

TEKniques Vol. 6 No. 1 T1 tape consists 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 programs 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.

Program 1

Title: 4907 to 4909 File Transfer and Conversion Utility

Authors: Tony Freixas

Gene Lynch

Howard Mozeico

Tektronix, Inc.

Wilsonville, OR

Memory Requirement: 32K

Peripherals: 4907 File Manager

4909 Multi-User File

Manager

Optional-4641 Printer

Files: 3 ASCII Program

Statements:

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; 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.

```
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:"11
120 REM --> CALL "MOUNT",1,A$
130 CALL "DIRECTORY",A$,"UNIT:"11,"sample"
140 IF A$="" THEN 210
150 CALL "OPEN","sample","LFN:"11
160 ON EOF (1) THEN 200
170 INPUT #1:A$
180 PRINT A$
190 GO TO 170
200 CLOSE 1
210 END
```

4909 Version

Program 2

Title: Micrograph Measurement

Author: Byron J. Bergert

Tektronix, Inc.

Rockville, MD

Memory Requirement: 64K

Peripherals: 4956 Tablet

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:

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

- circumference of a closed figure
- 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:

- erase the last measurement
- go to the next measurement
- repeat the last measurement
- 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.

Program 7

Title: PROGVARLI

Authors: G. Gauglitz
A. Lorch
University of Tuebingen
Tubingen, Germany

Memory Requirement: 32K

Peripherals: 4641 Printer

Files: 1 ASCII Program

Statements: 314

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.

A table of variables is printed, followed by a list of the variables including line numbers.

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).

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

# 160 GOSUB 220
170 SET DEGREES
# 180 GOSUB 250
# 190 GOSUB 350
# 200 GOSUB 560
210 GO TO 620

* 220 PRINT "ENTER TITLE FOR GRAPH :GG";
+ 230 INPUT B$
240 RETURN

* 250 PRINT "INPUT NO. OF PROPERTIES: GG";
+ 260 INPUT N
270 REM *STORAGE FOR PROPERTY LIST*
= 280 DIM L$(20*N)
290 L$=""
! 300 DELETE X,R,Q,Y
= 310 DIM X(N),R(N),Q(N),Y(N)
* 320 PRINT "INPUT RATING SCALE'S
DIVISIONS: GG";
+ 330 INPUT S1
340 RETURN

REM in line!
130 270 370 440 610 710 800
880 1110 1190 1320 1420

Subroutine from line to line
220 - 240
250 - 340
350 - 550
560 - 600
570 - 600
1430 - 1510

= 280 DIM L$(20*N)
= 310 DIM X(N),R(N),Q(N),Y(N)
! 300 DELETE X,R,Q,Y

# 24 GOSUB 560
# 160 GOSUB 220
# 180 GOSUB 250
# 190 GOSUB 350
# 200 GOSUB 560
# 1300 GOSUB 1430
# 1340 GOSUB 570

3 GO TO 100
16 GO TO 220
21 GO TO 350
25 GO TO 620
29 GO TO 700
32 GO TO 1
37 GO TO 320
40 GO TO 1330
210 GO TO 620
430 GO TO 390
920 GO TO 940
1050 GO TO 1070
1550 GO TO 1480

410 IF LEN(C$)<=20 THEN 450
460 IF I>10 THEN 480
510 IF LEN(C$)<=K THEN 530
820 IF T-90>-190 THEN 870
830 IF I<10 THEN 870
840 IF X(I)<S1 AND X(I)>=0 OR X(I)<0 THEN 860
890 IF X(I)>=0 THEN 910
910 IF X(I)>S1 THEN 930
1020 IF Y(I)>0 THEN 1040
1040 IF Y(I)>S1 THEN 1060
1200 IF Z=32 THEN 1220
1230 IF Z=32 THEN 1260
1280 IF Z=32 THEN 1300
1470 IF X(I)<0 OR X(I)>S1 THEN 1520
1490 IF NOT(F) THEN 1510

