

```

*      *      #      #      @      @      %%%      $      $
**    **    ##    ##    @@    @    %    %    $    $
*   *   *   *   #   #   @   @   @   %   $    $
*     *     #     #     @     @     @     %     $$$$
*     *     #     #     @     @@    %     %    $    $
*     *     ###    @     @     %%%    $    $

```

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Mass Users of the Ninety nine and Computer Hobbyis

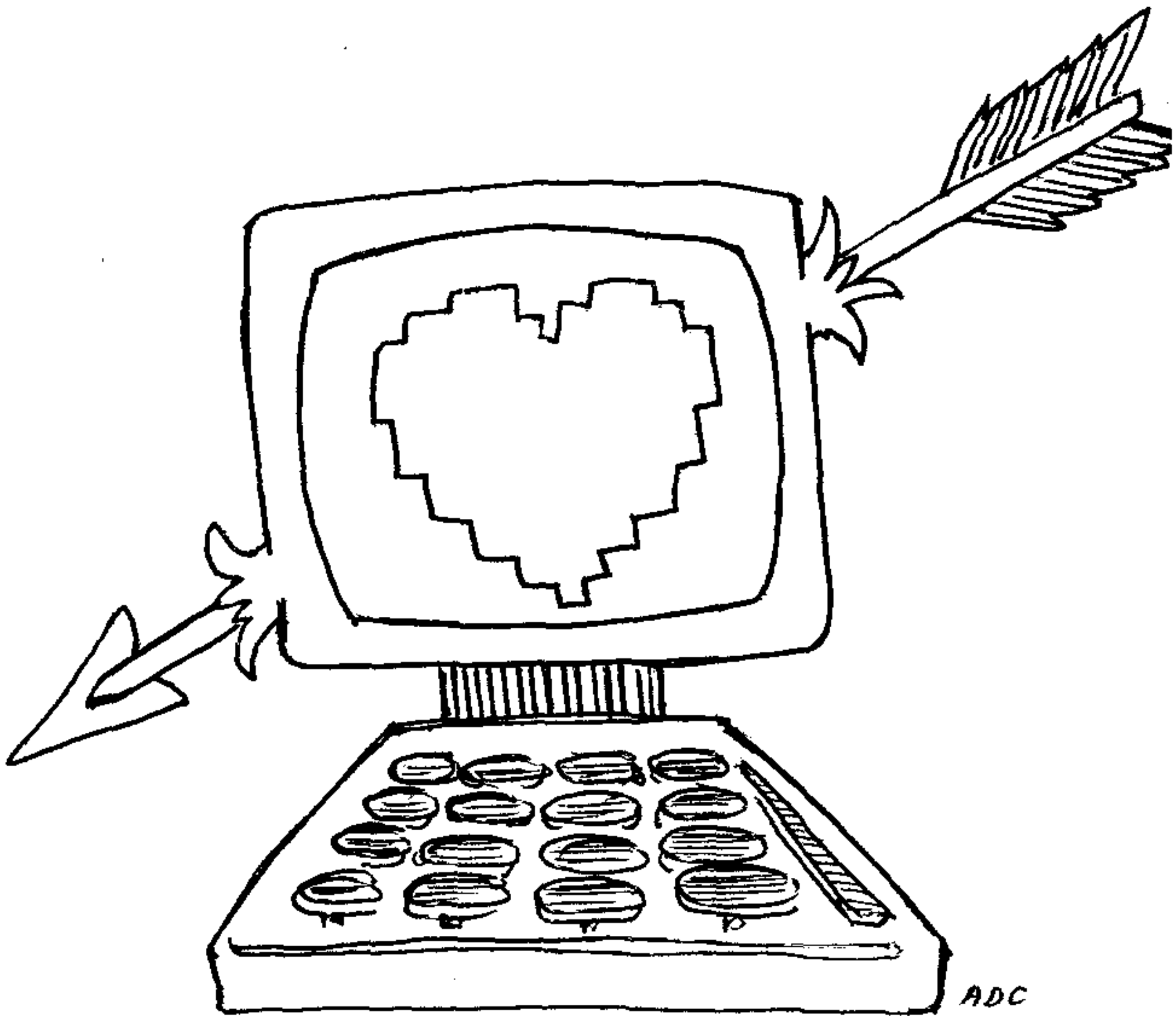
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Feb. 1985

Monthly Newsletter

Version ~~3.1~~  
4.2

HAPPY VALENTINE'S DAY



MUNCH MEETING January 15, 1985

The meeting was called to order at 7:35 PM by Bruce Willard, President. 40 members were present.

