

TEKNIQUES VOL.6 NO.1 T1

APPLICATIONS LIBRARY
APPLICATIONS LIBRARY

**DESKTOP COMPUTER
APPLICATIONS LIBRARY PROGRAM**

TITLE		PART NUMBER
TEKniques Vol. 6 No. 1 T1		062-6443-01
ORIGINAL DATE February, 1982	REVISION DATE	

ABSTRACT

TEKniques Vol. 6 No. 1 is a tape collection of 18 programs: four utility, two graphing, one programming aids, two statistics, two interfacing, one electrical engineering, one accounting, two text processing, two project management, and one miscellaneous.

Four of the program must be transferred to their own dedicated tapes. Complete instructions for accomplishing the transfers are included in the documentation.

The individual abstracts describe the programs.

Be sure to read the documentation before running a program.

Tape file 1 contains the directory. Press AUTOLOAD and select your program.

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TITLE	PART NUMBER
TEKniques Vol. 6 No. 1 T1	062-443-01

TRANSFERRING FILES TO A NEW TAPE

PLOT 50 General Utilities Vol. 1 (TEKTRONIX Part #4050A08) contains a program to transfer any type of 4050 files (program/data/text) quickly and easily along with the header names; however, it requires a 4924 Tape Drive, as does TAPEDUPE program contained on TEKniques Vol. 5 No. 4 T1 tape.

Transferring ASCII or BINARY PROGRAMS without a transfer program

- Step 1. Do a TLIST of the MASTER program tape.
- Step 2. Record which files go with which program (they are all named) and the size of each file.
- Step 3. MARK your new tape to accept the respective files for that program, e.g.,

FIND 0
MARK 1,20000
FIND 2
MARK 1,4000
etc.

- Step 4. Insert the MASTER tape.

FIND a file
OLD for ASCII or CALL "BOLD" for BINARY

- Step 5. Insert the new tape

FIND the file to receive the file in memory
SAVE for ASCII or CALL "BSAVE" for BINARY

REPEAT Steps 4 and 5 until all files comprising that program are transferred to the new tape. Note: This procedure will not retain the file header names.

Transferring ASCII or BINARY DATA to a new tape

The 4051R06 Editor ROM could be used to transfer ASCII DATA files.

4050 Applications Library program "Binary Data File Duplicator" will transfer BINARY DATA files without any peripheral.

4050 Applications Library program "Tape Duplication" will transfer ASCII or BINARY DATA or PROGRAM files, but requires a 4924 Tape Drive.

Both of these programs are contained on the 4050 Applications Library UTILITIES T1 tape (TEKTRONIX Part #062-5974-01), and UTILITIES D1 disk (TEKTRONIX Part #062-5975-01).



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE 4907 to 4909 File Transfer and Conversion Utility. (FTPCU)		ABSTRACT NUMBER TEKniqes Vol. 6 No. 1 T1 Program 1
ORIGINAL DATE February, 1982		EQUIPMENT AND OPTIONS REQUIRED 4907 File Manager 4909 Multi-User File Manager
AUTHOR Tony Freixas Gene Lynch Howard Mozeico	Tektronix, Inc. Wilsonville, OR	PERIPHERALS Optional-4641 Printer

ABSTRACT

Files: 3 ASCII Program

Statements: 1900

This program transfers files from the TEKTRONIX 4907 File Manager to the TEKTRONIX 4909 File Management System. The program files which contain 4907-related statements can optionally be converted, where possible, to program files which use 4909-related statements. Another supported option is to not transfer any files, but merely list all 4907-related statements contained in program files.

Option 1 - File Transfer

Files of any type (except password protected) may be transferred from the 4907 to the 4909. No changes are made to any files.

Option 2 - File Conversion

Files of any type (except password protected or SECRETed files) may be converted and transferred from the 4907 to the 4909. For program files, 4907-related statements, and their 4909 counterparts are listed. The 4909 statements replace 4907 statements where possible. When a 4907 statement cannot be converted to 4909 form, the 4907 statement is changed to a REMark.

"Large" host binary files (the exact size depends on the amount of system memory available) or host binary files with line numbers greater than 64999 cannot be converted or listed. They must be SAVED in ASCII format before they can be converted.

Converted programs will not necessarily RUN without some additional program modifications. For example, returned 4909 status messages may not have the same format as 4907 status messages. As a result, sections of programs which extract information from the status messages will have to be changed. The documentation assists in determining what needs to be changed, and how to change it.

Option 3 - File Listing

4907-related statements from the program may be listed along with their suggested 4909 counterparts. Note that the program files are unaffected. The statements

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are not converted; no transfer occurs. The only result is a listing of a portion of the program. Exceptional host binary files as specified above must be saved in ASCII format to be listed.

The three programs reside on and execute from tape. However, files input to these programs must reside on a 4907 File Manager.

TITLE FTPCU	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 1
<u>DESCRIPTION</u>	
This program performs one of three operations:	
<ol style="list-style-type: none">1. Transfers files of any type (except password protected) from the 4907 to the 4909. No changes are made to any files.2. Transfers and converts files of any type (except password protected or SECRETed files) from the 4907 to the 4909. Lists 4907 statements, and their 4909 counterparts for program files. Replaces the 4907 statements with 4909 statements where possible (see below).3. Lists 4907 statements and their suggested 4909 counterparts for 4907-resident program files. Note that the program files are unaffected; the statements are not converted. No transfer occurs. The only result is a listing of a portion of the program.	
The operations described above are subject to the following constraints.	
<ol style="list-style-type: none">1. Sufficient free space must exist on the 4907 for the temporary files which are created by this utility when it executes. These temporary files will reside in a library named "@C49074909/". If you have such a library on the disk to be processed, you must delete or rename that library.2. Password protected files are not operated upon by this utility. You must unprotect such files before autoloading this utility. This can be done with the RENAME statement. For example, to eliminate the password, "FOO", from file "TEMP" on unit 0, you would	
CALL "RENAME",0,"TEMP:FOO","TEMP:"	
To eliminate the password on a library, you would similarly use RENAME, but in this case you must specify a different library.	
CALL "RENAME",0,"MYLIB:FOOBAR/TEMP","MYLIB1/TEMP"	
CALL "RENAME",0,"MYLIB:FOOBAR/TEMP:FOO","MYLIB1/TEMP:"	
<ol style="list-style-type: none">3. SECRETed files cannot be converted or listed by this utility.	
** WARNING **	
An attempt to convert or list a SECRETed program file will result in an abnormal termination of this program.	
<ol style="list-style-type: none">4. "Large" host binary files (the exact size depends on the amount of system memory available) or host binary files with line numbers greater than 64999 cannot be converted or listed. They must be SAVED in ASCII format before they can be converted.5. Not all 4907-related statements are converted to 4909 statements. In such a case, the 4907 statement is converted to a REMark.	

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

The implications of these constraints are noteworthy:

1. Files input to this program must reside on a 4907 File Manager.
2. Exceptional host binary files, outlined above, must be SAVED in ASCII format if you want their disk-related statements converted or listed.
3. Converted programs will not necessarily RUN without some additional program modifications. Later sections of this document will assist you in determining what needs to be changed, and how to change it. For example, returned 4909 status messages may not have the same format as 4907 status messages. As a result, sections of programs which extract information from the status messages will have to be changed.

File names are printed to the screen or printer as they are transferred, listed, or converted. When files are being transferred, both the input (4907) file name and the output (4909) file name are printed. In general, these names should be identical. The exceptions are:

1. "@" is dropped from the file name when transferred to the 4909.
2. If a file on the 4909 is detected which has the same name as a file requested for transfer, you can:
 - A. overwrite it (that is, delete the file of the same name and then proceed with the transfer).
 - B. specify a new name for the file to be transferred.
 - C. skip processing of the file.

For the list or convert operations, the printed list of file names will also include any disk-related statements found within program files.

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

OPERATING INSTRUCTIONS

Follow these steps to use this program:

1. Set up the hardware properly;
2. AUTOLOAD;
3. answer the questions.

SETTING UP THE HARDWARE

Before running this utility, you should set up the hardware as follows:

1. Turn off the Graphic Computing System's power.
2. ROM packs: The 4907 File Manager ROM pack should be inserted into a backpack slot. The 4909 ROM pack should NOT be inserted into a backpack slot (in fact, these two ROM packs should never be installed on the same Graphic Computing System at the same time).
3. GPIB: The 4907 File Manager should be connected to the Graphic Computing System via the GPIB. If you intend to transfer any files to the 4909, then the 4909 should also be connected to the Graphic Computing System via the GPIB.

NOTE

If you intend to transfer files, you must temporarily change the GPIB address of the 4909 File Management System to any address other than 0 (1-30). See the 4909 Operators' manual for details.

If you intend to use a printer, make sure that it is properly connected to the Graphic Computing System.

4. Media: If you intend to transfer files to the 4909, make sure that the media to which you wish to direct your files has been mounted on the 4909 drive.
5. Turn on all the attached peripherals that you intend to use, in the normal sequence. Make sure that at least half of the peripherals attached to the Graphic Computing System are powered up.

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

AUTOLOAD

Insert the program tape into the Graphic Computing System tape drive and press the AUTOLOAD key.

ANSWERING THE QUESTIONS

The questions that are asked of you will frequently mention a "default." This is the value that is assumed if you don't type anything in response to the question, and just press RETURN.

If you wish to abruptly terminate the program, press the STOP user definable key (number 20). Before ending, the program will clean up any temporary or partial files, so that incomplete or unnecessary files are not left on your disk.

File names, and disk-related statements, if appropriate, are directed to your choice of the screen or printer. If the information is directed to the screen and you specify that you want hard copies automatically made, you will not have to press the PAGE key when the screen is full. However, if the information is directed to the screen and you don't specify hard copies, you will have to press the PAGE key when the page is full. In this way, you will have the opportunity to copy the information by hand.

Wildcard characters ("?", "*", and "#") are acceptable when specifying file names.

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

FILE FORMATS

All 4907 file formats are supported by the transfer operation. The file formats and their 4909 equivalents are:

4907 FORMAT	=>	4909 FORMAT
-----		-----
ASCII sequential	=>	ASCII direct
Binary sequential	=>	Binary direct
ASCII random	=>	ASCII numeric-indexed
Binary random	=>	Binary numeric-indexed
Host binary	=>	Host binary

Files with passwords cannot be transferred or converted.

Only Host binary and ASCII sequential files are candidates for conversion. Some tests will be made to determine if an ASCII file really is a program, but the tests are not exact and will occasionally fail. Use the transfer option alone if you have problems transferring ASCII sequential files. SECRET Host binary files cannot be converted. Any attempt to convert or list a SECRET file will cause the conversion program to crash.

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

SAMPLE CONVERTED PROGRAMS

```
100 INIT
110 UNIT 1
120 CALL "MOUNT",1,A$
130 CALL "file",1,"sample",A$
140 IF A$="" THEN 210
150 OPEN "sample";1,"R",A$
160 ON EOF (1) THEN 200
170 INPUT #1:A$
180 PRINT A$
190 GO TO 170
200 CLOSE 1
210 END
```

4907 Version

```
100 INIT
110 CALL "IDENTIFY", "UNIT:";1
120 REM --> CALL "MOUNT",1,A$
130 CALL "DIRECTORY",A$, "UNIT:";1,"sample"
140 IF A$="" THEN 210
150 CALL "OPEN", "sample", "LFN:";1
160 ON EOF (1) THEN 200
170 INPUT #1:A$
180 PRINT A$
190 GO TO 170
200 CLOSE 1
210 END
```

4909 Version

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1
<u>4907 to 4909 CONVERSIONS</u>	
<p>You should become familiar with the appropriate 4909 manuals before attempting to convert any programs to run on the 4909. Each 4907 statement needing conversion is listed in alphabetical order on the following pages. The equivalent 4909 syntax is given only when an automatic conversion is possible. Information is presented on the implications and side-effects of the conversion, if any.</p> <p>In converting programs, you will often find that 4907 file names will have to be altered. The rules for making the change are:</p> <ol style="list-style-type: none">1. Remove any file or library passwords. These passwords are not supported on the 4909.2. If a file name begins with "@", remove the "@".3. If the file name begins with "\$", remove the "\$" and prefix the file name with "SYSLIB/".4. If the file name does not begin with "@" or "\$", prefix the file name with "SCRATCHLIB/". <p>These rules are not the only ones possible; if you have become comfortable with the operation of the 4909, you may wish to define your own file name conversions.</p> <p>4907 and 4909 wildcards are the same ("?", "*" and "#") and operate similarly. Although there are some differences, they will rarely be noticed.</p> <p>Wherever you use unit numbers, you should be sure to check that the numbers are still appropriate to the 4909. You can set the unit number of the fixed disk on the 4909 to any value from 0 to 240 using a Unit Select Plug. The removable disk automatically receives a unit number 20 greater than the value of the fixed disk on the same drive.</p> <p>Before attempting to run a converted program, you should make sure that you have used the IDENTIFY command to establish a default unit or volume and a default user directory. This step need only be performed once per session. If you don't use the IDENTIFY command, then the default unit will be the lowest numbered one and the default directory will be the public directory. Refer to the 4909 ROM Pack Reference manual for a detailed explanation of the IDENTIFY command.</p>	

TITLE

FTPCU

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 1

1 APPEND

4907 Syntax Form

APP F.I.[,string];constant,constant

4909 Syntax Form

Same

The APPEND statement operates the same way on both the 4907 and the 4909. The file identifier should be revised for 4909 compatibility (please see the earlier explanation on altering file names).

2 ASSIGN

4907 Syntax Form

ASS F.I.;string

The ASSIGN statement cannot be directly translated to execute on the 4909. Using the 4909 WATTRIBUTE command, the following substitutions are suggested:

1. For attribute "R", substitute "@:FULL *:NONE". This gives only the owner of the file full access and is the default setting when a file is created.
2. For attribute "U", substitute "@:FULL *:FULL". This gives all 4909 users full access to the file.
3. None of the other attributes are either appropriate or necessary on the 4909.

A sample translation would be:

```
4907: 150 ASSIGN "@X";"R"
4909: 150 CALL "WATTRIBUTE","X","ALIST:@""*:FULL *:NONE""
```

Note that the file identifier should be revised for 4909 compatibility (please see the earlier explanation on altering file names).

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

3 CALL "COMPRS"**4907 Syntax Form**

CAL "COMPRS", numeric expression, numeric expression

4909 Syntax Form

Not needed

The COMPRS command is not needed on the 4909 since the 4909 will automatically deallocate any disk space not currently in use.

4 COPY**4907 Syntax Form**

COP F.I., numeric expression TO F.I., numeric expression

4909 Syntax Form

CALL "COPY","UNIT:"; numeric expression, F.I., "TO UNIT:";
numeric expression, F.I.

The file identifiers should be revised for 4909 compatibility, as should the unit numbers (please see the earlier explanation on altering file names and unit numbers).

TITLE FTPCU	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 1
----------------	---

5 CREATE

4907 Syntax Form

CRE F.I.[,string];numeric expression, numeric expression

The CREATE statement cannot be automatically converted to operate on the 4909. A manual conversion, however, is easy to perform. The general form of the command is

```
CALL "CREATE",type1,type2,F.I.
```

The conversion is made as follows

1. If the attribute "A" is used (indicating an ASCII file), then set type1 to "ASCII".
2. If the attribute "B" is used (indicating a Binary file) or if neither "A" or "B" is used, then set type1 to "BINARY".
3. The attributes "R" and "U" are implemented on the 4909 using the WATTRIBUTE command as described in the section on ASSIGN.
4. Other attributes cannot be converted.
5. If the file is sequential (if the second numeric expression evaluates to zero), then set type2 to "DIRECT".
6. If the file is random (if the second numeric expression does not evaluate to zero), then set type2 to "NINDEX".

Sample conversions are:

```
4907: CREATE "X","AUS";100,10
```

```
4909: CALL "CREATE","ASCII","NINDEX"
      CALL "WATTRIBUTE","X","ALIST:""@:FULL #:FULL"""
```

```
4907: CREATE A$;1000,0
```

```
4909: CALL "CREATE",A$,"BINARY","DIRECT"
```

TITLE	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 1
FTPCU	

6 CALL "CUSTAT"

4907 Syntax Form

CAL "CUSTAT",string variable

4909 Syntax Form

CALL "STATUS",string variable,"UNIT:ALL"

The conversion given is only approximate. The message returned by the 4909 STATUS command is not the same as that returned by the 4907 CUSTAT command in length, form or content. The program will have to be altered if it extracts information from the 4907 message. Please refer to the 4909 ROM Pack Reference manual for the exact definition and format of the 4909 status message returned.

7 DIRECTORY

4907 Syntax Form

DIR [[I/O address][numeric expression[,F.I.]]]

4909 Syntax Form

Same

The 4909 has two directory lengths available: short and long. A format code of 0 indicates a short directory; any other value will produce a long directory. If a file identifier is included in the DIRECTORY command, it should be revised for 4909 compatibility (please see the earlier explanation on altering file names).

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

8 CALL "DISMOUNT"**4907 Syntax Form**

CAL "DISMOUNT", numeric expression

4909 Syntax Form

Not needed

There is no need for a DISMOUNT command on the 4909. Before turning off a 4909 drive or removing a disk cartridge, however, you must check to make sure that no users are accessing any files on the affected media.

9 CALL "DREL"**4907 Syntax Form**

CAL "DREL", numeric expression

4909 Syntax Form

Not needed

There is no need for a DREL command on the 4909.

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

10 CALL "DRES"

4907 Syntax Form

CAL "DRES", numeric expression

4909 Syntax Form

Not needed

There is no need for a DRES command on the 4909 nor is there any way of reserving an entire unit for your exclusive use. You may, however, obtain exclusive access to a file using the 4909 RESERVE command. Please refer to the 4909 ROM Pack Reference manual for more information on reserving files.

11 CALL "DSTAT"

4907 Syntax Form

CAL "DSTAT", numeric expression, string variable

4909 Syntax Form

CALL "STATUS", string variable, "UNIT:"; numeric expression

The conversion given is only approximate. The message returned by the 4909 STATUS command is not the same as that returned by the 4907 DSTAT in length, form or content. The program will have to be altered if it extracts information from the 4907 message. Please refer to the 4909 ROM Pack Reference manual for the exact definition and format of the 4909 status message returned. The unit number may have to be changed for 4909 compatibility (please see the earlier explanation on altering unit numbers).

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

12 CALL "DUP"

4907 Syntax Form

CAL "DUP", numeric expression, numeric expression,
numeric expression

4909 Syntax Form

CALL "DUPLICATE","UNIT:"; numeric expression, "TO UNIT:";
numeric expression

The 4909 does not use the compression control parameter on the 4907 DUP command. If the output unit (the second unit specified in the DUPLICATE command) has a master password, then the password must be given. An example would be:

CALL "DUPLICATE","UNIT:";0,"TO UNIT:";20,"MPW:PASS"

The unit numbers may have to be revised for 4909 compatibility (please see the earlier explanation on altering unit numbers).

TITLE

FTPCU

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 1

13 CALL "FFRMT"

4907 Syntax Form

```
CAL "FFRMT",numeric expression(1),string(2),numeric expression(3),
      numeric expression(4),string(5),string(6),numeric expression(7),
      numeric expression(8),numeric expression(9),
      numeric expression(10),numeric expression(11)
```

4909 Syntax Form

```
CALL "FORMAT","UNIT:";numeric expression(1),"NVOL:";string(2),
      "NMPW:";string(5),"FAST"
```

The conversion given is only approximate. The unit number, the volume name and the password should be checked for 4909 compatibility. An earlier explanation was given on altering unit numbers. 4909 volume names and passwords contain at most 10 characters; the first character must be alphabetic and the following may be alphanumeric or "\$"'s or "_"'s.

NOTE

Because there is always a danger of lost data when formatting a disk and because the volume name and master password affect the operation of other 4909 commands, it is recommended that you study the 4909 FORMAT command carefully and make the proper conversion by hand.

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

14 CALL "FILE"

4907 Syntax Form

CAL "FILE", numeric expression, F.I., string variable

4909 Syntax Form

CALL "DIRECTORY", string variable, "UNIT:"; numeric expression, F.I.

The conversion given is only approximate. The message returned by the 4909 DIRECTORY command is not the same as that returned by the 4907 FILE command in length, form or content. The program will have to be altered if it extracts information from the 4907 message. Please refer to the 4909 ROM Pack Reference manual for the exact definition and format of the 4909 directory message returned.

Extra status information will be returned if ',"LONG"' is appended at the end of the 4909 command line as in:

CALL "DIRECTORY", A\$, "UNIT:"; 20, "X", "LONG"

The file identifier and the unit number should be revised for 4909 compatibility (please see the earlier explanation on altering file names and unit numbers).

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

15 CALL "FMVALS"

4907 Syntax Form

CAL "FMVALS", numeric variable, string variable

The 4909 does not possess a command equivalent to FMVALS. You can emulate the operation of FMVALS, if you wish, using the following technique:

1. Choose a variable to store the current unit number (U1 will be used in these examples), one to store the current userlib (U\$) and one to store the current user directory (D\$). The use of D\$ is optional and will be explained below.
2. After any INIT, add

```
U1=0
U$="SCRATCHLIB/"
D$="[]"
CALL "IDENTIFY","UNIT:";U1,D$
```

3. Change all 4907 unit commands such as CALL "UNIT",X to

```
U1=X
CALL "IDENTIFY","UNIT:",U1
```

In adapting a program using 4907 commands to run on the 4909, it should be understood that 4909 user directories are close analogues to 4907 units. Wherever the old program changed unit numbers, the converted program should probably change user directories. A better conversion, then, would be

```
U1=X
D$=<desired user directory>
CALL "IDENTIFY","UNIT:";U1,D$
```

TITLE

FTPCU

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 1

4. Change all userlib commands such as CALL "USERLIB",L\$ to
U\$=L\$&"/"

In addition, prefix ALL file names with U\$. For example,
the 4909 commands

```
APPEND "X"  
CALL "OPEN",X$,"LFN:1"  
CALL "RENAME","X","TO","Y"
```

would become

```
T$=D$&"X"  
APPEND T$  
CALL "OPEN",D$;X$,"LFN:1"  
CALL "RENAME",D$;"X","TO",D$;"Y"
```

Now you can convert FMVALS as follows

```
4907: FMVALS A,A$  
4909: A=U1  
A$=SEG(U$,1,LEN(U$)-1)
```

This scheme is not 100% effective, although it will work in most cases. It fails when either the userlib or the file name is the null string (the file name is null in a command such as DIR 0).

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1
16 CALL "FORMAT"	
4907 Syntax Form	
CAL "FORMAT", numeric expression(1), string(2), numeric expression(3), numeric expression(4), string(5), string(6), numeric expression(7), numeric expression(8), numeric expression(9), numeric expression(10), numeric expression(11)	
4909 Syntax Form	
CALL "FORMAT", "UNIT:"; numeric expression(1), "NVOL:"; string(2), "NMPW:"; string(5)	
The conversion given is only approximate. The unit number, the volume name and the password should be checked for 4909 compatibility. An earlier explanation was given on altering unit numbers. 4909 volume names and passwords contain at most 10 characters; the first character must be alphabetic and the following may be alphanumeric or "\$"'s or "_"'s.	
NOTE	
Because there is always a danger of lost data when formatting a disk and because the volume name and master password affect the operation of other 4909 commands, it is recommended that you study the 4909 FORMAT command carefully and make the proper conversion by hand.	

TITLE FTPCU	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 1
----------------	---

17 CALL "HERRS"

4907 Syntax Form

CAL "HERRS", numeric variable, numeric variable, numeric variable,
numeric variable, numeric variable

There is no exact 4909 equivalent for the 4907 HERRS command. As part of the 4909 STATUS command, you can obtain the number of errors on a unit since it was last formatted. For example:

CALL "STATUS", A\$, "UNIT:";20

Please refer to the 4909 ROM Pack Reference manual for instructions on how to use the 4909 STATUS command and for the exact format of the message returned.

18 KILL

4907 Syntax Form

KIL F.I.[,string]

4909 Syntax Form

CALL "DELETE", F.I.[,"MPW:";string]

The file identifier should be revised for 4909 compatibility (please see the earlier explanation on altering file names).

