Data Reduction Facility for Digitizing and Manipulating Data from Oscilloscope Photographs (Users Guide)

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(Users Guide)

by

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Abstract

An existing data reduction facility has been modified and upgraded to meet staff requirements. This facility is basically used to change the analog data recorded on oscilloscope photographs to digital information; which can be expanded, mathematically processed, replotted, stored for future reference, etc.

One of the main features of this facility is its capability to interact with Sandia's Network Operating System (NOS).

This report will describe the facility and its capabilities as well as guide the person operating the facility. In essence, this report will be the users manual for proper operation of the facility.

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Introduction

It is often necessary to analyze analog data from oscilloscope photographs, strip charts, or other graphical forms. Analysis of the data may involve conversion from analog to digital information. The digital information may be mathematically processed to extract the parameters needed for proper analysis of the original graph.

In the past, a data reduction facility was operated on a part-time basis by one individual. The facility has been modified and upgraded to make it suitable for more general use by staff personnel.

Facility Equipment

A block diagram of the equipment in the data reduction room is shown in Fig. 1. The "heart" of the facility is an H.P. 9845T desktop computer. The computer controls the interaction of the other equipment and also communicates with NOS. A tele-reader and digitizer were modified and combined to form a single piece of equipment (see Appendix 1) which we will call the telereader-digitizer. This telereader-digitizer has, as its name suggests, two major functions. The first function is to enlarge graphs or photographs with the enlarged image focused on the digitizer platten. At present, three different lenses may be interchanged to obtain enlargements of approximately 1.5X, 4.5X and 15X. The second function of the telereader-digitizer is to provide a means of digitizing information from the enlarged photograph. This digital information is transferred to the computer in rectangular coordinate form (each digitized point has an X value and a Y value). The operator chooses the point to be digitized by placing a viewing port with cross-hairs over that point and depressing a switch conveniently located at the viewing port. Data and programs are stored on a dual floppy disk drive unit. Programs are stored on the left disk and data is stored on the right disk. A plotter is available to produce hard copy plots of the data. The data may be scaled to produce the desired size plot. A datacomm package and modem are provided for communication between the desktop computer and NOS. Data

Figure 1. Block Diagram of Equipment.

may be sent to or from NOS at speeds approaching 1200 baud. Any standard NOS commands may be executed from the computer keyboard. When the computer is in datacomm mode (communicating with NOS) it responds as if it were a "smart" terminal with a CRT display of its interaction with NOS.

Appendix 1 provides a detailed description of how the hardware and software were selected for this facility. It also lists the equipment purchased for the upgrade.

Operational Procedures

This section deals with operation of the facility. For clarity we will assume you (the reader) will also be the operator. Due to the detailed description of the operational methods, it will be helpful for you to be in the data reduction room while reading this material. For a good understanding of the operational procedures, it will be beneficial for you to work with a qualified operator and try each step as it is outlined.

A relatively large computer program has been developed¹ to take the burden off the operator when reducing data. Under normal operating conditions you should have some general knowledge of how to use the telereader-digitizer and the computer. You will need to answer a few questions which appear on the CRT screen. However, the more difficult questions will be accompanied by an explanation or example of how to choose an appropriate answer. A flow chart of the computer program is shown in Fig. 2 and a complete software listing is located in Appendix 2.

The following procedure should be followed in setting up the facility to run the program:

1. Make sure no buttons on computer are depressed.
2. Turn on all equipment.
3. Place photograph in the telereader (enlarger).

¹The computer program "REDUC4" was developed at Sandia National Laboratories. However, a portion of this program was developed by the Hewlett Packard Company to operate the datacomm interface (H.P. Part No. 98046B).

Figure 2. Flow Chart of Program

4. Adjust lights in telereader for proper contrast on the digitizer screen.
5. On the keyboard, type LOAD "REDUC4:H8,0,0",10.
6. Press EXECUTE on the keyboard.

After the program has finished loading, the computer will ask:
"WOULD YOU LIKE TO:"

- (1) DIGITIZE A NEW FILE
- (2) LOOK AT OLD FILE
- (3) APPEND SOME FILES TOGETHER
- (4) PURGE A FILE
- (5) TALK TO NOS
- (6) EDIT A DATA FILE

We will deal with each of these options in detail to aid you in making the proper decisions. If at any time you get lost, simply press STOP, type CONT Start, and press EXECUTE. However, by doing so, data in the computer memory may be destroyed. The program will be started again from the beginning.

(1) DIGITIZE A NEW FILE

If, at start-up conditions you press 1, then CONT, you have chosen to digitize a new file. The computer will now ask: DO YOU WANT TO OFFSET YOUR DATA ON CRT PLOT? (Y OR N). If your answer is Y, then the computer will ask: WHERE WOULD YOU LIKE THE ORIGIN? Your answer, according to the instructions on the CRT, may be 1, 2, 3, or 4. Only your displayed data will have the new origin you have selected. This may be necessary because the CRT will only plot in the positive quadrant. The actual data stored in memory will not be offset.

The computer will now state: YOU MAY NOW ALIGN/EXTEND YOUR AXES. PRESS CONT TO PROCEED. The ALIGN/EXTEND procedure is used to establish a base line to which all the digitized data will be referenced. In other words, you are establishing the X, Y coordinate system. The first point you digitize will be the origin 0,0 and the second point you digitize will be any X value along the Y=0 axis. If you do not wish to ALIGN/EXTEND your axes, i.e. you are using the same photograph with another trace, then simply press CONT. You are now ready to digitize your data. Place the viewing port with cross-hairs directly over the point you want digitized. Press the digitize button and move on to the next point. You may digitize up to 1999 data points.

During the course of digitizing your data, you have several options as to the disposition of your data. Notice the top of the computer screen which references the special function keys (fa, fb, fc, fe) located on the digitizer. While digitizing data, you may press any one of these keys.

1. Key fa - START OVER: By pressing this key you will cause the computer to forget all previously digitized data and start the program over.

2. Key fb - DUMP GRAPHICS: Pressing fb causes the printer to print whatever is on the CRT. No data will be lost and you may resume digitizing as soon as the printer is finished.

3. Key fc - ADD MORE DATA: Use this key as an end of record mark if several different records or graphs are to be

stored in one large file such as in VISAR records. This key simply duplicates the last data point which was digitized and allows the user to put in a different graph and realign the axes.

4. Key fe - STORE DATA: Use this key when you are ready to store your digitized data on mass storage. The last digitized point will be duplicated. Then, you will be asked for a PERMANENT FILE NAME. The name you provide (up to 6 characters long) will be used as the permanent file name and the digitized data will be stored on mass storage. The program will then return to start-up conditions.

(2) LOOK AT AN OLD FILE

If, at start-up conditions you press 2, then CONT, you have chosen to look at an old data file. Next, you will be asked the NAME OF DATA FILE. Then, since the data will be plotted on the CRT, you will be asked: "DO YOU WANT TO OFFSET DATA TO FORCE IT INTO +X, +Y QUADRANT?" After the computer has received your answer, it will go ahead and plot the data on the CRT. After looking at the plot, you will need to press CONT to proceed. You will be asked: "DO YOU WANT A HARD COPY? (Y OR N)". If your answer is Y, the printer will print a copy of what was on the screen. Next, you will be asked: "DO YOU WANT A PLOTTER COPY? (Y OR N)". If your answer is Y, the computer will go to a plotting subroutine, and you will need to follow the instructions on the CRT. The program will then return to start-up conditions.

(3) APPEND SOME FILES TOGETHER

If you have chosen to append some files together, the computer will ask: "HOW MANY FILES DO YOU WISH TO APPEND?" In other words, how many small files do you wish to add together to make one large file? The computer will then ask for the first FILE NAME. The CRT will keep you updated as to the last file you appended and how many more you have to append. After all the files have been appended, you will be asked to give a PERMANENT FILE NAME for the new file. The new file will then be stored on mass storage. Your new data file will now be plotted on the CRT. After you have viewed the plot, press CONT to proceed. You will be asked: "DO YOU WANT A HARD COPY? (Y OR N)". If your answer is Y, the printer will print a copy of your data and the CRT plot. Next, you will be asked: DO YOU WANT A PLOTTER COPY? (Y OR N)". If your answer is Y, the computer will go to a plotting subroutine, and you will need to follow the instructions on the CRT. The program will then return to start-up conditions.

(4) PURGE A FILE

If you have selected option (4), the computer will ask: "WHAT IS NAME OF FILE YOU WISH TO PURGE?" This file will then be purged from mass storage. You will then be asked: "DO YOU WISH TO PURGE ANOTHER FILE" (Y OR N)". If your answer is Y, the above process will be repeated. If your answer is N, the program will return to start-up conditions.

(5) TALK TO NOS

If you have chosen to talk to NOS, the computer will get set up for data communication and tell you it is waiting for connection. At this time you will need to dial 351 and place the phone receiver in the modem. Next, log in using your normal NOS log in procedure. You may now communicate with NOS in the normal manner using the standard NOS commands. You may also use the special function keys on the computer keyboard.

We will now briefly discuss the use of some of the more frequently used special function keys.

1. Shift/Key 6 - Cat H8,0,0: Use this key to get a listing of the files from the left floppy disk.
2. Shift/Key 7 - Cat H8,0,1: Get a listing of data files from the right floppy disk.
3. Key 8 - Break: Interrupt communication with NOS.
4. Key 12 - Del Line: Delete the line you are typing.
5. Shift/Key 13 - Create: Create space for a file on mass storage before getting and recording that file from NOS.
6. Shift/Key 13 - Purge: Purge a file from mass storage.
7. Shift/Key 14 - Upload: Send a file from mass storage to NOS.
8. Shift/Key 15 - Record: Get a file from NOS and record it on mass storage.

A more detailed instruction set for the special function keys can be found in the H.P. data communication documentation manual.

If you get lost while talking to NOS or push the wrong key, it may be necessary to restart the program. To restart the program, press CONTROL STOP. Next, press RUN. Then type 5 and press CONT. Press CONT again and the computer should resume communications with NOS. You do not need to log in again, simply resume your conversation with NOS. You may log off at any time in the usual manner.

(6) EDIT A DATA FILE

This routine provides simple line substitution editing. You should only use this option for replacing a few spurious data points in your file. Use NOS if much editing is to be done. The computer will ask: "NAME OF DATA FILE?". When you have given the computer a file name, it will get that file from mass storage and ask: "WOULD YOU LIKE A HARD COPY OF THE DATA?". If your answer is Y, then a listing of the data will be printed on the printer. You will be asked to: "ENTER OLD X, Y PAIR TO BE REPLACED LIKE THIS: X:+00012 Y:-00123". It is important to enter the X, Y pair in the proper format (just like it is shown on the print out). Next you will be asked to: "ENTER NEW X, Y PAIR IN THE SAME FORMAT: X:+00012 Y:-00123". The computer will then replace the old pair with the new pair and ask: "WOULD YOU LIKE TO CHANGE ANOTHER POINT?"

If your answer is Y, the process will be repeated. If your answer is N, the computer will purge the old data file from mass storage and save the new edited file using the same file name. The program will then return to start-up conditions.

REMEMBER: Under normal conditions you may stop and restart the program by pressing STOP, then typing CONT Start, and pressing EXECUTE. However, if at any time the computer seems to have locked up (will not respond to keyboard commands), you will need to reset it. To do this, press CONTROL STOP. Next press RUN. You should now be back to start-up conditions. However, any time you press CONTROL STOP, you will lose any data stored in memory. You will also abort any input/output operations which may result in the loss of a data file on mass storage. Therefore, only use CONTROL STOP when absolutely necessary.

Conclusion

Digitizing waveform information from oscilloscope photographs may be relatively easy, or very tedious and time consuming, depending upon the number of digitized points and the required accuracy. In the past, detailed training of a single operator was necessary for quality work. With the modifications, new equipment, and new software, only minimal training is now necessary for the more casual user to produce quality work which may be tailored to fit his/her particular requirements. Digitized data may be printed, plotted, edited, scaled up or down, offset, stored on a local mass storage unit, or sent to and retrieved from NOS. Once the data is resident at NOS, any standard NOS commands may be used to manipulate the data.

The equipment in the data reduction room, like any other electro-mechanical equipment, is subject to wear and eventually failure. Any problems with the equipment should be reported to the 5131 division supervisor. Also any helpful suggestions for future facility improvements would be appreciated.

Appendix 1

Hardware and Software Selection

A considerable amount of redesign, upgrading of old equipment, and purchase of new equipment was necessary to meet staff requirements for the facility. The choice of new equipment was largely influenced by the availability of digitizers which could be modified and interfaced with an optical photograph enlarger. After a rather extensive search, the H.P. 9874A digitizer was selected for the following reasons:

1. Its translucent platen, similar to ground glass, would allow for a rear screen projection system.
2. It had the capability of transferring a point from one side of the platen to the other, which would allow for axis extension up to several feet. This feature was necessary for the reduction of data from strip charts.
3. It provided extremely high resolution (up to 5 significant digits with resolution of 25 μ m).
4. It was physically compatible with the existing telereader. The telereader is an optical projector which uses high quality interchangeable optics to vary magnification of the image.