The SECRETARY'S REPORT was accepted as printed in the newsletter.

TREASURER'S REPORT. Jim Cox reported that the checking account has a balance of \$250. \$150 in renewals of membership and \$25 in ads. Expenses for the month were \$75.60 for the newsletter and \$30 for postage.

LIBRARY COMMITTEE. Al Cecchini was unable to bring all the materials for the library this month. He has raffle tickets for sale at 5 for a dollar. The Personal Record Keeping cartridge, donated by the Anderson family, is the prize.

HARDWARE COMMITTEE. Bernie Miller has the WIDGET and FLOPPY COPY for those who ordered them last month. He will be taking orders tonight for anyone wishing them. FLOPPY COPY price is \$21.95 and Widget is \$30.

SOFTWARE COMMITTEE. Jack Suphrue encouraged all members to write to COMPUTE to urge them to continue their support of the TI. This month's edition has no TI Games, Application or Tutorials. The address is COMPUTE 324 West Wendover Ave., Greensboro, NC 27408. Jack introduced 3 books from SAMS: TI TRIVIA a data base program, TI CALC and TI GAMES. In the newsletter he reviewed the COMPUTE'S GUIDE TO EXTENDED BASIC HOME APPLICATIONS FOR THE TI 99/4A. Nine members volunteered to write a program from the book and return the program on disk and submit it to Jack on Feb 6th.

OLD BUSINESS. The survey response showed members were interested in Assembly LANGUAGE PROGRAMMING which will be taught by Dan Rogers, BASIC by Bruce Willard and TI-WRITER by John Doone. Other areas of interest in future meetings will be MULTI-PLAN, LOGO and ADVENTURE GAMES.

NEW BUSINESS. The Audio-Visual Department at the school is not funded by the State so there will be a rental charge on the monitors. Mrs Anderson made a motion and it was seconded and approved to pay for the rental which will gradually increase to \$25 in May. It was also voted to reimburse Bruce for this month's rental fee. There will be a raffle each month to raise funds. JP donated a program for next month. The drawing will be at the end of each business meeting. Come and support your group, you must be present to win. The officers meeting will be held at VIDEO CONNECTION on the first Tuesday of the month. Fund raising and the membership drive will be discussed. The leaders of the classes are requested to put a blurb in the newsletter about their upcoming programs. Bruce has a list of equipment for sale by a former owner of TI. The meeting adjourned at 8:05 PM.

DEMONSTRATIONS. Jack demonstrated FLOPPY COPY. The members attended the interest groups of their choice.

Respectfully submitted,

Vivienne Foster-Erlandson.

## PRESIDENT'S MESSAGE

WONDERFUL SUPER GREAT FANTASTIC EXCELLENT MARVELOUS PHENDOMENAL

In the January Newsletter I mentioned that the January meeting was going to be better than ever. Well, the superlatives above say it all. It was undoubtedly the best M.U.N.C.H. meeting I have ever seen. Those in attendance continually participated. Eleven members volunteered to put onto disk, very lengthy programs, that combined, would make an exceptionally good, menu-driven program. It would contain a data base, spread sheet, mailing list, bar graphs, etc. The end result would be put into the club library.

The first M.U.N.C.H. raffle was a smashing success. It went so well that it will be a monthly affair. I will notify everyone, via the Newsletter, of the next month's raffle item. Look further into this Newsletter for the particulars of the next raffle item, future items, and past winner. Semi-annually we will have a large "generic" fund raiser raffle.

I've got to admit that I made an error in judgement. Last month's meeting had the demonstration of "Floppy Copy". It looked so good that we injected it into the meeting just prior to the TI-WRITER demo. We had no idea it would take up so much time and interest. Because of this TI-WRITER was put off until this month. I am sincerely sorry for those of you who made a special effort to come to the meeting to participate in that demo. It won't happen again. Any future "hot" items must be scheduled so they will not interfere with existing schedules.

Al Cecchini is looking for some help at the monthly meeting with the club library. You see Al always makes sure the library books are available at each meeting and is always ready to serve you. Now, Al would like someone to help out so that he could attend a Special Interest Group. How about it? Can't someone out there come to the meeting and help Al?

Make your plans now to attend all future meetings and enjoy the festivities. There will be something for everyone. If you find a need for something else please contact me. I want all members to feel welcome and needed.

Bruce Willard, Pres.