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

19 CALL "MOUNT"

4907 Syntax Form

CAL "MOUNT", numeric expression, string variable

4909 Syntax Form

Not needed

When referencing a unit or volume, the 4909 will automatically perform a "mount" operation, if needed.

20 CALL "MRKBBG"

4907 Syntax Form

CAL "MRKBBG", numeric expression, string, string, string

A direct conversion of the 4907 MRKBBG instruction is not possible; however, the 4909 has functionally equivalent instruction: MARK. Because of the potentially destructive aspect of this instruction, it is recommended that you refer to the 4909 ROM Pack Reference manual for full documentation on the MARK instruction.

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

21 CALL "NEXT"

4907 Syntax Form

CAL "NEXT", numeric expression, string variable

4909 Syntax Form

CALL "OPEN", "LFN:"; numerical expression, "NEXT"

The conversion given is only approximate. The 4909 OPEN command does not return a status message. To receive a status message on the newly opened file, use

CALL "STATUS", A\$, "LFN:"; numerical expression

The message returned by the 4909 STATUS command is not the same as that returned by the 4907 NEXT command in length, form or content. The program will have to be altered if it extracts information from the 4907 message. Please refer to the 4909 ROM Pack Reference manual for the exact definition and format of the status message returned.

To catch the end of the group open sequence, you must have the ONERR error trap set. One way to handle errors is to have the ONERR routine set the error number trapped and return; for instance

```

150 CALL "ONERR",50000
....
50000 REM ONERR error handler
50010 CALL "DSKERR", E$
50020 E$=SEG(E$,7,3)
50030 E1=VAL(E$)
50040 RETURN

```

The end of the group sequence is signalled by "error" number 152(?). Assuming the error handler above, here is a possible translation which tests for the end of a group open:

```

4907: 1050 CALL "NEXT",1,A$
1060 IF A$<>"" THEN 1000
1070 PRINT "End of group open"

4909: 1050 CALL "OPEN","LFN:1 NEXT"
1060 IF E1<>152 THEN 1000
1065 E1=-1
1070 PRINT "End of group open"

```

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

22 OLD

4907 Syntax Form

OLD F.I.[,string]

4909 Syntax Form

Same

The OLD statement operates the same way on both the 4907 and the 4909. The file identifier should be revised for 4909 compatibility (please see the earlier explanation on altering file names).

TITLE

FTPCU

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 1

23 OPEN

4907 Syntax Form

```
OPE F.I.[,string];constant,F.I.,string variable
```

4909 Syntax Form

```
CALL "OPEN",F.I.,"LFN:";constant
```

The conversion given is only approximate. The 4909 OPEN command does not return a status message. To receive a status message on the newly opened file, use

```
CALL "STATUS",A$,"LFN:";numerical expression
```

The message returned by the 4909 STATUS command is not the same as that returned by the 4907 OPEN command in length, form or content. The program will have to be altered if it extracts information from the 4907 message. Please refer to the 4909 ROM Pack Reference manual for the exact definition and format of the status message returned.

The access type parameter can be converted as follows:

1. If "F" is specified (full access), the converted command can stand as written.
2. If "R" is specified (read access), add ',,"TACCESS: READ"' to the tail end of the converted OPEN command.
3. If "U" is specified (update access), then ????

It is not necessary to take any special action in order to perform a group open. The file identifier in the 4909 OPEN command can include wildcards (refer to the NEXT command for additional information).

TITLE	ABSTRACT NUMBER
FTPCU	TEKniques Vol. 6 No. 1 T1 Program 1

24 CALL "RENAME"

4907 Syntax Form

CAL "RENAME", numeric expression, F.I., F.I.

4909 Syntax Form

CALL "RENAME", "UNIT:", numerical expression, F.I., "TO UNIT:";
numerical expression, F.I.

The file identifiers should be revised for 4909 compatibility, as should the unit numbers (please see the earlier explanation on altering file names and unit numbers).

25 SAVE

4907 Syntax Form

SAV F.I.[,string];[constant[,constant]]

4909 Syntax Form

Same

The SAVE statement operates the same way on both the 4907 and the 4909. The file identifier should be revised for 4909 compatibility (please see the earlier explanation on altering file names).

TITLE

FTPCU

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 1**26 CALL "SPACE"****4907 Syntax Form**

```
CAL "SPACE", numeric expression, numeric expression,  
      numeric variable, numeric variable
```

4909 Syntax Form

Not needed

The SPACE command is not needed on the 4909 since all file space allocation is automatically managed by the 4909. If you wish to know the current file size, then use

```
CALL "DIRECTORY", string variable, F.I.
```

Please refer to the 4909 ROM Pack Reference manual for an exact definition of the status message returned (of which the file size is only part).

27 UNIT**4907 Syntax Form**

UNI constant

4909 Syntax Form

```
CALL "IDENTIFY", "UNIT:"; constant
```

The conversion given is only approximate; however, the only major flaws in this conversion are that the unit number is not reset to 0 after an INIT (as on the 4907) and that the FMVALS command is not supported. A better emulation of the 4907 UNIT command is described in the section on FMVALS.

TITLE	ABSTRACT NUMBER
FTCPU	TEKniques Vol. 6 No. 1 T1 Program 1

28 CALL "UNIT"

4907 Syntax Form

CAL "UNIT", numeric expression

4909 Syntax Form

CALL "IDENTIFY","UNIT:"; numeric expression

The conversion given is only approximate; however, the only major flaws in this conversion are that the unit number is not reset to 0 after an INIT (as on the 4907) and that the FMVALS command is not supported. A better emulation of the 4907 UNIT command is described in the section on FMVALS.

29 CALL "USERLIB"

4907 Syntax Form

CAL "USERLIB", string

The userlib command is not supported by the 4909; one method for emulating the userlib feature is given in the section on FMVALS.

TITLE	ABSTRACT NUMBER
FTCPU	TEKniques Vol. 6 No. 1 T1 Program 1

CONVERSION WARNINGS

Here are the list of warnings that will be output to the listing device after each converted line.

APPEND

Warning: The file identifier should be checked for 4909 compatibility.

ASSIGN

Problem: Automatic conversion is not possible for this statement.

COMPRS

Note: This statement is not needed on the 4909.

COPY

Warning: Check the file id's and unit #'s for 4909 compatibility.

CREATE

Problem: Automatic conversion is not possible for this statement.

CUSTAT

Warning: This is only an approximate translation.

DIRECTORY

Warning: The file identifier should be checked for 4909 compatibility.

DISMOUNT

Note: This statement is not needed on the 4909.

DREL

Note: This statement is not needed on the 4909.

TITLE	ABSTRACT NUMBER
FTCPU	TEKniques Vol. 6 No. 1 T1 Program 1

DRES

Note: This statement is not needed on the 4909.

DSTAT

Warning: This is only an approximate translation.

DUP

Warning: The unit numbers should be checked for 4909 compatibility.

FFRMT

Warning: This is only an approximate translation.

FILE

Warning: This is only an approximate translation.

FMVALS

Problem: Automatic conversion is not possible for this statement.

FORMAT

Warning: This is only an approximate translation.

HERRS

Problem: Automatic conversion is not possible for this statement.

KILL

Warning: The file identifier should be checked for 4909 compatibility.

MOUNT

Note: This statement is not needed on the 4909.

MRKBBG

Problem: Automatic conversion is not possible for this statement.

TITLE	ABSTRACT NUMBER
FTCPU	TEKniques Vol. 6 No. 1 T1 Program 1

NEXT

Warning: This is only an approximate translation.

OLD

Warning: The file identifier should be checked for 4909 compatibility.

OPEN

Warning: This is only an approximate translation.

RENAME

Warning: Check the file id's and unit #'s for 4909 compatibility.

SAVE

Warning: The file identifier should be checked for 4909 compatibility.

SPACE

Note: This statement is not needed on the 4909.

UNIT

Warning: This is only an approximate translation.

USERLIB

Problem: Automatic conversion is not possible for this statement.



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER
Micrograph Measurement		TEKniques Vol. 6 No. 1 T1 Program 2
ORIGINAL DATE		EQUIPMENT AND OPTIONS REQUIRED
November, 1980		4052/4054 with 64K
AUTHOR		PERIPHERALS
Byron J. Bergert Tektronix, Inc. Rockville, MD		4956 Tablet

ABSTRACT

Files: 1 ASCII Program

Statements: 901

The 4052/4054 Micrograph Measurement program facilitates the measurement of graphic and photographic images (graphic data, electron micrographs, X-rays, etc.). The program performs five basic measurements:

- o point-to-point distance
- o length of an irregular line
- o area of a closed figure
- o circumference of a closed figure
- o counts

You may also define an interactive measurement where, for example, the datum could be the result of one measurement divided by the result of another (e.g., counts per unit area).

The program prompts you for a measurement sequence, measurement parameters and data identification information. Once you begin the measurement sequence, a tablet menu permits you to:

- o erase the last measurement
- o go to the next measurement
- o repeat the last measurement
- o stop and display the data

Software distance filters are provided for the length, area and circumference measurements and for counts. For all measurements except point-to-point, the digitized line, figure or points, and the measurement value are displayed on the graphics screen.

The data are stored both in 4052/4054 memory and on magnetic tape. A statistics routine provides a table containing the number of observations, a mean, a standard deviation, and a standard error of the mean, for the measurements. Frequency histograms may also be generated.

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TITLE

Micrograph Measurement

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 2OPERATING INSTRUCTIONS

1. Insert the TEKniques Vol. 6 No. 1 program tape into the 4050, press AUTO LOAD and choose from the directory, or FIND 5 and OLD.
2. Place the tablet controller in STREAM SWITCH mode by depressing that button. All other buttons should be out. The highest STREAM rate should be used. Lay the tablet menu provided on the tablet.
3. When the program prompts you to initialize the tablet menu position the tablet cursor to the lower left corner and press any of the cursor buttons, then to the upper right corner, pressing any of the cursor buttons.
4. The program will ask you for a measurement sequence. You should enter each measurement in the order you wish it to be performed. Terminate each entry by pressing RETURN. The program allows up to eight measurements in sequence. If less than eight measurements are entered, you must terminate the sequence by entering a Ø followed by RETURN. If the measurement INTERACTION has been entered, the program will ask you to enter two measurements and an operator (+, -, *, or /).
5. The program will prompt for a date, a data identification line, the unit of measure which will be used for all output, and the magnification of the micrograph.
6. At this point, you will be prompted to insert your data tape and enter a file number for data storage. The file will be automatically marked.
7. The previously entered data identification line will be printed to tape. You will be prompted for a data set identification line which follows the data identification line in the first record of the data file.
7. The measurement sequence begins.

The type of measurement and the sequence number of the first measurement are displayed in the upper lefthand corner of the graphic screen.

The surface of the tablet will be represented on the screen for all measurements except point-to-point distance. (If a standard 4956 tablet is used, only the lower left portion of the tablet surface will be represented.)

The process is controlled from this point by the cursor buttons and tablet menu.

Begin measurements by pressing the Z-axis cursor button. Note that it is not necessary to hold the cursor button down while performing line length, circumference or area measurements. Simply move the cursor over the tablet surface after an initial button push.

TITLE

Micrograph Measurement

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 2

Point-to-point measurements are terminated with the Z-axis cursor button while Line Length and Counts are terminated with the left cursor button.

Area and Circumference measurements are terminated by the program when the figure is closed (i.e., when the distance between the cursor and the starting point is less than the distance filter value.) The distance filter also determines the distance between digitized points for these measurements.

The measurement "Counts" also prompts you for a distance filter value. However, in Counts the distance filter value is the distance a point must be from every other point in order to be accepted.

8. After completing the measurement, you may use the tablet menu to:
 - (1) erase the measurement
 - (2) go to the next measurement
 - (3) repeat the last measurement
 - (4) stop the measurement sequence and display the N, mean, standard deviation, and S.E.M. for each sequence number.
9. At this point pressing RETURN presents you with the options:
 - (1) return to the menu
 - (2) begin new data set using the same parameters
 - (3) generate a frequency histogram. After a frequency histogram is produced, you will be returned to these options.
10. If the program is not running, the contents of a data file may be displayed on the screen by pressing UDK #1 and entering a file number. Each datum is preceded by a code N1 to N6 indicating the type of measurement.

TITLE

Micrograph Measurement

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 2PARTIAL VARIABLE LIST.

<u>Variable</u>	<u>Type</u>	<u>Description</u>
A	Array	X, Y coordinates of points digitized in subroutine COUNTS
B	Simple	Number of current magnetic tape file
A1 to A6	Arrays	Accumulated data for each of the measurements in the MEASUREMENT sequence
C1 to C6	Simple	Subscripts for arrays A1 to A6
D	Simple	Distance filter for subroutine COUNTS
D3	Simple	Distance filter for linear measurements
D9	Simple	Returned by MEASUREMENT routines
F9	Simple	Flag set in MEASUREMENT routines by selecting "stop display data"
H1	Simple	Tablet menu--lower right X value
H2	Simple	Tablet menu--lower right Y value
H3	Simple	Tablet menu--upper left X value
H4	Simple	Tablet menu--upper left Y value
S	Array	Sequence numbers
S1	Simple	Number of measurements in sequence
W1 to W4	Simple	Values returned by subroutines
U	Simple	Magnification factor
U9	Array	Measurement numbers for INTERACTION
V9	Array	Data generated by measurements in INTERACTION
D\$	String	Date
G\$	String	Operator of INTERACTION
I\$	String	Identification Line
N\$	String	Datum identification string
V\$	String	Current units for data output
J\$	String	Data set identification line

TITLE

Micrograph Measurement

ABSTRACT NUMBER

TEKTMiques Vol. 6 No. 1 T1
Program 2TABLET MENU

ERASE LAST MEASUREMENT	GO TO NEXT MEASUREMENT	REPEAT LAST MEASUREMENT	FINISHED, DISPLAY DATA
---------------------------	---------------------------	----------------------------	---------------------------



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 3
4054 Dynamic Graphics Flowchart Symbols		EQUIPMENT AND OPTIONS REQUIRED 4054, Opt. 30/31, 64K Bytes
ORIGINAL DATE August, 1981		PERIPHERALS Optional-4662/4663 Plotter
AUTHOR Vaughn Andrews Craig Bulmer		Tektronix, Inc. Chicago, IL
<p>ABSTRACT</p> <p>Files: 1 ASCII Program</p> <p>Statements 800</p> <p>Taking advantage of the 4054 with Option 30 or Option 31, Dynamic Graphics, the program positions objects, text, or vectors, which are menu selected on the 4054 screen. Output may be to the screen or to the plotter.</p> <p>Developed pictures can be saved to and redisplayed from premarked files on the internal tape drive.</p> <p>Applications include flow charting, system configuration diagrams, organizational charts, and other similar activities.</p>		
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TITLE	ABSTRACT NUMBER
4054 Dynamic Graphics Flowchart Symbols	TEKniques Vol. 6 No. 1 T1 Program 3

OBJECTS

Objects include: Rhomboid
Sexagon
Terminal
Parallelogram
Diamond
Square
Circle
Rectangle
Arrow
Vector
Text

Objects may be changed by recoding those areas of the program which draw them.

Dashed lines could be used in vectors and stored in X(I,6) for vectors for which storage area is not used now.

Color changes for the 8-pen plotter could be easily incorporated by DIM X(400,7).

The program could be coded to include disk storage.

PRELIMINARY OPERATING INSTRUCTIONS

Premark your data files for 25088 bytes each.

DATA FILE STRUCTURE

One data file has been included as an example (file 7 on the program tape).

Data is stored in binary format:

FIND X9

WRITE @33: H,X,A\$

X9 = file number

H = number of items on display

X = array described under Internal Data Storage DIM X(400,6)

A\$ = string containing text DIM A\$(5000)

TITLE	ABSTRACT NUMBER
4054 Dynamic Graphics Flowchart Symbols	TEKniques Vol. 6 No. 1 T1 Program 3

INTERNAL DATA STORAGE

A\$ = String containing text for display DIM A\$(5000)

X = Array, DIM X(400,6), contains picture information

Three different classes of objects

- 1) Standard Objects
- 2) Vector Objects
- 3) Text Objects

For all object types

X4 = X(I,1) = symbol #
X(I,1) = 1 = rhomboid
X(I,1) = 2 = sexagon
X(I,1) = 3 = terminal
X(I,1) = 4 = parallelogram
X(I,1) = 5 = diamond
X(I,1) = 6 = square
X(I,1) = 7 = circle
X(I,1) = 8 = rectangle
X(I,1) = 9 = arrow
X(I,1) = 10 = vector
X(I,1) = 11 = text

For Standard Objects

S = X(I,2) = vert scale
S3 = X(I,6) = horz scale
R = X(I,3) = degrees of rotation
X1 = X(I,4) = X-center of object
Y1 = X(I,5) = Y-center of object

TITLE

4054 Dynamic Graphics Flowchart Symbols

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 3For Vector Objects $X_0 = X(I,2)$ = X-start of line $Y_0 = X(I,3)$ = Y-start of line $X_1 = X(I,4)$ = X-end of line $Y_1 = X(I,5)$ = Y-end of line $X(I,6)$ = not usedFor Text Objects $S_1 = X(I,2)$ = text size (1-4) $L = X(I,3)$ = starting position of string in A\$ $X_1 = X(I,4)$ = X-starting point of text $Y_1 = X(I,5)$ = Y-starting point of text $L_1 = X(I,6)$ = length of text string

TITLE

4054 Option 30 Flowchart Symbols

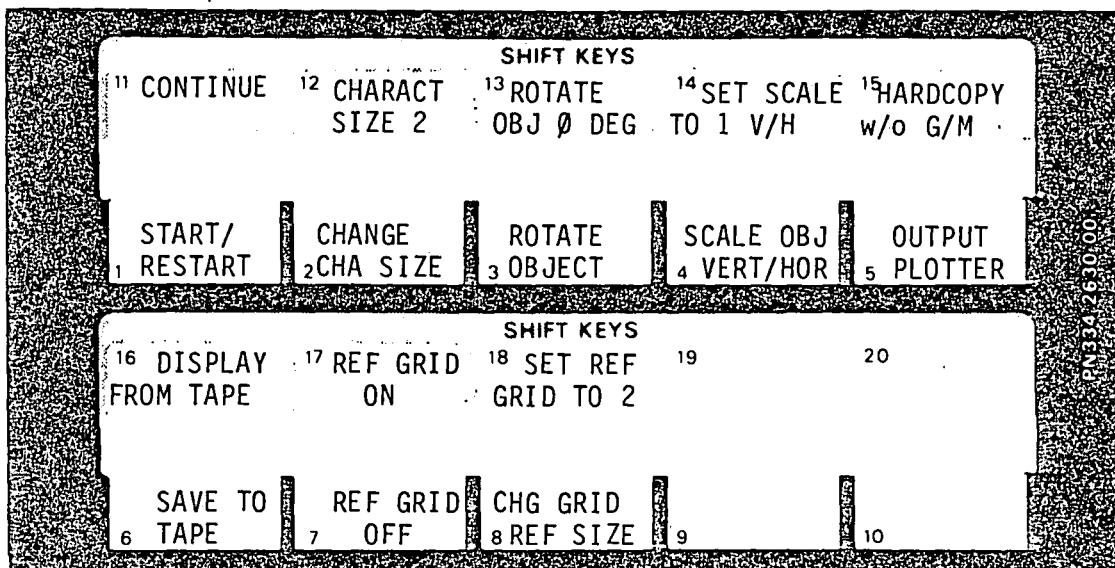
ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 3

TITLE 4054 Opt. 30 Flowchart

TAPE #

FILE #



Most of the User-Definable Keys are self-explanatory. A few may need to be clarified:

UDK #2 - Select 1 of 4 4054 character sizes.

UDK #4 - Scale objects from X.15 to X6.0 size of object as it is on menu in both vertical and horizontal.

UDK #15 - Hardcopy of screen without menu and reference grids.

UDK #17 - Reference grid only NOT snap-to-grids.

UDK #18 - Reference grid size expressed in GDU's.

TITLE	ABSTRACT NUMBER
4054 Option 30 Flowchart Symbols	TEKniques Vol. 6 No. 1 T1 Program 3

OPERATING INSTRUCTIONS

Load the program into 4054 memory through the tape directory, or by FINDing 6 and OLDing. Examples are contained in file 7 of the program tape and may be called in and displayed by pressing UDK 16.

Move the thumbwheels to select an object from the menu, or input a character:

"D" = discard an object

"F" = fix and retain an object

"G" = fix and discard an object

"M" = move when DRAW (vector) is selected

"CR" = terminates text input, no-op for using function keys, and object selection.



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 4	
Data Alignment		EQUIPMENT AND OPTIONS REQUIRED	
ORIGINAL DATE June, 1979	REVISION DATE	8K	
AUTHOR Captain Steve Sanford		U.S. Army Proving Grd Aberdeen, MD	
		PERIPHERALS Optional-4924 Tape Drive	
<p>ABSTRACT</p> <p>Files: 1 ASCII Program</p> <p>Statements: 104</p> <p>The program accepts a sequence of randomly spaced X,Y coordinate data from a tape file, in ascending X-value sequence. Output consists of linearly interpolated X,Y values based on a uniformly increment X-value sequence. The program prompts the user for all options.</p> <p>This program is applicable to aligning random time-value data for a fixed time interval such as that produced by the tablet digitization program, provided that the digitized data proceeds in ascending X-value sequence.</p>			

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TITLE	ABSTRACT NUMBER
Data Alignment	TEKNIques Vol. 6 No. 1 T1 Program 4

DATA TAPE STRUCTURE

File Number: Selected by user at execution time.

Type: ASCII

Format: Two numbers in standard "PRINT X,Y" format per record.

Unit: 33

Marking instructions: File is read-only.

File Number: Selected by user at execution time.

Type: ASCII

Format: Two numbers in standard "PRINT X,Y" format per record.

Unit: 2 (May be changed. See variable U0)

Marking Instructions: Pre-mark or may be automatically marked for 50000 bytes.

TITLE	ABSTRACT NUMBER
Data Alignment	TEKniques Vol. 6 No. 1 T1 Program 4

INTERNAL DATA STORAGE

<u>Variable</u>	<u>Used to Store</u>	<u>Type</u>
U0	External tape drive device number	Simple
T0	External tape error code	Simple
R\$	User prompt input	String
R	Input/Output File Number	Simple
I1	Starting X-value	Simple
I2	Increment X-value	Simple
I3	Ending X-value	Simple
M	Output tape switch	Simple
L	Output screen switch	Simple
X1	Previous X input value	Simple
Y1	Previous Y Input value	Simple
X	Current X input value	Simple
Y	Current Y input value	Simple
I	FOR loop index	Simple
F	Interpolation factor	Simple
Z	Output Y-value	Simple
W	Output X-value	Simple

METHODOLOGY

A FOR-loop (lines 750-920) generates I-values from the starting to ending X-values (I1 to I3) by the increment (I2) specified. When one of these I-values falls between the previous (X1) and current X values, a new Y-value (Z) is generated based on a linear interpolation between the previous (Y1) and current Y values. In the following way:

$$Y(\text{NEW}) = (Y(\text{current}) - Y(\text{previous})) * F + Y(\text{previous})$$

Where $F = (I - X(\text{previous})) / (X(\text{current}) - X(\text{previous}))$

If the Input-X-values are both less than I, then more input is read. If the input X-values are greater than I, then I is incremented. This procedure

TITLE	ABSTRACT NUMBER
Data Alignment	TEKniques Vol. 6 No. 1 T1 Program 4

is concluded by either an end-of-file on the input tape or incrementing I to the maximum X-value.

OPERATING INSTRUCTIONS

Load program from tape through the directory or FIND 7, OLD and RUN.

Be sure to provide an output tape if a permanent copy of the generated data is desired.

PROGRAM EXECUTION

Replace the program tape with the input data tape when solicited.

Answer the questions.

An external tape drive error will interrupt the program. Repair the problem (using the tape error code displayed as a guide) and re-run the program.