During the digitizer selection process, other facility equipment was evaluated with emphasis on interfacing compatibility. The aim was to provide a complete system delivered, interfaced, and easy to use. The H.P. 9800 series equipment met these

requirements and the published literature indicated good performance should be expected when used in the data reduction facility. The components chosen for the facility were as follows:

1. 9874A Digitizer
2. 9845T Desktop computer
3. 9895A Double dual-sided floppy mass storage
4. 98046B Terminal emulator
5. 9872B 4 pen plotter
6. 98035A Real time clock
7. 98034A HP-IB interface bus

Some software was included with the above equipment and some additional software was purchased from H.P. to provide proper communication with a large host computer such as Sandia's Network Operating System (NOS). Unfortunately due to some inconsistencies in software, much of the H.P. software had to be rewritten. A large portion of new software was also written and integrated with the H.P. software to provide a versatile user oriented data reduction program. A copy of the software is located in Appendix 2.

APPENDIX 2

Program Listing

```

10      ! "REDUC4" GENE HAMMONS 08-12-81
20      Commonok=0
30      Startagain:      ! START PROGRAM
40          IF Commonok THEN B1
50          RESTORE
60          OPTION BASE 1
70          CCOM 1500
80          MASS STORAGE IS ":H8,0,1"
90          DIM Digit(2,2000),Dfile$(2000)[20],Dir$(200)[50],Apfile$(10)[6]
100         DIM R$(170),Key$(100),Onoff$(0:1)[3],Rread$(160)
110         DIM Tronoff$(0:1)[8],Keybuffer$(160),Record$(160),E_data$(160)
120         DIM Forgn$(48),Ctrl$(99),Spec$(512),P$(256),P$(30)
130         DIM Cursor$(25),Escomma$(90),Hond$(90),Search$(160),Reponce$(160)
140         DIM Number(1:9),Literal$(1:3)[10],Escsave$(164),Lien$(160)
150         COM INTEGER Keymap(256:511),Cstatus(0:15),Sc,Ccomused
160         COM INTEGER Typewriter,Promptwaiting,Handshk
170         COM INTEGER Verify,Disp_fns,Remote,Echo,Hard_sc,Speed,Check
180         COM INTEGER Bitsperchar,Hardcopy,Keyboard,Filesize,Screen,Modem
190         COM Recordfile$(6),Eof$(8),Outsep$(6),Insep$(2),Prompt$(2)
200         COM Alt_brk$(10),Stopbits,Special$(60),Recordprot$(6),Recorddev$(7)
210         COM Highlight$(1),INTEGER Prompthandshake,Hard_hpib,Commonok
220         DIM Stsname$(0:15)[5],Dfile$(7)
230         COM Statetable$(1427)
240         COM Defstorage$(250)
250         READ Stsname$(*)
260         DATA ERR,RJ,WJ,SEP,MEM,LIN,R-ERR,"",T-FUL,BREAK,"",DSR,SDCD,CD,QTS,"
270         READ Onoff$(*),Record$
280         DATA off,on,""
290         READ Forgn$,Ctrl$,Spec$,Spec$(129),Spec$(257),Spec$(385,512)
300         DATA acute_accentaccent_grave circumflex umlaut
310         DATA nulsohstxetxeotenqackbelbs ht lf vt ff cr so si dledc1dc2dc3dc4
naksynetbcanem subescfs gs rs us spc
320         DATA "udk0   udk1   udk2   udk3   udk4   udk5   udk6   udk7
udk8   udk9   udk10  udk11  udk12  udk13  udk14  udk15  "
330         DATA "step   pause   run   continuestore   execute   left   right
up     down   rollup   rolldownhome   clear   clr->enddelchr  "
340         DATA "inschr delin  insln  recall  tab   tabset  tabclr  typwtr
??     ??     ??     ??     printallrewind list   edit   "
350         DATA "fwd    ??     back   result  stop   clrln"
360         Statuswaiting=Recording=Uploading=Escmode=Assigned=0
370         Keyboard=1
380         Bs$=CHR$(8)
390         Cr$=CHR$(13)
400         Lf$=CHR$(10)
410         Esc$=CHR$(27)
420         Hloff$=CHR$(128)
430         Fillchr$=CHR$(160)
440         Tronoff$(0)=Tronoff$=Esc$&"Z"&Bs$&Bs$&"  "&Bs$&Bs$&
450         Tronoff$(1)=Esc$&"Y"
460         Q$=CHR$(34)
470         Clr$=CHR$(12)
480         Search$="[EOD]"
490         GOSUB Setcursors
500         EXIT GRAPHICS
510         PRINTER IS 16
520         SERIAL                                !Set in serial mode.
530 Start:  Dpoints=1
540         Digzer=706                                !Digitizer select code.
550         OUTPUT Digzer;"IN;AT;SN"                !Initialize digitizer.

