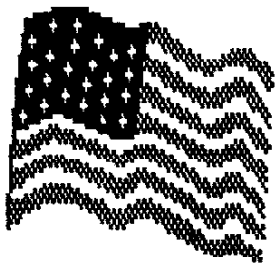
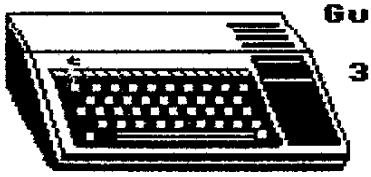
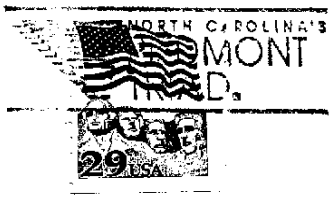
# GUILFORD 99'ERS NEWSLETTER



SUPPORTING THE TEXAS INSTRUMENTS TI-99/4A COMPUTER



GUILFORD 99'ERS UG
3202 CANTERBURY DR
GREENSBORO NC
27408


TO:

VOLUME 8 NUMBER 7 JULY 1991

George von Seth, Pres. (292-2035) Bob Carmany, Newsletter Ed (855-1538)
Tony Kleen, Sec/Treas (924-6344) Bill Woodruff,Pgm/Library (228-1892)
BBS: (919)621-2623 --ROS

The Guilford 99'er Users' Group Newsletter is free to dues paying members (One copy per family, please). Dues are $12.00 per family, per year. Send check to:Tony Kleen c/o 3202 Canterbury Dr., Greensboro, NC 27408. The Software Library is for dues paying members only. (Bob Carmany Ed )

OUR NEXT MEETING

DATE: July 2, 1991 Time: 7:30 PM. Place: Glenwood Recreation Center, 2010 S. Chapman Street.

Program for this meeting will be a demonstration of Tony's Menu Manager for TI-BASE. As usual, Tony will present yet another superb adaptation of TI-BASE. Let's see if we can get him to go commercial with one of these!!!

## MINUTES

The June meeting of the Guilford 99er Users' Group was held on Tuesday the 4th at the Glenwood Recreation Center on Chapman Street in Greensboro, NC. There were seven members present. Tow of our regular members, Bob and Mack, were unable to attend. Guys, I don't care what the other members said about ya', I don't believe a word of it!

The meeting opened promptly at 7:35, led by director George von Seth. There was not old business to attend to. New business was limited to who would get to present next month's program. I plan to present my TI-BASE Menu Manager.

The secretary/treasurer's reports were accepted as written/read. As of this writing, the club has $176.99 in the treasury.

The program for June was our 'once in a while' library exchange. This was an interesting program. Our diskettes in the library are DSSD. The P-box disk drive is SSSD. No one had a TI cartridge for disk utilities. The Funnelweb loader for XB was on the back side of the DSSD diskette. There were other abnormalities too numerous to mention. BUT . . . our members' ingenuity shone through. Bill brought his extra drive, which was DSSD, and altered the XB loader to load the disk copy software from drive 2.

## FAN REPLACEMENT

by Mack Jones

Having read an article in the December issue of MICROpendium on replacing the fan in the PE Box, I thought that would be wonderful for my PEB. The reason being, other than the noise while using the computer, that my easy chair is right alongside of my computer stand and my Daughter always seems to know when I need some quiet for reading because that is when she decides to use the computer.

I had forgotten about the article until today. While going through some odds and ends that I stored away in a shed, I ran across a muffin fan that someone somewhere had given me. I examined it and saw that other than a little dust on the fan blades, it looked almost new. I hooked it to a length of zip cord and plugged it in. You could not tell it was running a foot away! Then the thought came...DO IT!!

Now came the biggest chore, in my opinion, of the whole operation. I had forgotten just how "built-in" I had made my Box and the cables hooked to it. In fact, it took just about as long to remove all the cables and the PEB as it did to install the fan!

After removing the PEB from the computer, I removed the cards, and disk drives. (Be sure and wait for a few minutes if you have just used the computer). Now is a good time to look over your disk drives and see if any dust needs wiping and clean the head if it needs it. I took the Box out to the shop and looked it over. I remembered that the article spoke of quite a few screws to be removed and that is correct. There are no less than 15 screws that you will need to remove. There are 6 on

the back(do not remove the latch screws), 6 around the border, 1 in each corner, and 1 in the lower right of the bottom that must be removed. I would recommend a number 2 Phillips screwdriver to remove the screws as they are rather small. Then the front shell slides right off.

The fan has 4 mounting nuts that must be removed and one of them is a "Dilly" to get to. I found that by removing the power card and sliding it over out of the way, this nut could be removed. The nuts holding the fan are small and I found that a 7/32" nutdriver would fit them close enough to work. On the power board screws, only loosen them enough to slide the board to the right and it will come free.