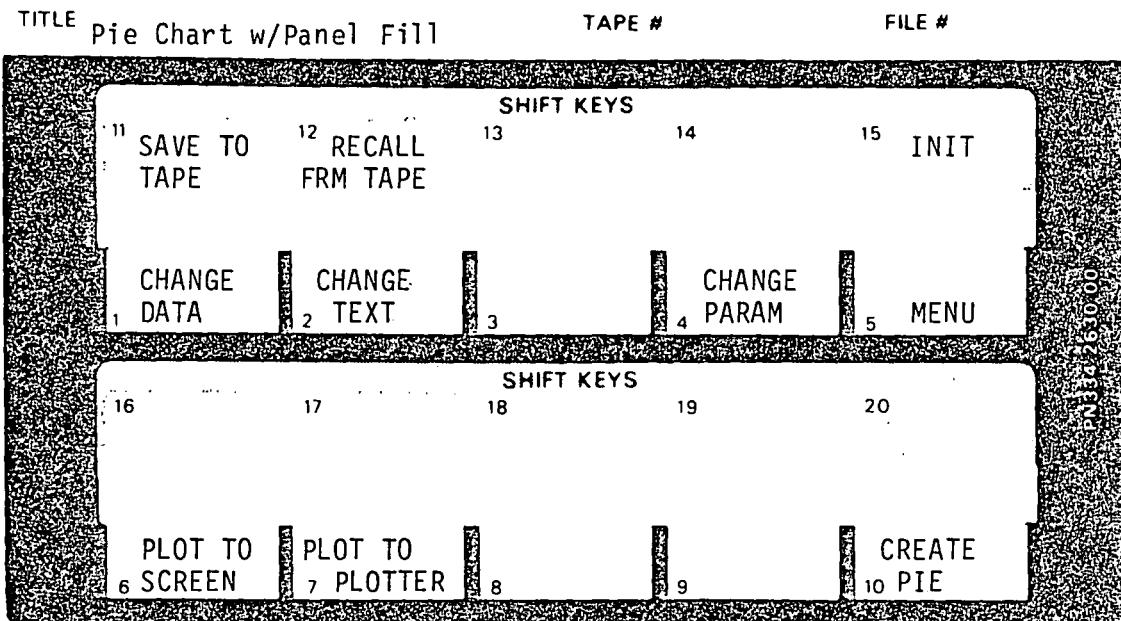
DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 5
Pie Chart with Panel Fill		EQUIPMENT AND OPTIONS REQUIRED
ORIGINAL DATE August, 1981	REVISION DATE	64K
AUTHOR see below		PERIPHERALS Optional - 4662 Plotter
<p>ABSTRACT</p> <p>Author: Chuck Eng Revised by: Lynn Cueto Tektronix, Inc. Tektronix, Inc. Wilsonville, OR Rockville, MD</p> <p>Files: 1 ASCII Program</p> <p>Statements: 634</p> <p>Pie Chart is extremely easy to use. Any number of segments may be assigned text and values. The annotation is printed horizontally around the pie with arrows pointing to their co-responding segments.</p> <p>The program will annotate each segment with actual values, or will compute and annotate each segment in percentage form, or both. Values must be positive.</p> <p>Any one or all of the segments may be exploded and/or shaded. Modifications to the chart are through the User-Definable Keys.</p> <p>If drawn on the plotter, the labels and segments may be different colors. Different character sizes for the labels is optional.</p> <p>Data may be stored in pre-marked files on tape and recalled for plotting or changing.</p>		
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TITLE

ABSTRACT NUMBER

Pie Chart with Panel Fill

TEKniques Vol. 6 No. 1 T1
Program 5KEYFUNCTION

- | | |
|---------------------|--|
| 1 CHANGE DATA | Change segment data. |
| 2 CHANGE TEXT | Change title, subtitle, lower labels, segment labels or preceding or trailing symbols. |
| 4 CHANGE PARAMETERS | Change segment explosion/shading, printed segment values, preceding or trailing symbols, title, subtitle, lower labels. |
| 5 MENU | Reprints the menu; doesn't alter the data in memory. |
| 6 PLOT TO SCREEN | Displays the graph on the screen. |
| 7 PLOT TO PLOTTER | Plots the graph on the 4662 Plotter. Allows for pen changes, and character size changes for title, subtitle, and lower labels. |
| 10 CREATE PIE | Initializes the system, begins a new pie. Previous data in memory will be lost. |
| 11 SAVE TO TAPE | Stores pie values and parameters in pre-marked tape file. |
| 12 RECALL FROM TAPE | Enter data and graph parameters from tape file. |
| 15 INIT | Initializes the system. Previous data in memory will be lost. |

TITLE	ABSTRACT NUMBER
Pie Chart with Panel Fill	TEKniques Vol. 6 No. 1 T1 Program 5

DATA TAPE STRUCTURE

Record 1 -- N = number of segments
S = value of all segments

Record 2 -- D = array of segment values (N elements)

Record 3 -- S1= array for segment shading (N elements)

Record 4 -- E = array for segment explosion (N elements)

Record 5 -- A\$ = all segment titles (N*11)

Record 6 -- S\$ = preceding annotation (max 10 cha)

Record 7 -- T\$ = trailing annotation (max 11 cha)

Record 8 -- V\$ = how segment values are to be displayed (1 cha)

Record 9 -- C\$ = main title (max 72 cha)

Record 10 -- R\$ = subtitle (max 72 cha)

Record 11 -- D\$ = lower label #1 (max 72 cha)

Record 12 -- L\$ = lower label #2 (max 72 cha)

Data files must be pre-MARKed. Actual length will depend on the number of segments; however, a file size of 1536 should handle most graphs, and probably 768 bytes would do.

Pie Chart with Panel Fill

OPERATING INSTRUCTIONS

Press AUTO LOAD and bring the program into memory through the tape directory, or FIND 9, OLD and RUN.

CREATING A PIE

Segment Labels

Segment labels may be up to 11 characters long. Anything greater will be truncated.

Exploded Segments

Any or all of the segments may be exploded (offset) from the main pie.

Shaded Segments

Any or all of the segments may be shaded. The program will prompt for the type of shading and the number of lines. The lower the value for the number of lines, the denser the shading. E.g., shading density of 2 is much greater than 5.

Segment Values

The values previously input may be calculated and displayed as percentages of the total value, left as the actual value, or both. When percentages are shown, they will be displayed on the same line as the segment titles. The actual value will be displayed on the following line.

Segment Symbols

You may specify a preceding and/or trailing symbol for the actual value entered. Although you may input up to 10 characters for the former and 11 for the latter, if the total length will not fit within the space between pie and border, the entire line will be replaced with asterisks.

By previewing your graph on the screen, you can quickly see if your line lengths exceed the allotted space and make the changes to your symbols, if necessary.

PLOTTING TO PLOTTER

Each segment may be plotted in a different color. All labels will be plotted in the same color unless you are pausing for positioning or character size change, at which time pens may be switched.

If you specify different character sizes or positioning, you will be prompted for the size before each line of text, and then for pen position. If your titles are to be centered, position the pen to the Y-axis (vertical) location. The program will automatically center the text in relation to the pie.

If you wish to position the text, move the pen to the horizontal and vertical location. The text will be printed beginning at that point, after the program checks for fit.

**DESKTOP COMPUTER
APPLICATIONS LIBRARY PROGRAM**

TITLE		ABSTRACT NUMBER
Enhanced Spider Web Chart		TEKniques Vol. 6 No. 1 Program 6
ORIGINAL DATE	REVISION DATE	EQUIPMENT AND OPTIONS REQUIRED
December, 1977	May, 1979	8K

AUTHOR	PERIPHERALS
see below	Optional-4662 Plotter

ABSTRACT

Author: Tom Price
Lorillard Research
Greensboro, NC

Revised by: Roger Chan
U.S.V. Pharmaceutical Research
Tuckahoe, NY

Files: 1 ASCII Program

Statements: 161

An update of the spider web profiles, this program has an input routine, interactive changeable title, rating scale, and rating value. It also handles out of range values.

Output may be to the screen or the plotter with a different character size for the title and multicolor if the latter.

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TITLE

Spiderweb Profiles

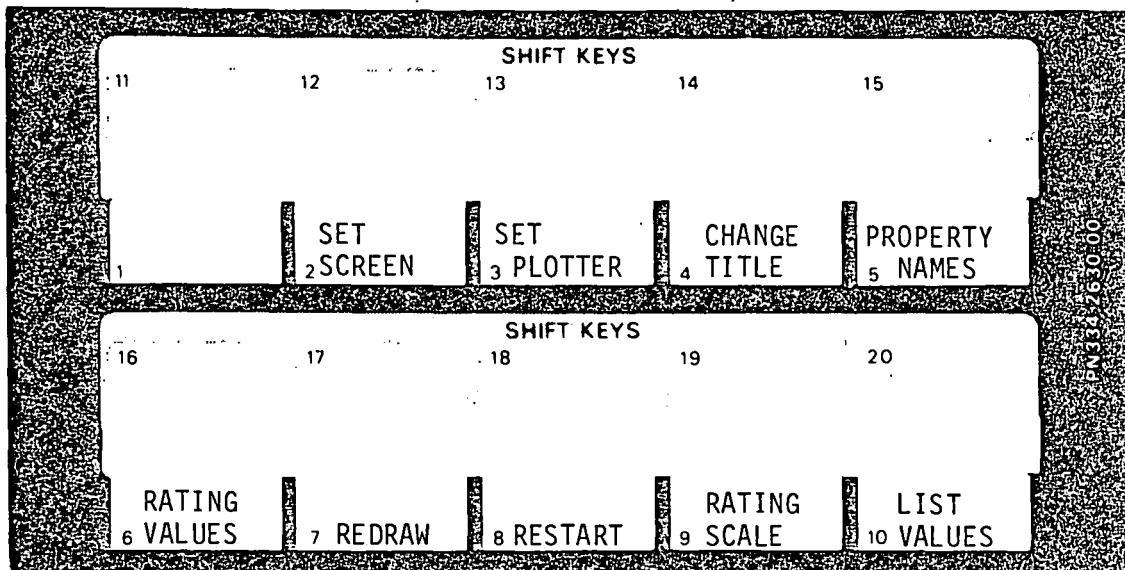
ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 6

TITLE Spider Web Profiles

TAPE #

FILE #

KEYFUNCTION

- | | |
|------------------|---|
| 2 SET SCREEN | Displays output on the screen (default) |
| 3 SET PLOTTER | Sends output to the plotter |
| 4 CHANGE TITLE | Change title only |
| 5 PROPERTY NAMES | Change properties' names |
| 6 RATING VALUES | Change rating value |
| 7 REDRAW | Redraw the chart |
| 8 RESTART | Initialize for new chart |
| 9 RATING SCALE | Change divisions on scale |
| 10 LIST VALUE | List current value of each property |

TITLE	ABSTRACT NUMBER
Spider Web Profiles	TEKniques Vol. 6 No. 1 T1 Program 6

OPERATING INSTRUCTIONS

Load the program into memory through the tape directory, or FIND 10, OLD and RUN.

Title

Title consists of one line up to 72 characters long.

Number of Properties

Number of properties per item; suggested maximum is 20.

Rating Scale Division

The number of divisions in the rating scale for each property; suggested maximum is 10.

Properties' Names

Input the name for each property up to a maximum of 20 characters each.

Rating

Key in the rating of each property as prompted.

PLOTTING

Preview your graph on the screen.

To transmit to the plotter, press UDK #3, then UDK #7.

The program will pause to allow a different pen color for the "web."

To return to the screen, press UDK #2, then UDK #7.

EDITING

You may change the graph title, the rating scale, the names of the properties or the rating values of the properties.

TITLE

Spider Web Profiles

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1
Program 6INTERNAL DATA STORAGE

<u>Variable</u>	<u>Use</u>	<u>Type</u>
Z	Output Device (1 or 32)	Simple
K	Maximum length of property	"
N	Number of Property	"
S1	Rating Scale Division	"
T	Rotation Angle for Scale	"
C\$	Working Storage	String
M\$	Carriage Return	"
B\$	Title for Graph	"
D\$	Working Storage/Spacing	"
L\$	Storage of Property Name	"
X(N)	Values of Property	"
Y(N)	Adjusted Values of Property	"
R(N)	Actual X-Coordinate on Screen	Array
Q(N)	Actual Y-Coordinate on Screen	"



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 Program 7
PROGVARLI		EQUIPMENT AND OPTIONS REQUIRED
ORIGINAL DATE April, 1980	REVISION DATE	32K
AUTHOR G. Gauglitz University of Tuebingen A. Lorch Tübingen, Germany		PERIPHERALS 4641 Printer
ABSTRACT		
<p>Files: 1 ASCII Program</p> <p>Statements: 314</p> <p>The program lists at the printer any ASCII BASIC program saved on the internal magnetic tape. Each line containing a PRINT, data-input, DIMENSION, DELETE or GOSUB statement is so referenced.</p> <p>A table of variables is printed, followed by a list of the variables including line numbers.</p> <p>A list of REM's, Subroutines, DIM's, DEL's, GO TO's, IF's, and FOR-NEXT loops is created, ending with the total number of statements in the file and the string length (essential to creating a file of minimal length).</p>		

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TITLE PROGVARLI	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 Program 7
--------------------	--

OPERATING INSTRUCTIONS

Load PROGVARLI into memory through the tape directory or FIND 11, OLD and RUN.

The program will prompt you for the tape number and sequence of files to list and cross-reference.

A neat listing of ASCII programs stored on the internal tape drive will be output on the printer. Each page contains the tape #, file # and date.

Blank lines will be inserted after GOTO's, RETURN's and when program statement numbers differ more than 10. FOR-NEXT loops are indented.

The following symbols flag special types of statements:

- * PRINT
- + data-input
- = DIMENSION
- ! DELETE
- # GOSUB

A list of variables follows the program listing. The variables are subsequently cross referenced by line numbers.

Special listings are printed for the following:

- REM statements
- SUBROUTINES - line to line
- DIM
- DELETE
- GOSUB
- GO TO
- IF ... THEN
- FOR ... NEXT

The total number of program lines is calculated and printed along with the minimal length required to mark a file to hold the program.

DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 8	
Rank Sum Statistic		EQUIPMENT AND OPTIONS REQUIRED	
ORIGINAL DATE October, 1981	REVISION DATE	24K	
AUTHOR Richard M. Engeman		PERIPHERALS Optional-4641 Printer 4662 Plotter	
Denver Wildlife Research Denver, CO			
<p>ABSTRACT</p> <p>Files: 1 ASCII Program</p> <p>Statements: 245</p> <p>This program calculates the test statistic for the rank-sum test. This non-parametric method tests for a shift in location between two unpaired samples (see Hollander and Wolfe, <u>Non-parametric Statistical Methods</u>, or Wilcoxon and Wilcox, <u>Some Rapid Approximate Statistical Procedures</u>.)</p> <p>The data is input from the keyboard and the program allows the user to correct it after viewing it. The output consists of the raw data, the sorted data, and the test statistic. Significance levels for the test statistic should be looked up in the tables contained in one of the references.</p>			
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TITLE

ABSTRACT NO:

Rank Sum Statistic

TEKniques Vol. 6 No. 1 T1
Program 8

Internal Data Storage:

<u>Variable</u>	<u>Used to Store</u>	<u>Type</u>
U\$	Interactive keyboard answers	string
N1	X sample size	simple
N2	Y sample size	simple
N	Overall sample size, N1 + N2	simple
W	Vector containing all data	array(N)
T	Vector containing treatment number (1 or 2) for each data point	array(N)
S	Vector containing the ranks for each data point	array(N)
W1	Storage vector used in determining averaged ranks for ties	array(N)
S1	Vector containing the ranks including averaged ranks, for each data point	array(N)
X	Vector containing data from X sample	array(N1)
Y	Vector containing data from Y sample	array(N2)
L	Vector containing # of tied observations for each data point	array(N)
Z	Counts # used lines on the screen for automatic paging, also used as counter elsewhere	simple
K	Cell location in vectors or temporary storage of contents of a cell	simple
B	Branch number for GO TO statements	simple
D	Device number for output	simple
P	Starting point locator for data array search in data correction	simple
G	Faulty data value to be corrected	simple
H	Correct value	simple
N9	End point for search in data array for faulty value	simple
S	Cell location in vectors	simple
K1	Temporary storage of contents of a cell of a vector	simple
R	Test statistic	simple
I2	Locator used in sort subroutine	simple
I3	Locator used in sort subroutine	simple
K2	Temporary storage of contents of a cell of a vector	simple

TITLE	ABSTRACT NO:
Rank Sum Statistic	TEKniques Vol. 6 No. 1 T1 Program 8

<u>Variable</u>	<u>Used to Store</u>	<u>Type</u>
I4	Temporary storage of contents of a cell of a vector	simple
Z2	Temporary storage when averaging ranks	simple
Z1	Locator when averaging ranks	simple

Methods:

The data from the X and Y samples are entered separately from the keyboard into individual sample arrays and an overall data array. The data in the overall array is ranked and the test statistic calculated according to Wilcoxon and Wilcox, Hollander and Wolfe, and most other non-parametric references. The significance level for the test statistic must then be found in tables such as those in the listed references.

Operating Instructions:

The program is designed to be highly interactive; hence, the operating instructions are incorporated into the program. The author recommends that the user be familiar with the rank sum test.

- a. Load the program through the tape directory, or FIND 12, OLD and RUN.
- b. Program Execution
 1. After entering RUN, the screen pages and prints some notes and references. The user is asked
IF YOU ARE READY TO INPUT DATA PRESS RETURN
 2. After pressing RETURN, the screen pages and the user is instructed to ENTER THE # OF ELEMENTS IN THE FIRST SAMPLE, X
If the response is less than 3, then the following message is printed on the screen
THE X SAMPLE IS TOO SMALL (<3)
TYPE RUN AND START OVER WITH A NEW SAMPLE
 3. If there is no problem with the sample size, then the user is instructed ENTER THE # OF ELEMENTS IN THE SECOND SAMPLE, Y
If the response is less than 3, then the following message is displayed on the screen
THE Y SAMPLE IS TOO SMALL (<3)
TYPE RUN AND START OVER WITH A NEW SAMPLE

TITLE

Rank Sum Statistic

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 8

4. If the Y sample size is adequate, the user is prompted to enter the X data
ENTER EACH ELEMENT OF X
PRESS RETURN AFTER EACH ENTRY
5. After all of the X data has been input, the user is instructed to enter the Y data
ENTER EACH ELEMENT OF Y
PRESS RETURN AFTER EACH ENTRY
6. Next the X data is printed on the screen with the heading
HERE IS THE X DATA
After the data has been printed, the user is asked
DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)
Answering with Y results in the following message
ENTER DEVICE #
The user then enters the number of the peripheral device where the output is desired. Afterwards the user is again asked
DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)
The output can thus be printed as many times as desired on as many output devices as are available.
7. If the above question is answered with N, then the Y data is printed on the screen with the heading
HERE IS THE Y DATA
Again, the user is asked the question
DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)
Again, this output may be printed on as many times as desired on as many output devices as available.
8. Answering the above question with N results in the user being asked
DO YOU WANT TO ALTER A DATA POINT? (Y OR N)
If the answer to this question is Y, then the user is asked
IS IT AN X OR Y DATA POINT?
After the appropriate sample is input, the user is instructed to
ENTER THE FAULTY VALUE
After entering the incorrect value, the user is told
ENTER THE CORRECT VALUE

TITLE

ABSTRACT NO:

Rank Sum Statistic

TEKniques Vol. 6 No. 1 T1
Program 8

After correcting the faulty value, the following message is printed on the screen

CORRECTED

Next the user is asked

DO YOU WANT TO ALTER ANOTHER DATA POINT? (Y OR N)

An answer of Y starts the correction process over again. If the program cannot find the faulty value in the indicated sample, a message of the following form is displayed.

THE VALUE i IS NOT IN THE j DATA

where i is the faulty value and j is indicated sample (X or Y). The user is then asked

DO YOU WANT TO ALTER ANOTHER DATA POINT? (Y OR N)

Any time the user answers either this question or the original question about correcting the data with N, the program continues.

9. The message

I HAVE TO CONCENTRATE NOW

indicates that the data is currently being sorted and appropriate ranks (for ties) calculated. After the sorting procedure, the user is next asked

DO YOU WANT TO SEE THE SORTED DATA? (Y OR N)

If the answer is N, the program continues without displaying the sorted data. If the answer is Y, the sorted data is printed on the screen with the following headings

HERE IS THE SORTED DATA

RANK	DATA	TREATMENT
------	------	-----------

The columns indicate, respectively, the ordered rank of the data, the ordered data point, the treatment sample it came from. After the sorted data has been printed out, the user is asked

DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)

The questions for outputting the sorted data are the same as those for the X and Y samples. Thus, here too, the output may be printed as desired on as many devices as available.

10. An answer of N leads to the printing of the test statistic on the screen in the following format

THE TEST STATISTIC IS THE SUM OF THE RANKS FOR THE SMALLER SAMPLE

R =
WITH N1 =
AND N2 =

FOR SIGNIFICANCE LOOK THIS VALUE UP IN ONE OF THE REFERENCES

TITLE

ABSTRACT NO:

Rank Sum¹ StatisticTEKniques Vol. 6 No. 1 T1
Program 8

where the appropriate quantities are given on the right-hand side; R = test statistic, N1 = X sample size, N2 = Y sample size

The user is again asked

DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)

Again, the output may be printed as desired on as many devices as available as long as this question is answered with Y. An answer of N ends the program.

Examples:

The following example is taken from Wilcoxon and Wilcox, page 7.

References:

Hollander, M. and Wolfe, D., Non-parametric Statistical Methods, New York: Wiley, 1973.

Wilcoxon, F. and Wilcox, R., Some Rapid Approximate Statistical Procedures, New York: Lederle Laboratories, 1964.

TITLE	ABSTRACT NUMBER
Rank Sum Statistic	TEKniques Vol. 6 No. 1 T1 Program 8

HERE IS THE X DATA

X1 = 1.76
X2 = 2.6
X3 = 2.81
X4 = 1.82
X5 = 1.94
X6 = 2.85
X7 = 2.81
X8 = 1.7
X9 = 2.41
X10 = 1.97
X11 = 3.55
X12 = 2.22
X13 = 2.25
X14 = 2.1
X15 = 3.5

DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)

HERE IS THE Y DATA

Y1 = 1.85
Y2 = 1.78
Y3 = 1.73
Y4 = 1.21
Y5 = 1.48
Y6 = 1.6
Y7 = 1.65
Y8 = 1.89
Y9 = 1.29
Y10 = 1.39
Y11 = 1.98
Y12 = 1.24

DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)

TITLE

Rank Sum Statistic

ABSTRACT NUMBER
TEKniques Vol. 6 No. 1 T1
Program 8

HERE IS THE SORTED DATA

RANK	DATA	TREATMENT
1	1.21	2
2	1.24	2
3	1.29	2
4	1.39	2
5	1.48	2
6	1.6	2
7	1.65	2
8	1.7	1
9	1.73	2
10	1.76	1
11	1.78	2
12	1.82	1
13	1.85	2
14	1.89	2
15	1.94	1
16	1.97	1
17	1.98	2
18	2.1	1
19	2.22	1
20	2.25	1
21	2.41	1
22	2.6	1
23.5	2.81	1
23.5	2.81	1
25	2.85	1
26	3.5	1
27	3.55	1

DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)

THE TEST STATISTIC IS THE SUM OF THE RANKS FOR THE SMALLER SAMPLE

R = 92
 WITH N1 = 15
 AND N2 = 12

FOR SIGNIFICANCE LOOK THIS VALUE UP IN ONE OF REFERENCES
 DO YOU WANT THIS PRINTED ON ANOTHER DEVICE? (Y OR N)



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE Two-Factor Repeated Measures Analysis of Variance		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 9
ORIGINAL DATE July, 1981		EQUIPMENT AND OPTIONS REQUIRED 32K
AUTHOR Richard M. Engeman	Denver Wildlife Research Denver, CO	PERIPHERALS Optional - 4641 Printer

ABSTRACT

Files: 1 ASCII Program

Statements: 407

This program calculates a univariate analysis of variance for data from a two-factor repeated measures experimental design, (see Winer, Statistical Principles in Experimental Design). The program can handle unequal group sizes in addition to the completely balanced case. For an analysis involving unequal group sizes, the user is given the option of analyzing the data with a least squares or unweighted means approach. The program cannot handle missing observations.