AGENDA for February 19, 1985

- 7:00 - 7:30 Open Demonstrations  
New Member Registration  
Software Exchange (members only)
- 7:30 - 8:00 Business Meeting:  
Approval of Minutes  
Treasurers Report  
Committee Reports  
Old Business  
New Business  
Announcements  
Raffle
- 8:00 - 9:00 Special Interest Group Meetings  
and Open Demonstrations and Discussion
- Basic Programming -- by Jack Sughrue  
TI-WRITER -- by John Doon  
Assembly Language -- by Dan Rogers

Plan for March meeting:

More on TI-WRITER  
Regular and advanced programming to  
continue

\*\*\*\*\*

"COMPUTER QUERIES"

Does anyone know of a combination line voltage surge protector and noise filter? I am looking for a surge protector that responds in nano seconds. It should also be able to cut in at least by 150 volts and withstand multiple surges. The line noise filter I'm not sure of the requirements. A combination unit is desirable, but not mandatory. If anyone knows of one please send, to the Group's address, the manufacturer's name and address. If convenient, drop it off at the Video Connection on Lincoln Street.

Bruce Willard, Pres.

**" . . . RAFFLE . . . RAFFLE . . . "**

There will be a MONTHLY RAFFLE. The January raffle item was Personal Record Keeping, donated by Pat and Dave Anderson and family. A big thanks goes out to the Anderson family for helping us get our raffle started. The winner of the raffle was a brand new member, and one who allows us to use her console at the meetings, Ms. Martha Campolito. Congratulations!!!

Now, for the February raffle, Technologies Support Group donated a Screen Dump (disk). Extended basic is not required and you would need a dot addressable 8-bit printer. The manufacturer is Extended Software Co.

NOW!!! We have a tremendous item for the March raffle. It has been donated by Dani Resources of Millbury. The item is a box of ten SS/SD disks in a library case.

The raffle is open to all who attend. The drawing will be immediately after the business meeting before we break into the various Special Interest Groups. Remember:

**!!!! YOU MUST BE PRESENT TO WIN !!!!**

\*\*\*\*\*

**MUNCH OFFICERS AND NUMBERS (all in 617 area)**

<b>President</b>	<b>Bruce Willard</b>	<b>852-3250</b>
<b>Vice Presidents</b>	<b>Ota Jiroutek</b>	<b>852-0835</b>
	<b>John Doon</b>	<b>852-4295</b>
<b>Secretary</b>	<b>V. Foster-Erlandson</b>	<b>481-8060</b>
<b>Treasurer</b>	<b>Jim Cox</b>	<b>869-2704</b>
<b>Editor</b>	<b>Pete Blackford</b>	<b>892-4946</b>
<b>Hardware Chair</b>	<b>Bernie Miller</b>	<b>429-5723</b>
<b>Programs Chair</b>	<b>Pete Rauptis</b>	<b>799-6035</b>
<b>Adv Prog. Chair</b>	<b>Dan Rogers</b>	<b>248-5502</b>
<b>Club Reviewer</b>	<b>Jack Sughrue</b>	<b>476-7630</b>
<b>Library</b>	<b>Al &amp; Lisa Cecchini</b>	
<b>Mail &amp; Messages</b>	<b>Video Connection</b>	<b>852-8213</b>

\*\*\*\*\*

**LOGO Teacher wanted.....Computer Sense Center**

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# TEXTWARE REVIEW #15

by Jack Sughrue

One of the delightful things about doing these columns each month is setting the time aside to read the new books and magazines and try out the new software. So often we fall victim to the "I would love to do more \_\_\_\_\_, but I just can't seem to find the time" syndrome.

Well, with having to "do my duty" for M.U.N.C.H. every month, I just force myself to read that book, play that disk, stick in that cartridge. And get lost in the make-believe world of computerhood. (All of us have our own forms of suffering. I just choose the painless ones.)

And, as I also choose what I wish to review, I have been choosing not to waste my time reviewing stuff I wouldn't recommend. (Unless I slip into a foul mood and my Irish ire rises.)

So, another recommendation tonight.

And from an old friend, the Howard W. Sams Co. (4300 West 62nd Street, Indianapolis, Indiana 46268).

The Sams's combo packs are popular with many TI owners because they contain the books with the tapes of all the programs in the books. Books and tapes can also be purchased separately. (Their latest catalog is in our club library and worth looking at.)

TI-99/4A GRAPHICS AND SOUNDS by Timothy Orr Knight (probably the richest young book-writing programmer in America today) is another excellent SAMS' combo.