The connections to the fan are the type that push together in a type of insulation jacket. I wished to use these same connectors so after disconnecting the fan wires, I cut the wires leaving enough wire in case I had to re-solder them. I inserted a section of heat shrink tubing over the wires and soldered them to the muffin fan wires. Be sure when mounting the new fan, that it is facing so that the air flow is towards the rear of the Box. My fan had an arrow pointing the air flow direction. After re-connecting the plugs, I re-assembled the Box and hooked it up. What a difference!!

After bringing it back into the house and installing the cards and drives I tried it out. If I move a few feet away and sit in my easy chair, there is no sound other than a quiet hum.

Anyone who is tired of the whirl-wind whine of their Box, I would strongly recommend the change to a quiet fan. There are quite a few ads offering these muffin fans for sale at a very cheap price. In fact my March issue of MICROpendium came today and there is an ad in the Classified section for Quiet Fans from STATCO, Inc., P.O. Box 145, Townsend, MA. 01469-0145. However there was no price listed or phone number. The fan I used is a SPRITE, MODEL SU2A1 and was made by ROTRON Inc. of Woodstock, N.Y. If any member would like to have help in installing one of these fans in their PEB, I will be happy to help in any way I can. I have had the computer open and cleaned several times and have learned most of the schemes to getting it back together again. I also have all of the tools needed. Try it, You'll like it!!

# MULTIPLAN TIPS

by Steve Zimmerman

This month's column will cover some of the problems you can get yourself into in MultiPlan by using the FORmat commands. These can be an aid to help you display what you need to show, but can also have some pitfalls for the unwary. Let's take a hypothetical spreadsheet (I just made it up!). This sheet will project figures into future years, using percentage increases. We will display figures as integers, using the FORmat command.

This is where the pitfall comes in. By using the FORmat command to "simplify" the display into whole numbers, a discrepancy (or series of discrepancies) is introduced into the worksheet. When a number is displayed as an integer using the FORmat command, x.00000...1 to x.49999... round down to x, and x.50000...0 to x.99999.. round up to x+1 --BUT ONLY ON THE DISPLAY! The ACTUAL number is still stored in that cell, and will be used when that cell is referenced in calculations! The same type of error can happen when numbers are assigned a fixed number of decimals.

MultiPlan will round the number of decimals displayed according to the same principle. Thus, if your display is rounded off, but the actual values are not, and the rounded values are then processed in formulas, you may see results which clearly "don't add up"! Still, the computer is "right" - the problem is operator error.

To see this in action, we'll now set up a spreadsheet. Begin in R2C1 with the number 10. Set the formula in R2C2 to RC[-1]*1.039. Copy this Right 12 cells. Now, move down to R4C1. Enter the formula =R[-2]C. Copy this Right 13 cells. Now, FORmat R4 to display Integer values( key F,C,R4,tab,tab, <enter>). We know that these cells contain the same values as those two cells above them, but display as integers rather than decimals.

Now, the fun begins, Move down to R6C1, enter the value 2, and Copy Right 13 cells. Next, move to R8C1, and enter the formula =R[-4]C*R[-2]C. Copy this Right 13 cells. Now, FORmat R* just like R4, above. Now, you can see some anomalies. In R8C5, 10*2 = 23! In R8C7 13*2 = 25! And so on.....

For more fun, move down to R10C1, and enter the formula =R[-2]C. (You can do this by keying =, moving the cursor up two cells, and hitting <enter>). Copy this Right 13 cells also. Since R10 values are equal to R8 values, you can now see what is actually in R8!

MultiPlan also has an integer function like that of Basic. We'll look at that now. Move down to R12C1, and enter this

formula: =INT(RC[-2]C) - by keying =, INT, ( up arrow, up arrow),<enter>. Copy this Right 13 cells (yes, AGAIN!). Now observe the differences between R8 and R12! R12 (using the INT function) has values just like those you would get in BASIC -- everything to the right of the decimal point has been dropped, not rounded up or down! This is quite a significant difference when doing calculations.

Of course, the same errors can appear any time you use FORmat to display numbers in a specific format and then use arithethical operators on them. Always use caution in setting up a worksheet to make sure of the types of numbers you will be working with and be discrete in your formatting you avoid this type of problem. Remember, a spreadsheet is just a tool - it's up to the user to make sure that the tool is used properly and that the implication of operator decisions are fully understood!

So much for Steve Zimmerman's article. Quite a scary story, but take heart: MultiPlan can do things right. Steve is right that the indiscriminate use of the FORmat options CAN MAKE THINGS LOOK RIGHT WITHOUT BEING RIGHT.

