

# ICOM40

**Integrated  
Communication  
System**

*For IBM PC Host*



# **ICOM40**

**Integrated  
Communication  
System**

This manual supports the  
following TEKTRONIX product:

ICOM40 Option 1Y



This manual supports a software  
module that is compatible with:

PC/DOS Version 3

*For IBM PC Host*



*Please check for change information  
at the rear of this manual*

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## ABOUT THIS MANUAL

### GENERAL INFORMATION

This manual tells you how to install and use the TEKTRONIX DOS/8540 Integrated Communication System software package (ICOM40). Before using this manual, you should be familiar with your personal computer (PC) and 8540 Integration Unit.

### MANUAL ORGANIZATION

This manual contains the following sections:

- Section 1 Provides an overview of ICOM40 with demonstration runs.
- Section 2 Describes how to use ICOM40.
- Section 3 Contains information about installing ICOM40.

### DEFINITION OF TERMS

Throughout the manual, references to the 8540 refer to the 8540 Integration Unit.

References to the PC refer to the IBM personal computer.

The term DOS refers to PC/DOS version 3.

## NOTATIONAL CONVENTIONS

Command lines use these notations:

- X> represents the DOS operating system prompt. (X represents the current disk drive.)
- 8540> represents the 8540 command mode prompt.
- Any text that follows an X> or an 8540> prompt is user input. You must enter this text exactly as shown, including all spaces.
- Upper case entries indicate DOS commands and lowercase entries indicate 8540 commands.

## DOCUMENTATION OVERVIEW

In addition to this manual, you may need to refer to the following manuals for details on specific components of the ICOM40 package.

- The *8540 Integration Unit System Users Manual* describes the 8540 and its OS/40 operating system.
- The *8540 Integration Unit Installation Guide* explains how to install and set up the 8540.

## REVISION INFORMATION

The README file contains the most up-to-date revision information about the manual. Enter important changes into the manual itself.

As the manual is revised and reprinted, revision history will be included in the manual's text and diagrams. Revised pages have the word REV and a date (REV OCTOBER 1985) at their bottom inside corner. New pages (containing old, new, or revised information) added to a section have the word ADD along with the revision date (ADD OCTOBER 1985).

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# Section 1

## LEARNING GUIDE

### SYSTEM OVERVIEW

The DOS/8540 Integrated Communication System software package (ICOM40) allows you to use an 8540 Integration Unit with a personal computer running DOS Version 2.1. The ICOM40 software simplifies communications between DOS and the 8540. With ICOM40, you need not write any special communication utilities.

### Explanation of the ICOM40 Interface

The ICOM40 package allows you to enter 8540 commands on your PC that perform software/hardware integration and debugging. ICOM40 recognizes 8540 commands entered on the PC and passes them to the 8540 for processing. The 8540 then executes the commands. The results of the executed 8540 commands are available for further processing by DOS.

You can use either of two command modes to enter 8540 commands when using ICOM40. The first mode is the 8540/DOS command mode. The 8540/DOS command mode allows you to enter both 8540 and DOS commands. In this mode you enter 8540 commands with the prefix ICOM.

The second mode is the 8540 command mode. In this mode you can enter any 8540 command without the ICOM prefix. However, you cannot enter any DOS commands until you exit from the 8540 command mode.

For more information about these two command modes, refer to "ICOM40 Demonstration Runs" at the end of this section.

### Installing ICOM40

Refer to section 3 of this manual for installation instructions.

## Description of ICOM40 Operation

When you enter an 8540 command on your PC, the following events occur:

1. Your PC reads the command and interprets it as an 8540 command.
2. The command is sent to the 8540, where it is executed.
3. Any file I/O is sent between the PC and the 8540.
4. The command output is sent back to your PC.

## ICOM40 DEMONSTRATION RUNS

The following two demonstration runs show you how to use ICOM40 with your 8540 and your PC. The first demonstration run uses the 8540/DOS command mode, which is the default method of entering 8540 commands. The second demonstration run uses the 8540 command mode.