The book contains 37 programs, 5 of which can only run in BASIC. The other 32 can run in extended or regular.



At first glance,, one feels it is a lesser work than the COMPUTE! book of similar title. Second and third glances (and a little hands-on follow-along) will soon prove that this book is a wonderful tutorial, that the mini programs can easily be built into some wild and wonderful subroutines, that Mr. Knight has provided yet another superb book for ~~US~~ TI owners.

This is a great book for the novice who has gone beyond the manual. It is an equally fine book for the advanced programmer.

This book could easily be renamed BASIC TRICKS FOR THE TI-99/4A, except that it is already a title for another SAMS book we'll be reviewing in the future.

Meanwhile, back at the console - the wizards and warlocks gone, the alien spaceships gone, the eat-em-ups and shoot-em-ups gone - we're left with this computer staring us in the face and little to do.

Well, you've created a "guess the number" game and you've tried a graphic stick figure dancing across the screen and you've had your name scroll up the screen two million times and you've put together five successive musical notes.

All for the good.

This book, however, lets you move into the big time (not BIG TIME or even Big Time). You do not do quatum leaps. This is a steady one-at-a-time approach that opens up that creative door and lets your imagination roam free. Each of the mini-programs does a single thing (make a diagonal line, random dots, circles, triangles; create random periodic noises, white noises, up and down (swooping) sounds; develop basic animation techniques, sound techniques; draw three-dimensional and multiple

combination graphics; learn how to downward scroll, horizontal scroll, change characters; and more) and does it well.

The end result is a compiled set of skills that lets you apply the learned information readily to numerous situations. (Do you remember the first time you changed the screen color on a simple program you wrote? Remember how proud you felt? How excited? These programs let you re-experience that kind of pride and excitement at a little more advanced level.)

Constantly I found myself saying, "Oh, neato. Now I get it."

This is a good book (and better combo pack). And it has a bit more than other similar books. It has an appendix that lists the color codes, the ASCII codes, the character sets and codes, the pattern identifier conversion, and a very comprehensive list of musical frequencies.

If this book is near your computer, you'll never need to rifle through manuals looking for quick references again. (As a matter of fact, quick reference guides containing these pieces of information sell for \$3.95 in card form.)

The book alone is \$9.95. The tape is \$7.95. The combo pack - in a nice, hard, book-look container - is \$16.95. I'd recommend either the book or pack, as the tape alone does not contain the valuable written tutorials.

\*\*\*\*\* IN THE NAIL BOX \*\*\*\*\*

Exceltec, Inc. (formerly Sunware Ltd) announced that they have secured the rights to build the TI EXTENDED BASIC Module and Manuals. They are offering volume discount to TI User Groups. The discount is 20% off for 5 or more. Any interest?