The data is input from the keyboard and the user may correct or change it after viewing it on the screen. The output consists of the appropriate analysis of variance table as well as tables of cell totals, means for each subject, means for each treatment level and interaction means.

The user has the option of printing all output, including the raw data, on either the screen or the 4641 printer. Various tasks may be selected from the menu: correcting data, output means tables, output AOV table, etc.

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TITLE

Two-Factor

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 9

Internal Data Storage:

Variable	Used to Store	Type
U\$	Interactive keyboard answers	string
P	Number of levels of treatment A	simple
Q	Number of levels of treatment B	simple
D8	Flag to check if means have been calculated	simple
N	Number of subjects in each level of A(group sizes)	array (P)
O\$	Flag denoting whether there are equal or unequal group sizes in the levels of A	string
N1	Accumulates total number of subjects	simple
X	Raw data matrix	array (N1,Q)
T	Cell totals/means	array (P,Q)
W	Total for each level of treatment A	array (P)
V	Total for each level of treatment B	array (Q)
P1	Total for each subject	array (N1)
B9	Means in A*B interaction cells	array (P,Q)
Z	Counts no. of lines on the screen so it will page automatically when necessary	simple
C	Row accumulator for inputting X	simple
L	Counter in various parts of program	simple
D	Device number for output	simple
I	Cell locations in matrices	simple
J	Cell locations in matrices	simple
K	Cell locations in matrices	simple
S	Corrected data value, sums raw data	simple
L1	Accumulates reciprocals of group sizes	simple
A1	Accumulates squares of raw data	simple
M	Counter	simple
M1	Counter	simple
S2	Sum of squared raw data	simple
H1	P/L1	simple
S6	Sum of squared subjects totals/Q	simple
S3	Sum of squares of totals for treatment A weighted by group size	simple
G	Grand total	simple
S1	Grand total squared divided by total no. of observations	simple
S4	Sum of squares of totals for treatment B divided by total no. of subjects	simple
S5	Sum of squares of cell totals divided by group size	simple
Q1	Treatment A sum of squares	simple
Q2	Subjects within groups sum of squares	simple
Q3	Treatment B sum of squares	simple
Q4	A*B interaction sum of squares	simple
Q5	B*subject within groups sum of squares	simple
W1	Mean for each level of A used in unweighted means analysis	array (P)
V1	Total for each level of B used in unweighted means analysis	array (Q)
U3	Sum of squares across W1 divided by Q (unweighted) means	simple

TITLE		ABSTRACT NUMBER
Two-Factor		TEKniques Vol. 6 No. 1 T1 Program 9
Variable	Used to Store	Type
G1	Sum across W1 used in unweighted means analysis	simple
U1	G1 squared divided by P*Q (unweighted means analysis)	simple
U4	Sum of squares across V1 divided by P (unweighted means analysis)	simple
U5	Sum of squares of cell totals (T)	simple
D1	Degrees of freedom treatment A	simple
D2	Degrees of freedom for subjects within groups	simple
D3	Degrees of freedom treatment B	simple
D4	Degrees of freedom A*B interaction	simple
D5	Degrees of freedom B*subjects within groups	simple
M1	Mean square for treatment A	simple
M2	Mean square for subjects within groups	simple
M3	Mean square for treatment B	simple
M4	Mean square for A*B interaction	simple
M5	Mean square for B*subjects within groups	simple
F1	F statistic for testing treatment A	simple
F2	F statistic for testing treatment B	simple
F3	F statistic for testing A*B interaction	simple
M9	Accumulator used in calculating means	simple
M8	Accumulator used in calculating means	simple
M7	Accumulator used in calculating means	simple
D9	Option selected from menu	simple

TITLE	ABSTRACT NUMBER
Two-Factor	TEKniques Vol. 6 No. 1 T1 Program 9

METHODS

The data matrix is entered from the keyboard across each subject's row, element by element. The coordinates of a data point are used in locating that point for data correction and for calculating the necessary quantities for analysis.

The appropriate sums and sums of squares used in the analysis of variance quantities are calculated according to Winer, Sec. 7.2, for the equal group size case and according to the methods in Sec 7.8 of Winer for the unequal group size case. For the unequal group size case, both a least squares and unweighted means analysis may be performed.

Operating Instructions:

The program is designed to be highly interactive with the operating instructions incorporated into the program. The user needs few instructions to operate the program, but it is advised that the reader be familiar with the concepts of repeated measures designs. The author recommends Winer as a reference.

a.

b. Program Execution

1. After entering RUN, the screen pages and prints some notes, references and the data structure for the two-factor repeated measures design. The user is asked

ARE YOU READY TO INPUT DATA? Y OR N

This allows the user time to study the data structure. If the question is answered with N, then the question is repeated.

2. The user is then asked

ENTER # LEVELS TREATMENT A

If the response is 1, then the following messages are printed and the program execution terminated.

YOUR DATA IS FROM A 1-WAY REPEATED MEASURES DESIGN
START OVER WITH A DIFFERENT DATA SET UP

TITLE

Two-Factor Repeated Measures Analysis
of Variance

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 9

3. Otherwise, the user is asked
ENTER # LEVELS TREATMENT B
If the response here is 1, then the following messages are printed
and execution terminated.
YOUR DATA IS FROM A 1-WAY ANALYSIS OF VARIANCE
START OVER WITH A DIFFERENT DATA SET UP
4. Otherwise, for each level of treatment A, the user is asked
ENTER # SUBJECTS IN LEVEL i OF TREATMENT A
If for each level of A the response is 1, then the following
messages are printed and execution terminated.
YOUR DATA IS FROM A 2-WAY AOV OR RANDOMIZED BLOCK DESIGN WITH NO
INTERACTION
START OVER WITH A DIFFERENT DATA SET UP
5. Otherwise, the following menu of options is displayed.
ENTER # FOR WHAT YOU WANT TO DO
1 = PRINT RAW DATA
2 = ALTER DATA POINT
3 = PRINT SUMMARY TABLE OF CELL TOTALS AND MEANS TABLES
4 = PRINT AOV TABLE
5 = INPUT A NEW DATA SET
6 = STOP
If the option selected includes an output, then the following
message is displayed.
ENTER DEVICE WHERE OUTPUT IS TO BE PRINTED
P = PRINTER
S = SCREEN
If option 4 is selected before option 3 has been selected, then the
following message is displayed.
MEANS TABLE MUST BE CALCULATED BEFORE THE AOV TABLE and option 3
is automatically selected for the user.
Each option will be discussed separately.
6. Option 1, PRINT RAW DATA
The following heading is printed on the selected device, followed
by a listing of the raw data.
THIS IS THE RAW DATA
The following message appears on the screen after the data is printed.
WHEN YOU PRESS RETURN THE SCREEN WILL PAGE AND THE PROGRAM WILL
CONTINUE.
This allows the user to examine the data on the screen before
continuing, if that is the device chosen.

TITLE

Two-Factor Repeated Measures Analysis
of Variance

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 9

Pressing RETURN then returns the user to the menu.

7. Option 2, ALTER DATA POINT

The following message is asked.

WHAT LEVEL OF A?

The user inputs the level, i, of A. Then the user is asked

WHAT SUBJECT IN LEVEL i?

The user inputs the subject #, j, and is then asked

WHAT LEVEL OF B?

The user inputs the level, k, of B. This corrects one data point.

The user is then asked

CORRECT ANOTHER DATA POINT? Y OR N

If the answer is Y, the process is repeated for another data point.

If the answer is N, the user is returned to the menu.

8. Option 3, PRINT SUMMARY TABLE OF CELL TOTALS AND MEANS TABLES

This option must be performed before option 4. If it is not, it will be done automatically when option 4 is selected. If option 2 is selected after option 3 or option 4 have been selected, then option 3 must be performed before doing option 4 again. If it is not selected by the user, it still will be done automatically by the program. If option 2 is not used after option 3, then the other options may be used at will.

The tables printed out include

- 1) summary table of cell totals
- 2) the mean for each subject (labeled on output by subject number within each level of treatment A)
- 3) mean response for each level of treatment A
- 4) mean response for each level of treatment B
- 5) mean response in the A*B cells

After the first, second and fifth of these tables, the screen pages. Therefore, the user is asked to press return after these tables are output. This enables the user to view the tables on the screen before it pages, if that is the output device selected by the user.

9. Option 4, PRINT AOV TABLE

If the group sizes for the levels of treatment A are equal, then the analysis is printed out directly on the selected device. Pressing RETURN according to the message displayed after the table is printed returns the user to the menu.

If the group sizes are not all equal, then the following message appears on the screen.

THERE ARE AN UNEQUAL NUMBER OF SUBJECTS IN THE LEVELS OF TREATMENT A

TITLE

Two-Factor Repeated Measures Analysis
of Variance

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 9

DO YOU WANT LEAST SQUARES OR UNWEIGHTED MEANS? L OR U

The user then selects the desired technique for analysis. After the table is printed, the user is again requested to press RETURN for the program to continue. The user is then asked

DO YOU WANT ANOTHER TABLE USING THE OTHER METHOD? Y OR N
(THIS ONLY APPLIES IF THERE ARE UNEQUAL NUMBERS OF SUBJECTS)

Answering with Y returns the user to the above question as to the type of analysis desired. Answering with N returns the user to the menu.

10. Option 5, INPUT A NEW DATA SET

Selecting this option returns the user to the start of the program where the question is asked

ARE YOU READY TO INPUT DATA? Y OR N

11. Option 6, STOP

This option terminates program execution.

Examples:

The outputs from two examples are contained on the following pages. The first is an example where equal group sizes are employed. The second is an example where unequal group sizes in the levels of A are used (see Winer for both examples).

References:

Winer, B.J., Statistical Principles in Experimental Design, New York:
McGraw-Hill, 1971.

EXAMPLE 1: Equal Group Sizes

THIS IS THE RAW DATA

0 0 5 3
3 1 5 4
4 3 6 2
4 2 7 8
5 4 6 6
7 5 8 9

WHEN YOU PRESS RETURN THE SCREEN WILL PAGE AND
THE PROGRAM WILL CONTINUE

ENTER # FOR WHAT YOU WANT TO DO

- 1=PRINT RAW DATA
 - 2=ALTER DATA POINT
 - 3=PRINT SUMMARY TABLE OF CELL TOTALS AND MEANS TABLES
 - 4=PRINT AOV TABLE
 - 5=INPUT A NEW DATA SET
 - 6=STOP
- 2

WHAT LEVEL OF A? 1

WHAT SUBJECT IN LEVEL 1

1

WHAT LEVEL OF B? 3

ENTER CORRECT DATA POINT 5

CORRECT ANOTHER DATA POINT? Y OR N

TITLE

Two-Factor

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 9**SUMMARY TABLE OF DATA (CELL TOTALS)**

7

4

16

9

16

11

21

23

WHEN YOU PRESS RETURN THE SCREEN WILL PAGE AND
THE PROGRAM WILL CONTINUE

THE MEAN FOR EACH SUBJECT IS LISTED BELOW

GROUP 1**SUBJECT****MEAN**

1

2

2

3.25

3

3.75

GROUP 2**SUBJECT****MEAN**

1

5.25

2

5.25

3

7.25

WHEN YOU PRESS RETURN THE OTHER MEANS WILL PRINT OUT

TITLE

Two-Factor

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 9

THE MEAN RESPONSE FOR EACH LEVEL OF TREATMENT A

LEVEL MEAN

1	3
2	5.91666666667

THE MEAN RESPONSE FOR EACH LEVEL OF TREATMENT B

LEVEL MEAN

1	3.83333333333
2	2.5
3	6.16666666667
4	5.33333333333

THE MEAN RESPONSE IN THE A*B CELLS

2.33333333333	1.33333333333	5.33333333333	3
5.33333333333	3.66666666667	7	7.66666666667

PRESS RETURN AND THE PROGRAM WILL CONTINUE

AOV TABLE

SOURCE	DF	SS	MS	F
BETWEEN SUBJECT				
A	1.	51.042	51.042	11.893
SUBJ IN GROUPS	4.	17.167	4.292	
WITHIN SUBJECT				
B	3.	47.458	15.819	12.798
A*B	3.	7.458	2.486	2.011
B*SUBJ IN GRPS	12.	14.833	1.236	

WHEN YOU PRESS RETURN THE PROGRAM WILL CONTINUE

TITLE

Two-Factor

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 9EXAMPLE 2: Unequal Group Sizes

THIS IS THE RAW DATA

3 6 9

6 10 14

10 15 18

8 12 16

3 5 8

1 3 8

12 18 26

9 10 18

10 22 16

3 15 8

7 16 10

5 20 12

WHEN YOU PRESS RETURN THE SCREEN WILL PAGE AND
THE PROGRAM WILL CONTINUE

TITLE	ABSTRACT NUMBER
Two-Factor	TEKniques Vol. 6 No. 1 T1 Program 9

SUMMARY TABLE OF DATA (CELL TOTALS)

19	31	41
33	48	76
25	73	46

WHEN YOU PRESS RETURN THE SCREEN WILL PAGE AND
THE PROGRAM WILL CONTINUE

THE MEAN FOR EACH SUBJECT IS LISTED BELOW

GROUP 1

SUBJECT

	MEAN
1	6
2	10
3	14.333333333

GROUP 2

SUBJECT

	MEAN
1	12
2	5.333333333
3	4
4	18.666666667
5	12.333333333

GROUP 3

SUBJECT

	MEAN
1	16
2	8.6666666667
3	11
4	12.333333333

WHEN YOU PRESS RETURN THE OTHER MEANS WILL PRINT OUT

TITLE

Two-Factor

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 9

THE MEAN RESPONSE FOR EACH LEVEL OF TREATMENT A

LEVEL MEAN

1	10.1111111111
2	10.4666666667
3	12

THE MEAN RESPONSE FOR EACH LEVEL OF TREATMENT B

LEVEL MEAN

1	6.4166666667
2	12.6666666667
3	13.5833333333

THE MEAN RESPONSE IN THE A*B CELLS

6.3333333333	10.3333333333	13.6666666667
6.6	9.6	15.2
6.25	18.25	11.5

PRESS RETURN AND THE PROGRAM WILL CONTINUE

THERE ARE AN UNEQUAL NUMBER OF SUBJECTS
IN THE LEVELS OF TREATMENT ADO YOU WANT LEAST SQUARES OR UN-WEIGHTED MEANS?
L OR U

AOV TABLE

SOURCE	DF	SS	MS	F
BETWEEN SUBJECT				
A	2.	22.933	11.467	0.168
SUBJ IN GROUPS	9.	612.622	68.069	
WITHIN SUBJECT				
B	2.	365.056	182.528	84.076
A*B	4.	195.867	48.967	22.555
B*SUBJ IN GRPS	18.	39.078	2.171	

WHEN YOU PRESS RETURN THE PROGRAM WILL CONTINUE

TITLE

Two-Factor

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 9

AOV TABLE

SOURCE	DF	SS	MS	F
BETWEEN SUBJECT				
A	2.	22.933	11.467	0.168
SUBJ IN GROUPS	9.	612.622	68.069	
WITHIN SUBJECT				
B	2.	365.056	182.528	84.076
A*B	4.	195.867	48.967	22.555
B*SUBJ IN GRPS	18.	39.078	2.171	

WHEN YOU PRESS RETURN THE PROGRAM WILL CONTINUE

DO YOU WANT ANOTHER TABLE USING THE OTHER METHOD? Y OR N
(THIS ONLY APPLIES IF THERE ARE UNEQUAL NUMBERS OF SUBJECTS)

AOV TABLE

SOURCE	DF	SS	MS	F
BETWEEN SUBJECT				
A	2.	23.153	11.576	0.170
SUBJ IN GROUPS	9.	612.622	68.069	
WITHIN SUBJECT				
B	2.	346.596	173.298	79.824
A*B	4.	179.788	44.947	20.703
B*SUBJ IN GRPS	18.	39.078	2.171	

WHEN YOU PRESS RETURN THE PROGRAM WILL CONTINUE



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 10
CDC 6500 Mainframe Interface		EQUIPMENT AND OPTIONS REQUIRED 16K
ORIGINAL DATE July, 1981	REVISION DATE	PERIPHERALS Option 1 Data Comm I/F
AUTHOR Andreas Goroche		Atmospheric Physicist Monterey, CA

ABSTRACT

Files: 1 ASCII Program

Statements: 125

The program calls all required utilities to connect the 4050 desktop as a terminal to a CDC 6500 computer system. Once connected, the 4050 can send and receive data in tape communications mode, as well as terminal mode.

Automatic or manual log-in are options.

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DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER
4050/468 Utility II		TEKniques Vol. 6 No. 1 T1 Program 11
ORIGINAL DATE November, 1981	REVISION DATE	EQUIPMENT AND OPTIONS REQUIRED
AUTHOR Craig Bulmer Tektronix, Inc. Chicago, IL		PERIPHERALS 4052R07/4052R08 TEKTRONIX 468 Oscilloscope
ABSTRACT		Optional-4662/4663 Plotter
<p>Files: 1 ASCII Program Requires dedicated data tape</p> <p>Statements: 1026</p> <p>This program will take waveforms from the 468 Oscilloscope and display the waveforms on the 4050 screen with printed header information of Channel 1, 2 and/or Add; Time/Div; Trigger Point; Max Volts; Min Volts; Min/Max Pulse Parameters; Histogram Pulse Parameters; Integrate Waveform; Differentiate Waveform; FFT; and Waveform Analysis.</p> <p>Waveforms can be saved to tape and redisplayed from tape. Output to either screen or plotter with reference scope grid. Waveforms displayed from tape are displayed as dots.</p>		

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TITLE

4050/468 Utility II

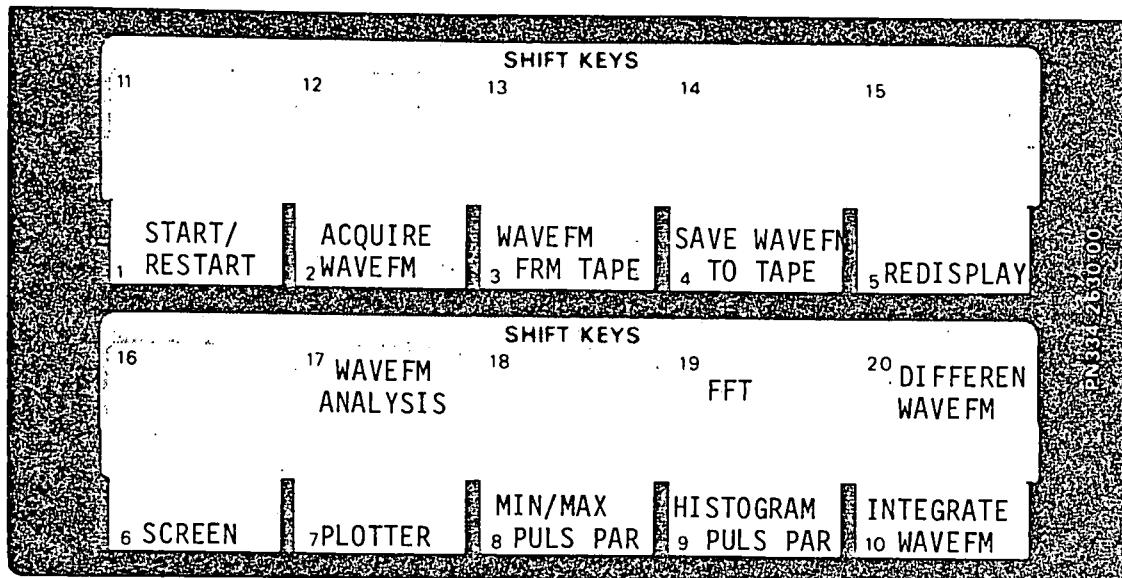
ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 11

TITLE 4050/468 Utility II

TAPE #

FILE #



KEY	FUNCTION
1	START/RESTART
2	ACQUIRE WAVEFORM
3	WAVEFORM FROM TAPE
4	SAVE WAVEFORM TO TAPE
5	REDISPLAY
6	SCREEN
7	PLOTTER
8	MIN/MAX PULSE PARAMETER
9	HISTOGRAM PULSE PARAMETER
10	INTEGRATE WAVEFORM
17	WAVEFORM ANALYSIS
19	FFT
20	DIFFERENTIATE WAVEFORM
11	SHIFT KEYS
12	SHIFT KEYS
13	SHIFT KEYS
14	SHIFT KEYS
15	SHIFT KEYS
16	SHIFT KEYS
18	FFT
19	DIFFERENTIATE WAVEFORM
20	WAVEFM ANALYSIS

TITLE

4050/468 Utility II

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 11

VERTICAL SCALE

CALL "DIF2",Y,Y

Y/(data sample interval) = Y

CALL "INT",Y,Y

Y * (data sample interval) = Y

CALL "FFT",Y

CALL "POLAR",Y,Y7,Y8

Y7/(# of samples/2) = Y7

HORIZONTAL SCALE

FFT Nyquist Frequency

TITLE	ABSTRACT NUMBER	
4050/468 Utility II	TEKniques Vol. 6 No. 1 T1 Program 11	
Variable	Use	Type
Y	Working array for data points	Array
Y1	Channel 1 data points	Array
Y2	Channel 2 data points	Array
Y3	Add channels data points	Array
A\$	Working waveform header	String
X\$	Channel 1 waveform header	String
Y\$	Channel 2 waveform header	String
Z\$	Add channels waveform header	String
X	Horizontal increment for DRAW @D:	Array
T1	Time/Div	Simple
V1	Volts/Div	Simple
R\$	Vertical units	String
S\$	Horizontal units	String



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 12
PC Component Mechanical Analysis		EQUIPMENT AND OPTIONS REQUIRED 32K
ORIGINAL DATE October, 1980	REVISION DATE	
AUTHOR Tom Sattler		PERIPHERALS
Motorola, Inc. Ft. Lauderdale, FL		

ABSTRACT

Files: 1 ASCII Program

Statements: 424

INTRODUCTION

Frequently it becomes desirable to be able to predict the mechanical strength of electrical components that have been reflow soldered onto a PC board. Throughout the life of the product, the designer must insure that the components are capable of withstanding any loading conditions that they may see, including those of tensile, shear and bending. These loads may be incurred from a variety of situations, ranging from a constantly applied load (ie. as a result of dampening materials used for shock isolation) to the possible insertion of a straight PC board into a slightly warped frame.

The present program will calculate the direct shearing and tensile forces required for the failure of solder bonds between any component and the PC board, where yielding is considered a failure. It will also determine whether or not failure may be expected due to first mode flexing of the board under a rigid component. The user needs to specify such parameters as the size and location of each soldered component, mechanical properties of the reflowed solder, and the maximum center deflection of the PC board. Both leaded and leadless components can be analyzed.

The program has been written for the Tektronix 4051 and requires approximately 30K bytes of memory to run for a typical PC board. Program storage onto magnetic tape (minus data) requires 16K bytes.

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DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 13
Cu-Sum-Fuel Consumption Measurement		EQUIPMENT AND OPTIONS REQUIRED
ORIGINAL DATE October, 1981	REVISION DATE	16K
AUTHOR Ron Clark Scottish Crop Research Institute Dundee, Scotland		PERIPHERALS
<p>ABSTRACT</p> <p>Files: 1 ASCII Program</p> <p>Statements: 148</p> <p>Cu-Sum is a graphical display of a method for controlling vehicle fuel consumption. It graphs vehicle fuel consumption against a standard. For n number of fill-ups, the user keys in the number of gallons of fuel purchased and the odometer reading at the time of purchase.</p> <p>After fuel and odometer figures have been keyed in, the user inputs the estimate of miles per gallon used.</p> <p>The graph is a cumulative sum of the differences of a set of readings from the expected. Changes in the consumption can easily be seen as the trend of the graph changes.</p> <p>Data may be corrected. A different standard may be chosen.</p>		
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TITLE Cu-Sum	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 13
-----------------	--

OPERATING INSTRUCTIONS

Insert the program tape into the 4050 and load the program through the tape directory, or FIND 17, OLD and RUN.

A short list of instructions will be displayed.

Have figures for gallons bought and odometer readings ready in pairs,

e.g., 4 32072
 4 32186
 4 32291

Key in the number of pairs of figures; then the figures, starting with gallons.