```

```

560         OUTPUT Digzer;"SG;SK0"
570         Commonok=1
580         Q1$=""
590         Eddata=0
600         PRINT PAGE;"WOULD YOU LIKE TO:"
610         PRINT "                (1) DIGITIZE A NEW FILE"
620         PRINT "                (2) LOOK AT AN OLD FILE"
630         PRINT "                (3) APPEND SOME FILES TOGETHER"
640         PRINT "                (4) PURGE A FILE"
650         PRINT "                (5) TALK TO NOS"
660         PRINT "                (6) EDIT A DATA FILE"
670         PRINT
680         PRINT "PRESS CONT TO PROCEED."
690         INPUT "Number ?",Q1$
700         IF Q1$="1" THEN GOTO Newone
710         IF Q1$="2" THEN GOSUB Getfile
720         IF Q1$="3" THEN GOSUB Append
730         IF Q1$="4" THEN GOSUB Purge
740         IF Q1$="5" THEN GOTO Chrmod
750         IF Q1$="6" THEN GOTO Eddata
760         GOTO Start
770 Newone: PRINTER IS 16
780         PRINT PAGE
790         Q4$=""
800         Q5$=""
810         Xofst=0
820         Yofst=0
830         INPUT "DO YOU WANT TO OFFSET YOUR DATA ON CRT PLOT? (Y OR N)",Q4$
840         IF Q4$<>"Y" THEN GOTO Prpg
850         PRINT PAGE
860         PRINT "WHERE WOULD YOU LIKE THE ORIGIN?"
870         PRINT "
880         PRINT "
890         PRINT "
900         PRINT "
910         PRINT "
920         PRINT "
930         PRINT "
940         PRINT "
950         PRINT "
          *****
          *3              *
          *              *
          *              *
          *2          4    *
          *              *
          *              *
          *1              *
          *****
960         INPUT "NUMBER?",Ornum
970         IF Ornum=2 THEN Yofst=6300
980         IF Ornum=3 THEN Yofst=12700
990         IF Ornum=4 THEN Yofst=6300
1000        IF Ornum=4 THEN Xofst=8700
1010        Prpg: PRINT PAGE
1020        PLOTTER IS "GRAPHICS"
1030        SCALE 0,17500,0,14200
1040        GRAPHICS
1050        GOSUB Frame          !Draw in frame and labels.
1060        OUTPUT Digzer;"BP"
1070        Skip3: INPUT "YOU MAY NOW ALIGN/EXTEND YOUR AXES. PRESS CONT TO PROCEED."
            ,Re
1080        OUTPUT Digzer;"SG;SK0"
1090        OUTPUT Digzer;"BP"
1100        FOR N=Dpoints TO 1999
1110            Dpoints=N
1120        Input:REM            !Input points
1130        OUTPUT Digzer;"OS"    !Check status.
1140        ENTER Digzer;Status
1150        IF NOT BIT(Status,7) THEN 1230 !If no key pressed, go on.
1160        OUTPUT Digzer;"OK"    !See which key was pressed.
1170        ENTER Digzer;Key
1180        IF Key=0 THEN LINE TYPE 1 !If no key set,regular line type.
1190        IF Key=1 THEN Fa        !If key fa is set, clear screen.
1200        IF Key=2 THEN Fb        !If key fb is set,dump graphics.

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1210 IF Key=4 THEN Fc !If key fc is set, do another trace.
1220 IF Key=16 THEN Fe !If key fe is set, store data
1230 IF NOT BIT(Status,2) THEN Input !If no pt digged, follow cursor.
1240 OUTPUT Digzer;"OD" !If point has been digitized,
1250 ENTER Digzer;Digit(1,N),Digit(2,N)
1260 X=Digit(1,N)
1270 Y=Digit(2,N)
1280 X$=VAL$(X)
1290 Y$=VAL$(Y)
1300 IF X$[1,1]="-" THEN Xsgn$="-"
1310 IF X$[1,1]<>"-" THEN Xsgn$="+"
1320 IF Y$[1,1]="-" THEN Ysgn$="-"
1330 IF Y$[1,1]<>"-" THEN Ysgn$="+"
1340 IF X$[1,1]="-" THEN Ysgn$="+"
1350 IF Y$[1,1]="-" THEN Xsgn$="-"
1360 Xlen=LEN(X$)
1370 Ylen=LEN(Y$)
1380 Nxzer=5-Xlen
1390 Nyzer=5-Ylen
1400 Dfile$(N)="X:"&Xsgn$&RPT$(CHR$(48),Nxzer)&X$&CHR$(32)&"Y:"&Ysgn$&RPT$(CHR$(48),Nyzer)&Y$
1410 LONG 5
1420 MOVE X+Xofst,Y+Yofst
1430 LABEL "+"
1440 NEXT N !Input another point.
1450 DISP "YOU HAVE DIGITIZED TO MANY POINTS (2000)"
1460 BEEP
1470 GOTO Fe
1480 Fa: GCLEAR !Start Again routine.
1490 EXIT GRAPHICS
1500 Dfile$=""
1510 MAT Digit=ZER
1520 GOTO Start
1530 PL: PRINTER IO 0 !Dump graphics routine.
1540 PRINT PAGE
1550 DUMP GRAPHICS
1560 PRINT PAGE
1570 PRINTER IS 16
1580 OUTPUT Digzer;"SK0"
1590 GOTO Input
1600 Fc: Dfile$(Dpoints)=Dfile$(Dpoints-1) !Duplicate last data point
1610 Dpoints=Dpoints+1
1620 OUTPUT Digzer;"SK0"
1630 GOTO Skip3 !Go get more data
1640 Fe: !Store data routine.
1650 Dfile$(Dpoints)=Dfile$(Dpoints-1) !Duplicate last data point
1660 GCLEAR
1670 EXIT GRAPHICS
1680 GOSUB Makefile
1690 OUTPUT Digzer;"DF"
1700 GOTO Start
1710 !
1720 !
1730 Append: ! APPEND SEVERAL FILES TOGETHER
1740 PRINT PAGE;"MAKE SURE PROPER MASS STORAGE UNIT IS READY"
1750 INPUT "HOW MANY DATA FILES DO YOU WISH TO APPEND?";Q4
1760 FOR N=1 TO Q4
1770 IF N>1 THEN PRINT PAGE;"THE LAST FILE APPENDED WAS "&Afile$(N-1)
1780 IF N>1 THEN PRINT "YOU HAVE "&VAL$(Q4-(N-1))&" MORE TO APPEND."
1790 INPUT "FILE NAME?";Afile$(N)
1800 CAT TO Dir$(*)
1810 FOR K=2 TO 7
1820 IF Afile$(N)[K]=" " THEN Num=K-1
1830 IF Afile$(N)[K]=" " THEN GOTO 1850
1840 NEXT K
1850 FOR L=1 TO 200

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1860 IF Dir$(L)[1,Num]=Apfile$(N) THEN Dpoints=VAL(Dir$(L)[19,21])
1870 NEXT L
1880 IF N=1 THEN Apoints1=1
1890 IF N=1 THEN Apoints2=Dpoints
1900 IF N<>1 THEN Apoints1=Apoints2+1
1910 IF N<>1 THEN Apoints2=Apoints1+Dpoints-1
1920 ASSIGN #1 TO Apfile$(N)
1930 FOR M=Apoints1 TO Apoints2
1940 READ #1;Dfile$(M)
1950 Digit(1,M)=VAL(Dfile$(M)[3,8])
1960 Digit(2,M)=VAL(Dfile$(M)[12,17])
1970 X=Digit(1,M)
1980 Y=Digit(2,M)
1990 NEXT M
2000 NEXT N
2010 Dpoints=Apoints2
2020 GOSUB Makefile
2030 GOSUB Plotit
2040 RETURN
2050 !
2060 !
2070 Replt1: ! PLOT TRACE ON GRADICULE PAPER ON PLOTTER
2080 DEG
2090 PEN 1
2100 PLOTTER IS 7,5,"9872A"
2110 Plotter=705
2120 LIMIT 0,400,0,285
2130 P1x=5.31
2140 P1y=2.83
2150 P2x=139.13
2160 P2y=90.65
2170 POINTER P1x,P1y
2180 DISP "SET P1---PRESS ENTER"
2190 DIGITIZE P1x,P1y
2200 POINTER P2x,P2y
2210 DISP "SET P2---PRESS ENTER"
2220 DIGITIZE P2x,P2y
2230 ! PRINTER IS 0
2240 ! PRINT P1x,P1y,P2x,P2y
2250 ! PRINTER IS 16
2260 Xmag=P2x-P1x
2270 Ymag=P2y-P1y
2280 Xor=P1x
2290 Yor=P1y
2300 Gdux=Xmag/19000
2310 Gduy=Ymag/12500
2320 Xst=1000*Gdux
2330 Yst=1000*Gduy
2340 CLIP P1x,19*Xst,P1y,13*Yst
2350 AXES Xst,Yst,P1x,P1y
2360 Xnum=0
2370 Ynum=0
2380 INPUT "WHERE WOULD YOU LIKE THE ORIGIN X,Y ? (COUNT MAJOR TICS) .DEFAULT
T IS (0,0)",Xnum,Ynum
2390 Xor=P1x+Xnum*Xst
2400 Yor=P1y+Ynum*Yst
2410 Xscale=1
2420 Yscale=1
2430 Xnmr1=1
2440 Ynmr1=1
2450 INPUT "WOULD YOU LIKE TO CHANGE X,Y SCALE FACTORS ON PLOT? (Y OR N)",Q5$
2460 IF Q5$<>"Y" THEN GOTO Skip1
2470 PRINT PAGE
2480 PRINT "ENTER SCALE FACTOR FOR X AXIS--HOW MANY UNITS PER MAJOR DIV.?"
2490 PRINT "THIS IS HOW TO DO IT:"
2500 PRINT

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2510 PRINT "THERE ARE NORMALLY 1000 COUNTS PER MAJOR DIVISION."
2520 PRINT "THEREFORE, IF YOU WANT TO DOUBLE THE LENGTH OF THE TRACE, YOU WOULD
ENTER 500."
2530 PRINT "LIKEWISE, IF YOU WANT TO HALVE THE LENGTH OF THE TRACE, YOU WOULD E
NTER 2000."
2540 PRINT
2550 PRINT "-----EXAMPLE-----"
2560 PRINT "SUPPOSE YOU HAVE A TIMING WAVE THAT IS 2.85 DIVISIONS LONG AND YOU
WANT IT TO BE"
2570 PRINT "3.0 DIVISIONS LONG, THEN YOUR SCALE FACTOR WOULD BE (2.85/3.0)*1000
OR 716.667"
2580 INPUT "ENTER SCALE FACTOR FOR X AXIS--HOW MANY UNITS PER MAJOR DIV.?",Xsca
le
2590 Xscale=1000/Xscale
2600 INPUT "USING SAME FORMAT ENTER SCALE FACTOR FOR Y AXIS--HOW MANY UNITS PER
MAJOR DIV.?",Yscale
2610 Yscale=1000/Yscale
2620 Skip1: PRINT PAGE
2630 INPUT "WOULD YOU LIKE TO CHANGE THE NUMERALS ON THE AXES?",Q6$
2640 IF Q6$<>"Y" THEN GOTO Skip2
2650 PRINT "ENTER NUMERAL FACTOR FOR X AXIS--HOW MANY UNITS PER MAJOR DIV.?"
2660 PRINT "THIS IS HOW TO DO IT:"
2670 PRINT
2680 PRINT "THERE IS NORMALLY 1 UNIT PER MAJOR DIVISION."
2690 PRINT "TO CHANGE TO 5 UNITS/DIV. SIMPLY ENTER 5"
2700 PRINT
2710 PRINT "-----EXAMPLE-----"
2720 PRINT "SUPPOSE YOU WANT YOUR X AXIS TO REPRESENT 5 MICROSECONDS/DIV."
2730 PRINT "THEN SIMPLY ENTER 5"
2740 INPUT "ENTER NUMERAL FACTOR FOR X AXIS--HOW MANY UNITS PER MAJOR DIV.?",Xn
mr1
2750 INPUT "USING SAME FORMAT ENTER NUMERAL FACTOR FOR Y AXIS--HOW MANY UNITS P
ER MAJOR DIV.?",Ynmr1
2760 Skip2: PRINT PAGE
2770 LOG 1
2780 CSIZE 2
2790 MOVE P1x,P2y
2800 LABEL USING "K";"      FILE NAME "&Dfile$
2810 LOG 4
2820 CSIZE 2
2830 N=(-Xnum+1)*Xnmr1
2840 FOR Xposition=P1x+Xst TO 18*Xst STEP Xst
2850 MOVE Xposition,P1y+.25*Yst
2860 LABEL USING "K";N
2870 N=N+Xnmr1
2880 NEXT Xposition
2890 LOG 2
2900 N=(-Ynum+1)*Ynmr1
2910 FOR Yposition=P1y+Yst TO 13*Yst STEP Yst
2920 MOVE P1x+.25*Xst,Yposition
2930 LABEL USING "K";N
2940 N=N+Ynmr1
2950 NEXT Yposition
2960 LOG 5
2970 CSIZE 2
2980 INPUT "WHICH PEN WOULD YOU LIKE? (1,2,3,4)",Pen
2990 PEN Pen
3000 MOVE Digit(1,1)*Gdux*Xscale+Xor,Digit(2,1)*Gduy*Yscale+Yor
3010 INPUT "WOULD YOU LIKE A SMOOTH LINE OR DISCRETE POINTS? (L OR P)",Li
nepoint$
3020 FOR N=1 TO Dpoints-1
3030 IF Linepoint$="L" THEN PLOT Digit(1,N)*Gdux*Xscale+Xor,Digit(2,N)*Gduy*Ysc
ale+Yor,-1
3040 IF Linepoint$="P" THEN PLOT Digit(1,N)*Gdux*Xscale+Xor,Digit(2,N)*Gduy*Ysc
ale+Yor,-2
3050 IF Linepoint$="P" THEN LABEL USING "K";"+ "

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3060 IF (Digit(1,N+1)=Digit(1,N)) AND (Digit(2,N+1)=Digit(2,N)) THEN PENUP
3070 IF N=Dpoints-1 THEN GOTO Nexn
3080 IF (Digit(1,N+1)=Digit(1,N)) AND (Digit(2,N+1)=Digit(2,N)) THEN INPUT "WH
ICH PEN WOULD YOU LIKE? (1,2,3,4)",Pen
3090 PEN Pen
3100 IF (Digit(1,N+1)=Digit(1,N)) AND (Digit(2,N+1)=Digit(2,N)) THEN MOVE Digit
(1,N+2)*Gdux*Xscale+Xor, Digit(2,N+2)*Gduy*Yscale+Yor
3110 IF (Digit(1,N+1)=Digit(1,N)) AND (Digit(2,N+1)=Digit(2,N)) THEN INPUT "WOU
LD YOU LIKE A SMOOTH LINE OR DISCRETE POINTS? (L OR P)",Linepoint$
3120 IF (Digit(1,N+1)=Digit(1,N)) AND (Digit(2,N+1)=Digit(2,N)) THEN N=N+1
3130 Nexn: NEXT N
3140 IF Linepoint$="L" THEN PLOT Digit(1,N)*Gdux*Xscale+Xor, Digit(2,N)*Gduy*Ysc
ale+Yor,-1
3150 IF Linepoint$="P" THEN PLOT Digit(1,N)*Gdux*Xscale+Xor, Digit(2,N)*Gduy*Ysc
ale+Yor,-2
3160 PEN 0
3170 PENUP
3180 RETURN
3190 !
3200 !
3210 Eddata: ! EDIT A DATA FILE
3220 Eddata=1
3230 GOSUB Getfile
3240 INPUT "WOULD YOU LIKE A HARDCOPY OF THE DATA?",Q8$
3250 IF Q8$="Y" THEN GOSUB Hardcopy
3260 Chngone: INPUT "ENTER OLD X,Y PAIR TO BE REPLACED LIKE THIS: X:+00012 Y:-
00123",Oldpair$
3270 INPUT "ENTER NEW X,Y PAIR IN THE SAME FORMAT: X:+00012 Y:-00123",Newpair$
3280 FOR N=1 TO Dpoints
3290 Chk=0
3300 IF Dfile$(N)=Oldpair$ THEN Chk=1
3310 IF Chk=1 THEN Dfile$(N)=Newpair$