Here is a sampling from TI-99/4A  
GRAPHICS AND SOUNDS that I find quite  
interesting: Music Translator.

```
3 REM GRAPHICS & SOUND 28:           MUS-TRANS
10 REM  TRANSLATOR
20 TT$="**  TRANSLATOR  **"
30 DEF RD(Z)=INT(100*(Z+.005))/100
40 CALL CLEAR
50 PRINT TAB(INT((29-LEN(TT$))/2));TT$
60 PRINT : : : "  THIS PROGRAM ALLOWS THE": : "USE
    TO TRANSLATE MUSICAL": : "NOTES INTO FREQUENCY
    DATA"
70 PRINT : "VALUES.  I WILL THEN ASK": : "YOU FOR
    DURATION AND": : "PLAY THAT NOTE FOR YOU."
80 PRINT : : : : : "  PRESS ANY KEY TO BEGIN"
90 CALL KEY(0,KEY,STATUS)
100 IF STATUS<=0 THEN 90
110 CALL CLEAR
120 PRINT "ENTER THE OCTAVE"
130 INPUT "(0-LOWEST, 4-HIGHEST)":DC
140 IF (DC<0)+(DC>4)THEN 110
150 CALL CLEAR
160 PRINT "NOTES:" : : : "  1) A": "  2) A SHARP, B
    FLAT": "  3) B": "  4) C": "  5) C SHARP, D FLA
170 PRINT "  6) D": "  7) D SHARP, E FLAT": "  8)
    E": "  9) F": " 10) F SHARP, G FLAT"
180 PRINT " 11) G": " 12) G SHARP, A FLAT": : : :
190 INPUT " SELECT (1-12) ":NOTE
200 IF (NOTE<1)+(NOTE>12)THEN 150
210 NOTE=(NOTE-1)+(DC*12)
220 FREQ=110*(2^(1/12))^NOTE
230 CALL CLEAR
240 PRINT "TO PLAY THIS NOTE, USE": :
250 PRINT TAB(8);RD(FREQ): :
260 PRINT "AS THE FREQUENCY VALUE IN": "THE CALL
    SOUND ROUTINE.": :
270 PRINT : : "PLAY NOTE? (Y/N) "
280 CALL KEY(0,KEY,STATUS)
290 IF (KEY<>89)*(KEY<>121)*(KEY<>78)*(KEY<>110)
    THEN 280
300 IF (KEY=78)+(KEY=110)THEN 400
310 CALL CLEAR
320 PRINT "ENTER DURATION (1-4250)"
```

```

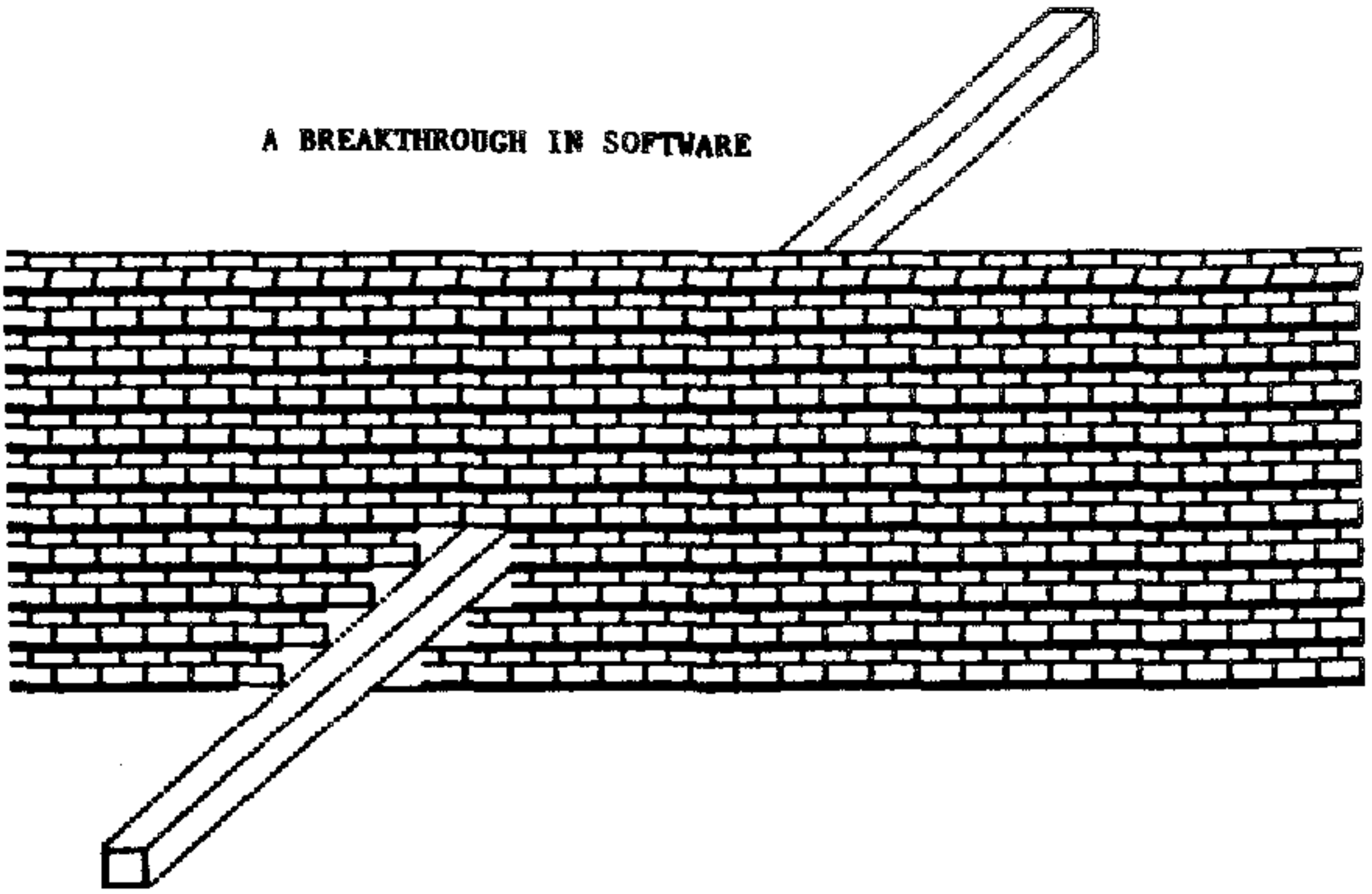
330 INPUT "(1 SEC = 1000) ":DUR
340 IF (DUR<1)+(DUR>4250) THEN 310
350 CALL CLEAR
360 PRINT "PLAYING NOTE FOR ";RD(FREQ): : "AT A
    DURATION OF";DUR: : : : : : : : :
370 CALL SOUND(DUR,FREQ,0)
380 FOR DELAY=1 TO INT(DUR/2)
390 NEXT DELAY
400 CALL CLEAR
410 PRINT "WANT TO ENTER MORE NOTES? (Y/N)"
420 CALL KEY(0,KEY,STATUS)
430 IF (KEY<>89)*(KEY<>121)*(KEY<>78)*(KEY<>110)
    THEN 420
440 IF (KEY=89)+(KEY=121) THEN 110
450 CALL CLEAR
460 END