Before performing either demonstration run, you should have installed the ICOM40 package and set up your 8540 as described in section 3.

### Demonstration Run Using the 8540/DOS Command Mode

This demonstration run shows you how to use the 8540/DOS command mode to enter 8540 commands.

#### *NOTE*

*If an error occurs during the execution of this demonstration run, refer to "ICOM40 Error Messages" in Section 2.*

1. Boot your PC and turn on your 8540.
2. Enter the following 8540 command line:

```
X> ICOM sel  
no emulator
```

The ICOM40 software recognizes the 8540 **sel** command and sends it to the 8540 for processing. The 8540 replies that you have not yet selected your emulator.

3. Use the **sel** command to specify the emulator that you will be using.  
For example, select the 8085 emulator:

```
X> ICOM sel 8085
```

4. Use the **sel** command to verify your selection:

```
X> ICOM sel  
8085
```

The 8540 responds with a message that the 8085 emulator has been selected.

5. Use the **f** (fill) command to place zeros in memory locations 00-2F:

```
X> ICOM f 0 2f 00
```

This command uses both the 8540 and the PC to produce the desired results.

6. Use the **d** (dump) command to verify that memory locations 00-2F are filled with zeros and then direct the output into a file:

```
X> ICOM d 0 2f >DUMPFFILE
```

7. List the contents of the file:

```
X> TYPE DUMPFFILE
```

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00.....
000010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00.....
000020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00.....

8. Use the **portcu** command to clean up the temporary channel file created by your ICOM40 session. Refer to Section 2 for a discussion of channel files and the **portcu** command.

```
X> ICOM portcu
```

## Summary of the Demonstration Run

In the preceding demonstration run you performed the following tasks:

- Used the 8540 **sel** and **f** commands
- Redirected the output of the 8540 **d** command into a file on the PC
- Used the **portcu** command to remove the temporary channel file

## Demonstration Run Using the 8540 Command Mode

This demonstration run shows you how to enter 8540 commands in the 8540 command mode.

### NOTE

*If an error occurs during the execution of this demonstration run, refer to "ICOM40 Error Messages" in Section 2.*

1. Boot your PC and turn on your 8540.
2. Invoke the 8540 command mode:

X> ICOM

You are now in 8540 command mode, which allows you to enter any 8540 command without prefixing it with ICOM. The 8540 command mode is signified by an 8540> prompt.

3. Enter the following 8540 command line:

```
8540> sel  
no emulator
```

The ICOM40 software recognizes the 8540 **sel** command and sends it to the 8540 for processing. The 8540 replies that you have not yet selected your emulator.

4. Use the **sel** command to specify the emulator that you will be using. For example select:

```
8540> sel 8085
```

5. Invoke the **sel** command again to verify your selection:

```
8540> sel  
8085
```

The 8540 responds that the 8085 emulator has been selected.

6. Use the **f** (fill) command to place zeros in memory locations 00-2F:

```
8540> f 0 2f 00
```

Use the **d** (dump) command to verify that memory locations 00-2F are now filled with zeros and direct the output into a file:

```
8540> d 0 2f >DUMPPFILE
```

Exit the 8540 command mode by entering the following command:

```
8540> exit
```

7. List the contents of the file:

X> TYPE DUMPFIL.

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00.....
000010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00.....
000020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00.....

8. Use the **portcu** command to clean up the temporary channel file created by your ICOM40 session. Refer to Section 2 for a discussion of channel files and the **portcu** command.