3320 IF Chk=1 THEN PRINTER IS 0
3330 IF Chk=1 THEN PRINT "OLD PAIR= ";Oldpair$& " NEW PAIR= ";Newpair$& " P
OINT #";N
3340 IF Chk=1 THEN PRINTER IS 16
3350 IF Chk=1 THEN N=Dpoints
3360 NEXT N
3370 IF Chk=0 THEN INPUT "POINT NOT FOUND--WOULD YOU LIKE TO TRY AGAIN?",Q9$
3380 IF (Chk=0) AND (Q9$="Y") THEN GOTO Chngone
3390 INPUT "WOULD YOU LIKE TO CHANGE ANOTHER POINT?",Q7$
3400 IF Q7$="Y" THEN GOTO Chngone
3410 PRINTER IS 0
3420 PRINT PAGE
3430 PRINTER IS 16
3440 PURGE Dfile$
3450 LUSUB Makit
3460 GOTO Start
3470 !
3480 !
3490 Offset: ! OFFSET DATA INTO +X,+Y QUADRANT
3500 Offsetx=0
3510 Offsety=0
3520 FOR N=1 TO Dpoints
3530 Digit(1,N)=VAL(Dfile$(N)[3,8])
3540 Digit(2,N)=VAL(Dfile$(N)[12,17])
3550 X=Digit(1,N)
3560 Y=Digit(2,N)
3570 IF (X<0) AND (X<-Offsetx) THEN Offsetx=0-X
3580 IF (Y<0) AND (Y<-Offsety) THEN Offsety=0-Y
3590 NEXT N
3600 FOR M=1 TO Dpoints
3610 Digit(1,M)=Digit(1,M)+Offsetx
3620 Digit(2,M)=Digit(2,M)+Offsety
3630 X=Digit(1,M)
3640 Y=Digit(2,M)

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3650 X$=VAL$(X)
3660 IF X$[1,1]="-" THEN Xsgn$="-"
3670 IF X$[1,1]<>"-" THEN Xsgn$="+"
3680 IF X$[1,1]="-" THEN X$=X$[2]
3690 Y$=VAL$(Y)
3700 IF Y$[1,1]="-" THEN Ysgn$="-"
3710 IF Y$[1,1]<>"-" THEN Ysgn$="+"
3720 IF Y$[1,1]="-" THEN Y$=Y$[2]
3730 Xlen=LEN(X$)
3740 Ylen=LEN(Y$)
3750 Nxzer=5-Xlen
3760 Nyzer=5-Ylen
3770 Dfile$(M)="X: "&Xsgn$&RPT$(CHR$(48),Nxzer)&X$&CHR$(32)&"Y: "&Ysgn$&RPT$(CHR$(48),Nyzer)&Y$
3780 NEXT M
3790 RETURN
3800 !
3810 !
3820 Makefile: PRINT PAGE; "MAKE SURE PROPER MASS STORAGE UNIT IS READY"
3830 INPUT "PERMANENT FILE NAME? ", Pfile$
3840 IF Pfile$="" THEN Return
3850 Dfile$=Pfile$
3860 Makit: Pfile$=Dfile$
3870 CREATE Pfile$, Dpoints, 25
3880 ASSIGN #1 TO Pfile$
3890 FOR N=1 TO Dpoints
3900 PRINT #1; Dfile$(N)
3910 NEXT N
3920 IF Q1$="3" THEN Return
3930 Dfile$=""
3940 MAT Digit=ZER
3950 Return: RETURN
3960 !
3970 !
3980 Getfile: ! PRINT PAGE; "MAKE SURE PROPER MASS STORAGE UNIT IS READY"
3990 INPUT "NAME OF DATA FILE?", Dfile$
4000 IF Dfile$="" THEN Retrn
4010 CAT TO Dir$(*)
4020 FOR N=2 TO 7
4030 IF Dfile$(N)="" THEN Num=N-1
4040 IF Dfile$(N)="" THEN GOTO 4060
4050 NEXT N
4060 Num=7-Num
4070 Dfile$=Dfile$&RPT$(" ", Num)
4080 FOR N=1 TO 200
4090 IF Dir$(N)[1,7]=Dfile$ THEN Dpoints=VAL(Dir$(N)[19,21])
4100 NEXT N
4110 ASSIGN #1 TO Dfile$
4120 FOR K=1 TO Dpoints
4130 READ #1; Dfile$(K)
4140 Digit(1,K)=VAL(Dfile$(K)[3,8])
4150 Digit(2,K)=VAL(Dfile$(K)[12,17])
4160 NEXT K
4170 IF Eddata=1 THEN GOTO Retrn
4180 GOSUB Replot
4190 Retrn: RETURN
4200 !
4210 !
4220 Hardcopy: PRINTER IS 0
4230 PRINT "FILE NAME "&Dfile$
4240 PRINT
4250 FOR K=1 TO Dpoints
4260 PRINT Dfile$(K), "POINT #"; K
4270 NEXT K
4280 PRINT PAGE
4290 PRINTER IS 16

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4300 IF Eddata=1 THEN GOTO R1
4310 DUMP GRAPHICS
4320 PRINTER IS 0
4330 PRINT PAGE
4340 PRINTER IS 16
4350 R1: RETURN
4360 !
4370 !
4380 Frame: !Frame building routine.
4390 CLIP 0,17500,0,12700
4400 LINE TYPE 1
4410 FRAME
4420 LOG 2 !Label keys on screen.
4430 MOVE 400,13500
4440 LABEL USING "K";"Fa - START OVER"
4450 MOVE 400,13000
4460 LABEL USING "K";"Fb - DUMP GRAPHICS"
4470 MOVE 6400,13500
4480 LABEL USING "K";"Fc - ADD MORE DATA"
4490 MOVE 13000,13500
4500 LABEL USING "K";"Fe - STORE DATA"
4510 UNCLIP
4520 RETURN
4530 !
4540 !
4550 Replot: ! REPLOT DATA
4560 Q3$=""
4570 Q4$=""
4580 INPUT "DO YOU WANT TO OFFSET DATA TO FORCE IT INTO +X,+Y QUADRANT? (Y OR N)",Q4$
4590 IF Q4$="Y" THEN GOSUB Offset
4600 GCLEAR
4610 GRAPHICS
4620 Plotit1 !
4630 PLOTTER IS 13,"GRAPHICS"
4640 SCALE 0,17500,0,14200
4650 CLIP 0,17500,0,12700
4660 LINE TYPE 1
4670 PEN 1
4680 FRAME
4690 UNCLIP
4700 LOG 2
4710 MOVE 1000,13000
4720 LABEL USING "K";"FILE NAME "&Dfile$
4730 FOR N=1 TO Dpoints
4740 X=Digit(1,N)
4750 Y=Digit(2,N)
4760 LOG 5
4770 MOVE X,Y
4780 LABEL "+"
4790 NEXT N
4800 PENUP
4810 PEN 0
4820 MOVE 17500,12700
4830 BEEP
4840 PAUSE
4850 INPUT "DO YOU WANT A HARD COPY? (Y OR N)",Q2$
4860 IF Q2$="Y" THEN GOSUB Hardcopy
4870 EXIT GRAPHICS
4880 INPUT "DO YOU WANT A PLOTTER COPY? (Y OR N)",Q3$
4890 IF Q3$="Y" THEN GOSUB Replt1
4900 PLOTTER IS 13,"GRAPHICS"
4910 MAT Digit=ZER
4920 Dfile$=""
4930 RETURN
4940 !

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4950 !
4960 Purge: INPUT "WHAT IS NAME OF FILE YOU WISH TO PURGE?",Purg$
4970 ON ERROR GOTO E56
4980 PURGE Purg$
4990 E56: IF ERRN=56 THEN INPUT "FILE NOT FOUND. PRESS CONT TO GO ON.",Ok
5000 EDIT "DO YOU WISH TO PURGE ANOTHER FILE? (Y OR N)",Q5$
5010 IF Q5$="Y" THEN GOTO Purge
5020 RETURN
5030 !
5040 !
5050 Chrmod: !
5060 ! 9845 Character mode High speed asynchronous terminal emulator
5070 PRINTER IS 16
5080 STANDARD
5090 DISP "Initializing"
5100 Defaults:RESTORE Defaults
5110 READ Hard_sc,Screen,Filesize,Bitsperchar,Check,Speed
5120 DATA 0, 16, 10, 7, 3, 1200
5130 READ Modem,Recorddev$,Recordprot$
5140 DATA 1, "H8,0,1", ""
5150 Recordlen=26
5160 Defstorage$=""
5170 Outsep$=Cr$
5180 Insep$=Cr$&Lf$
5190 Prompt$=CHR$(47)
5200 Highlight$=CHR$(120)
5210 Alt_brk$=CHR$(25)
5220 Eof$=CHR$(0)&CHR$(0)&CHR$(3)&Outsep$
5230 GOSUB Setall
5240 Hardcopy=Verify=Disp_fns=Typewriter=0
5250 Stopbits=2
5260 Handshk=0
5270 Prompthandshake=0
5280 Remote=Echo=Commonok=1
5290 CHECK READ OFF
5300 IF Verify THEN CHECK READ
5310 B1: PRINTER IS Screen
5320 TYPEWRITER OFF
5330 IF Typewriter THEN TYPEWRITER ON
5340 IF Sc<2 THEN B4
5350 UN USIHI(Sc,5)+2 GOTO B4,B4,B2,B7,B2
5360 D2: GOSUB Do_0
5370 GOTO B7
5380 B3: Sc=4
5390 Sc=Sc DIV 2*2
5400 B4: GOSUB Domodel
5410 IF Cmodelerror<>1 THEN B7
5420 DISP "Disconnecting"
5430 ON ERROR GOTO B5
5440 FOR Sc=2 TO 12 STEP 2
5450 CDISCONNECT Sc
5460 B5: NEXT Sc
5470 T=0
5480 FOR Sc=2 TO 6 STEP 2
5490 ON ERROR GOTO B6
5500 CMODEL ASYNC,Sc;MEMLIMIT=0,INBUFFER=0,TBUFFER=0
5510 CDISCONNECT Sc
5520 OFF ERROR
5530 IF T THEN B3
5540 T=3L
5550 B6: GOSUB Do_6
5560 NEXT Sc
5570 Sc=T
5580 IF T THEN B4
5590 DISP "No 98046 cards installed."
5600 STOP

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5610 B7:    OFF ERROR
5620      IF NOT Cmodelerror THEN GOSUB Setcursors
5630      DISABLE
5640      DISP "Terminal ready on "&VAL$(Sc)&" Set ROUT=0 After Login";
5650      DISP RPT$(" Local",NOT Remote);RPT$(" Disp fns",Disp_fns);
5660      DISP RPT$(" Echo off",NOT Echo);RPT$(" Hardcopy on",Hardcopy)
5670      PRINT USING "#,K";Cursor$
5680      ON KBD 3 GOSUB Key ,ALL
5690      TDISP RPT$(" ",160)
5700      GOSUB Setisrs
5710      IF NOT Cmodelerror THEN CREAD Sc+1;R$[1,0]
5720      Forcereturn=0
5730 Resume:Run=Uploading=0
5740      ENABLE
5750 B90:    IF Run THEN Start
5760 Again:  IF NOT Uploading THEN B90
5770      IF Remote AND Prompthandshake AND NOT Promptwaiting THEN B90
5780      DISABLE
5790      IF NOT Uploading THEN B90
5800      ON END #1 GOTO B92
5810      ON ERROR GOTO B92
5820      READ #1;R$
5830      Ck1$=R$
5840      ON ERROR GOSUB Cwrite_error
5850      IF Remote THEN CWRITE Sc;R$,Outsep$
5860      WAIT 100
5870      Promptwaiting=0
5880      Separator=1
5890      IF NOT Remote OR NOT Echo THEN GOSUB Rcv_rtn
5900      GOTO B93
5910 B92:   GOSUB Unassign
5920      DISP
5930      IF Remote THEN CWRITE Sc;Eof$
5940 B93:   OFF ERROR
5950      ENABLE
5960      GOTO B90
5970 Return_:Forcereturn=0
5980      RETURN
5990 Rcv_1:  IF NOT CSTAT(Sc,1) OR Forcereturn THEN Return_
6000 Rdt:    DISABLE
6010      CREAD Sc;Rread$
6020      Separator=CSTAT(Sc,3)
6030      R$=Rread$
6040      GOSUB Rcv_rtn
6050      ENABLE
6060      GOTO Rcv_1
6070 Rcv_3:  IF NOT CSTAT(Sc+1,1) OR Forcereturn THEN Return_
6080      CREAD Sc+1;Rread$
6090      GOTO Rcv_3
6100 Xmt_1:  IF NOT CSTAT(Sc,2) THEN RETURN
6110      DISABLE
6120      GOSUB Setcursors
6130      IF NOT Statuswaiting THEN X1
6140      ON ERROR GOSUB Cwrite_error
6150      CWRITE Sc;Response$&Outsep$
6160      OFF ERROR
6170      Statuswaiting=0
6180 X0:     ENABLE
6190      RETURN
6200 X1:    Promptwaiting=1
6210      GOTO X0
6220 Key:    Key$=KBD$
6230 Key1:   IF NOT LEN(Key$) THEN RETURN
6240      GOSUB Getkey
6250      IF Key<256 THEN Askey
6260      K=Keymap(Key)

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6270      IF NOT Keyboard AND (K<>2) THEN Klock
6280 Dokey: IF K>100 THEN Udf
6290      ON K GOTO Err,St,Hr,H,Cp,Ar,Ck,Dk,E,S,Tn,Rn,C,Z,Cak,Lt,Bk,Cnd,U,R,A,
Abk,Sts,P,Rm,Cat,CaI,Err,Err,Err,T,Stp
6300 Klock: DISP "Keyboard is locked"
6310 Er:    PRINT USING "#,K";Cursor$
6320 Err:    BEEP
6330      OFF ERROR
6340      RETURN
6350      GOTO Key1
6360 St:     DISP "Program stopped without disconnect"
6370      GOTO Stp1
6380 Stp:    DISP "Disconnecting"
6390      CDISCONNECT Sc
6400      DISP "Program stopped and datacomm disconnected"
6410 Stp1:  PRINT USING "#,K";RPT$(Troff$,Disp_fns)&Hloff$
6420      OFF KBD
6430      STOP
6440 T:      Typewriter=NOT Typewriter
6450      TYPEWRITER OFF
6460      IF Typewriter THEN TYPEWRITER ON
6470      GOTO Key1
6480 Ar:     PRINT USING "#,K";Hloff$&Esc$&CHR$(FNSpecialmap(Key))&Cursor$
6490      GOTO Key1
6500 H:      PRINT USING "#,K";Hloff$&Cr$&Cursor$
6510      GOTO Key1
6520 Hr:     PRINT USING "#,K";Hloff$&Esc$&"a80C"&Cursor$
6530      GOTO Key1
6540 S:      DISP
6550      ON ERROR GOSUB Cwrite_error
6560      IF Remote THEN CWRITE Sc;Outsep$
6570      R$=Cr$&Lf$
6580      Separator=1
6590 S1:     .OFF ERROR
6600      IF NOT Echo OR NOT Remote THEN GOSUB Rcv rtn
6610      Promptwaiting=0
6620      GOTO Key1
6630 CaI:    PRINT USING "#,K";Troff$&Esc$&"E"&Cursor$
6640      DISP
6650 Cnd:     PRINT USING "#,K";Hloff$&Esc$&"K"&Cursor$
6660      GOTO Key1
6670 C:      Highlight$=Hloff$
6680      GOSUB Setcursors
6690      PRINT USING "#,K";Hloff$&Esc$&"J"&Cursor$
6700      DISP
6710      GOTO Key1
6720 Z:      Key=FNSpecialmap(Key)
6730 Askey:  IF NOT Keyboard THEN Klock
6740      ON ERROR GOSUB Cwrite_error
6750      R$=CHR$(Key)
6760      IF Remote THEN CWRITE Sc;R$
6770      Separator=0
6780      GOTO S1
6790 Lt:     GOSUB Setpr
6800      ON ERROR GOTO Respr1
6810      CDUMP Sc;FORCE
6820      GOTO Respr
6830 Abk:    ON ERROR GOSUB Cwrite_error
6840      CWRITE Sc;Alt_brk$
6850      GOTO Bk1
6860 A:      ON ERROR GOSUB Cwrite_error
6870      CWRITE Sc;CHR$(6)
6880      GOTO Bk1
6890 Bk:     ON ERROR GOSUB Cwrite_error
6900      CCONTROL Sc;BREAK
