantage of the sound chip's 7-octave "vocal" range. Some neat things happen when you do.

DOING LARGE WORKS IN THREE PARTS

Now and then I tried out more adventurous ideas. It was from those experiences that I learned some valuable lessons. The "Nutcracker Suite" taught me that programming orchestral works on a three-note Sound Chip takes a little imagination to say the least.

The "Nutcracker Suite" had great potential as a sound chip arrangement, but required some serious rethinking in order to make it work. First I did some serious listening to a great recording we have by Eugene Ormandy and the Philadelphia Orchestra. There was no way I could reproduce what they could do.

A more realistic approach was a series of chamber arrangements. Most of the shorter dance numbers transcribed very well. The "Dance of the Sugar Plum Fairy," the reason I started the project in the first place, required some extra work because a small but essential part was missing from the score. In fact, the entire piano score I worked from was full of mistakes which had to be corrected and poor transcriptions which had to be reworked. The missing part had to be worked out by ear from the recording, and was added later. The sound chip's broad range allowed for a perfect celesta in the highest octaves and a contrasting basset horn played the lower octave. I pushed its range to the limit. I left out some of the harmony in the "Arabian Dance" because I didn't want the overall effect to sound like one of those Magnus chorl organs, yet I kept the harmony in the contrasting upper registers because I liked the steam calliope sound it produced.

The "Nutcracker Suite" took three months from the first typed note to finished product, and was by far our top seller. However, I vowed never to attempt the likes of it again on the sound chip.

GETTING THAT 'BIG SOUND' ON A MIDI

Programming a multi-part piece of music on a MIDI is similar to doing it on the sound chip but on a much larger scale. After I have keyed in a piece of music and while I'm playing it back on the piano, I try to envision what I want the work to sound like. Keeping my synthesizer's strengths and weaknesses in mind, I follow Christian Bach's practice of letting contrast be the rule rather than an accident. I let the music's character guide my arrangements, and still try to keep it within the composer's wishes. A couple of my favorite sounds to lay the foundation and maintain unity in the arrangement, then a few splashes of color to brighten it up, some alternate sounds for the contrast at the appropriate changes in phrases and dialogue, and I've put the first set of patches in. I undoubtedly find some I want to change after playing it back, but the first set of patches determine whether the work will sound pleasing with that arrangement or not.

Perhaps in your household, or maybe in your grandparents' house, there is one of those sumptuous Hammond, Lowery or Wurlitzer organs with the "Big Sound." These old favorites are making a comeback and they are better than ever with brand new sounds as well as old favorites, and most of these modern descendants also have 16-channel MIDI capabilities as well.

Remember those neat old music books with special arrange
(See Page 19)

MUSIC, SOUND CHIPS, MIDIS—

(Continued from Page 18)

ments just for those organs? There were thousands of books and single sheets sold. Think they're too tired for a modern synthesizer? Those timeless music scores are finding new life and a new audience in the world of MIDI, and you don't always need to spend a lot of money to find them. Some time last year I found some 30- and 40-year-old Hammond organ scores of some classical numbers in a used book store. There were hundreds of them, classical and popular standards, being sold for a song. I buy more of them each chance I get. If you still have some of these delightful gems and loved them, hang onto them. If you have no use for them, send them my way — PLEASE. I'll buy them.

Those Hammond and Lowery arrangements seemed to be made for the MIDI. They are trouble-free professional arrangements without the hassle. They are so-o-o-o easy to work from, and the manual markings in these scores make it clear to even the beginner where to change registrations for that colorful "big organ" sound. Not only that, but you don't need a state-of-the-art synthesizer to reproduce these arrangements effectively. They sound beautiful on that \$300 Casio or Yamaha you found at K-Mart. If you have a used book store in your area, you might check them out as an inexpensive source of music scores for your MIDI programming, as well as for your own personal use.

THE FINAL TOUCHES

Sound chip or MIDI, I always make a final check to be sure no errors or details have been overlooked. I generally follow along with the score while I listen to the finished work, although by now I know exactly where everything is without looking for it.

Does the sound chip produce any squeaks or squawks? Does it trip and stumble? If so where? Does it have enough contrast? Did I leave out a staccato?

Does the MIDI program sound disconcerting? If so, it is probably out of sync. What about the foundation patches? Are they solid enough to maintain the listener's interest? Contrast? Color? Is there balance in the overall sound? Is the main melody being drowned out by the harmony?

Paying attention to details makes the work sound professional even if you're not, whether it be the simplest piano piece or a complex orchestral work. It will sound great when it is given the proper care in programming. There's no sense doing it if you don't want to sit down and listen over and over again once you're done.

MORE THAN A PLAYER-PIANO

If I may change the subject and climb up on a soapbox for a moment before closing....

Those who were at the Lima Fair this year heard me play my various recorders along with a series of Elizabethan and Renaissance numbers. My Casio was programmed to sound like an ancient recorder ensemble. I also play transverse flute (both a modern one and a Renaissance model) and a Martin D-28 acoustic guitar on which I'm somewhat rusty. Eventually I will program songs which will be appropriate for me to play on those instruments. I mention this because I wanted to show that MIDIs are more than electronic player pianos for the computer puke who can't play a musical instrument.

(See Page 20)

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TRIALS OF A C99 BEGINNER

File conversion

By CHARLES E. KIRKWOOD JR.

This article is written especially for those readers who do not have a program to convert display variable files to internal fixed files or vice versa. It was necessary to have an internal fixed file in order to use the file sort program in the last c99 article. After the file has been sorted the program can be used to either print out the sorted file or store it as a display variable file on disk.

Two functions are included: itoa(n,s) and atoi(s). The function itoa(n,s) is not included in the Conversion Library and is used to convert the integer, n, to a string, s. It is a modification of the function itod(nbr,str,sz).

Actually, there is very little needed in the way of explanation of this program. The prompts ask for the disk and file name of the display variable file, the disk and file name of the internal fixed file and its record size. This record size can be up to and including 80 characters. Then the program needs to know which way to convert. Type 1 if the conversion is from display variable to internal fixed or 2 if it is from an internal fixed to a display variable file. When the prompt asks for the disk and file name of the display variable file, PIO can be typed instead of the disk and file name. When converting from a display to an internal file the internal file starts with **record 1** and are counted, the final count is converted to a character string and stored in **record 0** (zero).