The secret to not only have things look right but also to be right is a MultiPlan function called ROUND. ROUND puts you in complete control of numeric values, not only as to the number of decimals to display (or none if you key in "0" for number of decimals) but unlike the FORmat option, ROUND actually adjusts values in memory to your exact specifications!

Once you have keyed in Steve's example as shown above with all its peculiar results, go back to R4C1 and key in the new formula ROUND(RC[-2]C,0) and then press <enter>. Again, copy this Right 13 cells. After the recalculation finished, your revised sheet should look like the one below.

The moral of the story, MultiPlan has more power and more user control than is evident on first sight. For more information look up the ROUND function on page 180 of the MultiPlan manual.

Yes, ROUND is a very useful function and whenever your results don't seem to "add up", go back and examine your formulas to see whether ROUND would not be appropriate in the right places.

# XB DETECTIVE

by Terry Atkinson

There are many utility programs on the market, both fairware and commercial, which are indespensible when it comes to debugging, crunching, listing variables, checking line references, etc, in Xbasic programs. One such program is a commercial product called XB DETECTIVE.

XB DETECTIVE comes on a disk which cannot be copied, except with a track copier. Entering Xbasic with the XB DETECTIVE disk in drive one, automatically loads and executes the program, and you are returned to the Xbasic prompt "READY". You then load the program to be debugged/examined, and press FCTN 7 (AID) which then takes you to the XB DETECTIVE main menu which reads as follows:

1. LIST VARIABLES
2. FIND VARIABLES
3. FIND RESERVED WORDS
4. DELETE LINES
5. STRING SEARCHES
6. RETURN TO (X)BASIC

So you have loaded XB DETECTIVE, loaded your Xbasic program, entered XB DETECTIVE with FCTN 7, and press option 1. With this option the XB program is scanned and within a very short time (depending on the length of you XB program) a listing of all the variables, both string and numeric, are printed in two columns on the screen. You are then given the option to print this list to a printer, or continue the listing. Pressing C to continue, the next "page" of variables pops up. When the listing is completed, pressing C takes you back to the main menu.

Option 2 (FIND VARIABLES) does just that. You are asked for a variable name and wherever that variable is found in the XB program, a line number crossref for that variable is shown on the screen. Again, you have the option to print the listing to a printer.

Option 3 (FIND RESERVED WORDS) presents a menu of Xbasic's reserved words, such as REM, END, INPUT, GOSUB, FOR, NEXT, etc. Selecting the key associated with the reserved word searches the XB program and generates a line number crossref wherever that reserved word is found in the program. Again, you may print this list to a printer.

Option 4 (DELETE LINES) is very handy. Once selected, the program asks you for a start-line number and end line number to delete. XB DETECTIVE then deletes the line numbers specified.

Option 5 (STRING SEARCH) presents a menu asking whether you wish to search DATA statements, a string enclosed in quotes, or a string associated with a CALL statement. Then, you input the string to be found and XB DETECTIVE does it's work, indicating the line numbers this string is found in. Of course, you also have the option to print to printer.

Option 6 (RETURN TO XBASIC) is the final choice from the main menu. This enables you, at any time, to return to the program which you are debugging to make any necessary changes to it. Again, you may return back to XB DETECTIVE at any time by pressing FCTN 7.

Although the features of XB DETECTIVE are excellent, it certainly doesn't replace the other programs which can be used as a debugging tool for Xbasic programs. For example, Quality-Soft's QS-XREF does a superb job of generating a complete listing of options 1 & 3, and has the added feature of a line-number cross ref. Danny Michael's NEATLIST is similar. The SMASH program by OAKTREE does a superb job of shortening variable names, removing REM statements and "crunching" the program (combining non-referenced program lines). Tim MacEachern's CRUNCH is handy for changing individual variable names and at the same time, let's one know how much space is saved. The BIG PLUS for XB DETECTIVE is that it allows you to return to the Xbasic environment, manipulate your program and return to XB DETECTIVE for further "snooping". It is well worth the price for that feature alone. Options 2&3 which are user-input functions are both handled en-masse by other programs. Unique to XB DETECTIVE are options 4&5, the string search & delete lines functions. (Ignore the fact that the latter can be accomplished with the TI Programming Aids package. This one does it faster and easier).

In conclusion, I find that XB DETECTIVE is a very good utility, and would make a most welcome addition to your library, especially if you do a lot of Xbasic programming or wish to alter/enhance existing programs.