6910 Bk1:    BEEP

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6920      OFF ERROR
6930      WAIT 50
6940      BEEP
6950      GOTO Key1
6960 Setpr: PRINTER IS Screen
6970      IF Hardcopy AND NOT Hard_hpib THEN PRINTER IS Hard_sc
6980      IF Hardcopy AND Hard_hpib THEN PRINTER IS Hard_sc,Hard_hpib
6990      PRINT USING "K";Hloff$&RPT$(Troff$,Disp_fns)
7000      RETURN
7010 Sts:  GOSUB Setpr
7020      PRINT RPT$("-",33); " S T A T U S ";RPT$("-",34)
7030      P$="File in use"
7040      P1$=Recordfile$&Recorddev$&RPT$(", "&Recordprot$,LEN(Recordprot$)<>0)
7050      GOSUB Sts_s
7060      P$="OUTSEP"
7070      P1$=Outsep$
7080      GOSUB Sts_s
7090      P$="INSEP"
7100      P1$=Insep$
7110      GOSUB Sts_s
7120      P$="PROMPT"
7130      P1$=Prompt$
7140      GOSUB Sts_s
7150      P$="End of file"
7160      P1$=Eof$
7170      GOSUB Sts_s
7180      PRINT "Key definitions:"
7190      P$=" Alternate break"
7200      P1$=Alt_brk$
7210      GOSUB Sts_s
7220      FOR P=256 TO 511*(LEN(Defstorage$)<>0)
7230          P1=ABS(Keymap(P))-100
7240          IF P1<1 THEN Sts2
7250          P$=" "&FNName$(P)
7260          P1$=Defstorage$[P1+1;NUM(Defstorage$[P1])]
7270          GOSUB Sts_s
7280 Sts2:  NEXT P
7290      P$="zeroone evenodd none"
7300      PRINT VAL$(Stopbits); " stop bit"&RPT$("s",Stopbits>1),"Parity is ";P
7310      P1$=Check*4+1;4,VAL$(Bitsperchar); " bits/character",
7320      IF Speed THEN PRINT "Speed ="&Speed;"baud"
7330      IF NOT Speed THEN PRINT "Speed = EXT"
7340      P$="none enq/ackdc1/dc3"
7350      PRINT "98046 on";Sc,"Handshake="&P$[Handshk*7+1;7],"Modem "&Onoff$(
7360      Modem),"Verify mode "&Onoff$(Verify)
7370      PRINT "Screen on";Screen,
7380      PRINT "Hardcopy on "&VAL$(Hard_sc)&RPT$(", "&VHL$(Hard_hpib),Hard_hpi
7390      b<>0),
7400      PRINT "Uploading "&Onoff$(Uploading),"Echo is "&Onoff$(Echo)
7410      PRINT RPT$("Remote",Remote)&RPT$("Local",NOT Remote),"Recording "&On
7420      off$(Recording),"Display fns "&Onoff$(Disp_fns),"File size ="&Filesize
7430      PRINT "CCOM used for this CMODEL:"&Ccomused
7440      PRINT "Prompt handshake "&Onoff$(Prompthandshake),"File "&RPT$("not
7450      ",NOT Assigned)&"assigned","Background program "&RPT$("not ",NOT Run)&"running"
7460      IF CSTAT(Sc,5)<0 THEN Sts5
7470      PRINT "Datacomm status:"&TAB(10);
7480      IF CSTAT(Sc,5)=2 THEN Sts3
7490      PRINT "Datacomm suspended, CSTATUS could not be done."&TAB(10);
7500      FOR P=0 TO 15
7510          Cstatus(P)=CSTAT(Sc,P)
7520      NEXT P
7530      GOTO Sts4
7540 Sts3:  CSTATUS Sc;Cstatus(*)
7550 Sts4:  FOR P=0 TO 15
7560      IF P=8 THEN PRINT TAB(10);
7570      IF LEN(Stsname$(P)) THEN PRINT Stsname$(P)&"="&VAL$(Cstatus(P))&"

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";
7530      NEXT P
7540      GOTO Sts6
7550 Sts5: PRINT "Datacomm channel does not exist"
7560 Sts6: PRINT LIN(1);RPT$("-",80)
7570      GOTO Respr
7580 Respr1: BEEP
7590 Respr: PRINT USING "#,K";Tronoff$(Disp_fns)
7600      PRINTER IS Screen
7610      PRINT USING "#,K";Cursor$
7620      GOTO Key1
7630 Sts_s: P3=22
7640      PRINT P$;";";
7650      FOR P2=1 TO LEN(P1$)
7660          P4=NUM(P1$[P2])
7670          IF P4<>255 THEN Sts_s1
7680          P4=256+NUM(P1$[P2+1])
7690          P2=P2+1
7700 Sts_s1: P$=FNName$(P4)
7710          IF P3+LEN(P$)>78 THEN P3=22
7720          PRINT TAB(P3);P$;
7730          P3=P3+LEN(P$)+1
7740      NEXT P2
7750      PRINT
7760      RETURN
7770 P:      Hardcopy=NOT Hardcopy
7780      DISP "Hardcopy "&Onoff$(Hardcopy)&"
7790      R$=Tronoff$(Hardcopy)
7800      IF Disp_fns THEN GOSUB Printit
7810      GOTO Key1
7820 Rn:      IF Recording THEN Rf
7830          IF Uploading THEN U1
7840          GOSUB Assign
7850          IF NOT Assigned THEN Rn1
7860          PRINT #1;END
7870          Recording=1 OR TYP(1)
7880          Record$=""
7890          DISP "Recording on "&Q$&Recordfile$&Recorddev$&Q$&"
7900          CWRITE Sc;"OLD,"&Recordfile$&Outsep$
7910          CREAD Sc;Prompto$
7920          IF Prompto$("<")<"/" THEN GOTO 7910
7930          CWRITE Sc;"LNH"&Outsep$
7940          GOTO Key1
7950 Rn1:      DISP "File assignment of "&Q$&Recordfile$&Recorddev$&Q$&" unsuccessful"
7960          BEEP
7970          OFF ERROR
7980          GOTO Rf1
7990 Rf:      DISP "Recording stopped"
8000 Rf1:      UNTIL END #1
8010          ON ERROR GOTO Rf2
8020          IF LEN(Record$) THEN PRINT #1;Record$,END
8030 Rf2:      GOSUB Unassign
8040          OFF ERROR
8050          GOTO Key1
8060 Cp:      Cpmode=FNSpecialmap(Key)
8070          PRINT TAB(1)
8080          INPUT "HIT CLEAR LINE, TYPE IN FILENAME, THEN PRESS CONT.",Recordfil
8090          e$
8090          CWRITE Sc;"ROUT=0"&Outsep$
8100          CREAD Sc;Prompto$
8110          IF Prompto$("<")<"/" THEN GOTO 8100
8120          IF Cpmode=1 THEN GOTO 8490
8130          PRINT "CHECKING NOS FOR FILE NAME "&Recordfile$
8140          CWRITE Sc;"GET,"&Recordfile$&Outsep$
8150          CREAD Sc;Prompto$

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8160      IF Prompto$<>"/" THEN GOTO 8150
8170      CWRITE Sc;"XEDIT,"&Recordfile$&Outsep$
8180      Llen$=""
8190      CREAD Sc;Tlen$
8200      Llen$=Llen$&Tlen$
8210      Eprompt=POS(Llen$,"EMPTY")
8220      Xprompt=POS(Llen$,"?")
8230      IF Xprompt=0 THEN GOTO 8190
8240      IF Eprompt>0 THEN PRINT "FILE NOT FOUND."
8250      IF Eprompt>0 THEN CWRITE Sc;"E"&Outsep$
8260      IF Eprompt>0 THEN GOTO Pu_2
8270      PRINT "CHECKING NOS FOR FILE SIZE"
8280      CWRITE Sc;"B"&Outsep$
8290      CREAD Sc;Prompto$
8300      Xprompt=POS(Prompto$,"?")
8310      IF Xprompt=0 THEN GOTO 8290
8320      CWRITE Sc;"W"&Outsep$
8330      CREAD Sc;Prompto$
8340      Xprompt=POS(Prompto$,"W")
8350      IF Xprompt=0 THEN GOTO 8330
8360      Llen$=""
8370      CREAD Sc;Tlen$
8380      Llen$=Llen$&Tlen$
8390      Lprompt=POS(Llen$,CHR$(10))
8400      IF Lprompt=0 THEN GOTO 8370
8410      PRINT "FILE IS"&Llen$[Lprompt-5,Lprompt-2]&" LINES LONG"
8420      Filesize=VAL(Llen$[Lprompt-5,Lprompt-1])
8430      CREAD Sc;Prompto$
8440      Xprompt=POS(Prompto$,"?")
8450      IF Xprompt=0 THEN GOTO 8430
8460      CWRITE Sc;"E"&Outsep$
8470      CREAD Sc;Prompto$
8480      IF Prompto$<>"/" THEN GOTO 8470
8490      DISP "Type Y to verify ";RPT$("CREATE",Cpmode=2);RPT$("PURGE",Cpmode=1);" of "&Q$&Recordfile$&Recorddev$&Q$&";
8500      DISP RPT$(" to "&VAL$(Filesize)&" records "&VAL$(Recordlen)&" Bytes
      Long",Cpmode=2)
8510      ON KBD 3 GOSUB Pu_1 ,ALL
8520      GOTO Pu_2
8530 Pu_1: Key$=KBD$
8540 Pu_2: IF NOT LEN(Key$) THEN RETURN
8550      GOSUB Getkey
8560      IF (Key=89) OR (Key=121) THEN Pu_3
8570      BEEP
8580      DISP "Purge/create not verified."
8590      GOTO Pu_4
8600 Pu_3: ON ERROR GOTO Cr_1
8610      ON Cpmode GOTO Pu,Cr
8620 Pu: PURGE Recordfile$&Recorddev$,Recordprot$
8630      DISP ""&Q$&Recordfile$&Recorddev$&Q$&" purged."
8640 Pu_4: ON KBD 3 GOSUB Key ,ALL
8650      OFF ERROR
8660      GOTO Key1
8670 Cr: CREATE Recordfile$&Recorddev$,Filesize,Recordlen
8680      IF LEN(Recordprot$) THEN PROTECT Recordfile$&Recorddev$,Recordprot$
8690      DISP ""&Q$&Recordfile$&Recorddev$&Q$&" created to";Filesize;"record
      s."
8700      OFF ERROR
8710      GOTO Pu_4
8720 Cr_1: DISP "File creation/purge failed."
8730      OFF ERROR
8740      GOTO Pu_4
8750 Tn: Disp_fns=NOT Disp_fns
8760      DISP "Display functions "&Onoff$(Disp_fns)&""
8770      GOSUB Setcursors
8780      R$=Tronoff$(Disp_fns)

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8790      PRINT USING "#,K";R$
8800      IF Handcopy THEN GOSUB Printit
8810      GOTO Key1
8820 U:    IF Recording THEN U1
8830      IF Uploading THEN Uf
8840      GOSUB Assign
8850      IF NOT Assigned THEN Rn1
8860      CWRITE Sc;"NEW,"&Recordfile$&Insep$
8870      CREAD Sc;Promto$
8880      IF Promto$(">")/" THEN GOTO 8870
8890      CWRITE Sc;"TEXT"&Insep$
8900      DISP "PRESS CONT TO GO AHEAD WHEN IN TEXT MODE."
0910      ON KBD 2 GOSUB Uint ,ALL
8920      GOTO Uint1
8930 Uint:  Key$=KBD$
8940 Uint1: IF NOT LEN(Key$) THEN RETURN
8950      GOSUB Getkey
8960      Promphandshake=(Key=121) OR (Key=89)
8970      ON KBD 3 GOSUB Key ,ALL
0900      CAT TO Dir$(*)
8990      FOR N=2 TO 7
9000      IF Recordfile$[N]=" " THEN Num=N-1
9010      IF Recordfile$[N]=" " THEN GOTO 9030
9020      NEXT N
9030      FOR N=1 TO 200
9040      IF Dir$(N)[1,Num]=Recordfile$ THEN Filesize=VAL(Dir$(N)[19,21])
9050      NEXT N
9060      DISP "Uploading "&Q$&Recordfile$&Recorddev$&Q$&" with"&RPT$("out",N
OT Promphandshake)&" handshake"
9070      Uploading=1 OR TYP(1)
9080      GOTO Key1
9090 Uf:    DISP "Uploading stopped"
9100      GOTO Rf1
9110 U1:    DISP "File usage conflict"
9120      GOTO Er
9130 R:     ON ERROR GOTO Er
9140      Oldopt$=":T"&VAL$(FNSpecialmap(Key))
9150      REWIND Oldopt$
9160      GOTO Key1
9170 Cat:   UN ERRUR LUIU Respr1
9180      GOSUB Setpr
9190      Key$=""
9200      Oldopt$=":H8,0,"&VAL$(Key-326)
9210      CAT Oldopt$
9220      GOTO Respr
9230 Rm:    IF Remote THEN DISP "Local"
9240      Remote=NOT Remote
9250      IF Remote THEN DISP "Remote"
9260      Promptwaiting=1
9270      GOSUB Setisrs
9280      GOTO Key1
9290 E:     DISP "Edit mode: _____<--=left  --=>right  STEP=sele
ct  STORE=exit"
9300      Keybuffer$=""
9310      ON KBD 3 GOSUB E_1 ,ALL
9320      RESTORE Edata2
9330      READ E_loc
9340 Ed1:   READ E_len,E_name$,E_data$
9350      Keybuffer$[E_loc,80]=E_name$
9360      READ E_loc
9370      IF E_loc>0 THEN Ed1
9380      TDISP Cln$&Keybuffer$
9390      Keybuffer$=""
9400      Cursor=1
9410      Keybuffer$[1,79]=VAL$(Hard_sc)
9420      Keybuffer$[10;3]=VAL$(Hard_hpib)

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9430      IF NOT Hard_hpib THEN Keybuffer$[10;3]="off"
9440      Keybuffer$[20;79]=VAL$(Screen)
9450      Keybuffer$[27;2]=VAL$(Bitsperchar)
9460      Keybuffer$[37;3]=VAL$(Stopbits)
9470      E_data$="zeroone evenodd none"
9480      Keybuffer$[47;4]=E_data$[Check*4+1]
9490      Keybuffer$[54;5]=VAL$(Speed)
9500      Keybuffer$[60;3]=Onoff$(Echo)
9510      E_data$="none   enq/ackdc1/dc3"
9520      Keybuffer$[65;7]=E_data$[Handshk*7+1]
9530      Keybuffer$[73;3]=Onoff$(Modem)
9540      IF NOT Speed THEN Keybuffer$[54;5]="EXT"