The functions CSUP, CFIO, and TCIO must be linked with your assembled file.

```
/*CONVERT;C*/
#include DSK1.STDIO
#include DSK1.TCIOI
```

```
itoa(n,s) /*convert n to characters in s*/
int n;
char s[];
{
    int sz,sn;
    if(n<0)
    {
        n=-n;
        sn=1;
    }
    for(sz=0;sz<=5;++sz)
    s[sz]=' ';
    s[sz]='\0';
    sz=sz-1;
```

```
while(sz>0)
{
    s[sz]=n%10+'0';
    sz=sz-1;
    if(!(n=n/10))
        break;
}
if(sn==1)
s[sz]='-';
return s;
}

atoi(s)
char *s;
{
    int sign,n;
    while(*s==' ')
        ++s;
    sign=1;
    if(*s=='-')
    {
        sign=-1;
        ++s;
    }
    if(*s=='+')
        ++s;
    n=0;
    while(*s>='0' & *s<='9')
        n=10*n+(s++)-'0';
    return(sign*n);
}
```

```
main()
{
    int i,in,out,k,f1,f2,r,j,s,c,col;
    char fin[81],fout[81],rl[81],sj[81],buff[81];
    puts("          CONVERT\n\n");
    puts("Program will convert a display, ");
    puts("variable file to a relative, internal

    puts("fixed file or vice versa.\n\n");
    puts("D/V DISK and FILE ");
    f1=gets(fin);
    puts("\nI/F DISK and FILE ");
    f2=gets(fout);
    puts("\nRECORD SIZE ");
    r=atoi(gets(rl));
```

(See Page 21)

MUSIC, SOUND CHIPS AND MIDIS—

(Continued from Page 19)

The MIDI is a marvelous tool for the student musician struggling to learn those difficult passages. The flutist, violinist, pianist, or any musician in need of an accompanist or duet partner for practice at home could find the MIDI a lifesaver. The program is easily adjusted to play at your own pace, and because there is little room for error, the musician maintains good rhythm and timing without thinking. (Phrasing takes a little more practice on both

the part of the musician and the programmer.)

Computer music in general has a place as long as it has someone who appreciates it and an audience to play to. So, musician or not, program it, and enjoy playing it and listening to it. And Vive Pierre Boulez!

Public domain copies of the file-combining "Tool" for use with MIDI-Master may be obtained from Harrison Software, 5705 40th Place, Hyattsville MD 20781 for a \$1 copying and shipping fee.

c99—

(Continued from Page 20)

```

puts("\nConvert D/V to I/F  1");
puts("\nConvert I/F to D/V  2");
puts("\n      Type 1 or 2  ");
k=getchar();
col=80;
if(k=='1')
{
  in=fopen(f1,"r");

out=fopen(f2,OUTPUT+INTERNAL+RELATIVE+FIXED,r);
  j=1;
  while(fgets(buff,col,in))
  {
    twrite(buff,j,out,r);
    ++j;
  }
  i=0;
  j=j-1;
  itoa(j,sj);
  twrite(sj,i,out,r);
  fclose(in);
  fclose(out);
}
else if(k=='2')
{
in=fopen(f2,INPUT+INTERNAL+RELATIVE+FIXED,r);
  out=fopen(f1,"w");
  j=0;
  tread(buff,j,in,r);
  putchar(10);
  puts(buff);
  putchar(10);

```

```

fputs(buff,out);
k=atoi(buff);
for(j=1;j<=k;++j)
{
  tread(buff,j,in,r);
  puts(buff);
  fputs(buff,out);
  putchar(10);
}
fclose(out);
fclose(in);
}
}

```

There are many uses for a sort that can sort many records. One that comes to mind right now is to catalog all the MICROpendium disks. sort them and then print out an index. You might want to store and sort your other disks. So, below is a short Extended BASIC program, called DIRECTORY, that can be used to read the file names and store them in a display file. Two drives are required, one to read the disk catalog and the other for the master file. A disk catalog (directory) is read, then the prompt tells you to change disks, and press Enter. This program stores the file name, the disk name, the file size, the type file, and the record length on disk. To terminate the process just type **E** when the prompt calls for a new disk. You can add new disk catalogs to the master file at any time later. The records already stored will not be erased. The file can be erased by using a disk manager.

The c99 CONVERT program will convert your display file to an internal file. Use a record length of 33. FILESORT will sort your internal file and CONVERT will convert the sorted file back to a display file.

DIRECTORY—

```

100 CALL CLEAR !209
110 DIM T$(5)!109
120 T$(1)="DF" !240
130 T$(2)="DV" !001
140 T$(3)="IF" !247
150 T$(4)="IV" !008
160 T$(5)="PR" !012
170 PRINT "          DISK CATAL
(See Page 22)

```

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The most advanced Extended Basic for the TI-99/4A. RXB is an extension of the original TI XB and the Gram Kracker XB. RXB is 100% compatible with all XB programs. RXB is also 100% compatible with CALL LINK assembly and imbedded assembly. In addition all TI BASIC programs run without changes. By Rich Gilbertson. What sets RXB apart from the others?

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Examples: CALL SOSO, multiple sounds; CALL CODE, coincidence check and delete sprite (this is setup as an if-coinc occurred-then delete sprite); etc.

- Forty new CALLs

RENAME and PROTECT disk files; HPUT and VPUT for displaying text; WINDOWS and GWINDOWS for writing to areas of the screen; LDIAG and RDIAG, a diagonal version of HCHAR; IO, direct CRU control, sound processing; PDISK, mini-RAM disk in lower 8K; GRAMIT and RAMIT, saves and restores lower 8k to alternate GRAM banks; new DSR routines for DSRLNK and GPLLNK are also included.

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User Notes

Northeast fair date set

The 1993 Northeast Computer Fair hosted by the TI99/4A User Group of the Boston Computer Society is scheduled for April 17 at the Waltham High School, Waltham Massachusetts.

Justin Dowling of the group says the date was chosen so as not to conflict with Easter or Passover holidays.

Production of the fair is coordinated by Ron Williams, 14 East St., Avon, MA 02322.

Fest-West seeks vendor confirmations

The Fest-West "North" '93 committee recently sent informations to potential vendors for the fair scheduled Feb. 12-14 at the Howard Johnson Hotel in Salt Lake City, Utah.

Registrations for vendor tables will be \$35 if received by Jan. 15, \$45 after the date. The tables are 3x6 feet. Harold M. Hilburn, vendor representative, says vendors should call or write for reduced rates if additional tables are needed. Hilburn says power will be available, but vendors must specify amp load requirements.

Hilburn says vendors are encouraged to present seminars or forums at the event.

A block of 40 rooms has been reserved by the Howard Johnson Hotel for Fest West at rates of \$55 single and double and

\$62.50 quad rooms. Room reservations must be made direct to the Howard Johnson Hotel, 122 West South Temple, Salt Lake City, UT 84181, 1-800-654-2000. Attendees should mention Fest West when reserving rooms.

For further information contact Hilburn at 4846 South 2575 West, Roy, UT 84067-1704.

Harrison offers Pop classics

Harrison Software's J.C. Bach Music unit offers a new collection of MIDI Master music pieces, "POP" Classics Et Al." Selections include "Stranger in Paradise," by Borodin; "Clair de Lune," by Debussy; "Skater's Waltz," by Walteufel; "Over the Waves"; and "Meditation" from Thais by Massenet.

