

# 4051 Applications Library Newsletter

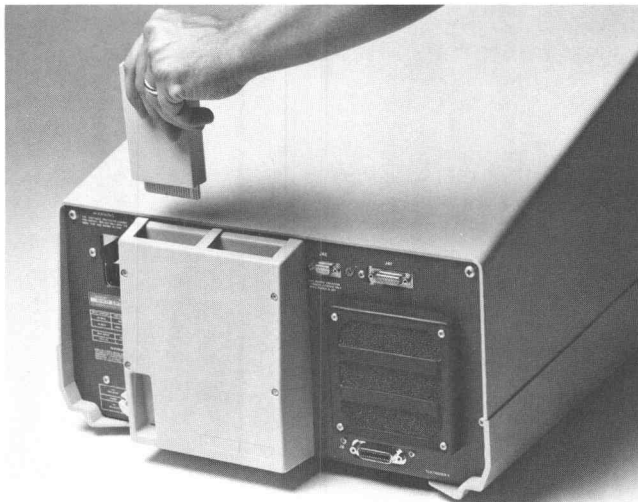
TEKTRONIX, INC.

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## Save and Retrieve Programs 4 to 6 Times Faster with the Binary Loader ROM Pack

The Binary Program Loader ROM allows you to store and retrieve programs 4 to 6 times faster than with the BASIC commands OLD, SAVE and APPEND. It also provides a new way to overlay programs — the LINK command.



### Converting a Program to use the 4051 Binary Program Loader

by Dan Taylor

The Binary Program Loader allows you to store and retrieve programs 5 to 6 times faster than with the BASIC commands OLD, SAVE, and APPEND. It also provides a new way to overlay programs—the Link command.

To convert an ASCII program tape to a binary one you'll need to:

1. Find all OLD, SAVE, and APPEND commands (see below) and convert them as follows:

OLD	— CALL "BOLD"
APPEND...	— CALL "BAPPEND"...
SAVE	— CALL "BSAVE"

NOTE: BSAVE does not allow you to specify line number—it saves the whole program (programs rarely have SAVES in them, though). Also, for BAPPEND the line number to append at is not changed by the RENUMBER command.

2. Convert ASCII program files to binary program files by:

```
FIND j
OLD
KILL j
FIND j
CALL "BSAVE"
```

3. Note: the "autoload" file (usually file #1) should be left as an ASCII program file since a binary program file cannot be autoloading.

Here's a little program that will find all the OLD, SAVE, and APPEND commands in an entire tape:

```
100 FOR F0 = 1 to 255
110   FIND F0
120   IF TYP (0) < 2 THEN 240
130   K = 0
140   ON EOF(0) THEN 240
150   INPUT @33:A$
160   S1 = POS(A$, " ", 2) + 1
170   B$ = SEG(A$, S1, 3)
180   IF B$ << "OLD" AND B$ << "SAV" and
      B$ << "APP" THEN 150
190   IF K THEN 220
200   K = 1
210   PRINT "↓ FILE #"; F0
220   PRINT A$
230   GOTO 150
240 NEXT F0
```

When the program gets to the LAST file on the tape it rewinds the tape and aborts with the error message:

```
MAG TAPE FILE NOT FOUND IN LINE 110—
MESSAGE NUMBER 52
```

continued on page 3

# Decoding 4924 Tape Drive GPIB Status and Error Bytes

by Gary Laroff

The TEKTRONIX 4924 Digital Cartridge Tape Drive can act as an auxiliary storage device of the 4051 and/or with systems that employ the General Purpose Interface Bus (IEEE Standard 488-1975). The 4924 can generate Service Requests to the 4051 and transmit information about its operation to the 4051 in a Status Byte. If an error occurs in the 4924, an additional Error Byte contains information about the error.



4924 DIGITAL CARTRIDGE TAPE DRIVE

The subroutine listed below was written as the GPIB POLLing and interrupt service routine for an ON SRQ statement. The routine is necessary as many occurrences can cause an SRQ from the 4924. An End-Of-File originated interrupt may signal rewinding the tape and listing the data. Or perhaps it signifies MARKing a new tape file and taking some other kind of data. An "over-read" or "file not open" error would signify that the operator might want the program to be aborted.