380 FOR I=1 TO N
540 NEXT I
620 FOR I=1 TO N
640 FOR J=1 TO I
660 NEXT J
690 NEXT I
740 FOR I=1 TO N
960 FOR J=1 TO S1
990 NEXT J
1090 NEXT I
1160 FOR I=1 TO G
1180 NEXT I
1370 FOR I=1 TO N
1390 NEXT I
1460 FOR I=N TO 1 STEP -1
1480 NEXT I

number of lines: 164
stringlength : 3297
```

Program 8

Title: Rank Sum Statistic

Author: Richard M. Engeman
Denver Wildlife Research
Center
Denver, CO

Peripherals: Optional-4641 Printer
-4662 Plotter

Memory Requirement: 24K

Files: 1 ASCII Program

Statements: 245

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, *Non-parametric Statistical Methods*, or Wilcoxon and Wilcox, *Some Rapid Approximate Statistical Procedures*.

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.

Program 9

Title: Two-Factor Repeated Measures Analysis of Variance

Author: Richard M. Engeman
Denver Wildlife Research
Center
Denver, CO

Peripherals: Optional-4641 Printer

Memory Requirement: 32K

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 a menu: correcting data, output means tables, output AOV table, etc.

Program 10

Title: CDC 6500 Mainframe I/F

Author: Andreas Gorocho
Atmospheric Physicist
Monterey, CA

Memory Requirement: 16K

Peripherals: Option 1 Data Comm. I/F

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.

Program 11

Title: 4050/468 Utility II

Author: Craig Bulmer
Tektronix, Inc.
Chicago, IL

Memory Requirement: 64K

Peripherals: Tektronix 468 Oscilloscope
4052R07/4052R08 ROMs
Optional-4662/3 Plotter

Files: 1 ASCII Program

Requires dedicated data tape

Statements: 1026

This program contains the same functions as the first 4050/468 Utility (abstract #51/00-6125/0 now in the Interfacing T1 package), with several additional features. It 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; Volts/Div; Time/Div; Trigger Point; Max Volts; Min Volts; Min/Max Pulse Parameters; Histogram Pulse Parameters; Integrate Waveform; Differentiate Waveform; FFT; and Waveform Analysis.

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.

Program 12

Title: PC Component Mechanical Analysis

Author: Tom Sattler
Motorola, Inc.
Ft. Lauderdale, FL

Memory Requirement: 32K

Files: 1 ASCII Program

Statements: 424

Often you want to predict the mechanical strength of electrical components which have been reflow soldered onto a PC board. Throughout the life of the product, the designer must insure that the components will withstand any loading conditions they may see, including tensile, shear and bending. These loads may be incurred from a variety of situations, ranging from a constantly applied load (i.e., as a result of dampening materials used for shock isolation) to the possible insertion of a straight PC board into a slightly warped frame.

This program calculates 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 also determines whether or not

failure may be expected due to first mode flexing of the board under a rigid component. Both leaded and leadless components can be analyzed.

The first set of data input deals primarily with properties of the solder *after* it has been reflowed. The next set is concerned with the individual types of chip components found on the user's PC board. Chip resistors are dealt with first, and the process repeated for remaining chip components (inductors, IC's, etc.). Information relating to any leaded components on the board is entered last.