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ADDENDUM:
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For anyone contemplating writing a program such as XB DETECTIVE, here are a few things I would like to see included:

A. Like XB DETECTIVE: the ability to switch back and forth between the utility and the program being operated upon;

B. Like XB DETECTIVE: a search for individual variables, reserved words and string options;

C. Like XB DETECTIVE: a delete line/block of lines function;

D. Like QS-XREF: a global line-number referencing table;

E. Like QS-XREF: a global crossref between line numbers and variables;

F. Like CRUNCH: the abiltiy to change variable names on an individual basis;

G. Like CRUNCH: Convert common numeric constants into variables resulting in a saving of space .

H. Like SMASH: the ability to combine lines;

I. Like SMASH: remove all non-referenced REM (or !) statements;

J. Unlike any other: have a provision for UNcombining lines. (Handy for converting Xbasic programs to basic);

I'm sure you can come up with a few desirable functions of your own that you would like to see. Now all we have to do is con someone into writing one!

```
10 REM B.WILLMORE RV-6.L.OWE
NS 7305 MORGANFORD ST.LOUIS
MO 63116 12/82
20 @=1
30 _=2
40 CALL CLEAR
50 DIM S1(60)
60 CALL SCREEN(_)
70 PRINT TAB(27);"ł"
80 PRINT TAB(27);"ł"
90 PRINT "łłł ł  łłł łłł ł
ł łłł łłł "
100 PRINT " ł  ł   ł  ł ł ł
 ł ł ł ł ł"
110 PRINT " ł  ł   łłł ł ł ł
 ł ł ł ł ł"
120 PRINT " ł  ł     ł ł ł ł
 ł ł ł ł ł"
130 PRINT " ł  ł   łłł łłł ł
łł ł ł łłł": : : :
140 PRINT "     TI 99 4A REV
ISION BY "
150 PRINT "       GREGORY L
OWENS": : :
160 PRINT TAB(14);"BY": : :
170 CALL SCREEN(16)
180 CALL COLOR(_,13,13)
190 R$="WILLMORE VIDEO"
200 FOR P=@ TO 14
210 CALL SOUND(150,-4,@)
220 CALL HCHAR(23,9+P,ASC(SE
G$(R$,P,@)))
230 FOR D=[ TO 50
240 NEXT D
250 NEXT P
260 CALL CLEAR
270 CALL SCREEN(13)
280 FOR I=@ TO 8
290 CALL COLOR(I,16,@)
300 NEXT I
310 PRINT "YOUR TI COMPUTER
IS CAPABLE OF MAKING AN ALMO
ST ENDLESS VARIETY OF SPECIA
L EFFECT  SOUNDS.": :
320 PRINT "THE PURPOSE OF TH
IS PROGRAM IS TO HELP YOU FI
ND JUST THERIGHT SOUND FOR Y
OUR SPECIALEFFECT.": :
330 PRINT "IT ALLOWS YOU TO
GENERATE  SIMPLE TO COMPLEX
 SOUNDS ANDTO THEN ADD SPECI
AL EFFECT  MODULATIONS.": :
:
340 PRINT "    (ONE MOMENT P
LEASE)": :
350 FOR N=[ TO 60
360 S1(N)=INT(110*(_^(@/12))
^N+.5)
370 CALL SOUND(-500,S1(N),4)
380 NEXT N
390 FOR A=[ TO 20 STEP 5
400 CALL SOUND(700,-7,A)
410 NEXT A
420 CALL CLEAR
430 T1=1000
440 F2=30000
450 A3=30
460 F4=30000
470 A5=30
480 F6=30000
490 A7=30
500 L8=@
510 A9=30
520 PRINT TAB(12);"MENU": :
: :
530 PRINT "  1.SIMPLE TONES
": : :
540 PRINT "  2.NOISE TONES"
: : :
550 PRINT "  3.COMPLEX TONE
S": : :
560 PRINT "  4.EXIT": : :
570 INPUT "SELECT NO.(1,2,3,
OR 4)":M
580 ON M GOTO 670,1600,2820,
5010
590 CALL CLEAR
600 PRINT TAB(10);"MODULATIO
NS": : : : :
610 PRINT TAB(9);"1.AMPLITUD
E": :
620 PRINT TAB(9);"2.FREQUENC
Y": :
630 PRINT TAB(9);"3.TIME": :
640 PRINT TAB(9);"4.MAIN MEN
U": : : : : :
650 INPUT "ENTER NUMBER(1,2,
3,4)":NS
660 ON NS GOTO 940,4490,4750
,420
670 CALL CLEAR
680 PRINT TAB(9);"SIMPLE TON
ES": : : :