X> ICOM portcu

### Summary of the Demonstration Run

In the preceding demonstration run you performed these tasks:

- You used the 8540 **sel** and **f** commands
- Invoked and exited the 8540 command mode
- Redirected the output of the 8540 **d** command into a file on the PC
- You used the **portcu** command to remove the temporary channel file



## Section 2

# USING ICOM40

### OVERVIEW

This section tells you how to use ICOM40 for communication between the 8540 and the PC. This section covers the following topics:

- The **portcu** command
- The **exit** command
- Aborting an 8540 command
- Downloading and uploading
- SVC limitations
- ICOM40 error messages

### THE portcu COMMAND

The **portcu** (port clean up) command is used to remove the channel file created by ICOM40. The channel file maintains information about files that have been opened for use by SVCs and 8540 commands. The channel file is automatically updated when you exit ICOM40. This preserves information about open files that is needed when reentering ICOM40.

The channel file does not automatically disappear when you stop using the 8540. Use the **portcu** command to remove the channel file (HSI.TMP) when you finish with the 8540 or reboot it. For example:

```
X> ICOM portcu
```

### THE exit COMMAND

The **exit** command is used to leave the 8540 command mode. For example:

```
8540> exit
```

## ABORTING AN 8540 COMMAND

To abort an 8540 command, use one or more CTRL-BREAKS. If you are in 8540 command mode an 8540> prompt will appear, indicating that you are still in 8540 command mode. If you aren't in 8540 mode, ICOM40 will be terminated and the DOS prompt X> will appear.

## DOWNLOADING AND UPLOADING TO AND FROM THE 8540

You can use ICOM40 with Tektronix software or with software supplied by other vendors. The following paragraphs explain how to download files from your PC to the 8540 and how to upload memory images from your 8540 to files on your PC. You should have set up your 8540, booted your PC, and connected it to your 8540.

### Using Tektronix Object Format files

You may want to download a file in a Tektronix load module format produced by a Tektronix assembler or linker. Use the **lo** command to download this formatted file from the PC to the 8540.

```
X> ICOM lo PCfile.ext
```

The **sav** command uploads memory images from your 8540 to a PC file. The **sav** command produces a file in Tektronix load module format. You can download this formatted file later using the **lo** command.

```
X> ICOM sav loadd hiadd transadd PCfile.ext
```

PCfile.ext is the file specification of the file on your PC. The loadd and hiadd are the lower and upper addresses of the memory area that contains the program. The transadd is the transfer address.

The transfer address is the address to which the microprocessor program counter is set following a download. If you omit the transfer address parameter, the system will assume that the parameter is 0.

## Using HEX format files

If you are using assemblers or compilers that generate Tektronix, Intel, or Motorola hexadecimal code, you must use the **vh** command of the Extended Hex Interface Option or **rh** command for downloading.

If you are programming for 8-bit chips, you can use the **rh** command to download your files. You must use the **vh** command of the Extended Hex Interface Option for 16-bit chips.

Refer to your *8540 Integration Unit System Users Manual* for information about the **rh** command. Refer to the *8500 Modular MDL Series Extended Hex Interface Users Manual* for information about the **vh** command.

## Downloading for 8-bit Microprocessors

To download a hex format file from your PC to the 8540, use the **rh** command:

```
X> ICOM rh -format <PCfile.ext
```

Use the **i** format parameter for Intel, or the **m** format parameter for Motorola hexadecimal code. (A format parameter is not used for Tektronix hexadecimal code.) **PCfile.ext** is the filespec of the hexadecimal file on the PC.

## Downloading for 16-bit Microprocessors

To download a file from your PC to the 8540, use the **vh** command:

```
X> ICOM vh <PCfile.ext
```

**PCfile.ext** is the filespec of the file on your PC. The format of the hexadecimal code is automatically determined to be Tekhex, Intel Hex or Motorola Hex.

## Uploading

To upload a file from 8540 program memory to your PC, use the **sav** command as described in the "Using Tektronix Object Format Files" discussion. You can later download the saved program using the **lo** command.

## SVC LIMITATIONS

You must observe the following restrictions when using SVCS.