When all the figures have been input they will be displayed for checking.

Key 'Y' or 'N' to answer: "IS THE DATA CORRECT? "

If 'N', then correct the array item by following the instructions on the screen and UDK #6 to re-check the data.

If 'Y', then key in the expected miles per gallon.

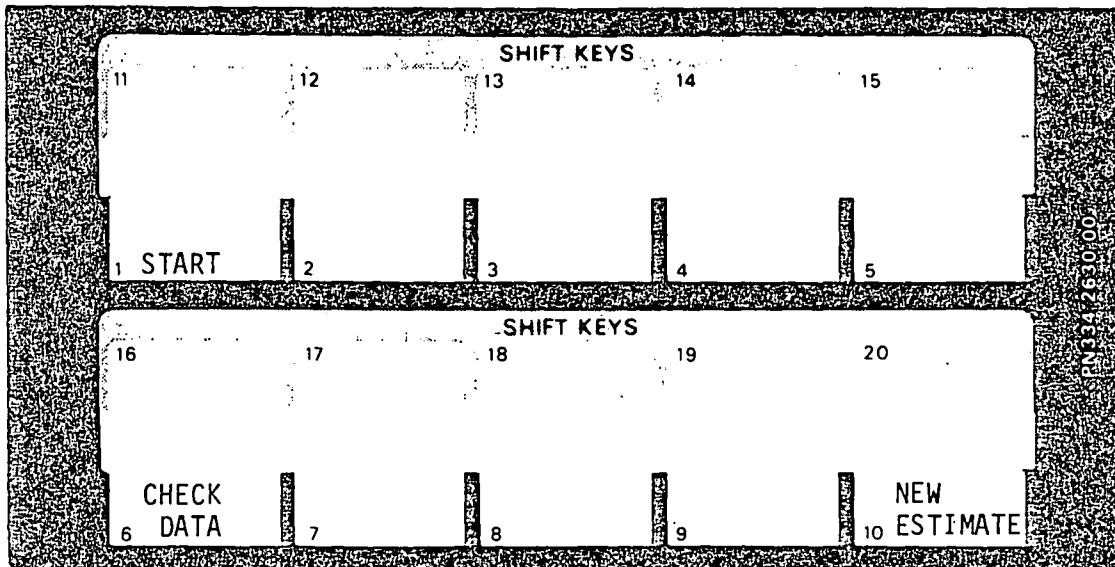
If the graph trend is not horizontal, try another standard by keying UDK 10 and inputting a new estimate.

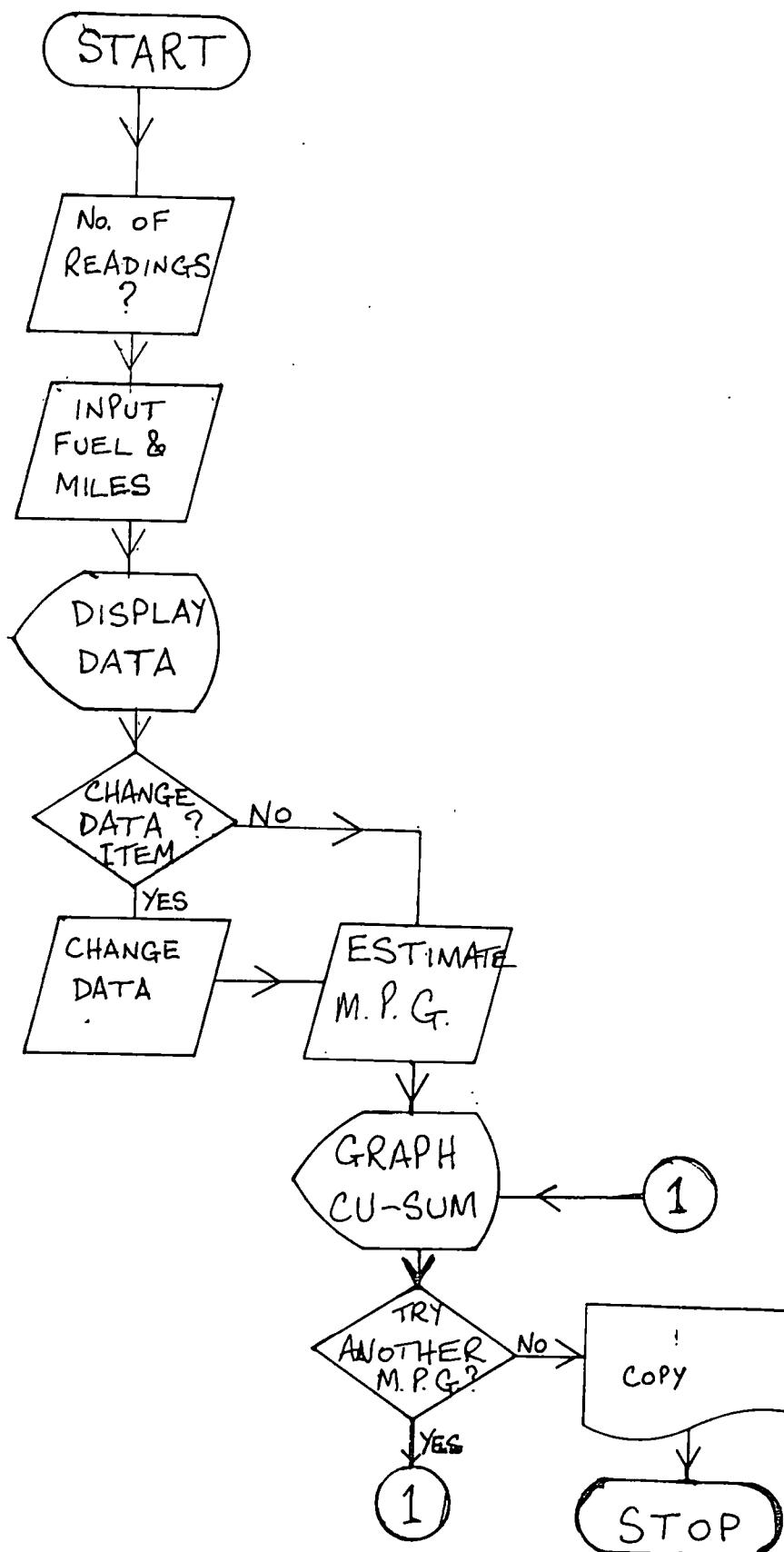
Try various figures, using UDK #10, as standard until satisfied.

References: Murdoch, J., Measuring and Controlling Vehicle Fuel Consumption (1974).

TITLE Cu-Sum
ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1
Program 13

TITLE Cu-Sum TAPE # FILE #





TITLE

Cu-Sum

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 13

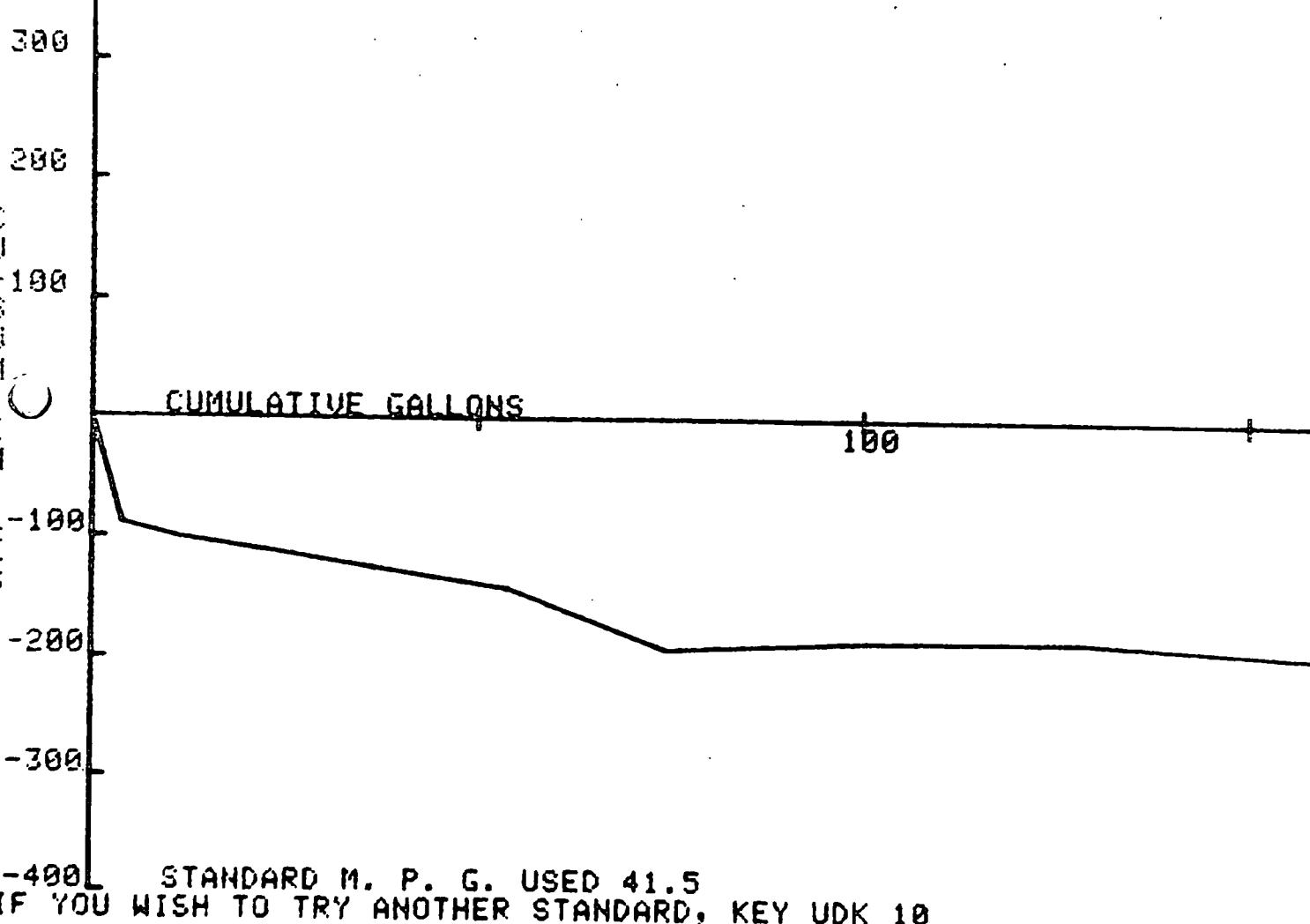
GALLONS

MILEAGE

G(1)=4.00	S(1)=157
G(2)=3.19	S(2)=235
G(3)=4.00	S(3)=444
G(4)=3.06	S(4)=611
G(5)=3.06	S(5)=734
G(6)=3.04	S(6)=858
G(7)=4.72	S(7)=951
G(8)=3.96	S(8)=1205
G(9)=5.34	S(9)=1362
G(10)=4.88	S(10)=1571
G(11)=3.67	S(11)=1818
G(12)=2.96	S(12)=1984
G(13)=3.56	S(13)=2086
G(14)=5.06	S(14)=2255
G(15)=4.00	S(15)=2534

Are the data correct ? Key 'Y' or 'N'

400 TOTAL GALS BOUGHT=58.50 MILES PER GAL=43.61
TOTAL MILEAGE =2377





DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE TEXTED		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 14
ORIGINAL DATE June, 1980		EQUIPMENT AND OPTIONS REQUIRED 32K
AUTHOR G. Gauglitz A. Lorch	University Tuebingen Tubingen, Germany	PERIPHERALS 4641 Printer

ABSTRACT

Files: 1 ASCII Program

Statements: 261

Text may be created, edited and stored as a binary data string. Previously created text may be recalled and edited from the internal magnetic tape.

Functions:

- o list text (line by line) from beginning
- o display next page beginning at line n
- o display last n lines of text
- o display next page
- o display last page
- o insert next text at n line
- o delete lines n to n
- o interchange n lines beginning at n
- o delete line n, insert next text
- o lengthen line n
- o change single characters
- o delete character
- o search
- o store text
- o add text from n file
- o print text

The files on tape have to be marked; this depends on the length and number of the lines of text.

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TITLE

ABSTRACT NUMBER

TEXTED

TEKniques Vol. 6 No. 1 T1
Program 14OPERATING INSTRUCTIONS

Load the program into memory through the tape directory, or FIND 18, OLD and RUN.

The program will prompt for the file containing the text. If none, enter Ø and it will immediately enter INSERT mode.

When text is entered from the keyboard or tape, line numbers are created for each line of text.

Use the following statements to enter/edit/store text:

- Z : displays text from the beginning (up to 30 lines per screen-page)
RET causes the next "page" of text.
- Z,281 : next text page, beginning with line 281, will be displayed.
- Z,-16 : displays the last 16 lines of text.
- + : next page displayed. Each CR afterwards will bring forth the following page of the one just displayed.
- : preceding page displayed. Each CR afterwards will bring forth the preceding page of the one just displayed.
- i : insert new text after last line of text. CR by itself ends input.
- i,73 : insert new text between lines 73 and 74. It will automatically renumber the lines. CR ends input.
- D,101 : delete lines, beginning with line 101. Will prompt for ending line number to delete. Automatically rennumbers lines after deleting.
- U : interchange lines. It will prompt for the beginning line, the number of line to interchange, and where to insert them.
- C,55 : delete line 55 and key in new text.
- 65 : single characters can be changed in line 65. When the line is displayed, the following commands may be used below the line of text:
 - space - character remains unchanged
 - Control-D - delete character
 - Control-B - blank instead of character
 - Control-I - insert string following the Control-I
 - RETURN - end of correction; line will be displayed once more. If satisfied, press CR again.

TITLE	ABSTRACT NUMBER
TEXTED	TEKniques Vol. 6 No. 1 T1 Program 14

s (text) : search the text for a word. Will display the line, if found.

m : store the text to internal magnetic tape file. Will prompt for lines to store and tape file number. Tape file must be pre-MARKed.

p : print text to peripheral printer (@41:) or plotter (@1:).

a : add text from another file to this text.

e : end of program.

When the program is stored on tape, a CR is automatically appended to each line.

TITLE

TEXTED

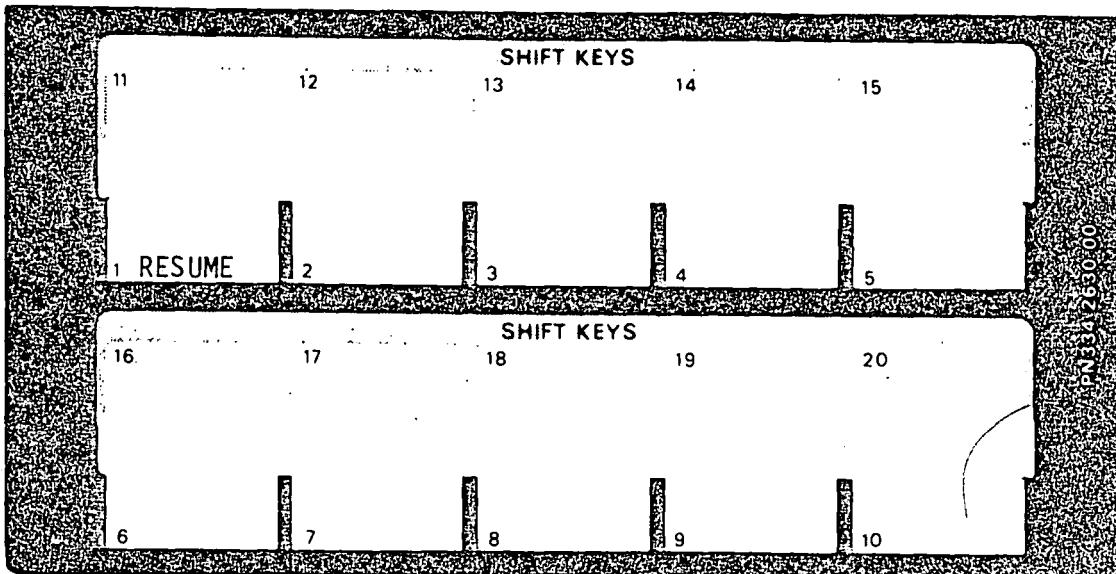
ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 14

TITLE TEXTED

TAPE #

FILE #



If the program aborts, or you enter a wrong command, or if you want to resume after Ending, simply press UDK 1 and you are prompted for a new statement command.



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 15
LABEL PRINTER		EQUIPMENT AND OPTIONS REQUIRED
ORIGINAL DATE August, 1979	REVISION DATE	24K
AUTHOR Ed Hoar	Tektronix, Inc. Wilsonville, OR	PERIPHERALS 4641 Printer

ABSTRACT

Files: 1 ASCII Program
Requires dedicated tape

Statements: 720

Use this program to enter, edit and print labels intended as short identifiers, operating instructions, supplemental information, and so on. For instance, labels which will be affixed to manuals, equipment or other such items could be produced by this program.

The program assumes the text will be printed on pinfeed labels. Different sized pinfeed labels are accommodated.

Facilities are included to sequence, fill in blanks, edit, store and retrieve labels.

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TITLE	ABSTRACT NUMBER
Label Printer	TEKniques Vol. 6 No. 1 T1 Program 15

PRELIMINARY OPERATING INSTRUCTIONS

TRANSFER the Label Printer program to its own dedicated tape:

Step 1: Insert the TEKniques Vol. 6 No. 1 T1 program tape into the 4050.
 FIND 19
 OLD

Step 2: Remove the TEKniques program tape from the 4050

Step 3: Insert your new tape into the 4050
 FIND 0
 MARK 1, 18176
 FIND 1
 SAVE
 FIND 2
 MARK 25, 1000

SPECIFICATIONS

67 characters per line
 20 lines max
 1000 characters total max

24 labels per tape

Change statements 870 and 880 if beginning and ending files for labels are other than 2 and 25, respectively.

OPERATING INSTRUCTIONS

Insert the Label Printer tape into the 4050 and press AUTO LOAD.

Label Size

The program prompts for the number of holes per label which determines its size, and the number of lines per label you will be prompted for, e.g., 3*hole #:

2-holes: 6 lines
 3-holes: 9 lines

TITLE

Label Printer

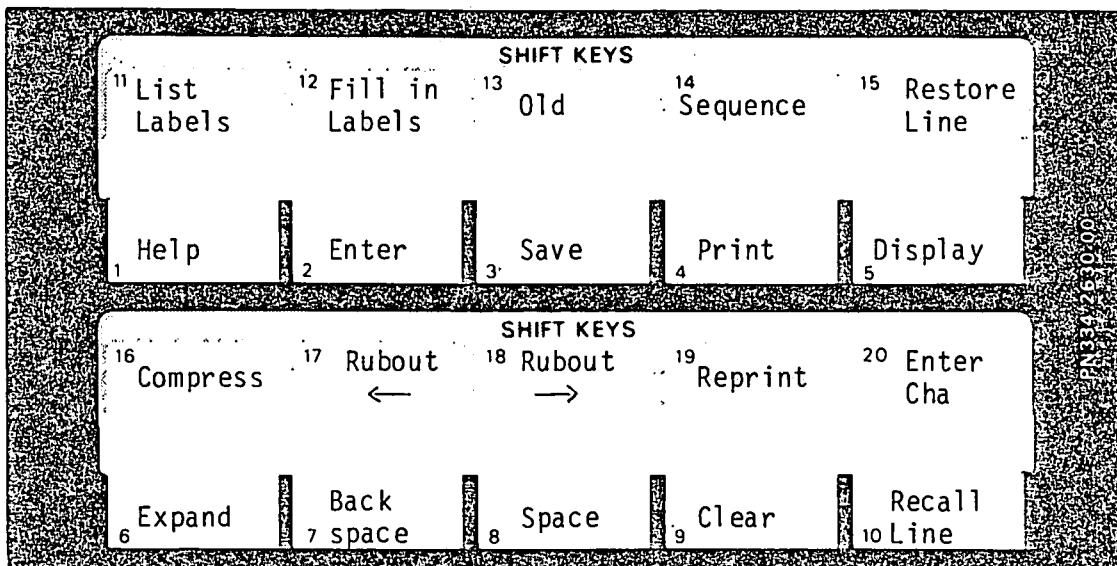
ABSTRACT NUMBER

TEKnikes Vol. 6 No. 1 T1
Program 15

TITLE Label Printer

TAPE #

FILE #

Key Function

- | | | | |
|---|---|----|---|
| 1 | Prints HELP messages or overlay | 8 | Spaces pointer to right. |
| 2 | Enters lines on a label. Lines to remain blank must have at least one space. Pressing RETURN without entry terminates input. | 9 | Clears text out of edit line by setting line to one blank. |
| 3 | Stores label on magnetic tape beginning with file 2.. | 10 | Recalls line to edit. Specified line is copied to buffer. If line number given is not part of label, it will result in a new line being added to label. See UDK15. |
| 4 | Displays label on screen as visual check, then asks for approval to print. Scans label for sequencing formatting characters ('%'s). | 11 | Lists first 65 characters of each label on tape. |
| 5 | Displays label and line numbers. Use during edit when line numbers not known. When a label is changed, it is renumbered. If lines are deleted or added, numbers of other lines will change. | 12 | Scans label for fill-in format characters ('\\'s). Prompts user to enter a string for each fill-in area. |
| 6 | Inserts as many blanks as possible at current pointer, shifting that character and all following to right. | 13 | Retrieves label from magnetic tape. |
| 7 | Backspaces pointer (moves it to left). Pointer takes form of character in the string. Blanks are indicated by underbar. | 14 | Prompts for new sequencing parameters for start, step and repeat. An empty input means no change. A zero step size indicates no sequencing. Numbers need not be positive. |
| | | 15 | Part of edit. Press on completion of line edit process. |
| | | 16 | Deletes blanks to right of pointer until current position is occupied by a non-blank character. |

TITLE

Label Printer

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 15User-Definable Key Overlay (continued)

- 17 and 18 Blanks character if non-blank at pointer position, otherwise moves one character left (right) and inserts blank.
- 19 Reprints current edit line. Use after using rubouts or other editing features.
- 20 Enters characters from keyboard into the edit line. characters will replace those in edit line at the current pointer position. Prompt will change to a ? when waiting. Input is terminated with a RETURN.

DATA FILE STRUCTURE

Files 2 through 25 have been pre-MARKED to receive label data.

Data files are binary.

Each file consists of a single string (A\$ or D\$), which contains the label information.

TITLE	ABSTRACT NUMBER
Label Printer	TEKniques Vol. 6 No. 1 T1 Program 15

ENTER LABELS

PRESS UDK 1. If a label already exists in memory, the program will give you the option to leave it, or clear it out and start another.

Enter the lines on the label.

Line to remain blank must have at least one space.

Press RETURN without entering anything to terminate input.

Form Filling

Special symbols signal the program at printing time to pause for you to enter text.

This feature would be used, for example, when label information is identical except for the name of the individual:

DESK COPY OF FRANK WEST

PLEASE RETURN TO:
TEKTRONIX INC.
BEAVERTON, OR 97077

When the label is prepared, the name of the individual is omitted. In its place hash marks are inserted, one mark for each character anticipated:

DESK COPY OF \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

PLEASE RETURN TO:
TEKTRONIX INC.
BEAVERTON, OR 97077

NOTE: Be sure to include enough marks for the longest name anticipated.

See "Fill In Labels" section for execution.

TITLE Label Printer	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 15
------------------------	--

Sequencing

A special symbol signals the program at the time of printing that a label needs sequencing. Before final printing, you may input a beginning value, increment (step between numbers), and the number of repeats printed before incrementing.

This is useful for controlled documents where a label with a particular control number may be placed on a document binding, inside its cover, and next to a name on a master list. When preparing the label, insert percent marks for each number anticipated:

CONFIDENTIAL INFORMATION
THIS IS A CONTROLLED DOCUMENT

ISSUED TO _____

CONTROL NUMBER . %%

NOTE: Be sure to include enough % for the longest number anticipated.

See "Print" and "Sequence" sections for execution.

Form Filling and Sequencing

The two formats may be used together. When inputting label, include hash marks for the text to be filled in later and % marks for the sequencing numbers to be included.

See "Old", "Fill in Labels", "Print" and "Sequence" sections for execution.

EDITING

12 User-Definable Keys may be used to edit a label.

Typically, you would press UDK #5 to display the label and corresponding line numbers.