690 PRINT "(PRESS ENTER TO S
ELECT TONE)": : : : : : : :
700 A3=_
710 FOR N=[ TO 60
720 F2=S1(N)
730 CALL SOUND(500,F2,A3)
740 CALL KEY([,K,Z)
750 IF K=13 THEN 780
760 NEXT N
770 GOTO 420
780 PRINT "FREQUENCY=";F2: :
790 PRINT "TIME=1000,AMPLITU
DE=2": : : : :
800 GOSUB 5020
810 CALL KEY([,K,Z)
820 IF Z+@=@ THEN 810
830 IF K=89 THEN 850
840 IF K=78 THEN 590 ELSE 81
0
850 INPUT "NEW TIME=":T1
860 INPUT "NEW AMPL=":A2
870 CALL CLEAR
880 CALL SOUND(T1,F2,A3)
890 GOSUB 5040
900 CALL KEY([,K,Z)
910 IF Z+@=@ THEN 900
920 IF K=89 THEN 870
930 IF K=78 THEN 590 ELSE 90
0
940 CALL CLEAR
950 PRINT "  AMPLITUDE MODU
LATION": : : :
960 PRINT TAB(5);"1.ON/OFF C
LICKING": :
970 PRINT TAB(5);"2.POS RAMP
": : :
980 PRINT TAB(5);"3.NEG STEP
S": :
990 PRINT TAB(5);"4.MODULATI
ON MENU": : : :
1000 INPUT "SELECT(1,2,3,OR
4)":NM
1010 ON NM GOTO 1020,1200,14
10,590
1020 CALL CLEAR
1030 PRINT TAB(8);"ON/OFF CL
ICKING": : : :
1040 PRINT "FOR Z=1 TO 10"
1050 PRINT "CALL SOUND(50,F2
,A3,...)"
1060 PRINT "NEXT Z": : : :
1070 ZZ=10
1080 T1=50
1090 GOSUB 4550
1100 GOSUB 5020
1110 FOR Z=@ TO ZZ
1120 CALL SOUND(T1,F2,A3,F4,
A5,F6,A7,-L8,A9)
1130 NEXT Z
1140 CALL KEY([,I,J)
1150 IF I=89 THEN 1170
1160 IF I=78 THEN 940 ELSE 1
110
1170 INPUT "NEW Z MAX=":ZZ
1180 INPUT "TIME=":T1
1190 GOTO 1100
1200 CALL CLEAR
1210 PRINT TAB(8);"POSITIVE
RAMP": : :
1220 PRINT "FOR A=30 TO 0 ST
EP -2"
1230 PRINT "CALL SOUND(-200,
F2,A,F4,A,...)"
1240 PRINT "NEXT A": : : :
1250 T1=-200
1260 SS=_
1270 GOSUB 4550
1280 GOSUB 5020
1290 FOR A=30 TO [ STEP -SS
1300 CALL SOUND(T1,F2,A,F4,A
,F6,A,-L8,A)
1310 NEXT A
1320 FOR D=[ TO 500
1330 NEXT D
1340 CALL KEY([,K,Z)
1350 IF Z+@=@ THEN 1290
1360 IF K=89 THEN 1380
1370 IF K=78 THEN 940 ELSE 1
340
1380 INPUT "AMPL STEP SIZE=-
":SS
1390 INPUT "TIME=":T1
1400 GOTO 1280
1410 CALL CLEAR
1420 PRINT TAB(6);"NEGATIVE
STEPS": : :
1430 PRINT "FOR A=0 TO 30 ST
EP 5"
1440 PRINT "CALL SOUND(500,F
2,A,F4,..)"
1450 PRINT "NEXT A": : :
1460 T1=500
1470 SS=5
1480 GOSUB 4550
1490 GOSUB 5020
1500 FOR A=[ TO 30 STEP SS
1510 CALL SOUND(T1,F2,A,F4,A
,F6,A,-L8,A)
1520 NEXT A
1530 CALL KEY([,K,Z)
1540 IF Z+@=@ THEN 1500
1550 IF K=89 THEN 1570
```

```
1560 IF K=78 THEN 940 ELSE 1
490
1570 INPUT "AMPL STEP SIZE="
:SS
1580 INPUT "TIME=":T1
1590 GOTO 1490
1600 CALL CLEAR
1610 PRINT TAB(8);"NOISE TON
ES": : : :
1620 PRINT TAB(6);"1.PERIODI
C NOISE": :
1630 PRINT TAB(6);"2.PERIODI
C WITH TONE": :
1640 PRINT TAB(6);"3.WHITE N
OISE": :
1650 PRINT TAB(6);"4.WHITE W
ITH TONE": :
1660 PRINT TAB(6);"5.MAIN ME
NU": : : :
1670 INPUT "NOISE TYPE(1,2,3
,4,5)":NT
1680 ON NT GOTO 1690,1900,22
50,2460,420
1690 CALL CLEAR
1700 PRINT TAB(8);"PERIODIC
NOISE": : :
1710 T1=4000
1720 A9=_
1730 FOR L8=0 TO 4
1740 CALL SOUND(T1,-L8,A9)
1750 PRINT TAB(12);"TYPE=";L
8: :
1760 NEXT L8
1770 PRINT "SELECT TYPE&TIME
 (Y/N)?": : :
1780 CALL KEY(1,K,Z)
1790 IF Z+0=0 THEN 1780
1800 IF K=78 THEN 1600
1810 IF K<>89 THEN 1780
1820 INPUT "TYPE=":L8
1830 INPUT "TIME=":T1
1840 CALL SOUND(T1,-L8,A9)
1850 GOSUB 5040
1860 CALL KEY(1,K,Z)
1870 IF Z+0=0 THEN 1860
1880 IF K=89 THEN 1820
1890 IF K=78 THEN 590 ELSE 1
860
1900 CALL CLEAR
1910 PRINT "  PERIODIC NOISE
 WITH TONE": : :