9550      TDISP Keybuffer$&RPT$(Bs$,79)
9560      GOTO E_1a
9570 Edata2: DATA 1,2,Hardcopy,0;1;2;3;4;5;6;7;8;9;10;11;12;13;14;15;16
9580      DATA 10,3,HP1B,off;1;2;3;4;5;6;7;8;9;10;11;12;13;14;15;16;17;18;19;2
0;21;22;23;24;25;26;27;28;29;30
9590      DATA 20,2,Screen,0;1;2;3;4;5;6;7;8;9;10;11;12;13;14;15;16
9600      DATA 27,1,Bits/char,5;6;7;8,37,3,Stop bits,1;1.5;2
9610      DATA 47,4,Parity,none;even;odd;zero;one
9620      DATA 54,5,Speed,EXT;50;75;110;134;150;200;300;600;1200;1800;2400;480
0;9600
9630      DATA 60,3,Echo,on;off,65,7,Handshk,none;enq/ack;dc1/dc3
9640      DATA 73,3,Modem,on;off
9650      DATA -1
9660 Edata3: DATA 1,File,7,Dev,15,Protect,24,Alt break,35,OUTSEP,42,INSEP
9670      DATA 48,PROMPT,55,End file,64,Size,0,*END*
9680 E_1:   Key$=KBD$
9690 E_1a:  IF NOT LEN(Key$) THEN RETURN
9700      GOSUB Getkey
9710      RESTORE Edata2
9720      E_loc=0
9730 E_1b:  E_lastloc=E_loc
9740      READ E_loc,E_len,E_name$,E_data$
9750      IF E_loc<>Cursor THEN E_1b
9760      IF Key=272 THEN E_1sp
9770      IF Key=272+64 THEN E_1sh
9780      IF Key=278 THEN E_1l
9790      IF Key=279 THEN E_1r
9800      IF Key=276 THEN E_1sr
9810      BEEP
9820      GOTO E_1a
9830 E_1sr: Hard_sc=VAL(Keybuffer$[1;2])
9840      Hard_hpib=0
9850      IF Keybuffer$[10;3]<>"off" THEN Hard_hpib=VAL(Keybuffer$[10;3])
9860      Screen=VAL(Keybuffer$[20;2])
9870      PRINTER IS Screen
9880      Modelchanged=1000*(Bitsperchar+Speed)+100*Stopbits+Check+Modem*.5
9890      Bitsperchar=VAL(Keybuffer$[27;1])
9900      Stopbits=VAL(Keybuffer$[37;3])
9910      Check=POS("zeroone evenodd none",Keybuffer$[47;4]) DIV 4
9920      Echo=(Keybuffer$[60;3]<>"off")
9930      Handshk=POS("ed",Keybuffer$[65;1])
9940      Modem=(Keybuffer$[73;3]<>"off")
9950      Speed=0
9960      IF Keybuffer$[44;3]<>"EXT" THEN Speed=VAL(Keybuffer$[54;5])
9970      Modelchanged=(Modelchanged<>1000*(Bitsperchar+Speed)+100*Stopbits+Ch
eck+Modem*.5)
9980      DISP "Edit mode:_____ use arrows, ASCII keys or STORE_
to exit"
9990      ON KBD 3 GOSUB E_2 ,ALL
10000     RESTORE Edata3
10010 E_1sr1: READ E_loc,E_name$
10020     IF E_name$="*END*" THEN E_1sr2
10030     Keybuffer$[E_loc,80]=E_name$
10040     GOTO E_1sr1

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```

10050 E_1sr2:TDISP Cln$&Keybuffer$
10060 Keybuffer$=RPT$(Fillchr$,79)
10070 Cursor=1
10080 Keybuffer$[1;6]=Recordfile$
10090 Keybuffer$[7;7]=Recorddev$
10100 Keybuffer$[15;6]=Recordprot$
10110 Keybuffer$[24;10]=Alt_brk$
10120 Keybuffer$[35;6]=Outsep$
10130 Keybuffer$[42;2]=Insep$
10140 Keybuffer$[48;2]=Prompt$
10150 Keybuffer$[55;8]=Eof$
10160 Keybuffer$[64;3]=RPT$("0",<Filesize<100>+<Filesize<10>)&VAL$<Filesiz
e)
10170 TDISP Keybuffer$&RPT$(Bs$,79)
10180 GOTO E_2a
10190 E_11: IF NOT E_lastloc THEN E_1a
10200 TDISP RPT$(Bs$,Cursor-E_lastloc)
10210 Cursor=E_lastloc
10220 GOTO E_1a
10230 E_1r: READ E_loc
10240 IF E_loc<0 THEN E_1a
10250 TDISP Keybuffer$[Cursor,E_loc-1]
10260 Cursor=E_loc
10270 GOTO E_1a
10280 E_1sp: E_data$="";"&E_data$
10290 E_lastloc=POS(E_data$&"",",",",",&TRIM$(Keybuffer$[Cursor;E_len])&"");
10300 IF NOT POS(E_data$[E_lastloc+1],",") THEN E_lastloc=0
10310 E_lastloc=POS(E_data$[E_lastloc+1],",")+E_lastloc+1
10320 E_1sp1:Nextoption$=E_data$[E_lastloc;POS(E_data$[E_lastloc]&"",",",",")-1]
10330 Nextoption$[1;E_len]=Nextoption$
10340 Keybuffer$[Cursor;E_len]=Nextoption$
10350 TDISP Nextoption$&RPT$(Bs$,E_len)
10360 GOTO E_1a
10370 E_1sh: E_data$="";"&E_data$
10380 E_lastloc=POS(E_data$&"",",",",",&TRIM$(Keybuffer$[Cursor;E_len])&"");
10390 IF E_lastloc=1 THEN E_lastloc=LEN(E_data$)+1
10400 E_1sh1: E_lastloc=E_lastloc-1
10410 IF E_data$[E_lastloc+1]<>" THEN E_1sh1
10420 E_lastloc=E_lastloc+1
10430 GOTO E_1sp1
10440 E_2: Key$=KBD$
10450 E_2a: IF NOT LEN(Key$) THEN RETURN
10460 GUSUB Lotkey
10470 IF Key=287 THEN Key=32
10480 K=FNSpecialmap(Key)
10490 IF K AND (Key>255) AND ((K=27) OR (K>122)) THEN Key=K
10500 IF Key<255 THEN E_2asc
10510 IF Key=278 THEN E_21
10520 IF Key=279 THEN E_2r
10530 IF Key=276 THEN E_2s
10540 E_2b: BEEP
10550 GOTO E_2a
10560 E_2asc: IF (Cursor>63) AND ((Key<48) OR (Key>57)) THEN E_2b
10570 IF (Key=8) OR (Key=12) THEN Key=Key+128
10580 IF Keybuffer$[Cursor;1]=Fillchr$ THEN E_2b
10590 Keybuffer$[Cursor;1]=CHR$(Key)
10600 E_2r: IF Cursor>79 THEN E_2a
10610 TDISP Keybuffer$[Cursor;1]
10620 Cursor=Cursor+1
10630 IF Keybuffer$[Cursor;1]<>Fillchr$ THEN E_2a
10640 IF Keybuffer$[Cursor]<>RPT$(Fillchr$,80-Cursor) THEN E_2r
10650 E_21: IF Cursor<2 THEN E_2a
10660 TDISP Bs$
10670 Cursor=Cursor-1
10680 IF Keybuffer$[Cursor;1]=Fillchr$ THEN E_21
10690 GOTO E_2a

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10700 E_2s: ON KBD 3 GOSUB Key ,ALL
10710 TDISP Cln$&RPT$(" ",160)
10720 DISP "Edit mode exited"
10730 Recordfile$=TRIM$(Keybuffer$[1;6])
10740 Recorddev$=":"&TRIM$(Keybuffer$[8;6])
10750 Recordprot$=TRIM$(Keybuffer$[15;6])
10760 Alt_brk$=TRIM$(Keybuffer$[24;10])
10770 Oldopt$=Prompt$&CHR$(255)&Insep$
10780 Outsep$=TRIM$(Keybuffer$[35;6])
10790 Insep$=TRIM$(Keybuffer$[42;2])
10800 Prompt$=TRIM$(Keybuffer$[48;2])
10810 Eof$=TRIM$(Keybuffer$[55;8])
10820 Filesize=VAL(Keybuffer$[64;3])
10830 IF (Oldopt$<>Prompt$&CHR$(255)&Insep$) OR Modelchanged THEN E_2s1
10840 ON ERROR GOTO E_2s1
10850 GOSUB Sethandshk
10860 OFF ERROR
10870 GOTO Key1
10880 E_2s1: GOSUB Domodel
10890 DISP "Terminal ready on "&VAL$(Sc)&" Set ROUT=0 After Login"
10900 GOSUB Setisrs
10910 Forcereturn=0
10920 IF Cmodelerror<>1 THEN Key1
10930 DISP "Unexpected error in setting up CMODEL ("&ERRM$&") FATAL!!
"
10940 BEEP
10950 STOP
10960 Udf: P=NUM(Defstorage$[ABS(Keymap(Key))-100])
10970 IF P+LEN(Key$)>98 THEN Udferr
10980 Key$=Defstorage$[ABS(Keymap(Key))-99;P]&Key$
10990 GOTO Key1
11000 Udferr: DISP "Keystroke buffer overflow"
11010 BEEP
11020 RETURN
11030 Cak: GOSUB Setall
11040 Defstorage$=""
11050 DISP "All key definitions cleared"
11060 GOTO Key1
11070 Ck: ON KBD 3 GOSUB Ck1 ,ALL
11080 DISP "Enter key to be cleared"
11090 GOTO Ck2
11100 Ck1: Key$=KBD$
11110 Ck2: IF NOT LEN(Key$) THEN RETURN
11120 GOSUB Getkey
11130 GOSUB Clearkey
11140 P$=FNName$(Key)
11150 ON KBD 3 GOSUB Key ,ALL
11160 DISP "&P$&" key definition cleared"
11170 GOTO Key1
11180 Dk: IF LEN(Defstorage$)>248 THEN Dkerr
11190 DISP "Define key mode: Enter key to be changed"
11200 TDISP Cln$
11210 ON KBD 3 GOSUB Definemode_1 ,ALL
11220 Keybuffer$=""
11230 GOTO Dm1_1
11240 Dkerr: DISP "Definition buffer full - ignored"
11250 GOTO Er
11260 Definemode_1: Key$=KBD$
11270 Dm1_1: IF NOT LEN(Key$) THEN RETURN
11280 GOSUB Getkey
11290 IF Key<256 THEN Dm1err
11300 ON KBD 3 GOSUB Definemode_2 ,ALL
11310 Definedkey=Key
11320 Keybuffer$=FNName$(Key)&": "
11330 DISP "Define key mode: Hit "&Keybuffer$[1,LEN(Keybuffer$)-2]&" k
ey to exit"

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11340      TDISP Keybuffer$
11350      GOSUB Clearkey
11360      Defpointer=LEN(Defstorage$)+1
11370      Defstorage$[Defpointer]=CHR$(0)
11380      GOTO Dm1
11390 Dm1err:DISP "Cannot define that key - aborted"
11400      GOTO Dm2
11410 Definemode_2:Key$=KBD$
11420 Dm1: IF NOT LEN(Key$) THEN RETURN
11430      GOSUB Getkey
11440      P=(Key>255)+1
11450      IF Key=Definedkey THEN Dm_exit
11460      IF (P+LEN(Defstorage$)>255) OR (NUM(Defstorage$[Defpointer])=255) OR
(NUM(Defstorage$[Defpointer])+P>98) THEN Dm_err
11470      Defstorage$[LEN(Defstorage$)+1]=RPT$(CHR$(255),P-1)&CHR$(Key)
11480      Defstorage$[Defpointer;1]=CHR$(NUM(Defstorage$[Defpointer])+P)
11490      P$=FNName$(Key)
11500 Dm4: IF LEN(P$)+LEN(Keybuffer$)<157 THEN Dm3
11510      Keybuffer$=Keybuffer$[POS(Keybuffer$,"")+1]
11520      GOTO Dm4
11530 Dm3: Keybuffer$[LEN(Keybuffer$)+1]=P$
11540      TDISP Cln$&Keybuffer$
11550      GOTO Dm1
11560 Dm_err:DISP "Definition buffer full - ";
11570 Dm_exit:DISP "Definition complete"
11580      Keymap(Definedkey)=Defpointer+100
11590 Dm2: ON KBD 3 GOSUB Key ,ALL
11600      TDISP Cln$&RPT$(" ",160)
11610      GOTO Key1
11620 Rcv_rtn:Rubloc=MIN(POS(R$&CHR$(127),CHR$(127)),POS(R$&CHR$(5),CHR$(5)))
11630      IF Rubloc>LEN(R$) THEN Rcv_r1
11640      R$[Rubloc]=R$[Rubloc+1]
11650      GOTO Rcv_rtn
11660 Rcv_r1:IF Ignorenextline THEN Rcv_r14
11670      IF Escmode THEN Rcv_r10
11680      Escignored=0
11690 Rcv_r2:Rsave=POS(R$[Escignored+1],Esc$)
11700      IF NOT Rsave THEN Rcv_r3
11710      Escsave$=R$[Rsave+Escignored]
11720      R$[Rsave+Escignored]=""
11730 Rcv_r3:PRINT USING "#,K";Highlight$&R$&RPT$("@" ,R$[MAX(LEN(R$),1)])=Esc$)&C
unsort$
11740      IF Hardcopy THEN GOSUB Printit
11750 Rcv_r5:IF (R$[1;1]<>Cr$) AND (R$[1;1]<>Lf$) THEN Rcv_r6
11760      R$=R$[2]
11770      GOTO Rcv_r5
11780 Rcv_r6:IF NOT LEN(R$) THEN Rcv_r7
11790      IF (R$[LEN(R$)]<>Cr$) AND (R$[LEN(R$)]<>Lf$) THEN Rcv_r7
11800      R$[LEN(R$)]=""
11810      GOTO Rcv_r6
11820 Rcv_r7:IF Recording THEN Rcv_r8
11830      Pose=POS(R$,"EXIT TEXT MODE")
11840      IF Pose=0 THEN GOTO Pos1
11850      DISABLE
11860      CWRITE Sc;"SAVE,"&Rerandfile$&Outsep$
11870      GOTO Rdt
11880 Pos1: Psn=PUB(R$,"*R")
11890      IF Psn=0 THEN GOTO Rcv_r9
11900      DISABLE
11910      IF Uploading THEN WAIT 100
11920      IF Uploading THEN CWRITE Sc;Ck1$&Outsep$
11930      IF Uploading THEN WAIT 100
11940      IF Uploading THEN GOTO Rdt
11950      ENABLE
11960      IF NOT Recording THEN Rcv_r9
11970 Rcv_r8:R=MIN(160-LEN(Record$),LEN(R$))

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11980      Record$[LEN(Record$)+1]=R$[1;R]
11990      R$=R$[R+1]
12000      IF Record$(">"/" THEN 12030
12010      Record$=""
12020      GOTO Rn
12030      IF NOT LEN(R$) AND NOT Separator THEN Rcv_r10
12040      ON ERROR GOTO Rcv_r11
12050      ON END #1 GOTO Rcv_r12
12060      IF Record$="LNH" THEN GOTO 12080
12070      PRINT #1;Record$,END
12080      Record$=""
12090      OFF ERROR
12100      IF LEN(R$) THEN Rcv_r8
12110 Rcv_r10:Escsave$[LEN(Escsave$)+1,MIN(LEN(Escsave$&R$),160)]=R$
12120 Rcv_r9:IF NOT LEN(Escsave$) THEN Rcv_r15
12130      R$=""
12140      GOSUB Doescape
12150      IF Ignorenextline THEN Rcv_r14
12160      IF NOT Escmode THEN Rcv_r2
12170      GOTO Rcv_r15
12180 Rcv_r11:DISP "File recording aborted due to error #";ERRN;"
12190      BEEP
12200      GOTO Rcv_r13
12210 Rcv_r12:DISP "End of file reached"
12220 Rcv_r13:OFF ERROR