These pieces and three others were arranged by Dolores P. Werths for Casio clavier. Instructions for playing on Yamaha claviers are included. Source files in SNF format are provided, so the user can "tailor" the music to his own tastes. The product comes as two DS/SD disks at \$10 from Harrison Software, 5705 40th Place, Hyattsville, MD 20781.

The MIDI-Master Users' Group organized by Werths and Jim Peterson has received a contribution from Bill Buckeyne for its library of MIDI music. For information on the group, write Werths at the above address.

Bruce Harrison of the company notes that some persons have complained that they cannot find a reasonably priced MIDI instrument. He suggests Service Merchandise as a source. Their toll free number is 1-800-251-1212.

Harrison notes that a bug in the company's Word Processor will crash the program if the disk with the bug eliminated is available to any current owner for \$2 to cover materials and mailing. Owners need not return the old disk.

MS Express releases Page Pro Cataloger

A program used to catalog Page Pro fonts, borders, pictures, pages and text files is being offered by MS Express Software. The program was written by Norman Rokke.

The program offers a variety of options to help Page Pro users maintain notebooks of their Page Pro files, fonts, etc. The program costs \$14.95, plus \$1 shipping. A Page Pro Cataloger Notebook, which includes 10 clear top-loading page protectors, is available for \$5.95, plus \$2 shipping. Both are available for a package price of \$19.95, plus \$3 shipping.

For more information, write to MS Express Software, P.O. Box 498, Richmond, OH 43944.

Reach thousands of TI and Geneve users with your product and event announcements. Mail them to MICROpendium Newsbytes, P.O. Box 1343, Round Rock, TX 78680.

DIRECTORY—

(Continued from Page 21)

```
OG" !156
180 PRINT !156
190 INPUT "INPUT DISK[1-3]?
":A !227
200 INPUT "OUTPUT DISK AND F
ILE? ":D$ !090
210 OPEN #2:D$,APPEND,DISPLA
Y ,VARIABLE !091
220 OPEN #1:"DSK"&STR$(A)&".
",INPUT ,RELATIVE,INTERNAL !
122
230 ON ERROR 340 !094
```

```
240 INPUT #1:A$,J,J,K !155
250 FOR I=1 TO 127 !163
260 INPUT #1:B$,B,J,K !148
270 IF B<0 THEN PR$="Y" ELSE
PR$=" " !192
280 K$=STR$(K) !192
290 B=ABS(B) !122
300 IF B=5 THEN K$=" " !071
310 IF LEN(B$)=0 THEN 340 !1
77
320 PRINT #2:B$;TAB(12);A$;T
AB(22);J;TAB(26);T$(B);TAB(2
9);K$;TAB(32);PR$ !192
```

```
330 NEXT I !223
340 CLOSE #1 !151
350 PRINT :: PRINT !186
360 INPUT "CHANGE INPUT DISK
,
PRESS <ENTER> TO
CONTINUE PRESS E TO END ":
E$ !228
370 CALL CLEAR !209
380 IF E$<>"E" THEN 220 !206
390 CLOSE #2 !152
400 END !139
```

First Draft/Final Copy

A radical departure from TI-Writer

By JOHN KOLOEN

TI users have never had a shortage of word processing programs. A list of them would probably fill a page. And, for the most part, they've been modeled or adapted from TI-Writer, the original TI word processor. Those that have not stayed close to this model have failed to attract wide distribution. Among these is Companion, by far the fastest and most unique of the word processors available for the TI.

Now comes First Draft/Final Copy by Art Gibson. Although modeled on TI-Writer, it also diverges farther from the model than other TI-Writer clones. TI-Writer was perhaps the starting point for First Draft/Final Copy, but it definitely has gone its own way. First Draft is the equivalent of the TI-Writer editor and Final/Copy is similar in function to the TI-Writer formatter.

Among First Draft's more notable features is a virtual text buffer which allows you to create documents as large as 1440 sectors on a double-sided, double-density disk. Also handy is a configuration function that allows you to customize First Draft for such things as tab settings, screen and text colors, word wrap, default drives for dictionaries and screen width (40 or 80 columns). First Draft also uses pull-down menus and lets you view a document on a disk while another document is in memory.

The catalog function supports a variety of commands that should have been included with TI-Writer from the very start. They include outputting the directory to a printer, adding comments to a disk that appear just under the disk name when cataloged, protecting, unprotecting and deleting files as well as marking files. File marking is used to load a file after cataloging a disk. With the catalog on screen, you cursor to the file you want to load and press M. This highlights the file. When you want to load it from the Files menu, you simply select the Load option and the drive number and filename you highlighted automatically appears on the input line.

First Draft even lets you rename a file (FCTN D) and initialize a disk in SSSD to DSDD formats (FCTN O).

Review

REPORT CARD

Performance	B
Ease of Use	B
Documentation	C
Value	A
Final Grade	B

Cost: \$39.95, plus \$3 S&H U.S., \$4 Canada

Manufacturer: Asgard Software, P.O. Box 10306, Rockville, MD 20849

Requirements: TI99/4A or Geneve with 2 disk drives (1 can be a RAMdisk), expansion RAM, XB or E/A, printer.

One other advantage to First Draft is the near elimination of that annoying pause in TI-Writer when ending one line and beginning another. You can type freely with this program, seldom getting ahead of the text buffer. And, of course, it comes with a 25,000 word dictionary/spell checker.

Other innovations include an extensive online help file, a built-in text file converter (D/V80 to D/F80 and vice versa) and the ability to compose text using side-by-side, newspaper-style columns. However, I don't recommend doing this unless your TI supports an 80-column display.

What will TI-Writer users give up in exchange for all these new options? Here's a list:

- No "Oops" key.
- It takes considerably longer to save a file than on TI-Writer.
- Setting up First Draft requires loading a configuration file and saving it. It will take some time reading the manual to get it right. One hint, which is mentioned in the manual, is to make sure that you save the configuration file using a different filename than the original config file. Also, if you load from XBASIC, you'll need to use the loader that comes with First Draft and enter as the filename the name you gave to your configuration file.

• First Draft does not support windowing.

• First Draft won't reformat to larger margins. So, if you set your margins at 5 and 35, don't expect to be able to reformat to 1 and 40.

• First Draft won't read TI-Writer text files. First Draft creates D/F80 files. However, the built-in converter will handle the conversion process quite handily. Incidentally, a Display/Fixed file is roughly twice as large as the identical file saved as Display/Variable. Interestingly, Final Copy will print either D/F80 or D/V80 files.

PERFORMANCE: The first thing you do with First Draft is to run the configuration utility. This is done from a menu that appears when the program is loaded. There are three options initially: Configure, run Final/Copy and a utility used to organize words in the First Draft dictionary.