## 1. Subroutine description

The 4924 and any other device on the line is POLLed in the normal manner. In the listing, the 4924 is device number 3 and some other devices

have primary addresses 4 and 20. The 4924 interrupt calls a service subroutine at line 2000 which decodes the status byte from the serial POLL (lines 2040-2120) and prints out the meaning of the status bits that have been set (lines 2130-2200).

The error is decoded in a similar manner and printed out by lines 2210-2320.

## 2. Sample output

An SRQ has occurred and the status byte was = 97. The error code was 12.

### TEKTRONIX 4924 STATUS BITS SET :

1	EOF
6	ERR
7	SRQ

### TEKTRONIX 4924 ERROR STATUS :

12	END OF FILE
----	-------------

## 3. Program listing

The subroutine is listed below.

```

1000 REM *** SERVICE REQUEST POLLING AND RECOGNITION ROUTINE ****
1010 POLL Y,Z13:4:20
1020 GO TO Y OF 2000,3000,3000
1030 REM *** END OF POLLING ROUTINE ****
2000 REM *** SERVICE ROUTINE FOR DEVICE 3 (4924 TAPE DRIVE) ****
2010 INPUT @3,30:0
2020 DELETE E$
2030 DIM E$(260)
2040 A0=Z
2050 A$=""
2060 FOR I=1 TO 8
2070 B=2*(A0/2-INT(A0/2))
2080 A0=INT(A0/2)
2090 B$=STR(B)
2100 B$=SEG(B$,2,1)
2110 A$=A$&B$
2120 NEXT I
2130 C$="EOF EOT LINEALT BUSYERR SRQ NULL"
2140 PRINT "JTEKTRONIX 4924 STATUS BITS SET : "
2150 FOR I=1 TO 8
2160 B$=SEG(A$,I,1)
2170 IF B$="0" THEN 2200
2180 D$=SEG(C$,I*4-3,4)
2190 PRINT " ",I,D$
2200 NEXT I
2210 PRINT "JTEKTRONIX 4924 ERROR STATUS : "
2220 E$="NO TAPE ERROR "
2230 F$="DOMAIN OR ARGUMENT FILE NOT FOUND MAG TAPE FORMAT "
2240 E$=E$&F$
2250 F$="ILLEGAL ACCESS FILE NOT OPEN READ ERROR "
2260 E$=E$&F$
2270 F$="NO CARTRIDGE OVER-READ WRITE-PROTECTED "
2280 E$=E$&F$
2290 F$="READ-AFTER-WRITE END OF MEDIUM END OF FILE "
2300 E$=E$&F$
2310 F$=SEG(E$,Q*20+1,20)
2320 PRINT " ",I,Q,F$
2330 IF Q=12 THEN 2350
2340 RETURN
2350 FIND @3:1
2360 PRINT
2370 RETURN
2380 REM *** END OF TEKTRONIX 4924 SERVICE ROUTINE ****

```

## Membership Packets

Special packets are being mailed to those who have returned their membership cards. The packets contain submittal and order forms, documentation instructions and documentation forms.

If you need any of these forms or the documentation instructions before receiving your packet, check with your local Tektronix Field Office.

continued from page 1

For example, running this program with PLOT 50: Mathematics Vol. 1 (approximately 3 minutes) produces:

FILE #1  
430 OLD

FILE #13  
120 APPEND 1000

MAG TAPE FILE NOT FOUND IN LINE 110—  
MESSAGE NUMBER 52

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## 4051 APPLICATIONS LIBRARY PROGRAM ABSTRACTS

Documentation and program listings of these programs may be ordered for \$15.00 each. Programs will be put on tape for an additional \$2.00 handling charge per program and a \$26.00 charge for the tape cartridge. (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.)

Please use the Applications Library Order Form. Order forms are included in the Membership Packet and are available from your local Tektronix Field Office.

### • BUSINESS ADMINISTRATION

#### SECURITY/INVESTMENTS

**ABSTRACT NUMBER: 51/00-0601/0**

**Title:** *Check Book Balancing*  
**Author:** Kathy Thurman  
**Memory Requirement:** 8K  
**Peripherals:** None

**ABSTRACT:** This routine is designed to help the user balance his personal checkbook.

The user is asked to input:

1. Ending statement balance
2. Ending checkbook balance
3. All outstanding checks
4. All outstanding deposits
5. Check charges or handling costs

The output is the adjusted checkbook balance. If this does not agree with the bank statement after adjustments, the difference is printed out and the user is guided to check the entries he has made regarding his statement and check register.