12230      GOSUB Unassign
12240      BEEP
12250      GOTO Rcv_r15
12260 Rcv_r14:R$=Escsave$=""
12270      Ignorenextline=Ignorenextline-Separator
12280 Rcv_r15:IF (Highlight$=Hloff$) OR NOT Separator THEN RETURN
12290      Highlight$=Hloff$
12300      R$=Esc$&"&d0"
12310      GOSUB Setcursors
12320      PRINT USING "#,K";Cursor$
12330      IF Hardcopy THEN Printit
12340      RETURN
12350 Domodel:Cmodelerror=1
12360      IF (Check<2) AND (Bitsperchar=8) THEN Check=4
12370      ON ERROR GOTO Do_5
12380      DISP "Disconnecting"
12390      CDISCONNECT Sc;HOLD
12400      CMODEL ASYNC,Sc;PROMPT=Prompt$,ALERTN=1,CHARLENGTH=Bitsperchar,CHECK
=Check,INSEP=Insep$,STOPBITS=Stopbits
12410      Ccomused=CSTAT(Sc,4)
12420      IF NOT Modem THEN CCONNECT Sc;SPEED=Speed,HANDSHAKE OFF,NO ACTIVITY=
0
12430      IF Modem THEN CCONNECT Sc;SPEED=Speed,HANDSHAKE ON
12440 Do_0: ON INT #Sc,9 GOTO Do_3
12450 Do_1: IF CSTAT(Sc,5)=2 THEN Do_2
12460      ON KBD 9 GOTO Do_kbd ,ALL
12470      DISP "Waiting for connection - press any key to abort"
12480      GOTO Do_1
12490 Do_3: CCONTROL Sc;RESET
12500      GOTO Do_0
12510 Do_2: OFF INT #Sc
12520      CCONTROL Sc;READALL ON
12530      Cmodelerror=0
12540      OFF ERROR
12550      ON KBD 3 GOSUB Key ,ALL
12560 Sethandshk:IF NOT Handshk THEN CCONTROL Sc;ACK OFF
12570      IF Handshk=1 THEN CCONTROL Sc;ACK ON
12580      IF Handshk=2 THEN CCONTROL Sc;XON
12590      RETURN
12600 Do_kbd:DISP "Connection aborted by user"
12610      BEEP

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12620      WAIT 1000
12630      BEEP
12640      Cmodelerror=2+0*LEN(KBD$)
12650      DISP "Disconnecting"
12660      ON INT #Sc;9 GOTO Do_4
12670      ON ERROR GOTO Do_4
12680 Do_4: CDISCONNECT Sc
12690      DISP
12700      OFF ERROR
12710      ON KBD 3 GOSUB Key ,ALL
12720      GOTO Setisrs
12730 Do_5: OFF ERROR
12740      ON KBD 3 GOSUB Key ,ALL
12750 Do_6: IF ERRN<>307 THEN RETURN
12760      DISP "Insufficient CCOM allowance for select code";Sc;" FATAL!!"
12770      BEEP
12780      STOP
12790 Clearkey:IF Key<256 THEN RETURN
12800      IF Keymap(Key)<101 THEN RETURN
12810      Ck0=Keymap(Key)-100
12820      Ck1=NUM(Defstorage$[Ck0])+1
12830      GOSUB Setkey
12840      Defstorage$[Ck0]=Defstorage$[Ck0+Ck1]
12850      FOR Ck2=256 TO 511
12860          IF ABS(Keymap(Ck2))-Ck0+100 THEN Keymap(Ck2)=Keymap(Ck2)-SGN(Keyma
n(Ck2))*Ck1
12870      NEXT Ck2
12880      RETURN
12890 Setisrs:Forcereturn=1
12900      IF Remote THEN Set_1
12910      ON INT #Sc+1,2 GOSUB Rcv_3
12920      OFF INT #Sc
12930      RETURN
12940 Set_1:ON INT #Sc,1 GOSUB Xmt_1
12950      ON INT #Sc+1,2 GOSUB Rcv_1
12960      RETURN
12970 Printit:IF Hard_hpib THEN PRINTER IS Hard_sc,Hard_hpib
12980      IF NOT Hard_hpib THEN PRINTER IS Hard_sc
12990      PRINT USING "#,K";R$
13000      PRINTER IS Screen
13010      RETURN
13020 Setcursors:Cursor$=Esc$&"a+1C"&Highlight$&Esc$&"D"&CHR$(132)
13030      IF Disp_fns THEN Cursor$=Ir6++$&Cursor$&Tronoff$(1)
13040      RETURN
13050 Assign:IF Assigned THEN RETURN
13060      ON ERROR GOTO Ass_1
13070      INPUT "HIT 'CLEAR LINE ', TYPE IN FILENAME, PRESS CONT.",Recordfile$
13080      ASSIGN Recordfile$&Recorddev$ TO #1,K,Recordprot$
13090      Assigned=NOT K+0*TYP(1)
13100 Ass_1:OFF ERROR
13110      IF Assigned THEN RETURN
13120 Unassign:ASSIGN #1 TO *
13130      Recording=Assigned=Uploading=0
13140      RETURN
13150 Getkey:Key=NUM(Key$)
13160      IF Key=255 THEN Key=256+NUM(Key$[2])
13170      Key$=Key$[2](Key>255)]
13180      RETURN
13190 Cwrite_error:BEEP
13200      DISP "Datacomm not in active state resulted in error ("&ERRN$&")"
13210      WAIT 2000
13220      BEEP
13230      RETURN
13240      DEF FNSpecialmap(Key)=(POS(Special$,CHR$(Key)) OR 0)*NUM(Special$[PO
S(Special$[1,LEN(Special$) DIV 2],CHR$(Key))+LEN(Special$) DIV 2])
13250      DEF FNName$(Key)=TRIM$(FNCtrl$(Key)&FNNorm$(Key)&FNSpec$(Key)&FNForg

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n$(Key))
13260 DEF FNCtrl$(Key)=RPT$(Ctrl$(Key MOD 33*3+1;31,Key<33)
13270 DEF FNNorm$(Key)=RPT$(CHR$(Key),(Key>32) AND (Key<255) AND (Key<>127
))&RPT$("del",Key=127)
13280 DEF FNSpec$(Key)=RPT$(RPT$("ctrl_",Key DIV 128 MOD 2)&RPT$("sh_",Key
DIV 64 MOD 2)&Spec$(Key MOD 64*8+1;81,(Key>255) AND (Key<506))
13290 DEF FNForgn$(Key)=RPT$(Forgn$(Key>505)*(Key-506)*12+1;121,Key>505)
13300 Doescape:Escignored=0
13310 IF Escmode THEN D_cont
13320 Escpointer=1
13330 IF NOT LEN(Escsave$) THEN RETURN
13340 Escmode=1
13350 D_cont:IF NOT Escmode THEN D_ignore
13360 IF Escpointer>=LEN(Escsave$) THEN RETURN
13370 Escpointer=Escpointer+1
13380 Escchar$=Escsave$(Escpointer;1)
13390 ON Escmode GOTO D_s1,D_s2,D_s3,D_s4,D_s5
13400 D_s1: Escmode=POS("@&,YZ^E",Escchar$)
13410 IF Disp_fns THEN Escmode=5*(Escchar$="Z")
13420 ON 1+Escmode GOTO D_cont,D_s1at,D_cont,D_cont,D_s1yz,D_s1yz,D_s1up,D
_s1e
13430 D_s1at:WAIT 1000
13440 GOTO D_remove
13450 D_s1yz:Disp_fns=(Escmode=4)
13460 GOSUB Setcursors
13470 GOTO D_ignore
13480 D_s1e:Highlight$=Hloff$
13490 GOTO D_s4a
13500 D_s2: Escmode=4*(Escchar$="d")
13510 GOTO D_cont
13520 D_s3: Escmode=5*(Escchar$="c")
13530 GOTO D_cont
13540 D_s4: Escmode=2*(NUM(Escchar$) MOD 2)+NUM(Escchar$) DIV 2 MOD 2+4*(NUM(Esc
char$) DIV 4 MOD 2)
13550 IF (Escchar$="@" ) AND (Escchar$<"P") THEN Highlight$=CHR$(128+Escmo
de)
13560 D_s4a:GOSUB Setcursors
13570 PRINT USING "#,K";Cursor$&Highlight$
13580 D_ignore:R$=R$&Escsave$
13590 Escsave$=""
13600 Escignored=1
13610 Escmode=0
13620 RETURN
13630 D_s1up:Statuswaiting=1
13640 Response$=Esc$&"\4690020"
13650 D_remove:R$=R$&Escsave$(Escpointer+1)
13660 Escsave$=""
13670 Escmode=0
13680 RETURN
13690 D_s5: IF (Escchar$<>Cr$) AND (Escpointer<84) THEN D_cont
13700 ON ERROR GOTO Escerr
13710 MAT Number=ZER
13720 Escomma$=TRIM$(Escsave$(4,Escpointer-1))
13730 State=Literalptr=Numberptr=1
13740 L1: D1=POS(Statetable$,"s"&VAL$(State)&"t")+3+(State>9)
13750 Search$=Statetable$(D1;POS(Statetable$(D1),"s")-1)
13760 L3: IF Search$(1,1)="1" THEN Lit
13770 GOSUB Nextword
13780 IF Branch THEN L2
13790 Escerr:Laststatus=1
13800 OFF ERROR
13810 GOTO D_ignore
13820 L0: Laststatus=0
13830 OFF ERROR
13840 L4: Escpointer=Escpointer-1
13850 GOTO D_remove

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13860 L2: IF Branch<0 THEN ON -Branch GOTO F1,F2,F3,F4,F5,F6,F7,F8,F9,F10,F11,
F12,F13,F14,F15,F16,F17,F18
13870 State=Branch
13880 GOTO L1
13890 Lit: GOSUB Getword
13900 IF NOT LEN(Word$) THEN Escerr
13910 Literal$(Literalptr)=Word$[1,10]
13920 Literalptr=Literalptr+1
13930 Search$=Search$[2]
13940 GOTO L3
13950 F1: Word$=":T15"
13960 GOTO F5_1
13970 F2: Literalptr=Literalptr-1
13980 Word$[1,7]=Literal$(Literalptr)
13990 IF Word$[1,11]<>":" THEN Escerr
14000 GOTO F5_1
14010 F3: Word$=":T14"
14020 GOTO F5_1
14030 F4: Word$=":F8"
14040 GOTO F5_1
14050 F5: Word$=":U12"
14060 F5_1: Literal$(1)[1,6]=Literal$(1)
14070 Word$[1,13]=Literal$(1)[1,6]&Word$
14080 Word$[14]=RPT$(Literal$(2)[1,6],Literalptr=3)
14090 Saveword$=Word$
14100 ON Number(3) GOTO F5ass,F5pur,F5run,F5_2
14110 F5ass:Recordfile$=TRIM$(Word$[1;6])
14120 Recorddev$=TRIM$(Word$[7;7])
14130 Recordprot$=TRIM$(Word$[14])
14140 Number(1)=Numberptr=0
14150 GOTO F11
14160 F5pur:PURGE Word$[1,13],Word$[14]
14170 GOTO L0
14180 F5run:ON ERROR GOTO Escerr
14190 IF Run THEN Escerr
14200 IF Literalptr=2 THEN LINK Word$[1,13].End,F5run_
14210 LINK Recordfile$&Recorddev$,End,F5run_
14220 F5run_:Run=1
14230 GOTO L0
14240 F5_2: State=61
14250 Saveword$=Word$
14260 GOTO L1
14270 F6: IF (Number(1)<0) OR (Number(1)>16) THEN Escerr
14280 Hard_hpib=0
14290 Hard_sc=Number(1)
14300 GOTO L0
14310 F7: IF (Number(1)<0) OR (Number(1)>30) THEN Escerr
14320 Hard_hpib=Number(1)
14330 Hard_sc=7
14340 GOTO L0
14350 F8: IF Recording OR Uploading THEN Escerr
14360 GOSUB Assign
14370 IF NOT Assigned THEN Escerr
14380 Uploading=1
14390 GOTO L0
14400 F9: IF Recording OR Uploading THEN Escerr
14410 GOSUB Assign
14420 IF NOT Assigned THEN Escerr
14430 PRINT #1;END
14440 Recording=Ignorenextline=1 OR TYP(1)
14450 GOTO L0
14460 F10: Number(1)=(UPC$(Word$[1;1])="E")
14470 Search$=" #0 HANDSHAKE#1 RECORD#2 VERIFY#3 KEYBOARD#4 SEND#5 LOG#6 "
14480 GOSUB Nextword
14490 IF NOT LEN(Escomma$) THEN F10_0
14500 GOSUB Getword

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14510 Search$="MODE"
14520 IF UPC$(Word$)<>Search$[1,LEN(Word$)] THEN Escerr
14530 IF LEN(Escomma$) THEN Escerr
14540 F10_0:ON 1+Branch GOTO Escerr,F10_1,F10_2,F10_3,F10_4,F10_5,F10_6
14550 F10_1:Prompthandshake=Number(1)
14560 GOTO L0
14570 F10_2:IF Number(1) THEN F9
14580 GOSUB Unassign
14590 GOTO L0
14600 F10_3:Verify=Number(1)
14610 CHECK READ OFF
14620 IF Verify THEN CHECK READ
14630 GOTO L0
14640 F10_4:Keyboard=Number(1)
14650 GOTO L0
14660 F10_5:IF Number(1) THEN F8
14670 GOSUB Assign
14680 GOTO L0
14690 F10_6:Hardcopy=Number(1)
14700 GOTO L0
14710 F11: IF Recording OR Uploading THEN Escerr
14720 GOSUB Assign
14730 ON ERROR GOTO Escerr
14740 D3=Number(1)
14750 IF Numberptr=1 THEN D3=1E99
14760 READ #1,1
14770 FOR D2=1 TO D3
14780 IF (TYP(1)<>2) AND (TYP(1)<>8) THEN F11_1
14790 READ #1;Word$[1,0]
14800 NEXT D2
14810 F11_1:Assigned=1
14820 GOTO L0
14830 F13: Escomma$="FILE "&Escomma$
14840 F12: Number(3)=POS("PRC",UPC$(Word$[1,1]))+1
14850 Createflag=(Number(3)=4)
14860 State=4
14870 GOTO L1
14880 F14: Response$=VAL$(Laststatus)
14890 Statuswaiting=1
14900 Ignorenextline=2
14910 GOTO L4
14920 F15: Word$=":T15"
14930 GOTO F16_1
14940 F16: Word$=":T14"
14950 F16_1:REWIND Word$
14960 GOTO L0
14970 F17: Number(2)=256
14980 F18: CREATE Saveword$[1,13],Number(1),Number(2)
14990 IF LEN(Saveword$[14]) THEN PROTECT Saveword$[1,13],Saveword$[14]
15000 GOTO L0
15010 Getword:IF NOT LEN(Escomma$) THEN Escomma$=" "
15020 D1=MIN(POS(Escomma$[2]&" ", " "),POS(Escomma$[2]&"#", "#"))+1
15030 Word$=TRIM$(Escomma$[1,D1-1])
15040 Escomma$=TRIM$(Escomma$[D1])
15050 RETURN
15060 Nextword:GOSUB Getword
15070 IF (Word$[1,1])="0" AND (Word$[1,1]<="9") THEN Next_2
15080 IF Word$[1,1]="#" THEN Next_3
15090 D1=POS(Search$," "&UPC$(Word$[1,POS(Word$&"#", "#")-1]))
15100 Next_0:IF NOT D1 THEN Next_1
15110 Next_5:D1=POS(Search$[D1],"#")+D1
15120 Branch=VAL(Search$[D1;POS(Search$[D1]," ")]
15130 RETURN
15140 Next_1:Branch=0
15150 IF NOT Createflag THEN RETURN
15160 Createflag=0