The configuration program is easy to use. Simply respond to the queries. What I like best about the config program is that you can establish "permanent" indents, tabs and line margins, which can be changed at any time using First Draft. It asks if you want word wrap on or off (I suggest on) and whether you want First Draft to load with insert mode on or off. Then you are prompted for a name to save the file, which is initially called UE. Don't try to save it with the name UE because the config utility will not overwrite an existing file. Actually, the config program saves the entire First Draft program as three assembly language files (UE, UF and UG). If you call it UE40, for example, it would be saved as UE40, UE41 and UE42. Although you can have as many configurations as you have disk space, I recommend keeping only one on your working copy of First Draft and reserve the bulk of the disk space for the dictionary files. (You'll need a DSDD disk to include the dictionary files.)

Having saved the config files, First Draft automatically loads itself. However, to load the program in the future, you'll need to add it as an item to the main menu, probably below the dictionary utility. You do this by pressing FCTN-9 at the main

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FIRST DRAFT/FINAL COPY—

(Continued from Page 23)

menu and cursoring down to the slot in the menu reserved for the letter D. (Menu items are arranged alphabetically.) On one line you enter the menu item and on a second line you enter the drive where your config file is stored and its name, ie. UE40.

EDITING SCREEN

The First Draft editing screen is somewhat different from TI-Writer. At the top are five pulldown menus: Files, Strings, Lines, Other and Help. Below it is a solid line and below that is a line that tells you the location and number of the dictionary you are using as well as whether word wrap is on and whether you are in insert mode. On the next line is a readout for the line number you are currently on as well as the disk drive and filename you are using. On the next line are the margins, indent and tab settings. This same line also occurs at the bottom of the screen, which seems like overkill to me. I'd rather have the duplicated line used for text.

Another dramatic difference between TI-Writer and First Draft is that there are no line numbers on the left side of the screen. If you're used to turning off the line numbers on TI-Writer, then this shouldn't present a problem. However, line numbers are important when trying to use the Lines option. The Lines pulldown menu lets you goto, move or copy any line or series of lines. However, as with TI-Writer, you have to know the line numbers of the text you want to move, copy or goto. The only way to find this out is to move the cursor to the appropriate line and look at the line number readout at the top of the screen. This is something that TI-Writer users will have to get used to.

The Files menu offers the following options:

- Catalog, Open an existing D/F80 file
- Save a file
- Close a file
- Merge files
- Print a document without formatting commands
- Quit
- View a D/F or D/V80 file.

The catalog option is way ahead of the Show Directory function of TI-Writer. Merging one file with another is easy to

do, though time-consuming since First Draft writes the second file to disk as it merges.

EASY SEARCH AND REPLACE

The Strings option is easier to use than the TI-Writer Search/Replace function. All you do here is pull down the Strings menu, select Find, enter the word or characters you want to find and press enter. The cursor then moves instantly to that word. If you want to modify a word, enter the word you want to change and the word you want to change it to. Then press enter and the cursor instantly highlights the string you want to change. You have the option of changing it, stopping or going on to the next occurrence. A third option from the String menu is Spell, which lets you check the spelling of the next word after the cursor or the entire document. Both operations take a long time and I don't recommend using it unless you are running out of a RAMdisk.

The Other menu lets you reset tabs, screen color, dictionary in use and convert files. You'll get most use out of the the file conversion option, especially if you want to load TI-Writer files into First Draft.

EXTENSIVE ONLINE HELP

The final menu option from First Draft is Help. This accesses an 85-sector help file which you can access by page number. It is easy to use and very helpful.

Editing keys are similar to those used in TI-Writer. Character deletion is FCTN-1, insert on/off is FCTN-2, delete line is FCTN-3, page up is FCTN-4, word tab is FCTN-5, page down is FCTN-6, tab is FCTN-7, insert line is FCTN-8, escape is FCTN-9 and word wrap on/off is FCTN-0.

Control keys include CTRL-2, reformat; CTRL-3, goto left/right margin; CTRL-4, goto next paragraph; CTRL-5, goto beginning of the file; CTRL-6, goto last paragraph; CTRL-7, goto end of file; CTRL-8 and CTRL-9 display characters 30 and 31, used for printer commands; CTRL-0, erase to end of line; and CTRL- =, displays character 29, used for printer commands.

You'll notice the absence of keys to enter carriage returns and page breaks. Carriage returns are entered when you hit the enter key at the end of a paragraph, assuming there are no lines below the point at

which you want the carriage return symbol to appear. If you hit the enter key while in the insert mode, a carriage return will also be created regardless of where you are in a document.

Overall, I didn't find it difficult to adapt to the editing or function/control options supported by First Draft. However, those who are accustomed to having their entire documents available in RAM will have to get used to the idea of being able to display only a maximum of 199 lines. As an example, I am now on line 258 of this review. If I want to scroll back to the beginning of the review I have to wait for that part of the review to be loaded back into memory while the lines that I'm currently displaying are saved to disk. This is a time-consuming process and the only way to speed it up is to use a RAMdisk while working on your document. A RAMdisk will speed the process up significantly. I gave it a "B" on performance because of the difficulty I had editing long documents.

FINAL COPY

Final Copy outputs formatted copy to printer. Formatting commands are the familiar "dot" commands used by the TI-Writer formatter. However, Final Copy supports a number of dot commands not available with TI-Writer.

Formatting commands are entered in First Draft the same way as they are entered using the TI-Writer editor. There are far too many dot commands to list here, including those used to place and load TI-Artist Instances and Page Pro pictures within documents (.Gn to load a graphic and .GM to define left margin for a graphic and line width). The extensive support for dot commands allows the user to take greater control over a printer than is possible with TI-Writer.

Fortunately, there are a number of sample files included with Final Copy to show you how to use the various dot commands.

Not having a windowing capability like TI-Writer requires extra care when composing full page documents on a 40-column screen. However, there is plenty of flexibility in the dot commands supported by this software and a little trial and error effort will likely produce results you can't get out of TI-Writer.

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FIRST DRAFT/FINAL COPY—

(Continued from Page 24)

DOCUMENTATION: First Draft comes with a 23-page bound manual, plus an additional 16 pages of appendices listing dot commands and how to use them. It's obvious that a lot of time was put into the manual, which makes it unfortunate that Asgard didn't use a better printer to output the master pages. The type is fuzzy and everything looks like it's set in bold-face.

Although there is a table of contents, there is no index, which would have been useful. I would also like to have seen more information about Final Copy, which gets short-shrift here. For example, when I tried to output this review, I was presented with a number of input prompts without any clue as to what information I was supposed to enter. Was it asking me to input page number ranges? Or printer definitions? I didn't have a clue. And the manual remains silent on the question. I figured out later that the @ character is used as a default for the dot prompt command. I then went back and changed the dot prompt character to something else not used in the document and proceeded with the formatted printout. Also, the appendices left out at least one dot command (.PT) which is described in one of the example files as Prompt Text.