UDK#10 will prompt you for the line # to recall. This line is brought into the text buffer, consequently, in addition to the UDK editing keys, you may also use the 4050 regular LINE EDITOR keys except "Recall Next Line".

The UDKs must be used to move the cursor instead of the keyboard space and backspace keys.

See the overlay page for a description of the UDK edit key functions. Be sure to press UDK #15 to return the corrected line to the label when finished.

TITLE

Label Printer

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 15SAVING LABELS TO TAPE

When you are finished inputting your label, press UDK 3 to save it to tape.

The program will prompt you for the label number, then locate the pre-MARKed file and store it.

LISTING LABELS ON TAPE

The program searches all of your data files on tape and prints the first 65 characters of each label stored therein on the 4050 display screen. Listing will destroy any label in memory.

RESTORING LABELS FROM TAPE

Press UDK 13 and the program will prompt you for the label number of your choice (the LIST LABEL routine will remind you of these numbers), and then bring that label in from the appropriate file.

At this point any of the UDK's may be used.

PRINTING LABELS

Old in your desired label from tape, (UDK #13).

Fill in Labels

Press UDK #12 to fill in the line of previously inserted hash marks.

Press UDK #4 to print the filled in label.

Sequence

When UDK #4 is pressed, the program scans for % marks to insert numbers. The default sequence is 1, 1, 1. That is, the first label will have a "1" inserted, 1 label will be printed, and the number will be incremented by 1.

To change this sequence, press UDK 14 and respond to the prompts. A sequence of 10, 5, 50 would insert 10 in the %% space on the first label, print 50 labels, then increment the number by 5, thus inserting 15 on the next batch of labels, printing 50, etc.

Print

Pressing UDK 4 will print the label in memory, first checking for %% marks, as outlined above.

TITLE

Label Printer

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 15Fill in, Sequence and Print

Combine the fill-in and sequence functions by OLDing in your label (UDK 13).

Press UDK 12 and fill-in your text.

Press UDK 14 for inputting your proper sequence.

Print UDK 4 to begin your printing process.

HELP

Pressing UDK 1 will print out a list of the User-Definable Key functions or, in the case of a mistake detected by the program, will display additional error information.

Some effort has been made to detect common mistakes and to lead the operator through the s-mpler tasks.

METHODOLOGY

The label string is assembled from strings typed in as lines. These lines are delimited in the string by a CR. Lines consisting of at least one blank may be entered into the label; an empty string, however, signals the label is complete.

During editing a line is segmented into another string and later replaced in the original string.

If during editing an empty line is created, this line will be deleted from the label.

If a non-existent line is selected for editng, a new line will be created.

When a line is replaced, automatic renumbering takes place.

During editing and when replacing lines, characters are added or deleted in place.

Error checking for the more command modes of misuse is carried out. In view of the modest amount of effort required to re-enter a label, some self-protection features were omitted and testing is not exhaustive.

TITLE

Label Printer

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 15INTERNAL DATA STORAGE

A\$ and D\$ are the principle storage variables.

Each contains an entire label including a CR at the end of each line.

Extra lines consisting only of a CR are appended to result in each string containing an entire label.

D1 contains the address of the printer.

T is a (20,2) array used during editing to extract and replace lines.

T(I,1) is the location of the first character in the Ith line.

T(I,2) is the length including CR of the Ith line.

The .20 dimension implies a maximum of 20 lines in the label.

DATA MOVEMENT WITHIN PROGRAM

The label is moved around from variable to variable in the program. Not all desired paths are implemented and some transfers occur as a side effect.

In the following diagram, nodes represent storage locations, tape, or the printer. Arrows represent a transfer associated with a User-Definable Key command. A dotted arrow indicates a conditional transfer and is part of the hiding of the data structure from the naive user.

A\$ = storage for original label and buffer for label list.

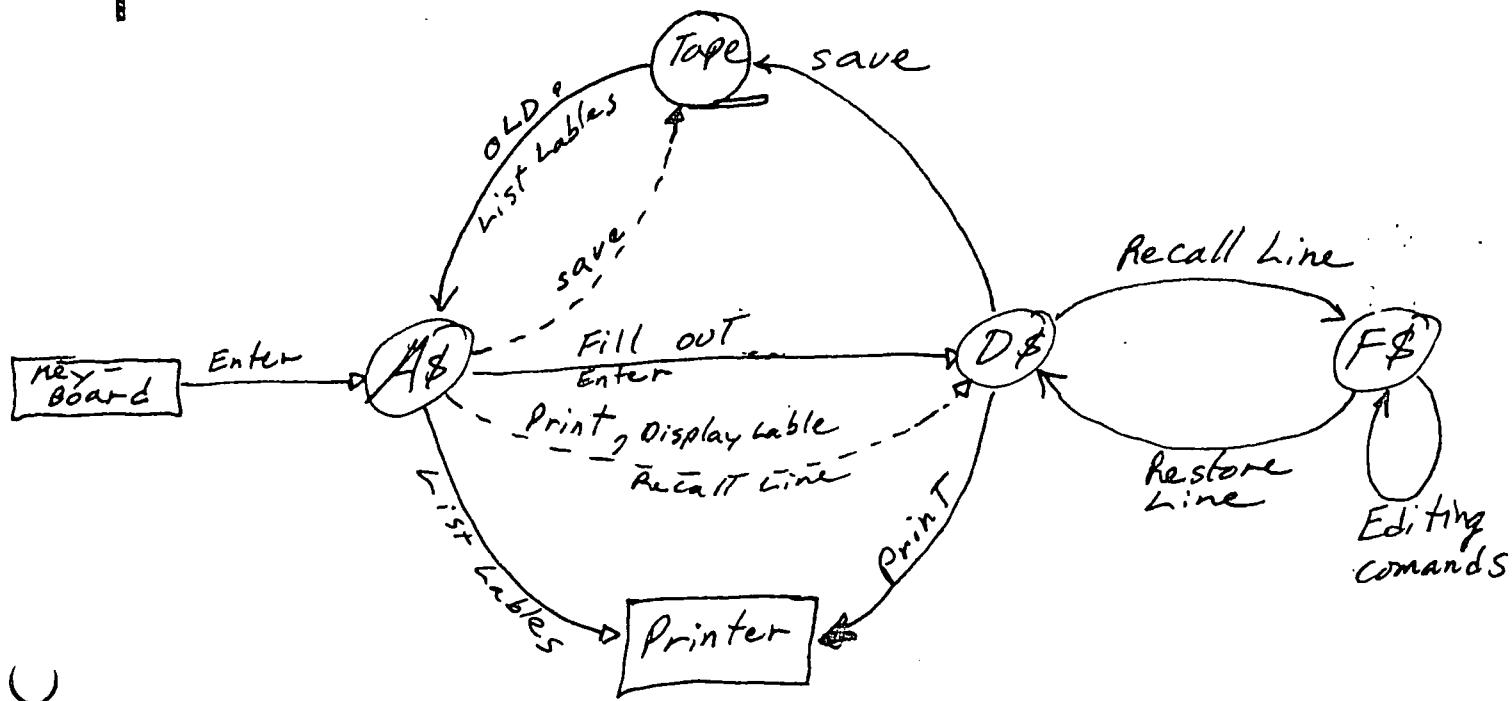
D\$ = copy after filling or for editing.

F\$ = single line for editing.

TITLE

Label Printer

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 15

Conditions:
 $D\$$ not defined.

CAUTIONS and Suggestions for Enhancements

After a label is edited, it must be SAVED then OLDED before filling. Filling is always performed on an original label and an edited label is not moved from the editing area to the original area. This may be accomplished directly by typing:

$$A\$ = D\$$$

The complete program is rather large for a simple printing task. With some slight risk, large section of code may be deleted if you're only going to enter or print labels:

- A. REMarks
- B. Editor Section
- C. Fill-in Section
- D. Sequencing section and GOSUBs relating to it in the PRINT section.



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 16
Fund Usage		EQUIPMENT AND OPTIONS REQUIRED
ORIGINAL DATE January, 1981	REVISION DATE	16K
AUTHOR W. J. Orvis	Lawrence Livermore National Labs Livermore, CA	PERIPHERALS see below

ABSTRACT

Files: 3 ASCII Program
3 Binary Data (examples)
Requires dedicated tape

4054 Version requires Dynamic
Graphics Opt. 30
Optional-4641 Printer
-4662 Plotter
-4952 Joystick

Statements: 1047

The Fund Usage program is an accounting type of program which prints, plots and archives costs related to project management.

Project costs are divided into four subaccounts:

- Consultants
- Subcontracts Billed
- Subcontracts Liens
- Internal

Data is accumulated monthly and is processed by account and by fiscal year. The number of projects and their data files is only limited by the capacity of a program tape.

Plotting of data differentiates each subaccount, the total costs and the spending limit. These plots can be used to recognize trends in spending patterns, especially in relation to the spending limit.

All input data is automatically archived and updated to maintain a complete record of all past trends.

NOTE: Although the 4054 version of the program uses Dynamic Graphics (Opt. 30), some minor changes would allow it to run without them.

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TITLE

FUND USAGE PROGRAM

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 16

1. DESCRIPTION

Most project management requires that close watch be kept on project related costs, especially when limited funds are available. This program was designed to keep track of these costs for several different projects while also presenting the data in tabular or graphical form for easy analysis.

Data is processed in fiscal year blocks for each account. Data is accumulated monthly and can be divided among 4 subaccounts. 1) Consultants, 2) Subcontracts Billed, 3) Subcontracts Liens, and 4) Internal. The names of these subaccounts are purely arbitrary and could be changed rather easily. All but type 3 (Liens) are handled as increasing accounts (i.e., when the data is plotted, the data from previous months is added to the current months data to give a cumulative total). Type 3 (Liens) are a different matter. They do not represent money spent but are costs that were incurred but not yet paid. As bills are paid the costs are shifted from type 3 Liens to type 2 Bills. Because of this, each months Liens are treated separately and are not added to those from a previous month.

Once data has been input, it can be stored by pressing a single key. This automatically stores the data and updates its directory. The only limit to the number of different accounts or the number of years of data that may be stored is the length of a data tape (100 data files nominal).*

Output is available at the CRT and hard copy can be made with a 4631 hardcopy unit. Optionally, graphic data can be sent to a 4662 plotter and printed data can be sent to a 4641 line printer.

*Note: In programs where the number of different accounts is large (10), the routine for correcting account titles may not work. This is because all of the account titles after the one being corrected are stored in the variable Y\$(1000). If this is a problem, increase the size of Y\$ in Line 8460.

TITLE Fund Usage	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 16
<u>PRELIMINARY OPERATING INSTRUCTIONS</u>	
<p>The Fund Usage program must be transferred to its own dedicated tape.</p> <p>BE SURE THE TEKNIQUES PROGRAM TAPE IS WRITE-PROTECTED BEFORE TRANSFERRING.</p>	
<p>Transferring files from TEKniques program tape to Fund Usage tape using the instructions on page iii:</p>	
<p>Transfer files 20 through 25 from the TEKniques tape to files 1 through 6 on the Fund Usage tape.</p> <p>Files 1 through 3 and file 6 on the Fund Usage tape may be marked the same as files 20 through 22 and file 25, respectively, on the TEKniques tape.</p> <p>However, files 4 and 5 on the Fund Usage tape must be marked for 15104 each before the data is transferred.</p>	
<p>Transferring files from TEKniques program tape to Fund Usage tape without a transfer program:</p>	
<p>STEP 1: Insert TEKniques program tape into 4050. FIND 20 REM Directory File OLD</p>	
<p>STEP 2: Insert Fund Usage tape into 4050. FIND 0 MARK 1,768 FIND 1 SAVE</p>	
<p>STEP 3: Insert TEKniques program tape into 4050. FIND 21 REM 4054 Version OLD</p>	
<p>STEP 4: Insert Fund Usage tape into 4050. FIND 2 MARK 2,12032 FIND 2 SAVE</p>	
<p>STEP 5: Insert TEKniques program tape into 4050. FIND 22 REM 4051 Version OLD</p>	
<p>STEP 6: Insert Fund Usage tape into 4050. FIND 3 SAVE FIND 4 MARK 2,15104 FIND 6 MARK 100,768</p>	

TITLE

Fund Usage

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 16PRELIMINARY OPERATING INSTRUCTIONS (continued)

At this point the directory and two program files have been transferred and your data files marked.

If you wish to transfer the examples from TEKniques program tape to the Fund Usage tape, follow these steps. Otherwise, skip and begin with "OPERATING INSTRUCTIONS."

Transferring Data Files to Fund Usage tape

Step 1: Insert TEKniques program tape into 4050

FIND 23
READ @33:A\$,T\$,S\$
FIND 24

Step 2 READ @33:X\$,Y\$,Z\$
DIM D(54)
FIND 25 ;
READ @33:D

Step 2: Insert Fund Usage program tape into 4050

FIND 4
WRI @33:A\$,T\$,S\$
FIND 5
WRI @33:X\$,Y\$,Z\$
FIND 6
WRI @33:D

TITLE

FUND USAGE PROGRAM

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 16

2. DATA TAPE STRUCTURE:

There are two copies of this program on this tape in files 2 and 3, the first is written for the 4054 and the second for the 4051. The 4054 version makes use of the CHARSIZE command and to dynamic graphics (option 30) available on the 4054 to make more pleasing printed or plotted output. Otherwise the programs are identical. File 1 is a menu.

All data is stored on the program tape in premarked binary data files starting with file 6. File 4 contains the account numbers and account titles, while a directory to the data files is in file 5.

File Number	File Type	Length	Name
1	ASCII Program	10240	Menu
2	ASCII Program	20224	Fund Usage Program (4054)
3	ASCII Program	15000	Fund Usage Program (4051)
4	Binary Data	15000	Account Numbers and Account Titles
5	Binary Data	15000	Location of Yearly Account Data
6-106	Binary Data	768	One fiscal years data for one account

FUND USAGE PROGRAM

TEKniques Vol. 6 No. 1 T1
Program 16

3. INTERNAL DATA STORAGE

Variable	Contents
F1	Data file number of the current account/year
F2	Number of the current month
F4	Subaccount number
F5	Year
F6	Flag: (0) old data file exists (1) assign a new data file
Q1	Plot address (default 32)
Q2	Normal print address (default 32)
Q3	Print output address (default 32)
X\$ (100)	Input Target, Scratch
Y\$ (100)	Input Target, Scratch
Z\$ (100)	Input Target, Scratch
A\$	Account number
M\$	Month name
T\$ (100)	First line of the account title (55 characters maximum)
S\$ (100)	Second line of the account title (30 characters maximum)
D(54)	Data file containing the current account/year 1-13 subaccount 1 for 12 months plus start 14-26 subaccount 2 for 12 months plus start 27-39 subaccount 3 for 12 months plus start 40-52 subaccount 4 for 12 months plus start 53 spending limit 54 plot limit
L1	Plot lower limit
L2	Plot upper limit (=D(54))
L3	Tick mark spacing
L5	Symbol width
L6	Symbol height
L7	Line spacing
S1-S4, X, Y	Scratch
I, J	Loop variables

TITLE

FUND USAGE PROGRAM

TEKniques Vol. 6 No. 1 T1
Program 16

4. METHODS

Data for a particular account over the period of one fiscal year is stored in the array D. As more data is inout, it is added to that data previously contained in the data file.

The plot and print routines both act on the data file D. Note that in the plot routine, the Liens are handled differently from the other subaccounts as described in 1 above.

The account number and title are stored in tape file 4. They are in sets of three: Account Number, Title Line One, and Title Line Two. Tape file 5 maintains a directory of the contents of the other data files on this tape. If a data file is being stored for the first time, its account number, year, and tape file number are added to the end of file 5. During subsequent accesses, tape file 5 is read to determine the data file location.

TITLE

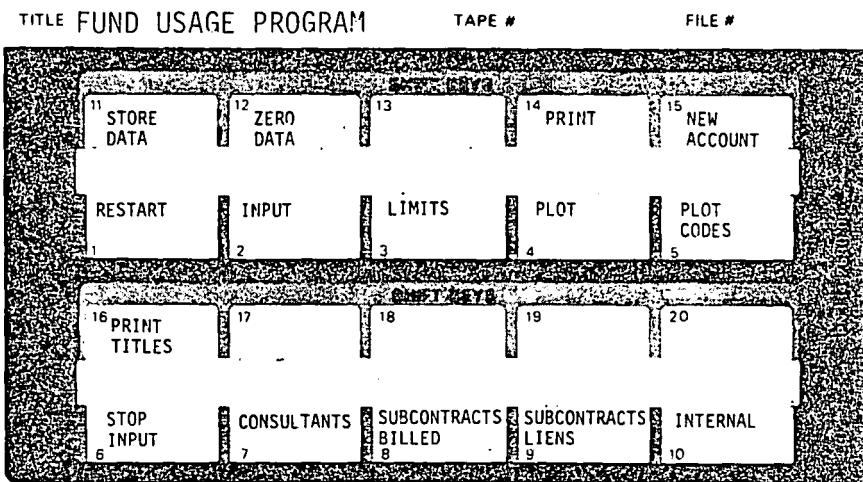
FUND USAGE PROGRAM

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 16

5. OPERATING INSTRUCTIONS

The following describes the function of the user definable keys.



UDK

- | | |
|-------------------------|---|
| 1 - RESTART | - Start a new year and account |
| 2 - INPUT | - Input data for a particular month |
| 3 - LIMITS | - Set the plot upper limit and the spending limit |
| 4 - PLOT | - Plot the data |
| 5 - PLOT CODES | - Plot the symbol codes |
| 6 - STOP INPUT | - Stops the input routine initiated by Key 2 |
| 7 - CONSULTANTS | - The following 4 keys are used with the input routine to indicate which account the data goes with |
| 8 - SUBCONTRACTS BILLED | |
| 9 - SUBCONTRACTS LIENS | |
| 10 - INTERNAL | |
| 11 - STORE DATA | - Store the current account data, over write any old data |
| 12 - ZERO DATA | - Zero the current data file |
| 14 - PRINT | - Print the data in a table |
| 15 - NEW ACCOUNT | - Input new account numbers and names |
| 16 - PRINT TITLES | - Print the current account numbers and names. |

TITLE

FUND USAGE PROGRAM

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 16

The program is loaded by inserting the program tape and pressing AUTO LOAD. This will give you the tape menu. Select the fund usage program by pressing a 2 or 3 and a RETURN. The program will then be loaded and run.

The program will first request the year and account number. If the account exists, it will load the titles from file 4, if not it will stop and request you to create a new account (see below).* Next, the program will look for a data file for the specific year requested. If the file exists, it will be loaded, otherwise a new data file will be assigned.

***** FUND USAGE PROGRAM *****

INPUT THE YEAR : 1980

INPUT THE ACCOUNT NUMBER: AA00345

NO SUCH ACCOUNT, START A NEW ACCOUNT

Pressing the INPUT key begins the input for a particular month. When requested, input at least the first three letters of a months name, or START. Inputting START allows you to set the subaccount values at the beginning of the year to some value other than 0. You may now begin inputting data for each of the 4 subaccounts. Use user definable keys 7 through 10 rather than the RETURN key to differentiate between the subaccounts. Each input is then added to any existing data for that month and the subtotal is printed. Press STOP INPUT to end this procedure. Note that the data has not yet been stored on tape.

*To create a new account, press UDK #15. When the account number and name have been created, press UDK #1 to begin operation.

TITLE

FUND USAGE PROGRAM

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 16

***** ADD DATA *****
 INPUT THE MONTH (OR START): START
 USE KEYS 6-10 TO SPECIFY THE ACCOUNT AFTER INPUTTING THE NUMBER

INPUT THE DATA:

5000	SUBTOTAL = 5000	CONSULTANTS
10000	SUBTOTAL = 10000	BILLS
10000	SUBTOTAL = 10000	LIENS
8000	SUBTOTAL = 8000	INTERNAL
2000	SUBTOTAL = 10000	INTERNAL

DONE

DONT FORGET TO STORE THIS DATA FILE

Pressing LIMITS prints the old plot and account limit and requests you to input some new ones.

***** SET LIMITS *****
 AA00234 FOUND WITH A SPENDING LIMIT OF \$0.00
 AND A PLOT LIMIT OF \$0.00
 INPUT THE NEW SPENDING LIMIT: 200000
 INPUT THE NEW PLOT LIMIT: 220000

Pressing PLOT plots the current data file. You will be asked to input the last month for which data exists and to select the output medium.

***** PLOT DATA *****
 INPUT THE LAST MONTH TO BE PLOTTED
 INPUT THE MONTH (OR START): JAN

32-CRT
 1-PLOTTER

INPUT THE PLOT MEDIUM: 32

TITLE

FUND USAGE PROGRAM

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program:16

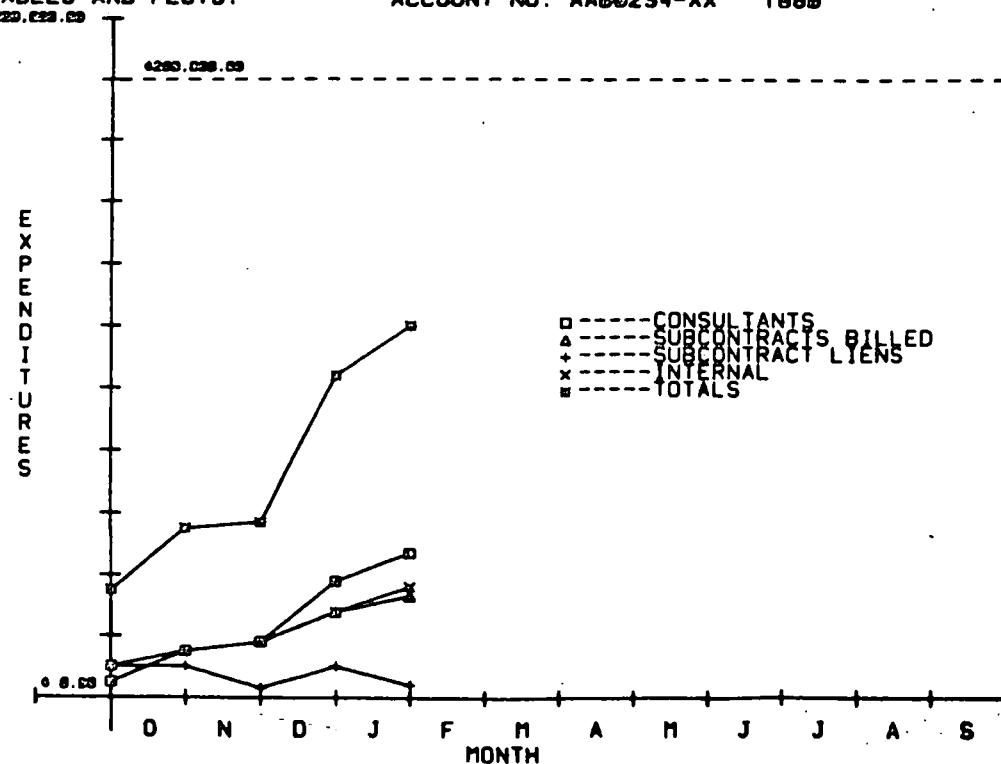
The data will now be plotted on the selected medium. If a 4662 plotter is used, it must be loaded with paper and corners set.

The plot codes shown are printed on the plot using the key PLOT CODES. The operation of this key depends on what machine you are using. If you have a 4054, press the key PLOT CODES and the block will appear in refresh graphics on the tube face. Use the thumb wheels to position it, then press RETURN to cause it to be printed. If you are plotting on the 4662 plotter, press PLOT CODES, and use the plotters joystick to position the pen to the lower left corner of the block. Press RETURN and the block will be printed.

There are two options for plotting the code block with a 4051. You can use the keys HOME, RETURN, and the SPACE BAR to position the cursor to the lower left corner of the block, then pressing PLOT CODES will print the block. If you have a joystick, then remove the REM from line 7040, and then press PLOT CODES. Using the joystick, position the cursor to the lower left corner of the block and press return to cause the block to be printed.