```

**Foundation Computing now sells a CP/M system for the 99/4. This system gives you two (2) RS 232 ports, 64K of memory, a double density controller and a Z80A micro-processor. Price \$349.95.**

**We have received a copy of the CorComp Cursor which describes their first year of existence. (CorComp is in Chapter 11 bankruptcy to get them through some financial problems - Ed.) Problems and solutions with their products are talked about. There is a section on TI FORTH use and modifications for double-density, etc. They also request that TI users send their ideas for new product wants. Send to: New Products, CorComp, Inc., 1255 N. Tustin Ave., Anaheim, CA 92807. (DO IT! They deserve the support of the TI Users for their efforts - Ed.)**

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## COMPACT MUSIC

by Tony Falco

I have often read that there are numerous mathematical patterns in music. But I only became aware of some of them when I started to program music for the 99/4A. And certainly there must be many relationships with which I am not familiar. One fascinating relationship exists between each note of the musical scale and its successor. This relationship will enable us to remove some of the drudgery from programming music.

The musical scale is a geometric sequence whose first term is 110 (the lowest frequency possible on the 99/4A) and whose common ratio is the twelfth root of two. ( $2^{(1/12)}$ ). This means to go up one note we multiply the current frequency by the twelfth root of two. To go up two notes multiply by the twelfth root of two raised to the second power etc. To go up a whole octave (12 notes) one multiplies by  $(2^{(1/12)})^{12}$  or simply two.

Now, wouldn't it be nice to be able to read the music for a whole song into one continuous string and then read all the musical data from this coded string one character at a time. Each character representing a duration or a frequency. The first program (in *EXTENDED BASIC*) listed below will generate a table which is much like the one you will find in the appendix of your manual. However, the last column will have a character that you can use as a code for the indicated frequency. The second program demonstrates how to convert the code into music. When executed the program will play a familiar patriotic tune in three part harmony. Each note is represented by a four character segment of the whole string. For example the first chord is "20RW" (the first four characters in DATA), and the program converts it to `CALL SOUND(560,247,0,294,0,392,0)`.

In the second of the programs, line 10 sets the tempo. This is best done by ear, experimenting to get the best sound. Lines 20 to 50 contain all the coded DATA which lines 110 to 130 make into one continuous string. The frequencies for four octaves of music are set up and stored in an array in lines 60 to 100. Note that the computer generates all the frequencies and there is no need for you to type in any frequencies.

Lines 150 to 210 converts the code four characters at a time and then plays the resulting chord.

For me, however, there will always remain the long difficult process of converting symbols on sheet music into notes to code.

```

100 OPEN #1:"PI0"
110 ST$="A A#B C C#D D#E F F
#G G#" : OCT$(1)="(LOW)"
120 OCT$(2)="(MIDDLE)" : OC
T$(3)="(HIGH)" : OCT$(4)="(
high HIGH)"
130 DEF M(X)=2*(X-12*INT(X/1
2))+1 : DEF P(X)="2^("&STR
$(X)&"/12)"
140 PRINT #1:TAB(11),"MUSICA
L SCALE":
150 PRINT "2^(POWER/12) "; "F
REQ. "; "NOTE "; "CODE"
160 PRINT #1:"POWER OF 2 "; "
FREQUENCY "; "NOTE "; "CODE"
170 FOR T=1 TO 4 : FOR P=A
TO A+11 : LTR$=SEG$(ST$,M(P
),2)
180 IF LTR$="C " THEN LTR$=L
TR$&OCT$(T)
190 CALL SOUND(-4000,110*2^(
P/12),0): PRINT P:TAB(14);I
NT(110*2^(P/12)+.5);
200 PRINT TAB(22);SEG$(ST$,M
(P),2);TAB(26);CHR$(65+P)
210 PRINT #1:P$(P)&"110=";I
NT(110*2^(P/12)+.5),LTR$,CHR
$(65+P)
220 NEXT P : A=P
230 PRINT RPT$("-",28): PRI
NT #1:RPT$("-",80): NEXT T
: CLOSE #1 : END
240 !For no printer eliminat
e lines with OPEN, CLOSE and
PRINT #1 !