Overall, the manual could have been better organized. I found it somewhat confusing for a beginner and then it was difficult to find answers to questions I had about using the program, especially Final Copy. For all of these shortcomings, I gave the manual a "C."

EASE OF USE: Operating First Draft

should be no problem for anyone familiar with TI-Writer. Final Copy, because of the greater number of dot commands it supports, will take some time to master. But you expect that from a program that gives you capabilities you've never had. And, in some respects, there is an *unlearning* curve here. You'll have to learn to do without the Oops command and become accustomed to a radically different file saving technique. I give it a "B."

VALUE: At \$39.95 First Draft/Final Copy represents a different and affordable approach to word processing than most Tiers have experienced. It has far more capability than TI-Writer and is priced less than TI-Writer was when it first came out. (For those who already own Asgard's Spell-It! spelling checker, First Draft is only \$29.95.) I gave it an "A" for value because you get a lot for a reasonable price.

Incidentally, Asgard says First Draft is Geneve compatible. Unfortunately, I was unable to load it on my Geneve, despite numerous attempts.

FINAL GRADE: The biggest issue for me is whether I can get used to the virtual buffer approach to file saving. In 40-column mode you can write 200 lines before the buffer is filled, while in 80-column mode you are limited to 100 lines.

I'm not even sure what the advantage is to a virtual buffer. I don't like the idea of having to wait several minutes for text to load in order to go to a specific point in a document to edit it. Even though this means you can have enormous documents, think of how long it will take to get back to the beginning, say, from line 1,000. It would be quicker to close the document

and reload it in order to get back to the beginning. It's for this reason that I highly recommend the use of a RAMdisk.

I also noticed that First Draft didn't always load the next section of text in 200 line blocks. Frequently, while scrolling up or down a document the program would begin reading from the disk after as few as 90 lines had been scrolled. I found this to be troublesome. I'd rather that it was consistent in loading 200 lines at a time. Makes it easier for editing. When initially loaded, however, First Draft consistently loads the first 200 lines.

Because of this, First Draft isn't a clearcut, miles-ahead kind of word processor. It has many advantages over TI-Writer and part of the price paid to gain these advantages was the reduction of available memory, which necessitated the virtual buffer approach.

Then, too, a version of First Draft is expected to be available that is compatible with the Asgard Memory System 128K/512K card. According to Asgard's Chris Bobbitt, this version of First Draft will be able to take full advantage of the extra RAM available with this card. I would expect this to be a clearcut winner.

But for now I'm in a quandary. I like First Draft a lot, but I'm not a fan of virtual buffers. If you've got a RAMdisk, then the problems posed by the virtual buffers are greatly reduced. If you don't have a RAMdisk, you'll still gain a lot of power from using First Draft, but it'll take you a lot longer. I have no qualms about recommending it if you intend to write documents of several hundred lines. But I don't recommend it for the Great American Novel.

MICRO-REVIEWS

King Turambar Disk Copy, Boggle, Musical Valentine's Day Card and Bonds

By STAN KRAJEWSKI

Thank you for your letters. It's nice to know that I can describe a program well enough that a particular user can see whether it is suited for him. That too is a purpose of this column. It's also a good feeling knowing that the first page you turn

to is MICRO-REVIEWS. Software and hardware are the heart of our system, and this column serves a purpose by letting everyone know what's out there. I also had some requests from users wanting to know more about users and goings-on in other areas. I will gladly accept any information

that anyone wants to give me to pass around to other user groups and or individual users. I will try to add bits of information to my column in this capacity to keep us a closer-knit group.

I have heard that the membership of the
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MICRO-REVIEWS—

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Chicago area TIers is going down. Yet on the other hand the San Francisco 99ers are going strong, with new members still appearing. I also heard from DORTIG (DORSET TIGROUP) a group in the south of England. These eight active members program, repair their own systems and enjoy helping with each other's problems. Anyone interested in contacting any group I mention can write me for the address.

I would like to remind some vendors that produce or sell software, to treat each order promptly. We need to cherish the users we have left. The last thing we need to do is disappoint users and make them feel uncomfortable with the future of our community. I have found that TIers are the most honest and friendly people to encounter; however, I and other users have had our orders neglected for several months. Let's work together to keep the good name of the users of our beloved TI99/4A and Geneve computers.

Ratings for the software reviewed in this column are based on the star system that follows.

★ Leave it alone, back to the drawing board.

★★ Needs improvements, but workable.

★★★ A good program, worth trying.

★★★★ Send your money and buy it.

NOTE: If the Geneve 9640 is NOT specifically mentioned in system requirements of any column I write, the program is TI99/4A compatible only.

★★★★

KING TURAMBAR DISK COPY

King Turambar has struck again. Remember his Fairware Drawing Master Program?

This program is a fast copier that uses all the available memory in the TI. As a result, one pass produces an SS/SD copy. System requirements are TI99/4A or Geneve 9640, 32K memory, Editor/Assembler cartridge or Option 5 loader, disk drive and the Maximem cartridge.

Even though this program copies SS/SD disks, it is not limited to that. It will copy from 360 to 2880 sectors, depending how many phases you put it through. That's a DS/HD copy capability! However, at this

time it is a single drive copier.

Although this program was supposed to run on the TI with the TI Controller, I could not get it to run. It would load, and the screen would say BUTTON ON "M". I have no idea what this means. The only thing I can figure is you have to have the Maximem 56 KB cartridge on the TI or a P-GRAM device. The Geneve must have the extra memory needed. Also this program will not run on a CorComp Controller, including the CorComp Micro Expansion System. So I can only guarantee it to run on the Geneve. I hope the author will write me and shed some light as to why it didn't work on my TI system.

Operating the program is as simple as typing "COPY1" at the E/A 5 prompt. It then asks you how many phases you would like to use. One phase is a full 360 sectors, two phases, 720 sectors. It continues up to eight phases in 360 sector increments. The docs describe 1 phase as 90KB. This is a 360-sector disk; 360KB would be a DS/DD disk. Do not confuse KB for sector size. What else does this copier offer that others don't? If an error occurs, it will wait for you to press enter, then just pick up from where it left off. After the copy is completed it will ask you, copy "Again Y/N."

Source code is included on disk along with the Rag Software Program Linker. This is Fairware and the author asks a donation if you use the program or the source code. International money orders may be purchased at the U.S. Post Office. For a copy of King Turambar Disk Copy send to: Laurent Peron, "La Feuillade" No 10, Saint Front de Pradoux, 24400 Mussidan, France.

★★★

BOGGLE

System requirements are Geneve 9640 or TI99/4A, 32K RAM, Extended BASIC and disk drive.