### • UTILITY

#### GENERAL

**ABSTRACT NUMBER: 51/00-8006/0**

**TITLE:** *INTERACTIVE SOFTWARE CHARACTER PROGRAM GENERATOR*

**AUTHOR:** LeRoy Nollette

**MEMORY REQUIREMENT:** 8880 Bytes

**PERIPHERALS:** 4662 Plotter (Optional)

**ABSTRACT:**

An interactive program that allows the user to specify the rotation, rotation increment, character height, character width, starting X location, starting Y location and a character string. It then writes a program on tape which will draw that string. When the program generation for a string is completed the user can choose to define another string or to close the file. When the file is closed, it "Olds" in the newly created program and runs it. By changing one line in the newly generated program its output can be directed to the 4662 Plotter.

**ABSTRACT NUMBER: 51/00-8007/0**

**TITLE:** *TEXT EDITOR*

**AUTHOR:** Dee Davis

**MEMORY REQUIREMENT:** 7K + space for text

**PERIPHERALS:** None

**ABSTRACT:**

The editor accepts free form text from ASCII magnetic tape files, allows alterations, and saves the altered file on tape again—can accept 308 lines.

The editor consists of subroutines controlled by the special function keys. It can:

- Open file and form string array
- List lines
- Delete lines
- Swap lines
- Insert characters
- Delete characters
- Character search
- Renummer in basic
- Clean file
- Save file

**ABSTRACT NUMBER: 51/00-8008/0**

**TITLE:** *2D STRING ARRAYS AND SORTING OF STRING MATRICES*

**AUTHOR:** Nick Fkias

**MEMORY REQUIREMENT:** 8K Bytes

**PERIPHERALS:** Optional: 4631, 4641

**ABSTRACT:**

The program allows the user to define an N x M matrix whose elements are alphanumeric strings. Data is entered either from the keyboard or from tape. Any number of columns and/or rows can be listed. The data can be sorted according to any column. Individual elements can be changed and the new matrix can be saved on tape again. Listing can be done on the 4051 display or 4641 printer.

**ABSTRACT NUMBER: 51/00-8009/0**

**TITLE:** *SLIDE MAKER PROGRAM*  
**AUTHOR:** Dan A. Simchuk  
**MEMORY REQUIREMENT:** 8K (4051)  
**PERIPHERALS:** 4662 Opt. 1

**ABSTRACT:**

The Slide Maker Program was developed to be an aid in creating overhead slides for instruction and presentation. The operator may key in text to be printed and the X and Y scale factors for its size when plotted. The operator may manually position the text using the plotter's joystick or specify a Y position and allow the program to automatically center the text on the page.

The operator may also generate lines, boxes, and diamonds on the slide. An option is also available to generate centered text in bold letters for contrast and emphasis.

The program should be useful to anyone who presents information on a regular basis using an overhead projector and requires a rapid means of generating masters for presentation slides.

## **New Name And Winner**

The winner of the Newsletter naming contest will be announced in the February issue. Watch for the new look and new name.

## • MISCELLANEOUS

### **GRAPHICS**

**ABSTRACT NUMBER: 51/00-9511/0**

**TITLE:** *CONTOUR PLOT*  
**AUTHOR:** Bob Kopitzke, Dan Taylor  
**MEMORY REQUIREMENT:** 8K  
**PERIPHERALS:** 4662 Plotter (Optional)

**ABSTRACT**

This program produces a contour map from a rectangular array of "elevation" data points. Any number of contour levels may be chosen—it can plot one level at a time or many levels at once. There are no restrictions on the values of the levels. The program sequentially analyzes four data points (a cell) at a time. As each cell is processed all the contours which happen to pass through that cell are drawn before proceeding to the next cell. Therefore the program is more suited to the 4051 screen than to the 4662 plotter (although it will work with the plotter).

## **Applications Newsletter**

The Applications Library Newsletter is designed to provide general information and communications between 4051 users as well as abstracts of programs in the library.

Articles and programming tips should be mailed to: Tektronix, Inc., Applications Library Newsletter 60-369, P.O. Box 500, Beaverton, Oregon 97077.

4



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