```

```

10 TEMPO=280
20 DATA 2DRW3PTW1KPT2KPT2GTW
3RUW1KOR2KOR2KOT2ORU2ORW2RUY
2SW[2RTW2GTW2RUW2ORW3PTW
30 DATA 1KPT2KPT2PTW3ORW1KOR
2KOR2RW^2RW12RW^2Y\^2RVY2W[^
2V[^2U[^2RUW3W\^1W\^2W\^
40 DATA 2TW\2RU\1RU[2RU[2TW\
2R[^2TW[2RUY2RUW2TW\2UW\2WW\
2TW\3UY\1PUY2PUY2RU\3TW\
50 DATA 1PTW2PTW2WWW2YYY2\1\
2WWW2W[^6PT\
60 DIM F(48)
70 FOR N=0 TO 47
80 F(N)=110*2^(N/12)
90 NEXT N
100 F(48)=44000 !REST:CODE W
ITH LOWER CASE Q!
110 FOR N=1 TO 4
120 READ M$
130 MUSIC$=MUSIC$&M$
140 NEXT N
150 FOR N=1 TO LEN(MUSIC$)ST
EP 4
160 D=VAL(SEG$(MUSIC$,N,1))$
TEMPO
170 N1=F(ASC(SEG$(MUSIC$,N+1
,1))-65)
180 N2=F(ASC(SEG$(MUSIC$,N+2
,1))-65)
190 N3=F(ASC(SEG$(MUSIC$,N+3
,1))-65)
200 CALL SOUND(D,N1,0,N2,0,N
3,0)
210 NEXT N
220 GOTO 150

```

\*\*\*\*\*

## "WE NEED FILING HELP. . ."

We have many newsletters from user groups across the U.S. and Canada. There are many good articles in these. However, there are too many to reprint in our newsletter or they are too long. I would like a volunteer to take these newsletters and file them by group and date. Then they could be viewed at the meetings. Perhaps special arrangements could be made to check these out from the library.

This is a one shot deal. Once we get a filing system working then all other newsletters that come in will be able to go into their respective files. How about it? Do we have any members with filing experience? Just give me a phone call if you can help.

Bruce Willard, Pres.



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REMARKS on HARDWARE #2  
 by: Bernie Miller

Before I start this month's reviews, let me say a few words about our recent club purchases. For the past couple of months, club members have been buying software and hardware at user group discounts. This has been very successful. In the past two months alone, over a dozen members purchased a disk copy utility called "Floppy Copy", and another half a dozen have ordered the three cartridge expander called "Widget"! Because of all the support M.U.N.C.H. has been showing, I have been able to add a few more good deals to the list. Unfortunately, the price of FLOPPY COPY has gone up two dollars each due to shipping costs. It is still a good deal at \$22.00. Added to the list of discounts are as follows:

A) FLOPPY COPY 3 pass disk copier	disk	\$22.00	
B) STAMP MANAGER database	disk	\$15.00	
C) MUSIC SYNTHESIZER music prog.	disk	\$10.00	
D) BEST PUBLIC DOMAIN music I	disk	\$ 8.00	
E) music II	disk	\$ 7.00	
F) games I	disk	\$ 8.00	
G) games II	disk	\$ 9.00	
H) BALLOON WAR graphic adventure	disk	\$ 8.00	
I) MISTER T 3 screen arcade game	tape	\$ 5.00	
J) SUPER EXTENDED BASIC utility	disk	\$75.00	
K) MULTI-DISK INFORMER utility	disk	\$25.00	
	S.X.B. version	disk	\$16.00
L) VIDEO TITLES I utility	disk	\$21.50	
M) VIDEO TITLES II utility	disk	\$36.00	
N) VIDEO TITLES III utility	disk	\$21.00	
P) "PROGRAMS FOR THE T.I. HOME COMPUTER" book and programs	disk	\$16.00	