1920 PRINT "(PRESS ENTER TO
SELECT TONE)": : : : : : : :
1930 T1=2000
1940 A=30
1950 A9=_
1960 Z=1
1970 FOR N=1 TO 60
1980 FOR C1=0 TO 30
1990 CALL KEY(1,K,Z)
2000 IF K=13 THEN 2070
2010 NEXT C1
2020 F6=S1(N)
2030 CALL SOUND(T1,F6,A,F6,A
,F6,A,-4,A9)
2040 L8=4
2050 NEXT N
2060 GOTO 1600
2070 CALL CLEAR
2080 FOR B=0 TO 500
2090 NEXT B
2100 PRINT "  TYPE -4 PARAME
TERS": : : :
2110 PRINT "CALL SOUND(T1,F,
30,F...-4,2)": :
2120 PRINT "TIME=2000": :
2130 PRINT "FREQUENCY=";F6:
: :
2140 PRINT "  (DEPRESS ""R""
TO REPEAT)": : :
2150 GOSUB 5020
2160 CALL SOUND(T1,F6,30,F6,
30,F6,30,-4,A9)
2170 CALL KEY(1,K,Z)
2180 IF Z+0=0 THEN 2170
2190 IF K=89 THEN 2220
2200 IF K=82 THEN 2160
2210 IF K=78 THEN 590 ELSE 2
170
2220 INPUT "TIME=":T1
2230 INPUT "AMPL=":A9
2240 GOTO 2150
2250 CALL CLEAR
2260 PRINT TAB(9);"WHITE NOI
SE": : : :
2270 T1=2000
2280 A9=_
2290 FOR L8=5 TO 8
2300 CALL SOUND(T1,-L8,A9)
2310 PRINT TAB(9);"TYPE=";L8
: : :
2320 NEXT L8
2330 PRINT "SELECT TYPE&TIME
 (Y/N)?": : :
2340 CALL KEY(1,K,Z)
2350 IF Z+0=0 THEN 2340
2360 IF K=78 THEN 1600
2370 IF K<>89 THEN 2340
2380 INPUT "TYPE=":L8
2390 INPUT "TIME=":T1
2400 CALL SOUND(T1,-L8,A9)
2410 GOSUB 5040
2420 CALL KEY(1,K,Z)
2430 IF Z+0=0 THEN 2420
2440 IF K=89 THEN 2380
2450 IF K=78 THEN 590 ELSE 2
420
2460 CALL CLEAR
2470 PRINT "  WHITE NOISE W
ITH TONES": : :
2480 PRINT "(PRESS ENTER TO
SELECT TONE)": : : : : : : :
2490 PRINT "NOTE:GOOD EFFECT
S AT HIGH  FREQUENCIES": :
2500 T1=1000
2510 A9=_
2520 L8=8
2530 Z=1
2540 FOR N=1 TO 60
2550 FOR C1=0 TO 30
2560 CALL KEY(1,K,Z)
2570 IF K=13 THEN 2650
2580 NEXT C1
2590 F6=S1(N)
2600 CALL SOUND(T1,F6,30,F6,
30,F6,30,-L8,A9)
2610 NEXT N
2620 GOTO 1600
2630 FOR B=0 TO 500
2640 NEXT B
2650 CALL CLEAR
2660 PRINT TAB(7);"TYPE 8 PA
RAMETERS": : :
2670 PRINT "CALL SOUND(T1,F,
30,F..-8,A9)": :
2680 PRINT "  TIME=1000": :
2690 PRINT "  FREQUENCY=";F
6: : :
2700 PRINT "  NOISE AMP=2(3
0@TONES)": : : :
2710 PRINT "  (PRESS""R""T
O REPEAT)": : : :
2720 GOSUB 5020
2730 CALL SOUND(T1,F6,30,F6,
30,F6,30,-L8,A9)
2740 CALL KEY(1,K,Z)
2750 IF Z+0=0 THEN 2740
2760 IF K=89 THEN 2790
2770 IF K=82 THEN 2730
2780 IF K=78 THEN 590 ELSE 2
740
2790 INPUT "TIME=":T1
2800 INPUT "AMPL=":A9
2810 GOTO 2730
2820 CALL CLEAR
2830 PRINT "CALL SOUND(T1,F2
,A3,F4,A5,F6"
2840 PRINT "          A7,-L
8,A8)": :
2850 PRINT "----------------
----------":
2860 PRINT "-USE KEYS 1-9 TO
 INCREASE   VALUES"
2870 PRINT "-DEPRESS SHIFT&1
-9 KEYS TO  DECREASE VALUES
"
2880 PRINT "-DEPRESS""ENTER"
"FOR REPEAT"
2890 PRINT "-DEPRESS ""E"" T
O EXIT"
2900 PRINT "_____________
___________": :
2910 PRINT "           T1
 F2  A3": :
2920 PRINT "CALL SOUND(   ,
   , "
2930 T1=1000
2940 Z=1
2950 PRINT "       , ,
 , ,- , )": :
2960 PRINT "     F4  A5  F6
  A7 L8 A9"
2970 F2=110
2980 A3=5
2990 F4=110
3000 A5=5
3010 F6=110
3020 A7=5
3030 L8=0
3040 A9=5
3050 D1$=STR$(T1)
3060 CALL HCHAR(20,17,32)
3070 FOR L=0 TO LEN(D1$)
3080 CALL HCHAR(20,L+13,ASC(
SEG$(D1$,L,0)))
3090 NEXT L
3100 IF Z+0<>0 THEN 3550
3110 D3$=STR$(F2)
3120 CALL HCHAR(20,22,32)
3130 FOR L=0 TO LEN(D3$)
3140 CALL HCHAR(20,L+18,ASC(
SEG$(D3$,L,0)))
3150 NEXT L
3160 IF Z+0<>0 THEN 3550
3170 D4$=STR$(A3)
3180 CALL HCHAR(20,25,32)
```