For each category of chip components (capacitors, inductors, etc.) the program outputs: part number, tensile force required for the solder beneath the part to fail, the shear force required for the solder beneath the part to fail, and whether or not the imposed maximum board deflection will cause a bending failure.

For leaded components, output will be: part number, number of leads on that component, the force required on the component, normal to the PC board, for the solder to fail.

The documentation details the algorithm used in the program.

Data may be saved on a premarked tape file.

SAMPLE RUN (STATIC LOADING)				
chip capacitors				
PART NO.	TENSILE FORCE (LB)	SHEAR FORCE (LB)	BENDING FAILURE?	
2001	12.60	8.80		
2002	34.02	23.76		
2003	12.60	8.80		
2004	26.22	19.71	YES	
2301	34.02	23.76		
integrated circuits				
PART NO.	TENSILE FORCE (LB)	SHEAR FORCE (LB)	BENDING FAILURE?	
5001	105.84	73.92	YES	
5201	119.55	83.49		
5301	105.84	73.92		
leaded components				
PART NO.	NO. OF LEADS	NORMAL FORCE (LB)		
6001	4	29.14		
6301	2	15.59		
6505	2	25.99		
Hit page to continue				

Program 13

Title: Cu-Sum-Fuel Consumption Measurement

Author: Ron Clark
Scottish Crop Research Institute
Dundee, Scotland

Memory Requirement: 16K

Files: 1 ASCII Program

Statements: 148

Cu-Sum 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.

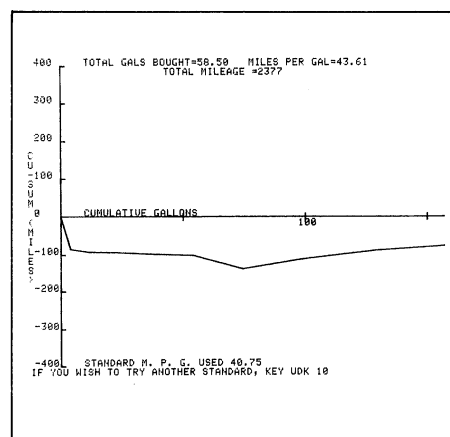
After fuel and odometer figures have been keyed in, the user inputs the estimate of miles per gallon used.

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.

Data may be corrected. A different standard may be chosen.

If the trend of the graph is horizontal, then the chosen estimate is the correct one.

The program is based on "Measuring and Controlling Vehicle Fuel Consumption" by J. Murdoch (1974).



Program 14

Title: TEXTED

Authors: G. Gauglitz

A. Lorch

University of Tuebingen

Tuebingen, Germany

Memory Requirement: 32K

Peripherals: 4641 Printer

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:

- list text (line by line) from beginning
- display next page beginning at line n
- display last n lines of text
- display next page
- display last page
- insert new text at n line
- delete lines n to n
- interchange n lines beginning at n
- delete line n, insert new text

- lengthen line n
- change single characters
- delete character
- search
- store text
- add text from n file
- print text

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

Program 15

Title: Label Printer

Memory Requirement: 24K

Peripherals: 4641 Printer

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.

Specifications: 67 characters per line

20 lines max

1000 characters total max

25 labels per tape (may be easily changed)

Features: Different sized pinfeed labels accommodated.

Form filling -

Label text input with flag for some variable information to be keyed in at run time, e.g., different names on one line with rest of text the same.

Sequencing -

At run time set a beginning value, step between numbers, and the number of repeats printed before incrementing. Useful for controlled documents in which a label with a particular control number may be placed on the binding, inside the cover, and next to the name on a master list.

Editing -

Text of label may be changed line-by-line using edit functions of rubout, expand, compress, backspace/space, insert and clear.

Help -

A UDK will print out a list of the function keys and additional information when a mistake is detected by the program.

Storage and Retrieval -

One label per file may be stored, retrieved, printed, edited, etc.

Listing -

Labels from each file on tape may be read and displayed on the screen.