This list has certainly grown a bit! All prices include postage and handling, and can be ordered at upcoming meetings. Please do not call me to order anything, only because if you did, chances are I won't be home! Talk to

any of the club members who have tried to reach me, and you'll know what I mean! One more thing, please try to bring cash when you order, checks are a hassle for me to process. I will not be at the February meeting due to a trip I am taking to the Washington Users group. I will however try to give the disks I received to an officer, to be handed out at the meeting. If you ordered something, make sure you get it! I will resume taking orders during the March Meeting.

Rumors, I hear rumors... Radio Shack seems to be selling the Texas Instruments R.F. modulator for only \$5.00. Yes, five dollars. As most of you know, these modulators sell for between ten and thirty-five dollars, so if you need one, or wish to stockpile them for the future, better go down quick. At five bucks, I don't think they will be there forever. If you do go down, and they are sold out, you can order them through mail order for \$10.00 each, which is still a bargain. The company is called ALL ELECTRONICS CORP, p.o. box 20406, Los Angeles, CA. 90006. The part number to order is #AVMOD, and the price is \$10.00 + \$2.50 postage and handling. Check, Mastercard, or Visa accepted. This company also sells the keyboard for the 99/4A. The price is \$6.50 each or two for \$11.00. They must be crazy to sell the keyboards for only \$6.50 each, the keyboard is the most expensive part of the computer to produce! Unisource advertised P-CODE cards for \$100.00, but forget it, they were sold out before the ad even came out. Speaking of P-CODE cards, I am in DESPERATE need of one, if anyone knows the whereabouts of one new, or used, please let me know!

Now, on to the reviews. The first product, or should I say line of products, are put out by a company in Natick MA. called ELECTRONIC SPECIALISTS, Inc. These folks make interference control products for all types of equipment, including computers. Their vast line includes (breathe deep): filter suppressors, interrupters, isolators, line check monitors,

regulators, twist protectors, wire in line filters, and much more! In this review, I'll talk about two of these; line check monitors, and isolators. The line check monitor is a small (about 3 inches high) instrument that monitors your AC power line voltage going into your computer. The range is between 90 and 140 volts. The normal voltage is around the 110 to 125 range. If it rises above, or falls below this range, you should save your program fast, and turn off your computer, or else there might be a lockup. I've seen mine go all the way to 135 in bad storms and have ignored it, and yes, I have lost hours of programming due to my stupidity. The price of this instrument is \$76.95. If you are just a game or "armchair" user of the computer, then perhaps \$76.95 is a bit steep, but if you are a serious programmer like me, then it is worth every penny you put into it.

The next product is even more important to your computer, as well as your sanity. I am talking about the isolator. An isolator is a metal box, ranging in size from a few inches to a four inch by four inch box. In this box are from one to ten power outlets, like those you see on a power strip. The outlets are specially shielded to prevent "power spikes" from electrical lines to reach your computer (or t.v. or v.c.r. or stereo, etc) equipment. Power spikes usually occur during electrical storms, when there is a large amount of voltage bouncing back and forth. Normally, these power spikes can destroy whatever program is in memory at the time. If the spike is large enough (we are talking REALLY LARGE, folks), some of the i.c.'s in the computer could be fried. Some of the more expensive isolators come with a variety of options. Some come with hash filters, super filters, magnum filters, spike suppressors, etc.. If you want to know more about each individual isolator, write to the above company for a free catalog. For me to explain each one would probably triple the size of this

article. The prices for isolators depend on how many sockets you get, along with which options you choose. A cheap one starts at about \$24.95, and they go up to as much as \$1,039.95. The one I use cost \$239.95, and I haven't had a problem yet! Believe me, it does pay for itself in the long run.

In the upcoming months, I will be reviewing a few printers including Panasonic, Gemeni, and Epson, along with some joysticks, and the long awaited DSDD card. If you have any ideas for my column, or suggestions on what to review, please let me know! My address is: 30 Jar Brook road, Holliston, MA. 01746. Please, DO NOT mail orders for software, see me in person at the MARCH meeting.

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Please return all borrowed materials to the MUNCH library at each meeting. This will give other members a chance to enjoy our collection of "text-ware" as much as you have !!! THANK YOU !!

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(Come to the VISITORS entrance and follow the signs for MUNCH..)