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3190 FOR L=@ TO LEN(D4$)
3200 CALL HCHAR(20,L+23,ASC(
SEG$(D4$,L,@)))
3210 NEXT L
3220 IF Z+@<>@ THEN 3550
3230 D5$=STR$(F4)
3240 FOR L=@ TO LEN(D5$)
3250 CALL HCHAR(21,11,32)
3260 CALL HCHAR(21,L+7,ASC(S
EG$(D5$,L,@)))
3270 NEXT L
3280 IF Z+@<>@ THEN 3550
3290 D6$=STR$(A5)
3300 FOR L=@ TO LEN(D6$)
3310 CALL HCHAR(21,14,32)
3320 CALL HCHAR(21,L+12,ASC(
SEG$(D6$,L,@)))
3330 NEXT L
3340 IF Z+@<>@ THEN 3550
3350 D7$=STR$(F6)
3360 FOR L=@ TO LEN(D7$)
3370 CALL HCHAR(21,19,32)
3380 CALL HCHAR(21,L+15,ASC(
SEG$(D7$,L,@)))
3390 NEXT L
3400 IF Z+@<>@ THEN 3550
3410 D8$=STR$(A7)
3420 FOR L=@ TO LEN(D8$)
3430 CALL HCHAR(21,22,32)
3440 CALL HCHAR(21,L+20,ASC(
SEG$(D8$,L,@)))
3450 NEXT L
3460 IF Z+@<>@ THEN 3550
3470 D9$=STR$(L8)
3480 CALL HCHAR(21,25,ASC(D9
$))
3490 IF Z+@<>@ THEN 3550
3500 D0$=STR$(A9)
3510 FOR L=@ TO LEN(D0$)
3520 CALL HCHAR(21,28,32)
3530 CALL HCHAR(21,L+26,ASC(
SEG$(D0$,L,@)))
3540 NEXT L
3550 CALL KEY(I,K,Z)
3560 IF K=69 THEN 590
3570 CALL KEY(I,I,J)
3580 IF I<>13 THEN 3610
3590 GOSUB 4070
3600 GOTO 3550
3610 IF Z+@=@ THEN 3550
3620 IF K<33 THEN 3550
3630 IF K=42 THEN 4450
3640 IF K<42 THEN 4140
3650 IF K=64 THEN 4090
3660 IF K<49 THEN 3550
3670 ON (K-48)GOTO 3680,3720
,3770,3810,3860,3900,3950,39
90,4030
3680 IF T1>3900 THEN 3050
3690 T1=T1+100
3700 GOSUB 4070
3710 GOTO 3050
3720 IF N2>59 THEN 3110
3730 N2=N2+@
3740 F2=S1(N2)
3750 GOSUB 4070
3760 GOTO 3110
3770 IF A3>29 THEN 3170
3780 A3=A3+@
3790 GOSUB 4070
3800 GOTO 3170
3810 IF N4>59 THEN 3230
3820 N4=N4+@
3830 F4=S1(N4)
3840 GOSUB 4070
3850 GOTO 3230
3860 IF A5>29 THEN 3290
3870 A5=A5+@
3880 GOSUB 4070
3890 GOTO 3290
3900 IF N6>59 THEN 3350
3910 N6=N6+@
3920 F6=S1(N6)
3930 GOSUB 4070
3940 GOTO 3350
3950 IF A7>29 THEN 3410
3960 A7=A7+@
3970 GOSUB 4070
3980 GOTO 3410
3990 IF L8>7 THEN 3470
4000 L8=L8+@
4010 GOSUB 4070
4020 GOTO 3470
4030 IF A9>29 THEN 3500
4040 A9=A9+@
4050 GOSUB 4070
4060 GOTO 3500
4070 CALL SOUND(-T1,F2,A3,F4
,A5,F6,A7,-L8,A9)
4080 RETURN
4090 IF N2<@ THEN 3110
4100 N2=N2-@
4110 F2=S1(N2)