```
CONFIDENTIAL
CONTROLLED DOCUMENT

ISSUED TO ////////////////
DOCUMENT %%
```



```
CONFIDENTIAL
CONTROLLED DOCUMENT

ISSUED TO PAT KELLEY
DOCUMENT 1
```



```
CONFIDENTIAL
CONTROLLED DOCUMENT

ISSUED TO PAT KELLEY
DOCUMENT 1
```



```
CONFIDENTIAL
CONTROLLED DOCUMENT

ISSUED TO PAT KELLEY
DOCUMENT 2
```



```
CONFIDENTIAL
CONTROLLED DOCUMENT

ISSUED TO PAT KELLEY
DOCUMENT 2
```

Program 16

Title: Fund Usage

Author: W.J. Orvis

Lawrence Livermore

National Labs

Livermore, CA

Memory Requirement: 16K

Peripherals: Optional-4641 Printer

-4662 Plotter

-4952 Joystick

4054 Version requires

Dynamic Graphics Opt. 30

Files: 3 ASCII Program

3 Binary Data (examples)

Requires dedicated tape

Statements: 1047

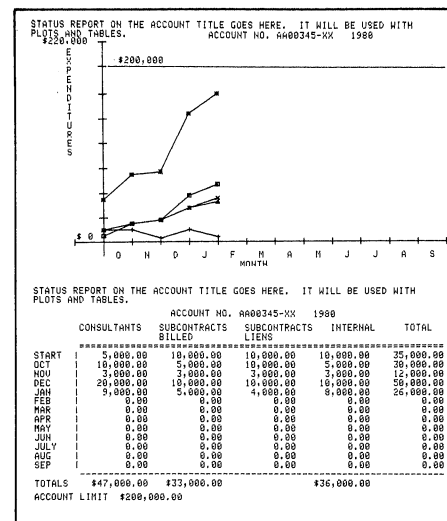
Most project management requires that close watch be kept on project related costs, especially when limited funds are available. This program tracks these costs for several different projects and presents the data in tables or graphs for easy analysis.

Data is processed by fiscal year for each project account. Each account is divided into four subaccounts: 1) Consultants, 2) Subcontracts Billed, 3) Subcontracts Liens, and 4) Internal. The names of these subaccounts are purely arbitrary and could be changed easily.

Data is accumulated monthly. All but type 3 (Liens) are handled as increasing accounts (i.e., when the data is plotted, the data from previous months are added to the current month's data to give a cumulative total). Type 3 (Liens) data are a different matter. They do not represent money spent but are costs that have been incurred but not yet paid. As bills are paid, the costs are shifted from type 3 (Liens) to type 2 (Bills). Therefore, each month's Liens are treated separately and are not added to those from a previous month.

Data is stored on the program tape in pre-marked binary data files. Account numbers

and account titles reside in a file following the program files. A directory to the data files follows this file. The remaining files contain the data for each account.



Program 17

Title: Manufacturing Sequence Flowcharter

Author: Paul Howard
Tektronix, Inc.
Wilsonville, OR
Memory Requirement: 32K
Peripherals: Optional-4662/3 Plotter
-4641 Printer

Files: 1 ASCII Program
1 ASCII Text
Requires Dedicated Tape
Statements: 731

A nontechnical 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.

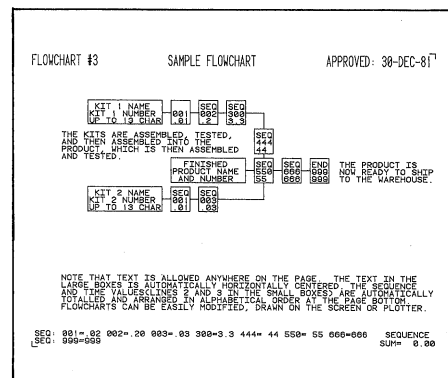
By combining two box types, vertical or horizontal interconnect lines and text you create your flowchart. Four UDK's position the cursor to place or delete the flowchart elements quickly. Text within the two boxes is automatically centered.

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, however.

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.



Program 18

Title: Air Defense Game

Authors: R. Hershman
F. Greitzer
R. Kelly
Navy Personnel R&D Center
San Diego, CA
Memory Requirement: 32K
Peripherals: MicroWorks FP-51
ROM Pack

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.

TEKniques Vol. 6 No. 1 D1 Part #062-6442-01

TEKniques Vol. 6 No. 1 D1 disk consists of 11 programs: one computer aided education, one electrical engineering, one graphing, one mapping, one programming aids,

one project aids, three text processing, and two utility.

The individual abstracts describe the program.

Program 1

Title: Spacetime/Minkowski

Author: Joel A. Gwinn
University of Louisville
Louisville, KY
Memory Requirement: 4054 Option 30
32K
Peripherals: 4907 File Manager
Files: 1 Program
1 Data
Statements: 315

This program facilitates graphical solution of kinematics problems in Special Relativity Theory using the Minkowski Diagram, a graphical representation of the Lorentz Transformation.

Spacetime/Minkowski elicits the relative velocity of two observers, and constructs a

system of space and time coordinates corresponding to the following:

Observer O' is fixed at the origin of a spatial reference frame (rocket frame) which moves at speed $v=c$ (c is the speed of light in free space) through the reference frame (laboratory frame) of observer O . At time zero in both frames, the origins of the space reference frames coincide. Subroutines controlled by the User-Definable Keys provide, in refresh mode, the essential elements of the graphical solution.

A calculator mode is available for numerical work.