**STATUS REPORT ON THE ACCOUNT TITLE GOES HERE. IT WILL BE USED WITH
THE TABLES AND PLOTS.**

ACCOUNT NO. AAB0234-XX 1988



TITLE

ABSTRACT NO:

FUND USAGE PROGRAM

TEKniques Vol. 6 No. 1 T1
Program 16

Pressing PRINT will cause a table to be printed, containing all of an accounts data for the current year, including totals and subtotals. You will be asked to select the output medium.

STATUS REPORT ON THE ACCOUNT TITLE GOES HERE. IT WILL BE USED WITH THE TABLES AND PLOTS.

ACCOUNT NO. AAB8234-XX 1980

	CONSULTANTS BILLED	SUBCONTRACTS	SUBCONTRACTS LIENS	INTERNAL	TOTAL
START	5,000.00	10,000.00	10,000.00	10,000.00	35,000.00
OCT	10,000.00	5,000.00	10,000.00	5,000.00	30,000.00
NOV	3,000.00	3,000.00	3,000.00	3,000.00	12,000.00
DEC	20,000.00	10,000.00	10,000.00	10,000.00	50,000.00
JAN	9,000.00	5,000.00	4,000.00	8,000.00	26,000.00
FEB	0.00	0.00	0.00	0.00	0.00
MAR	0.00	0.00	0.00	0.00	0.00
APR	0.00	0.00	0.00	0.00	0.00
MAY	0.00	0.00	0.00	0.00	0.00
JUN	0.00	0.00	0.00	0.00	0.00
JULY	0.00	0.00	0.00	0.00	0.00
AUG	0.00	0.00	0.00	0.00	0.00
SEP	0.00	0.00	0.00	0.00	0.00
TOTALS	647,000.00	633,000.00		636,000.00	

ACCOUNT LIMIT 60.00

The key NEW ACCOUNT allows you to create new account numbers with titles or to change the titles on old account numbers. If you are adding a new account, you will be asked to input the new account number (alphanumeric including symbols), and then the new account title. The title can consist of up to two lines; with up to 55 characters in the first line and up to 30 characters in the second. This data will be stored in file 4. Correcting data is similar, however the old account title will be overwritten with the new one (see Note page 132).

NEW ACCOUNTS

- 1-NEW ACCOUNT
- 2-CORRECT ACCOUNT

INPUT NUMBER: 1

INPUT THE ACCOUNT NUMBER: AA00234

INPUT THE TITLE BETWEEN THE MARKS

THE ACCOUNT TITLE GOES HERE. IT WILL BE USED WITH
THE TABLES AND PLOTS.

TITLE

FUND USAGE PROGRAM

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 16

Pressing PRINT TITLES will cause all of the existing account numbers and titles to be printed.

Pressing STORE DATA will cause the current data file to be stored. If an existing data file was being updated then the old file will be overwritten.

The key ZERO DATA will cause the whole current data array D to be zeroed. If the data was not stored, then it is lost.



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 17
Manufacturing Sequence Flowcharter		EQUIPMENT AND OPTIONS REQUIRED
ORIGINAL DATE September, 1980	REVISION DATE November, 1981	32K
AUTHOR Paul Howard	Tektronix, Inc. Wilsonville, OR	PERIPHERALS Optional-4662/3 Plotter -4641 Printer

ABSTRACT.

Files: 1 ASCII Program
1 ASCII Text
Requires dedicated tape

Statements: 731

A non-technical person with little 4050 Desktop Computer experience can easily create and edit flowcharts with this program. Producing and maintaining flowcharts which describe the processes that sets of materials go through to become finished products are the primary targets of this program, however, other flowcharts can be created.

By combining two box types, vertical or horizontal interconnect lines and text you create your flowchart. Four UDK's position the cursor to place or delete the flowchart elements quickly. Text within the two boxes is automatically centered.

Fast redrawing maintains a "clean" sketch on your screen. Once you're satisfied, you may send the flowchart to the plotter, or store it on tape.

A new Flowcharter tape is easily produced by pressing a UDK and following instructions. The program, user's manual and directory file will automatically be transferred to the new tape. Each Flowcharter tape holds 30 flowcharts.

Flowcharts may be transferred between Flowcharter tapes.

The user's manual contained in a separate file may be sent to the screen or to the 4641 printer.

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TITLE

Manufacturing Sequence Flowcharter

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 17PRELIMINARY OPERATING INSTRUCTIONS

The Manufacturing Sequence Flowcharter files must be transferred from the TEKniques program tape to a tape dedicated to the Manufacturing Sequence Flowcharter program. Make sure the TEKniques tape is on safe.

Transfer files 26 and 27 from the TEKniques program tape to files 1 and 2 on a blank tape, using a program described on page iii. Once the two files have been transferred, insert the Manufacturing Sequence Flowcharter tape into the 4050, FIND 3, MARK 1,7168. You are now ready to AUTO LOAD the program and begin execution.

OR

Transfer files 26 and 27 from the TEKniques program tape to files 1 and 2 on a blank tape using the following technique:

STEP 1: Insert the blank tape into the 4050; this will become the Manufacturing tape.

```
FIND 1
MARK 1,18944
FIND 2
MARK 1,8960
FIND 3
MARK 1,7168
```

STEP 2: Insert the TEKniques program tape into the 4050.

```
FIND 1
OLD
```

STEP 3: Insert the Manufacturing Sequence tape into the 4050.

```
FIND 1
SAVE
```

STEP 4: Key in the following lines of code and RUN.

```
100 DELETE L$
110 DIM L$(11000)
120 L$=""
130 A$=CHR(13)
140 FIND 27
150 FOR I=1 TO 223
160 INPUT @33:T$
170 T$=T$&A$
180 L$=L$&T$
190 NEXT I
200 PRINT "REMOVE TEKniques TAPE"
210 PRINT "INSERT FLOWCHARTER TAPE"
220 INPUT X$
230 FIND 2
240 PRINT @33:L$
250 PRINT "DONEGGG"
260 END
```

TITLE Manufacturing Sequence Flowcharter	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 17
<u>GETTING STARTED</u>	
Power up the plotter (if used) and set page size, the hard copier, the printer and the 4050.	
Insert the Manufacturing Sequence Flowcharter tape and press AUTO LOAD.	
When prompted, enter today's date. Be sure to include the hyphens in the date.	
In response to "PRINT APPROVED DATE?", the approved date is the date previously entered which will be displayed if you answer (Y). Any other response will leave it blank.	
If you answer (Y) to HARD COPY AUTOMATICALLY?, every time a complete FLOWCHART is drawn on the screen, the hard copy will be made.	
Responding (Y) to the "PRINT FLOWCHART # AND DRAW TIC MARKS?" prompt will print the FLOWCHART number in front of the FLOWCHART TITLE on the top of the screen and will print dots around the screen perimeter to indicate where the boxes and interconnecting lines may be drawn.	
A (Y) to "SUM SEQUENCES?", will cause all times (bottom line of BOX) to be summed by sequence (center line of BOX) and then summed into the instrument total TIME. The sequences and times will be listed on the bottom of the page.	
These values are recomputed every time the FLOWCHART is drawn, thus the figures are always current.	
Each sequence on the center line of the BOX and each time on the bottom line of the BOX must be between 000 and 999. In addition, a decimal point can replace one of the time digits. Only the values in the small BOXes are checked or summed.	
From this point, select the appropriate User-Definable Keys (one of the ten white keys in the upper left corner of the keyboard).	
NOTE: If a PROMPT (question) ends with a "#", then only a number from 1 to 30 or a RETURN is a valid response.	
If a PROMPT ends with a "?", then only a Y or N or RETURN is valid. Any key other than Y in this case implies a NO. If only RETURN is pressed after a "#", and no RETURN prompt is indicated, then the present function is not executed; the menu will be displayed.	

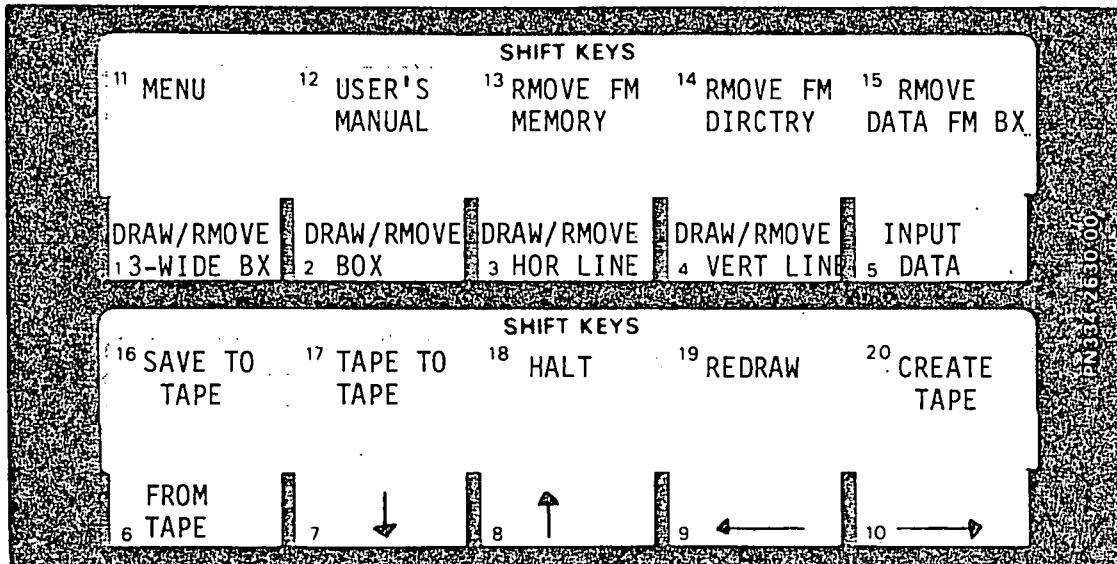
TITLE

Manufacturing Sequence Flowcharter

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 17

TITLE Manufacturing Seq. Flowcharter TAPE # FILE #

Key # and NameFunction

- 1 DRAW/RMOVE 3-WIDE BOX Draw a 3-WIDE BOX which will hold 3 lines of 13 characters. They will be automatically centered on each line. Press UDK #1 again to REMOVE 3-WIDE BOX.
- 2 DRAW/REMOVE BOX Draw a BOX which will hold 3 lines of 3 characters. The center and bottom line must be blank or contain numbers between 000 and 999. The center line is primarily used for SEQUENCE numbers, and the bottom line for TIMES. A DECIMAL POINT (.) can replace one of the bottom line digits. Press UDK #2 again to REMOVE BOX.
- 3 DRAW/REMOVE HORIZONTAL INTERCONNECT LINE Draw a HORIZONTAL LINE which will connect to BOXES and/or other lines. Press UDK #3 again to REMOVE the HORIZONTAL LINE.
- 4 DRAW/REMOVE VERTICAL INTERCONNECT LINE Draw a VERTICAL LINE which will connect to BOXES and/or other lines. Press UDK #4 again to REMOVE the VERTICAL LINE.
- 5 INPUT DATA (SPACE)(RETURN) ENDS INPUT Input data into a BOX or any place on the page. Data input ends after three lines are entered into a BOX or after a (SPACE)(RETURN) is entered at the beginning of a line.

TITLE Manufacturing Sequence Flowcharter	ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 17
<u>USER-DEFINABLE KEYS (continued)</u>	
<u>Key # and Name</u>	<u>Function</u>
6 DRAW FLOWCHART FROM TAPE ON SCREEN/PLOTTER (Address 32/1)	<p>Load the selected FLOWCHART data from tape to memory then draw it on the SCREEN using the options selected after pressing (AUTOLOAD), (see GETTING STARTED).</p> <p>PROMPT: A. "DRAW: #" Enter FLOWCHART number to draw.</p> <p>B. "ON PLOTTER?" (Y) will draw on PLOTTER.</p> <ol style="list-style-type: none"> 1. "2 FLOWCHARTS?" (Y) draws two FLOWCHARTS on one PLOTTER page (1st on left, 2nd on right). 2. "& FLOWCHART: #" Enter 2nd FLOWCHART # to merge onto right side of PLOTTER page.
7 MOVE CURSOR (*) DOWN	Move the CURSOR down one tic mark.
8 MOVE CURSOR (*) UP	Move the CURSOR up one tic mark.
9 MOVE CURSOR (*) LEFT	Move the CURSOR left one tic mark.
10 MOVE CURSOR (*) RIGHT	Move the CURSOR right one tic mark.
11 MENU	List the User-Definable Key MENU by function.
12 LIST USER'S MANUAL	List the USER'S MANUAL on the SCREEN or at address #51, the right backpack slot. If to SCREEN, a HARD COPY will be made at the end of each page.
13 REMOVE FLOWCHART FROM MEMORY	Remove the present FLOWCHART from memory. Once removed it cannot be retrieved!!!
14 REMOVE FLOWCHART TITLE FROM FLOWCHART DIRECTORY	<p>TITLE ONLY REMOVED from FLOWCHART DIRECTORY on File #2.</p> <p>The FLOWCHART can still be retrieved by entering that number to draw from tape to SCREEN/PLOTTER.</p>
15 REMOVE DATA WITHIN BOX	REMOVE the data within a BOX. To REMOVE data in an area outside of a BOX, draw a BOX around the data, REMOVE the data in the BOX, then remove the BOX.

TITLE

Manufacturing Sequence Flowcharter

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 17USER-DEFINABLE KEYS (continued)

<u>Key # and Name</u>	<u>Function</u>
16 SAVE FLOWCHART IN MEMORY TO TAPE	<p>Copy the FLOWCHART currently in memory onto the tape (30 FLOWCHARTS maximum). Enter (0) (RETURN) to relist MENU.</p> <p>PROMPT: A. "REPLACE #" Replace the existing FLOWCHART on the tape with the present FLOWCHART in memory.</p> <p>B. "DESIRED TITLE:" Enter TITLE of FLOWCHART (40 char. max) or (RETURN) to use "PRESENT TITLE" shown above.</p> <p>C. "ASSIGN/REMOVE/MODIFY APPROVED DATE?" Add, remove, or change the "approved" date which eventually shows up in the upper right corner of each FLOWCHART.</p>
17 COPY A FLOWCHART TO ANOTHER FLOWCHART TAPE	<p>COPY a FLOWCHART from the present MANUFACTURING SEQUENCE FLOWCHARTER tape to another MANUFACTURING SEQUENCE FLOWCHARTER tape.</p> <p>PROMPT: A. "COPY: #" Enter the number of FLOWCHART to be copied to another FLOWCHARTER tape.</p> <p>B. "REMOVE: #" "AFTER COPYING?" Remove the FLOWCHART TITLE from the original FLOWCHART DIRECTORY after COPYING is done.</p>
18 HALT FLOWCHART DRAWING	Halt the drawing in progress.
19 REDRAW FLOWCHART IN MEMORY	Redraw the FLOWCHART presently in memory. After the MENU is listed, this is the normal UDK to press to clear the SCREEN and draw the tic marks useful for drawing a new FLOWCHART from scratch.
20 CREATE A NEW MANUFACTURING SEQUENCE FLOW-CHARTER TAPE	Initialize a blank tape for use as a FLOWCHARTER TAPE.



DESKTOP COMPUTER APPLICATIONS LIBRARY PROGRAM

TITLE		ABSTRACT NUMBER TEKniques Vol. 6 No. 1 T1 Program 18
Air Defense Game		EQUIPMENT AND OPTIONS REQUIRED
ORIGINAL DATE January, 1981	REVISION DATE	32K
AUTHOR R. Hershman F. Greitzer R. Kelly	Navy Personnel Center San Diego, CA	PERIPHERALS MicroWorks FP-51 ROM Pack

ABSTRACT

Files: 2 ASCII Programs
Requires dedicated tape

Statements: 669

The Air Defense Game is an interactive scenario in which the player defends his ship by launching missiles against incoming enemy targets. The 4050 simulates a radar screen with the player's ship at the center and enemy raids entering from the periphery.

Difficulty level is selected by menu, and a summary of the player's performance (including a skill rating) is displayed after each engagement. Performance data are stored in binary files. An off-line analysis program assesses performance in greater detail.

The program material contained herein is supplied without warranty or representation of any kind. Tektronix, Inc., assumes no responsibility and shall have no liability, consequential or otherwise, of any kind arising from the use of this program material or any part thereof.

TITLE

Air Defense Game

ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 18PRELIMINARY OPERATING INSTRUCTIONS

The Air Defense Game files must be transferred from files 28 and 29 on the TEKniques program tape to files 1 and 2 of a tape dedicated to the Air Defense Game.

The Air Defense Game automatically MARKS files.

Transfer files 28 and 29 from TEKniques program tape to a blank tape using the instructions on page iii, then insert Game tape into 4050 and FIND 3, MARK 1,1.
or

Transfer files 28 and 29 according to the following instructions:

STEP 1: Insert TEKniques program tape into 4050.
FIND 28
OLD

STEP 2: Insert Air Defense Game tape into 4050.
FIND 0
MARK 1,11008
FIND 1
SAVE

STEP 3: Insert TEKniques program tape into 4050.
FIND 29
OLD

STEP 4: Insert Air Defense Game tape into 4050.
FIND 2
MARK 1,6144
FIND 2
SAVE
FIND 3
MARK 1,1

TITLE

ABSTRACT NO:

AIR DEFENSE GAME

TEKniques Vol. 6 No. 1 T1
Program 18

1. DESCRIPTION

Game Scenario. Hostile air targets approach the player's ship at one of three speeds, and the player defends by launching missiles against them. (See the instructions to the player on page 154). A sample snapshot of the game in progress appears on page 155. The "+" at the center of the display is the ship. Its detection range (outer circle) exceeds its 20-mile weapon range (inner circle) so that a launch-time decision is necessary for each target. The goal is to kill all targets at maximum range, but weapons that are launched too soon will fall short of the target (i.e., splash) and be ineffective. After a splash, it is possible to fire again, but only one missile is permitted in flight on a given track at one time; duplicate, or inflight launches result in a penalty. Of course, a penalty is also incurred if a target is allowed to hit the ship.

Targets are identified by a 2-digit track number (TN) and enter as dots ("blips") at the outer circle. Each target heads directly toward the ship and is updated at approximately 11.7 second intervals by another blip that corresponds to the next sweep of the simulated radar. The player launches a missile at a target by entering its TN via coded function keys on the 4051 keyboard. Feedback is flashed at the left of the display and indicates either a good launch or an error. Errors occur if the keyed TN does not exist or if a missile is already in flight at the entered TN. A dash (-) represents the player's missile. It has the same speed as a fast target, and its position is also updated during each radar sweep. Visual and auditory feedback is given when a missile destroys a target (a kill) and when a target impacts the ship (a hit). A full play of the game constitutes an engagement, which ends when all targets have either been killed or have hit the ship.

The major factors affecting the game are the total number of targets, target speed, and the tempo of operation.

Number of targets. Selection from a menu provides 6, 18, 36, 54, or 72 total targets in an engagement. Although spatial constraints allow a maximum of 90 targets (4 degrees between neighboring tracks), limitations in computer memory forced the 72-target ceiling.

Target speed. Targets advance at one of three constant speeds (fast, medium, or slow), and equal numbers of each are always assigned. Speed determines the optimal time to fire, that is, the update at which a launch will achieve the maximum kill range.

Tempo of operation. This important variable controls the rate at which targets appear. Three options are selectable by menu. In the Low tempo condition, entry times of the individual targets are relatively spread out and the player's task is quite easy. As the tempo is raised to Intermediate and High, the times of entry are increasingly crowded together, and the demands on the player increase. While targets enter throughout the engagement, the peak demand on the player is always in the middle of an engagement. The effect of the tempo of operation is to vary the magnitude of this peak.

TITLE

ABSTRACT NO:

AIR DEFENSE GAME

TEKniques Vol. 6 No. 1 T1
Program 18

AIR DEFENSE GAME INSTRUCTIONS

YOUR SHIP IS UNDER ATTACK BY INCOMING MISSILES WITH VARYING SPEEDS AND LAUNCH TIMES. YOUR TASK IS TO MONITOR THE RADAR DISPLAY AND DESTROY THEM. THE PRIORITIES OF THE ENGAGEMENT ARE:

- (1) AVOID BEING HIT.
- (2) AVOID SPLASHING YOUR OWN MISSILES BY LAUNCHING TOO EARLY...YOUR WEAPONS RANGE IS 20 MILES, WHICH IS THE INNER CIRCLE OF THE RADAR DISPLAY.
- (3) DESTROY INCOMING MISSILES AS SOON AS POSSIBLE AFTER THEY ENTER YOUR WEAPONS RANGE.
- (4) AVOID LAUNCHING A MISSILE IF YOU ALREADY HAVE ONE IN FLIGHT ON THE SAME TARGET.

YOUR SKILL RATING (0-100) WILL INCLUDE A 12-POINT PENALTY FOR EACH HIT SUSTAINED AND A 2-POINT PENALTY FOR EACH INFIGHT LAUNCH. THE MAXIMUM KILL RANGE IS 20 MILES. FIVE POINTS ARE DEDUCTED FOR EACH MILE THAT YOUR AVERAGE KILL RANGE IS UNDER 20.

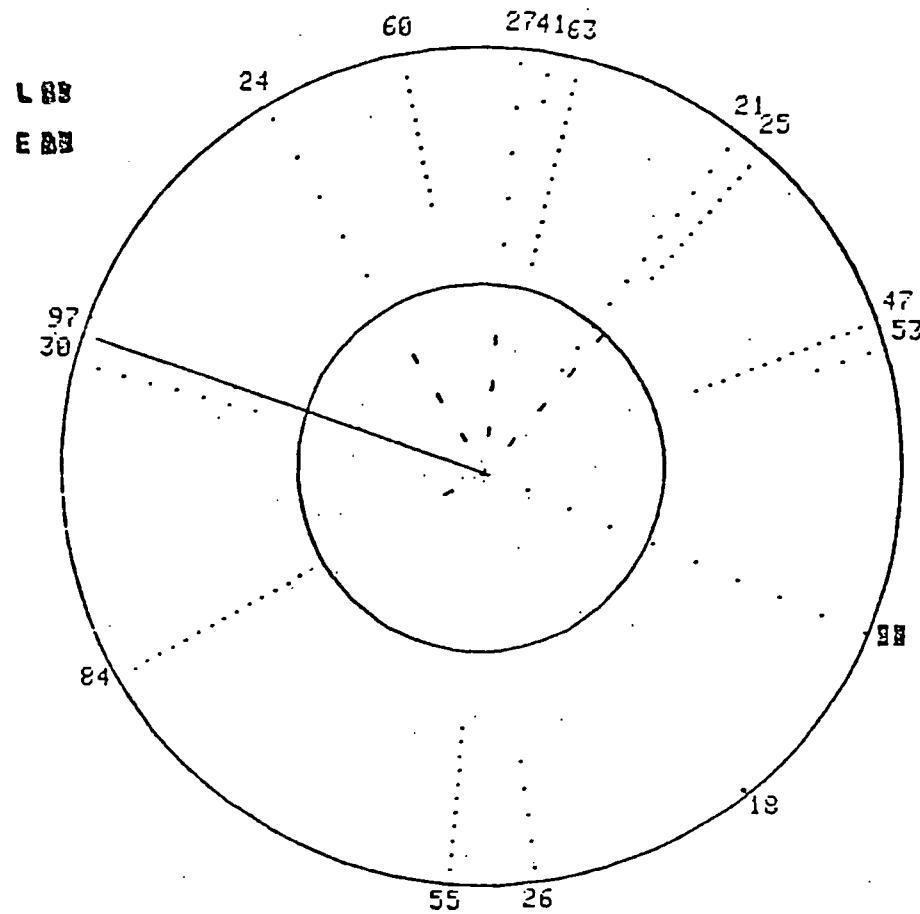
TO LAUNCH A MISSILE, USE THE TEN WHITE KEYS AT THE UPPER LEFT OF THE KEYBOARD. ENTER THE TWO-DIGIT TRACK NUMBER OF THE TARGET...A READOUT WILL THEN INFORM YOU OF A SUCCESSFUL LAUNCH--OR AN ERROR. AN ERROR OCCURS IF YOU KEY A NUMBER INCORRECTLY OR IF YOU LAUNCH A MISSILE UNNECESSARILY.

GOOD LUCK....THE FATE OF YOUR SHIP LIES IN YOUR HANDS!

TITLE

AIR DEFENSE GAME

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 18

CRT display of a single update in the Air Defense Game.