Boggle is a word game using the computer as a random letter generator. An unlimited number of players can play. Its screen consists of a 4x4 grid which contains 16 letters. After the letters are displayed, a three-minute timer begins counting. Each player will then try to decipher

as many words as possible by looking at the grid. Blocks containing letters can be used for each word, as long as the last letter touches the new letter. Words created by each player are jotted down on paper for reading back at the end of the three-minute period. Instructions are included for point value and explanation of the game.

This game differs from other games of its genre, because unlike word searches, the words in this game do not have to be in a straight line. The letter grid is almost a full screen in size, thus making the letters easy to read from a distance. This reduces the crowding around the computer, just to see the playing grid, in multiple-player games.

A useful feature is the ability to stop the timer and create the drawing of a new grid by pressing the "R" key. This is used if the grid is undesirable by containing too many consonants and no vowels. Also, the drawing of the board is fast as the program contains assembly routines.

The price for Boggle is \$7.95 plus \$ S&H. It's available from D&L Software, 89 Little Neck Ave., Swansea, MA 02777.

★★

MUSICAL VALENTINE'S DAY CARD

I haven't seen anything come out for Valentine's Day, except for this program by 13-year-old Sam Carey. Though his programming ability is not commercial quality, he continues to show an effort in programming.

System requirements are Geneve 9640 or TI99/4A, 32K RAM, Extended BASIC and disk drive. I'm sure this would work without the 32K and disk drive system, and you should ask for cassette if all you have is Extended BASIC and a cassette system.

This program starts by asking you to input your valentine's name. After you press enter, "I Left My Heart In San Francisco" will play. At the same time the computer will draw a heart, asking your valentine to "be mine," by name. Surrounding the heart is a border of moving hearts.

Musical Valentine's Day Card is available from Software And More, 5820 SE Westfork St., Portland OR 97206-0742.

(See Page 27)

Comparing languages

By RICH GILBERTSON

Gilbertson is the author of Rich GK Extended BASIC—Ed.

How to compare languages presents a Catch 22 situation. I mean, you would have to know about each language in order to compare them. Otherwise you're really just taking someone else's word for it as to which one is best for you.

I can't totally solve your problem as even I and many others in this field don't know all the computer languages for the TI. I do know we have ASPIC, LOGO, Fortran, Cobol, Forth, C, BASIC, Extended BASIC, and GPL. And oh, yes, Assembly language. In this installment we will only be concerned with the most common TI99/4A languages. Those are the ones that have been around the longest, Assembly, GPL and Extended BASIC. I purposely dropped BASIC, as Extended BASIC will run any BASIC program. (At least my RichGKXB will.)

So Extended BASIC is known by everyone, or at least you know it exists even if you can't write programs in it. Assembly is that mythical language you've heard is the fastest and best, also the hardest to learn and work with. This leaves GPL, the only language specifically for the TI. Graphics Programming Language or GPL is built into the operating system of the TI and actually is what puts the cartridge menus up on screen. GPL is half of the operating system of the TI and has some distinct advantages over other languages for the TI. One is, as GPL is built into the TI to begin with, you never need to load anything to make GPL programs work. As with Assembly and BASIC, the operating system has everything needed to run these languages. There are tons of tutorials on Extended BASIC and Assembly, but very few on GPL! With that in mind I thought it best to show all three languages doing the same thing.

The following programs are not complete programs in the sense that they will work by themselves. The Extended BASIC programs

will function because the interpreter is built in the cartridge through GPL — that's 90 percent of what Extended BASIC is written in — while only 10 percent of Extended BASIC is Assembly. Both GPL and Assembly need a compiler to convert the following source code into a object code that can be loaded and run. So the source code of the following programs in GRAMKcracker Extended BASIC, GPL and Assembly all do the same thing, but are not fully functional by themselves.

To simplify what each one does, the Extended BASIC program's version of each program explains what is going on. If you are not one who understands Extended BASIC either, now's your chance to start learning and at the same time see two other languages.

EXTENDED BASIC PROGRAM BYTES USED 14 * NOTE USES GPL Routine.
100 CALL CLEAR

GPL PROGRAM BYTES USED 2
ALL 32

* NOTE SUPPORT NOT NEEDED AS
OPERATING SYSTEM IS BUILT IN.

ASSEMBLY PROGRAM BYTES USED 16
LI R0,>2000
LI R1,767
J1 BLWP @VSBW
DEC R1
JNE J1

* NOTE I AVOIDED COUNTING THE
ASSEMBLY SUPPORT ROUTINES IN
ORDER TO MAKE THIS PROGRAM
WORK. SPACE OF ARTICLE IS
LIMITED. 1K IS NEEDED FOR
SUPPORT ROUTINES.

EXTENDED BASIC PROGRAM BYTES USED 10
100 GOTO 100

GPL PROGRAM BYTES USED 2 OR 3
BR LABEL
BS LABEL
B LABEL

ASSEMBLY PROGRAM BYTES USED 2 OR 4
JMP @LABEL
B @LABEL

EXTENDED BASIC PROGRAM BYTES USED 41
100 CALL JOYST(1,X1,Y1) :: CALL KEY(1,K,S)

GPL PROGRAM BYTES USED 4
ST >01,@>8374
SCAN

(See Page 28)

MICRO-REVIEWS—

(Continued from Page 26)

The price is \$10 plus \$1 S&H.

★★★ BONDS

System requirements are Geneve 9640 or TI99/4A, 32K RAM, Extended BASIC, disk drive and an Epson-compatible printer.

This is a program that will store your U.S. Savings Bonds. It'll store the bond number, purchase date and purchase price. Add a Record — lets you create up to 350 records per file, and reload your file back into memory for adding more bonds. Delete a Record — lets you delete any

bonds that you have cashed in. Display Records — displays all of your bonds on screen, including the serial number, issue date and value. It will also calculate and display the interest of each bond and the value of all the bonds. Print File — prints a hard copy of your bonds and their value.

Since interest rates constantly change, Add New Interest Rate allows you to enter the market interest rates after the five-year prescheduled rates. With the program Bonds you don't have to do any guessing, or go to a bank for the redemption rate. It does all the calculating for you. It will even display the penalty if you turn it in before the maturing date.

By entering a future date when entering

the program, you can even predict the return you will get by purchasing a bond of a particular dollar amount. For these reasons I feel the program does its job well, and the printout is an easily understandable helpful feature.

Bonds is available from D&L Software, 89 Little Neck Ave., Swansea MA 02777, priced at \$10.95 plus \$1 S&H.

If you would like your software or hardware reviewed in this column, you may send it to: Stan Krajewski, Route 6 Box 568-15, Live Oak, FL 32060. If you would like it returned, please include postage. If you need to call me for any reason, you may reach me at (904) 364-7897 E.S.T.