```

```

15170      D1=1
15180      Escomma$=Word$&" "&Escomma$
15190      GOTO Next_5
15200 Next_3:Word$=Word$[2]
15210 Next_2:D1=POS(Search$," n#")
15220      IF NOT LEN(Word$) THEN Next_6
15230      Number=0
15240 Next_4:Number1=NUM(Word$)-48
15250      IF (Number1<0) OR (Number1>9) THEN Next_6
15260      Number=Number*10+Number1
15270      Word$=Word$[2]
15280      IF LEN(Word$) THEN Next_4
15290      Number(Numberptr)=Number
15300      Numberptr=Numberptr+1
15310      GOTO Next_0
15320 Next_6:Branch=0
15330      RETURN
15340 Extended_codes:
15350      DATA ASSIGN#2 COPY#24 DISABLE#-10 ENABLE#-10 FIND#33 PURGE#-12 REWIN
D#56 REPORT#52 RUN#-12 CREATE#-12
15360      DATA SOURCE#3 DESTINATION#3 LOG#10,TON#-12 FILE#-13,FIIF#5
15370      DATA 1 #-1 PASSWORD#6 ON#7 DEVICE#8 RIGHT#9 LEFT#10 FLOPPY#12 DISK#1
5
15380      DATA 1 #-1 ON#7 DEVICE#8 RIGHT#9 LEFT#10 FLOPPY#13 DISK#15
15390      DATA DEVICE#8 RIGHT#9 LEFT#10 FLOPPY#13 DISK#15,1 #-2
15400      DATA #-1 TAPE#11,#-3 TAPE#12,#-1,#-3,#-4 DISK#14
15410      DATA #-4,#-5,TON#17 HP-IB#18 EXTERNAL#21 SHARED#22
15420      DATA HP-IB#18 EXTERNAL#21 SHARED#22,n#19,#-7,n#21
15430      DATA #-6 PRINTER#66,PRINTER#23 n#21,n#21,ALL#25 FILE#25
15440      DATA FROM#26 SOURCE#27 DATACOMM#30,SOURCE#27 DATACOMM#30
15450      DATA #-8 TON#28 DATACOMM#29,DATACOMM#29,#-8,#-9 TON#31 SOURCE#32
15460      DATA SOURCE #32,#-9,RECORD#34 END#35,n#37,OF#36 DATA#37
15470      DATA DATA#37,#-11 ON#38 SOURCE#39 DESTINATION#39
15480      DATA SOURCE#39 DESTINATION#39,#-11,FILE#41
15490      DATA 1 ON#42 RIGHT#43 LEFT#45 FLOPPY#47 DEVICE#50 DISK#49
15500      DATA RIGHT#43 LEFT#45 FLOPPY#47 DEVICE#50 DISK#49
15510      DATA #-12 TAPE#44,#-12,#-13 TAPE#46,#-13,#-14 DISK#48
15520      DATA #-14,#-15,1 #-16,1 ON#42 RIGHT#43 LEFT#45 FLOPPY#47 DEVICE#50 D
ISK#49
15530      DATA STATUS#53,OF#54 COMMAND#55,COMMAND#55
15540      DATA #-14,#-15 RIGHT#57 LEFT#59,#-15 TAPE#58,#-15
15550      DATA #-16 TAPE#60,#-16
15560      DATA LENGTH#62,n#63,#-17 RECORD#64,n#65
15570      DATA #-18,#-6
15580      DATA [EOD]
15590 Setall:RESTORE Map
15600      READ Keymap(*)
15610      FOR S=1 TO IE99
15620          READ K
15630          IF K<0 THEN RETURN
15640          Special$[S]=CHR$(K)
15650      NEXT S
15660 Setkey:RESTORE Map
15670      FOR S=256 TO Key
15680          READ S1
15690      NEXT S
15700      Keymap(Key)=S1
15710      RETURN
15720      ! Highest used is: 32
15730 Map: DATA 25,11,1,1, 16,14,20,20, 17,21,8,7, 14,9,23,24
15740      DATA 1,1,1,10, 10,10,6,6, 6,6,6,6, 4,13,18,1
15750      DATA 1,6,6,1, 1,1,1,31, 1,1,1,1, 1,1,1,1
15760      DATA 1,1,14,1, 2,14,1,1, 1,1,1,1, 1,1,1,1
15770      DATA 1,1,1,1, 32,1,26,26, 22,1,1,15, 5,5,19,12
15780      DATA 1,1,1,10, 10,10,4,3, 6,6,1,1, 4,27,1,1
15790      DATA 1,1,1,1, 1,1,1,1, 1,1,1,1, 1,1,1,1

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15800      DATA 1,1,1,1,      2,1,1,1,      1,1,1,1,      1,1,1,1
15810      DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
15820      DATA 1,1,1,10,     10,10,1,1,     6,6,1,1,      1,1,1,1
15830      DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
15840      DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
15850      DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
15860      DATA 1,1,1,10,     10,10,1,1,     1,1,1,1,      1,1,1,1
15870      DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
15880      DATA 1,1,1,1,      1,1,1,1,      1,1,1,1,      1,1,1,1
15890      DATA 5, 12, 53, 50, 6, 7, 70, 71
15900      DATA 22, 23, 24, 25, 26, 27, 76, 77
15910      DATA 88, 89, 152, 153, 33, 34
15920      DATA 127, 27, 24, 8, 14, 15, 14, 15
15930      DATA 68, 67, 65, 66, 85, 86, 2, 1
15940      DATA 83, 84, 72, 70, 77, 76
15950      DATA -1
15960 End:   END

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