Note: The player has destroyed track no. 97 and has sustained a hit from the target at 4 o'clock. Fourteen other tracks (dotted lines) are active. Three targets, track numbers 84, 24, and 27, are engaged by the player's missiles (dashed lines). A splash has occurred on track no. 25.

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AIR DEFENSE GAME

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Program 18

Performance analysis. The 4051 records the player's actions and displays selected feedback at the end of each engagement. This summary (see page 157) includes the average range for kills, the total number of kills and hits, the number of splashes and inflight launches, and a skill rating (R) that reflects overall proficiency. R is defined by:

$$R = 100(\text{Average kill range}/20) - 12(\text{no. of hits}) - 2(\text{no. of inflights}).$$

If performance is perfect, all targets will be destroyed at the maximum range of 20 miles and there will be no hits or inflight launches. Then R=100. More detailed measures are of special interest to researchers in human performance. These can be obtained with the separate off-line analysis program (File 2) that analyzes the data stored on tape. See Kelly, Greitzer & Hershman (1981) for a complete discussion.

Timing and implementation. The playing time for an engagement varies from approximately 7.1 minutes for the high tempo-18 target game to 24.8 minutes for the low tempo-72 target game. The most challenging games are those at high tempo with 18 or more targets. The 6-target game is recommended for initial practice only.

2. DATA TAPE STRUCTURE

- a. Type of data files: Binary
- b. Files used: At initialization, the program searches for the next available file; it then marks tape as required.
- c. Format used: See Line 4090 of the Air Defense Game Program.
- d. Index of data files: No data files exist prior to the first use of the program. Data are then stored in consecutive files starting at File 4. To cancel existing data files and reset tape storage to file , execute the commands: FIN 3, MARK 1,100.
- e. Tape usage: Use the program tape as the data tape.
- f. Optional bypass of data storage: If data storage is not desired, insert two lines of code as follows:

```
175      GO TO    270
4015     GO TO    4120
```

3. INTERNAL DATA STORAGE

a. Variables

1. Air Defense Game Program (See page 166)
2. Data Analysis Program (See page 169)

TITLE

ABSTRACT NO:

AIR DEFENSE GAME

TEKniques Vol. 6 No. 1 T1
Program 18

AIR DEFENSE SUMMARY

PLAYER NO. 10

NO. OF TARGETS = 18 TEMPO: INTERMEDIATE

SPEED	# KILLS	# HITS
FAST	5	1
MEDIUM	6	8
SLOW	6	0

TOTAL KILLS = 17 TOTAL HITS = 1

AVERAGE RANGE FOR KILLS = 16.42 (MAX. = 20)

NO. OF MISSILES LAUNCHED = 19
NO. OF MISSILES SPLASHED = 1
NO. OF INFLIGHT LAUNCHES = 0

SKILL RATING = 70 (MAX. = 100)
Data is being stored on tape...

DO YOU WANT TO PLAY AGAIN (Y/N)?

TITLE	ABSTRACT NO:
AIR DEFENSE GAME	TEKniques Vol. 6 No. 1 T1 Program 18

b. Storage format

The program stores a record of missile launches by the player in the string L\$ that is constructed as the game progresses. L\$ consists of 6-digit substrings of the form UUUDTN where

UUU = 100 plus the Update number on which the launch occurred

D = Designator for the type of launch

D = 6: good launch

D = 7: launch error (a missile is already in flight at the target)

TN = the 2 digit Track Number (01-99) of the target

4. METHODS

The program flow for the game is shown on pages 159-163. The first part of the program (START to node B in the flowchart) provides instructions to the player and sets up the engagement parameters. The major section (pp.160-161) controls the scheduled entry and display of targets and missiles for each update, tallies the player's actions and other events, and generally supervises the progress of the scenario. To reduce variability in computation and display timing, on every update the program carries an inventory of 90 targets that are spaced 4 degrees apart. Only the active ones are displayed; all others are "drawn" with a dummy command. At the end of the engagement, the last section of the main program (page 162) controls the feedback display and the storage of data on magnetic tape.

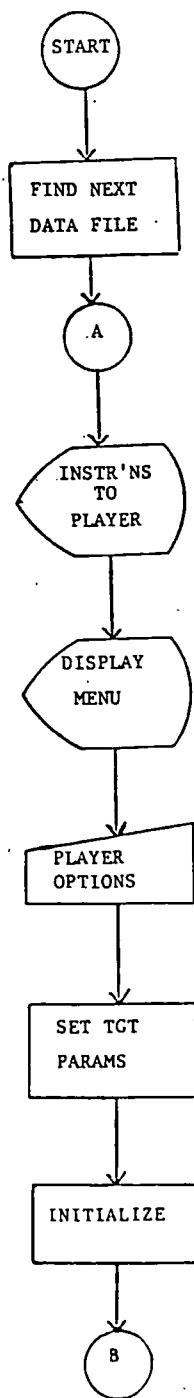
A weapon-launching routine (page 163) interrupts the main program to process missile firings as they are input through the function keys; the interrupt software causes no disruption of the flow of the game.

The speed of graphic and arithmetic operations was enhanced by attaching an FP-51 ROM pack, available from MircoWorks, P. O. Box 1110, Del Mar, California 92014.

TITLE

AIR DEFENSE GAME

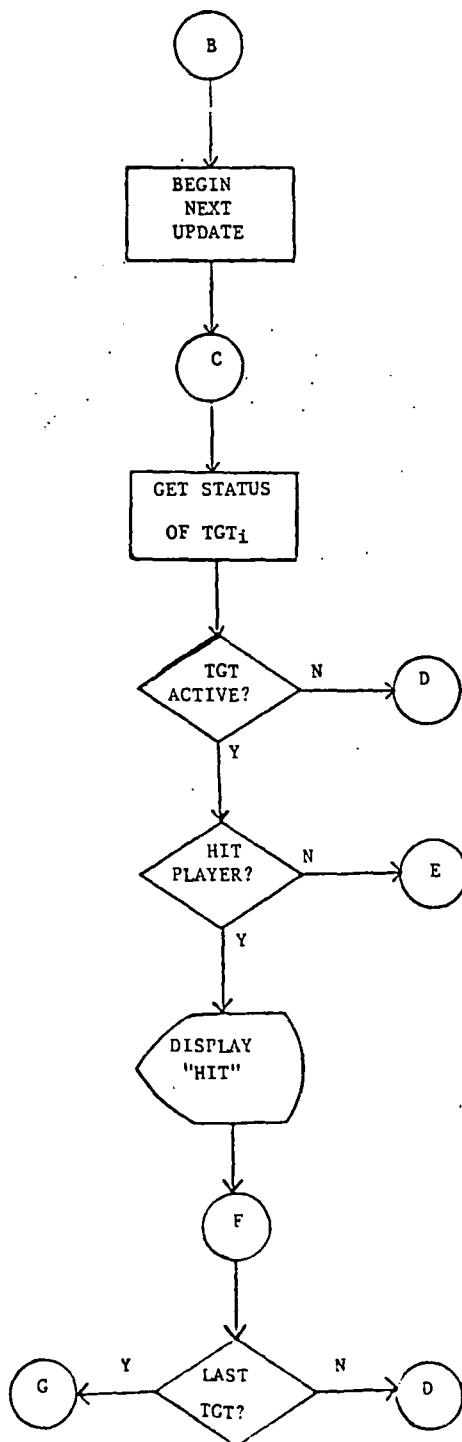
ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 18

TITLE

AIR DEFENSE GAME

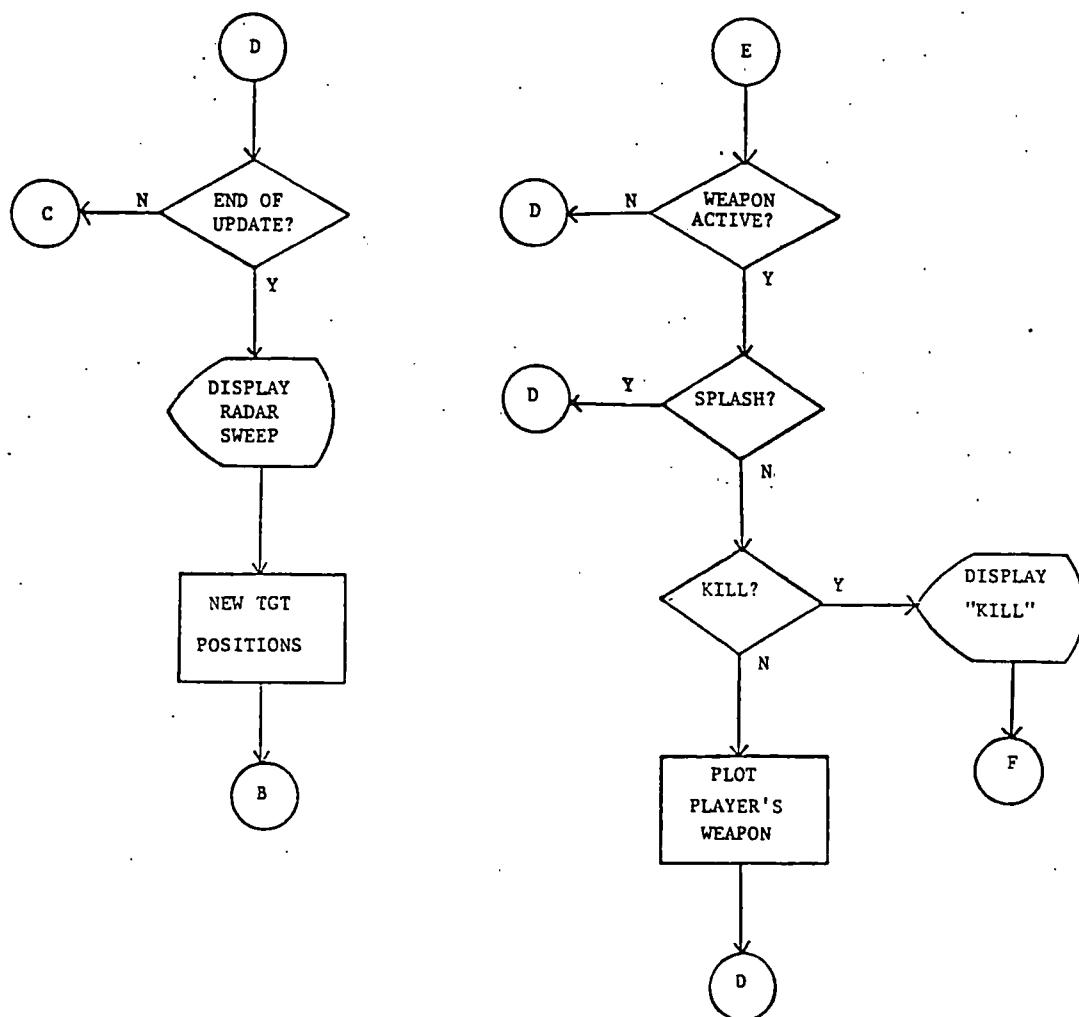
ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 18

TITLE

AIR DEFENSE GAME

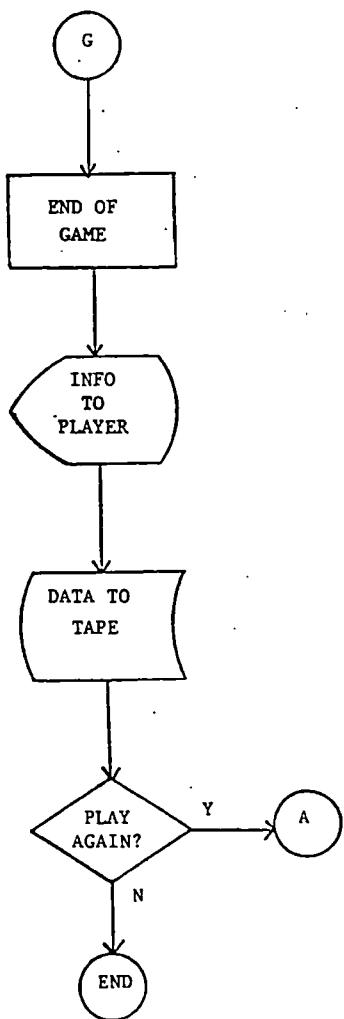
ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 18

TITLE

AIR DEFENSE GAME

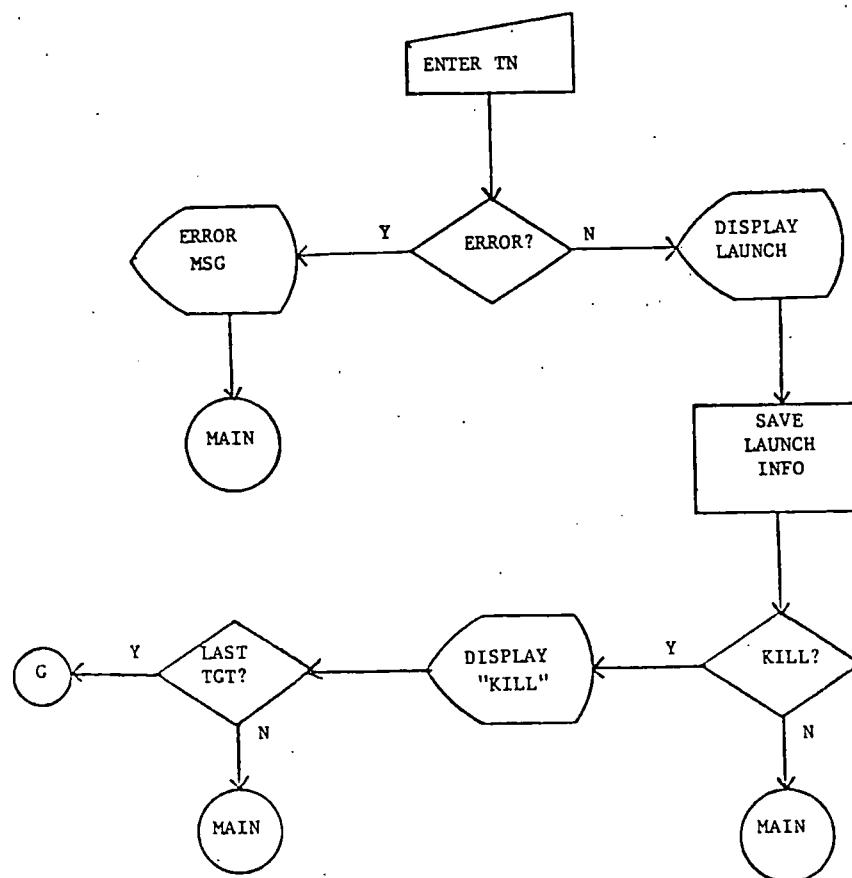
ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 18

TITLE

AIR DEFENSE GAME

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 18

TITLE

AIR DEFENSE GAME

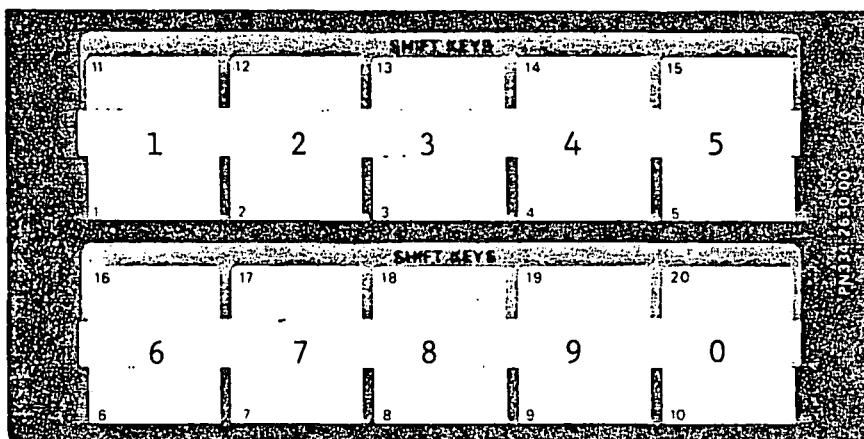
ABSTRACT NUMBER

TEKniques Vol. 6 No. 1 T1
Program 18

TITLE

TAPE #

FILE #



5. OPERATING INSTRUCTIONS

a. Overlay

An overlay with the digits 0-9 is used to enter track numbers for missile launchings.

b. Program Loading

1. Air Defense Game (File): Press AUTOLOAD
2. Data Analysis Program (File):

```
FIND 3
CALL "BOLD"
RUN
```

TITLE

ABSTRACT NO:

AIR DEFENSE GAME

TEKniques Vol. 6 No. 1 T1
Program 18

c. Program Execution

Air Defense Game

1. Enter player's I.D. as requested.
2. Select tempo of operation (Low, Intermediate, or High) from menu.
3. Select number of targets (target density = 1, 2, 3, or 4).
4. When the game begins, use the function keys to launch missiles. Two separate keypresses are used for the two-digit track number of the target. Each key must be pressed and released quickly to avoid input errors.
5. The game ends when all targets have either been killed or have hit the ship.

Data Analysis Program

1. Enter the file number of the data to be analyzed.
2. Enter CRs as prompted to sequence through the displayed output.

6. REFERENCES

Kelly, R. T., Greitzer, F. L., & Hershman, R. L. Air defense: A computer game for research in human performance. (Technical Report 80-7). San Diego: Navy Personnel Research and Development Center, 1981.

TITLE

ABSTRACT NO:

AIR DEFENSE GAME

TEKniques Vol. 6 No. 1 T1
Program 18

VARIABLES IN AIR DEFENSE GAME PROGRAM

VARIABLE <u>NAME</u>	<u>DEFINITION</u>	<u>TYPE</u>
A	Switch for servicing function keys	Simple
A\$	Tape file header	String
A1	Target bearing(degrees)	Array(N)
A4	Update at which target will hit own ship	Array(N)
A5	Target entry time: plus 1000(hit) or 2000(killed)	Array(N)
A6	Own missile status (1=in flight)	Array(N)
A7	Own missile position	Array(N)
A8	Target track number(TN)	Array(N)
A9	Code for target bearing=A1/4	Array(N)
B	Temporary storage: bearing randomization	Simple
C	Temporary storage: TN randomization	Simple
C1	No. of hits (fast, medium, slow)	Array(3)
C2	No. of kills (fast, medium, slow)	Array(3)
D	Tempo of operations	Simple
F1	Magtape data file no.	Simple
F3	X-coordinate for target display	Array(90)
G3	Y-coordinate for target display	Array(90)
H	Missile status	Simple
H\$	Launch data: 6 digits	String
H0	No. of hits on own ship	Simple
H9	Missile status	Array(N)
I	Index in for-next loop	Simple
I\$	Launch information	String
I0	Index in for-next loop	Simple
J	Index in bearing randomization	Simple
J1	Index in TN randomization	Simple
J2	Index in for-next loop	Simple
K	Loop control: NO/D	Simple
K1	No. of kills	Simple

TITLE

AIR DEFENSE GAME

TEKniques Vol. 6 No. 1 T1
Program 18

<u>VARIABLE NAME</u>	<u>DEFINITION</u>	<u>TYPE</u>
K3	Radar sweep array for FP-51	Array(180)
K4	No. of targets entering this update	Simple
K5	Pointer to targets that enter this update	Array(N)
K9	Accumulator for killing range	Simple
L	Final length of L\$	Simple
L\$	Player's launch history	String
L1	Current length of L\$	Simple
L3	Radar sweep array for FP-51	Array(180)
L7	No. of inflight launches	Simple
L8	No. of splashes	Simple
L9	No. of good launches	Simple
M\$	Display of launch status	String
N	Total no. of targets	Simple
N\$	Display of launch status	String
NO	No. of targets of each speed	Simple
P3	Target range	Array(N)
Q\$	Text	String
R	Skill rating	Simple
R\$	Text for feedback	String
R1	0's or 1's for entry time randomization	Array(N)
S	Index for flashing TN display	Simple
S\$	Player I.D.	String
S1	Index for flashing TN display	Simple
S3	Target speed	Array(N)
T\$	Input of launch data	String
T0	2-digit launch data	Simple
T2	Array for track number lookup	Array(N)
T7	X-coordinate for own ship	Simple
U	Update counter	Simple
V\$	Text	String

TITLE	ABSTRACT NO:
AIR DEFENSE GAME	TEKniques Vol. 6 No. 1 T1 Program 18

VARIABLE <u>NAME</u>	<u>DEFINITION</u>	<u>TYPE</u>
W	Track number lookup: 1, 2,...,N	Array(N)
WS	Text	String
W6	Index in for-next loop	Simple
W7	Counter to equate inter-update intervals	Simple
W8	Logical switch for game parameters 1 = high tempo, N = 72; 0 = otherwise	Simple
X	X-coordinate for display of circle	Array(101)
X\$	Text	String
X1	X-coordinate for missile track: origin	Simple
X2	X-coordinate for missile track: terminus	Simple
X3	X-coordinate for missile track: origin	Simple
X4	X-coordinate for missile track: terminus	Simple
X7	X-coordinate to display track number	Simple
X8	X-coordinate to overwrite track number	Simple
X9	Target status for display: 0 = inactive; 1 = active	Array(90)
Y	Y-coordinate for display of circle	Array(101)
Y1	Y-coordinate for missile track: origin	Simple
Y2	Y-coordinate for missile track: terminus	Simple
Y3	Y-coordinate for missile track: origin	Simple
Y4	Y-coordinate for missile track: terminus	Simple
Y7	Y-coordinate to display track number	Simple
Y8	Y-coordinate to overwrite track number	Simple
Z	Dummy variable	Simple
Z0	Radius of circle	Simple
Z1	Counter for repositioning display	Simple

TITLE

ABSTRACT NO:

AIR DEFENSE GAME

TEKniques Vol. 6 No. 1 T1
Program 18

VARIABLES IN DATA ANALYSIS PROGRAM

VARIABLE NAME	DEFINITION	TYPE
A\$	Target speed designator(F, M, or S)	String
A1	Target bearing(degrees)	Array(N)
A5	Target entry time: plus 1000(hit) or 2000(killed)	Array(N)
A8	Target track number(TN)	Array(N)
C\$	Outcome designator(hit or kill)	String
C1	No. of hits (fast, medium, slow)	Array(3)
C2	No. of kills (fast, medium, slow)	Array(3)
D	Code for tempo of operations	Simple
F	No. of updates until optimal launch	Array(3)
F\$	Input for file to be analyzed	String
F4	No. of updates until hit occurs	Array(3)
F5	Target speeds	Array(3)
F6	Range at entry time	Array(3)
F7	Scale for ordinate in MO graph	Array(6)
H	Updates on which hits occurred	Array
I	Index in for-next loop	Simple
I1	Index in for-next loop	Simple
J	Index in for-next loop	Simple
J1	Counter for missed opportunities	Simple
K	Update at which kill occurs	Simple
K4	Update for first launch opportunity	Simple
K5	Last update prior to a hit	Simple
K9	Average distance for kills	Simple
L	Length of L\$	Simple
L\$	Player's launch history	String
L7	No. of inflight launches	Simple
L8	No. of splashes	Simple
L9	No. of good launches	Simple
M	Maximum value of MO by update	Simple
N	Total no. of targets	Simple

TITLE

AIR DEFENSE GAME

ABSTRACT NO:

TEKniques Vol. 6 No. 1 T1
Program 18

<u>VARIABLE NAME</u>	<u>DEFINITION</u>	<u>TYPE</u>
N0	No. of targets of each speed	Simple
Q	Table of target and launch information	Array(N,5)
Q\$	Text for game parameters	String
Q6	Lag score	Simple
R	Table of target status by update	Array(U,6)
R1	Skill rating	Simple
R5	No. of targets remaining	Simple
S	Sum of squares for lags	Simple
SS	Player I. D.	String
T\$	File number designator	String
T1	Code for update extracted from L\$	Simple
T2	Code for track number extracted from L\$	Simple
U1	Last update of game	Simple
W	Table for track number lookup	Array(99)
X	Sum of lags	Simple
X\$	Launch information extracted from L\$	String
X1	Temporary storage for kill computation; Unit for abscissa in MO graph	Simple
X2	Temporary storage for kill computation; Unit for ordinate in MO graph	Simple
Y	Summary table of lags, inflight launches, and splashes by target speed	Array(3,4)