LANGUAGES—

(Continued from Page 27)

ASSEMBLY PROGRAM BYTES USED 12

```
LI    >0100
MOVB  R0,@>8374
BLWP  @KSCAN
```

EXTENDED BASIC PROGRAM BYTES USED 17

```
100 GOSUB 1000
1000 RETURN
```

GPL PROGRAM BYTES USED 4

```
CALL  SUB
SUB   RTN
```

ASSEMBLY PROGRAM BYTES USED 6

```
BL    @SUB
SUB   RT
```

EXTENDED BASIC PROGRAM BYTES USED 30

```
100 CALL HCHAR(12,16,42)
```

GPL PROGRAM BYTES USED 6

```
ST    42,V@368
```

ASSEMBLY PROGRAM BYTES USED 12

```
LI    R0,368
LI    R1,>2A00
BLWP  @VSEW
```

EXTENDED BASIC PROGRAM BYTES USED 58

```
100 CALL GCHAR(10,10,G) :: CALL HCHAR(20,20,G,4)
```

GPL PROGRAM BYTES USED 18

```
ST    V@298,@FAC
DST   >1714,@837E
LOOP  ST    @FAC,@>837D
      DEC  @>837E
      CEQ  >13,@>837E
      BR   LOOP
```

ASSEMBLY PROGRAM BYTES USED 30

```
LI    R0,298
CLR   R1
BLWP  @VSBR
LI    R2,3
LI    R0,628
LP    BLWP  @VSBW
      AI    R0,32
      DEC  R2
      JNE  LP
```

EXTENDED BASIC PROGRAM BYTES USED 45

```
100 CALL SUBROUTINE
1000 SUB SUBROUTINE
1010 SUBEND
```

GPL PROGRAM BYTES USED 4

```
CALL  SUB
SUB   RTN
```

ASSEMBLY PROGRAM BYTES USED 42

```
SUBWS BSS 32
SUB   DATA SUBWS
      DATA SUB2
SUB2  RTWP
      BLWP @SUB
```

EXTENDED BASIC PROGRAM BYTES USED 21

```
100 CALL MAGNIFY(3)
```

GPL PROGRAM BYTES USED 3

```
ST    >E2,#1
```

ASSEMBLY PROGRAM BYTES USED 8

```
LI    R0,>01E2
BLWP  @VWTR
```

EXTENDED BASIC PROGRAM BYTES USED 10

```
100 RANDOMIZE(8)
```

GPL PROGRAM BYTES USED 2

```
RAND >08
```

ASSEMBLY PROGRAM BYTES USED 8

```
LI    R0,>0800
MOV   R0,@>83C0
```

EXTENDED BASIC PROGRAM BYTES USED 20

```
100 CALL SCREEN(5)
```

GPL PROGRAM BYTES USED 3

```
ST    4,#7
```

ASSEMBLY PROGRAM BYTES USED 8

```
LI    R0,>0704
```

```
BLWP  @VWTR
```

EXTENDED BASIC PROGRAM BYTES USED 30

```
100 IF VAR=8 THEN 200 ELSE 300
```

GPL PROGRAM BYTES USED 7

```
L100 CEQ  8,@VAR
      BS   L200
      BR   L300
```

ASSEMBLY PROGRAM BYTES USED 8

```
L100 CI    8,@VAR
      JEQ  L200
      JMP  L300
```

GK EXTENDED BASIC PROGRAM BYTES USED 12

```
100 CALL BYE
```

GPL PROGRAM BYTES USED 1

```
EXIT
```

ASSEMBLY PROGRAM BYTES USED 8

```
LWPI  >83E0
BLWP  @>0000
```

You can see if you just look at the number of bytes used by each language that all of them suffer in some area. At times Extended BASIC approaches Assembly in memory usage, while at times Assembly approaches GPL in memory usage. It is apparent that GPL can't be beat even in the simplest of the routines that Assembly should excel in. Texas Instruments did a great job with creating GPL. It either matches Assembly in size or beats it every time. By the way, GPL also uses less memory than any other language I've compared it to, including Forth and C.

Now you know I think GPL is tops, and you may now have a little more respect for GPL. So with that in mind I'd like to add what can be done with GPL and Assembly combined. My work has resulted in a new Extended BASIC called Rich GK XB. The GK stands for GRAMKracke, so RichGKXB is RXB for short. RXB has a number of GPL commands available as Extended BASIC commands modified slightly so XB programmers can use them. One of them is a GPL command called MOVE, what does it do? EXAMPLE:

```
EX    MOVE  BYTES,@FROM,@TO
```

Breaking down this command we get EX is a label, MOVE is the command's name, BYTES is a value of how many ranging from 1 to >FFFF (65535). The @FROM means at label FROM which is an address and the opposite is the @TO which means the address destination. Got it, so it will move any number of bytes from any address to any address. The kicker is it does it with any type of memory from VDP, GRAM, GROM, ROM or RAM. Best of all, the above example only uses seven bytes. RXB has a MOVE command that is the exact same command, but modified for Extended BASIC users to have. EXAMPLE:

```
100 CALL MOVE(TYPE,BYTES,FROM,TO)
```

Note that the only real difference is the TYPE and it ranges from 0 to 11 with each type number meaning a different type of memory to a different type of memory. Like, say, 3 is from RAM to VDP, or 9 is from GRAM to RAM. Get the idea, by using RXB you would also be learning GPL, as the commands are the same. Now if you're the owner of a GRAM device like a GRAMKracke, GRAMULATOR, P-GRAM card, Mechatronics GRAM card, GRAMKART or other GRAM device you can most likely use RXB. The idea is to teach GPL in any fashion available.

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User Notes

Program reports key press values

This item, by Bob Webb, appeared in the Connection, the newsletter of the Kansas City 99ers.

This small program is one of my most used programs. I can never remember the number associated with a key press or ASCII symbol. So, I threw this thing together. Let me caution you before I continue: Do not run this program until you have saved it. Once you start it, the only

way to stop it is to turn your computer off. Function QUIT and FCTN 4 (break) are disabled so you can't break back in or kill it. This was done so that all combinations of key presses could be viewed. If you don't want these features, REM out lines 160 to 190. You must REM out or delete line 170 if you don't have a memory expansion hooked up or a syntax error is generated.

After this program is running, press any key. It's number will be displayed. If an ASCII symbol is associated with that particular key press it will also be displayed,

to the right of the number.

This program does not break any new ground. However, you might find a part of it to be of use. I have added one of my favorite little details to it. If not key is pressed for a given amount of time, it jumps to a screen saver type of subprogram. The BLANK variable is a counter. This clock ticks away and if a key is pressed it is reset to zero and begins again. If no key is pressed, it jumps down to line 400 and stays there until a key is pressed.