4120 GOSUB 4070
4130 GOTO 3110
4140 ON (K-32)GOTO 4090,4150
,4190,4230,4280,4370,4320,44
10,4450
4150 IF T1<200 THEN 3050
4160 T1=T1-100
4170 GOSUB 4070
4180 GOTO 3050
4190 IF A3<@ THEN 3170
4200 A3=A3-@
4210 GOSUB 4070
4220 GOTO 3170
4230 IF N4<@ THEN 3230
4240 N4=N4-@
4250 F4=S1(N4)
4260 GOSUB 4070
4270 GOTO 3230
4280 IF A5<@ THEN 3290
4290 A5=A5-@
4300 GOSUB 4070
4310 GOTO 3290
4320 IF N6<@ THEN 3350
4330 N6=N6-@
4340 F6=S1(N6)
4350 GOSUB 4070
4360 GOTO 3350
4370 IF A7<@ THEN 3410
4380 A7=A7-@
4390 GOSUB 4070
4400 GOTO 3410
4410 IF A9<@ THEN 3500
4420 A9=A9-@
4430 GOSUB 4070
4440 GOTO 3500
4450 IF L8<_ THEN 3470
4460 L8=L8-@
4470 GOSUB 4070
4480 GOTO 3470
4490 CALL CLEAR
4500 PRINT "   FREQUENCY MOD
ULATION": : :
4510 PRINT "FOR D=0 TO 100 S
TEP 2"
4520 PRINT "CALL SOUND(-50,F
2+D,A3,F4+D, ...-L8,A9)"
4530 PRINT "NEXT D": : :
4540 GOTO 4590
4550 PRINT "T1=";T1;"F2=";F2
;"A3=";A3
4560 PRINT "F4=";F4;"A5=";A5
;"F6=";F6
4570 PRINT "A7=";A7;"L8=";L8
;"A9=";A9: : :
4580 RETURN
4590 T1=-50
4600 DD=100
4610 FS=_
4620 GOSUB 4550
4630 GOSUB 5020
4640 FOR D=0 TO DD STEP FS
4650 CALL SOUND(T1,F2+D,A3,F
4+D,A5,F6+D,A7,-L8,A9)
4660 NEXT D
4670 CALL KEY(I,K,Z)
4680 IF Z+@=@ THEN 4640
4690 IF K=89 THEN 4710
4700 IF K=78 THEN 590 ELSE 4
640
4710 INPUT "FREQ RANGE=":DD
4720 INPUT "FREQ STEPS=":FS
4730 INPUT "TIME=":T1
4740 GOTO 4630
4750 CALL CLEAR
4760 PRINT TAB(5);"TIME MODU
LATION": : :
4770 PRINT "FOR T1=1 TO 300
STEP 10"
4780 PRINT "CALL SOUND(T1,F2
,A3,...A9)"
4790 PRINT "FOR D=0 TO 5"
4800 PRINT "NEXT D"
4810 PRINT "NEXT T1": : :
4820 PRINT "LAST VALUES"
4830 GOSUB 4550
4840 TM=300
4850 D=5
4860 TS=10
4870 GOSUB 5020
4880 FOR T1=TS TO TM STEP TS
4890 FOR T=1 TO D
4900 NEXT T
4910 CALL SOUND(T1,F2,A3,F4,
A5,F6,A7,-L8,A9)
4920 NEXT T1
4930 CALL KEY(I,K,Z)
4940 IF Z+@=@ THEN 4880
4950 IF K=89 THEN 4970
4960 IF K=78 THEN 590 ELSE 4
880
4970 INPUT "TOT TIME=":TM
4980 INPUT "TIME STEP=":TS
4990 INPUT "DELAY=":D
5000 GOTO 4870
5010 END
5020 PRINT "CHANGE PARAMETER
S (Y/N)?": : :
5030 RETURN
5040 PRINT TAB(8);"TRY AGAIN
(Y/N)?": :
5050 RETURN
```