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LANGUAGES—

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Another command is a new command I'm just finishing for RXB called IO. Now IO means Input Output and IO allows the XB programmer to use a GPL command (the same name IO) in his XB programs. EXAMPLE: CALL IO(0,VDP-ADDRESS)

This command would go out to a VDP address and execute the list in VDP memory by the sound chip playing whatever it found there. It will play if whether or not you are running a program. The sound chip will run it independently of your present program

and can even repeat if the list tells it to. Other features of IO is its ability to also talk to a type of memory called CRU (Control Register Unit), better known as the IO chip. With this command almost every wire or chip in the TI99/4A can be read or written (controlled.) At first glance this stuff may sound like fantasy, but it is true, and I'm adding more to RXB everyday.

RXB is available from either C.A.D.D. Electronics or Bud Mills Services). Readers with questions may write Gilbertson at 2205 SE Salmon, Portland, OR 97214; or call (503) 233-7829.

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User Notes

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```

100 ! KEY TO NUMBER PROGRAM
110 ! EXTENDED BASIC & 32K
120 ! BY BOB WEBB, 6-1991
130 ! CAUTION: YOU WILL HAVE
    TO
140 ! TURN OFF COMPUTER TO E
    ND.
160 ! CALL LOAD disables qui
    t
170 CALL INIT :: CALL LOAD(-
    31806,16)
180 ! ON BREAK NEXT DISABLES
    FCTN 4
190 ON BREAK NEXT
210 CALL CLEAR
220 BLANK=0
230 DISPLAY AT(5,5):"KEY TES
    T PROGRAM"
240 DISPLAY AT(7,5):"Press A
    ny Key."
250 DISPLAY AT(9,5):"Its num
    ber will"
260 DISPLAY AT(10,5):"be dis
    played."
270 !
280 !MAIN LOOP
290 !
300 CALL KEY(0,K,S)
310 BLANK=BLANK+1
320 IF BLANK>1000 THEN 410
330 IF S=0 THEN 300
340 DISPLAY AT(12,4):K
350 DISPLAY AT(12,10):CHR$(K
    )
360 BLANK=0
370 GOTO 300
380 !
390 ! BLANK SCREEN
400 !
410 CALL CLEAR
420 CALL KEY(0,K,S)
430 IF S=0 THEN 420
440 GOTO 210

```

Output TRACE to a printer

This item appeared in the News Digest of the TI User Group of Sydney, New South Wales, Australia. It was written by Mike Slattery.

Ever dream of being able to send the output from the TRACE command to your

printer instead of having it on the screen? Dream no more, for salvation is at hand.

The following program will take the TRACE line numbers off the screen and dump them to your printer. To get the program to work, type it in or MERGE it at the end of your program and insert a GOSUB to the line number. Make sure your program reaches the GOSUB, otherwise it will not work.

```

100 OPEN #1:"PIO"
110 PR$=""
120 FOR R=1 TO 24 :: FOR D=3
    TO 28 :: CALL GCHAR(R,C,X):
    : IF C=3 AND X<>60 THEN
150 :: CALL HCHAR(R,C,32)::
    IF X=60 THEN 140 :: IF X=31
    OR X=32 THEN 150 :: IF X=6
    2 THEN X=32
130 PR$=PR$&CHR$(X):: CT=CT
    +1 :: IF CT>75 AND(X=32 OR
    X=31)THEN PRINT #1:PR$ :: P
    R$="" :: CT=0
140 NEXT C
150 NEXT R
160 PRINT #1:PR$ :: PR$=""
    :: CT=0
170 CLOSE #1 :: CALL CLEAR
180 RETURN

```

Execute NEW from inside program

This item has appeared in several user group newsletters. It is written by Jonathan D. Guidry.

The NEW command is very valuable to the programmer. However, it only executes in immediate mode. Have you ever wondered how to make the computer clear the memory from inside a program?

If you tried to use the word NEW after a line number, you got a *COMMAND ILLEGAL IN A PROGRAM error. The key word NEW, in immediate mode, resets memory positions -31868 and -31952 to FF, FF, FF, FF in hexadecimal.

Here is an example of the usage of resetting memory positions -31868 and -31952. If you plan to use the example below, you must have a memory expansion and E/A, Mini-Memory or Extended BASIC.

```

CALL INIT
CALL LOAD (-31868,255,255,255,255)

```

CALL LOAD(-31952,255,255,255,255)

In Extended BASIC, chain the three statements together using double colons. If you have a program in memory at the time these are executed, it will be erased. Try it.

These statements are most useful at the end of a program. For example, if you place these statements at the end of a directory program called LOAD in Extended BASIC, it will give you back the prompt after it is finished, and the memory will be erased.

These three statements can also guard that top-secret program you've been working on by erasing the memory if the correct password isn't given at the beginning of the program. It also prevents snooping. Also, do not forget that they can be put anywhere in a program.

Guidry encourages correspondence. He can be reached at 731-H Creighton Dr., New Iberia, LA 70560.

Disk drive upgrade recommended

This item appeared in several newsletters. It was written by Frank Aylstock.

The 5.25-inch (360K) disk drive is becoming an orphan. The disk controllers do not know if you have 3.5-inch or 5.25-inch drives. The only thing they know is what your input is, and the only control you have is the number of tracks per sector, number of sides and density.

The TI disk controller will handle double-sided but only single-density. The CorComp controller will handle double-sided and double-density. The Myarc controller will with the quad chip installed will handle disk drives up to 720K. (Without this chip the controller will handle up to double-sided, double-density.—Ed.) The 5.25-inch quad-density drives are another orphan, but you can use 3.5-inch disk drives. The 3.5-inch drives can be up to 1.44 meg. This means that you will have 2880 sectors, or the equivalent of eight SS/SD floppy disks.

The only drawback to the 3.5-inch drive is that all the programs you receive come
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User Notes

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on 5.25-inch floppy disks. However, you can set up your system so that you have at least one 5.25-inch disk drive. The Myarc HFDC will also accept up to quad-density disks.

I recommend that you switch to 3.5-inch drives for the following reasons:

1. The disks are enclosed in a shell/cover which hold them rigid and will not allow the disk to get bent. You can even write on the disk cover without harming the data.

2. They contain their own reuseable "write protect" tab.

3. They are small and require less space to store or transport.

4. They contain a sliding "door" which protects the storage medium at all times. They door opens and closes automatically when the disk is inserted or removed from the drive.

5. The small size also helps to read and write data faster than the 5.25-inch floppy drives.

6. The disks are coated with superior oxide which is less vulnerable to data loss.

7. They are considered more reliable than 5.25-inch disks, especially important when dealing with quad-density disks.

8. The drives take less current during the reading and writing process. In fact, some of the 3.5-inch drives use only five volts.

Last is the price. Around the Los Angeles area, the drives can be purchased for as little as \$50. And there is no conversion or other hardware changes to be made, and they will replace the existing drives with very little labor.

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