- SVCS 10, 30, 50, 70, 90, and the 8540 **as** command should reference only the files in the current directory. Assignment of files across directories is not supported.
- SVCS 13, 1C, and 16 are not supported. SVC 13 gets the command line parameter, SVC 1C gets the execution line parameter, and SVC 16 gets the last CONI character.

Refer to the *8540 System Users Manual* for further explanation of the SVCS.

## ICOM40 ERROR MESSAGES

The following is a list of ICOM40 error messages.

**ICOM: ‘ICOMPRT’ not a legal port name.**

The DOS environment variable ICOMPRT was not defined to be COM1 or COM2.

**ICOM: Can’t open ‘ICOMPRT’.**

The hardware is not present or has not been installed correctly for the designated port.

**ICOM: ‘ICOMSPEED’ not a legal baud rate.**

The specified baud rate is not one of the following: 110, 150, 300, 600, 1200, 2400, 4800, or 9600.

**ICOM: ‘ICOMPATH’ invalid path.**

The path contains nonexistent directories or ends with the backslash character.

**ICOM: ‘ICOMRETRY’ invalid.**

The ICOMRETRY environment variable contains characters other than digits.

**ICOM: ‘ICOMFTYPE’ invalid.**

ICOMFTYPE has been defined as something other than ASCII or BINARY.

**ICOM: Time out, error retry count exceeded.**

This is a communications problem. Common problems are: conflicts in baud rate, use of an HSI cable rather than an RS-232 cable, lack of power to the 8540, or use of wrong mode with the 8540.

**ICOM: Can't open channel file.**

A problem (such as write protection) exists with the channel file.

**ICOM: Improper information in channel file.**

The information in the channel file has been corrupted.

**ICOM: Data block overflow.**

The amount of incoming information overflowed the read buffer.

**ICOM: Illegal redirection.**

Redirection was attempted on the DOS command line while you tried to enter the 8540 command mode.

**ICOM: No standard input file name.**

**ICOM: No standard output file name.**

**ICOM: No standard error file name.**

Redirection was specified in ICOM40 mode but the filenames were not included.

**ICOM: Can't redirect standard input from 'FILE'.**

**ICOM: Can't redirect standard output to 'FILE'.**

**ICOM: Can't redirect standard error to 'FILE'.**

The file designated for redirection cannot be created or read.

**ICOM: Redirection illegal for LO, X, and SAV commands.**

Due to syntax changes for the LO, X, and SAV commands, redirection is no longer possible.



## Section 3

# INSTALLATION

### OVERVIEW

The following pages discuss the files provided on the distribution disk and describe the procedure for installing the ICOM40 package on the IBM PC.

### SOFTWARE DISTRIBUTION MEDIA

The ICOM40 package is shipped on one 5 1/4" DSDD 48 tpi floppy disk, which is referred to as the ICOM40 disk. The package consists of five files:

- |              |   |
|--------------|---|
| ICOM.EXE     | The executable file used to communicate with the 8540.  |
| CONFIG.DOC   | A sample CONFIG.SYS file containing parameters needed by DOS to support ICOM.   |
| AUTOEXEC.DOC | A sample AUTOEXEC.BAT file containing examples that show how to set the optional DOS environment variables used by ICOM40. The file also contains the environment variables and their default values. For more information about these variables, refer to "Setting The Logical Assignments" later in this section. |
| SET8540      | A file containing the 8540 commands necessary to program the 8540 STARTUP string so the 8540 will start up in TERM mode. For more information refer to "Setting Up The 8540".   |
| README       | A file containing manual revision information. Enter necessary changes into this manual.  |
| PART.NUM     | A file containing part number for ICOM40. This file is for reference only; it need not be copied to a DOS disk.   |

## INSTALLATION PROCEDURE

Perform the following steps to install the ICOM40 package on your PC/DOS system:

1. Inspect the ICOM40 disk. If it appears to be damaged, don't proceed any further, but contact your nearest Tektronix service center.
2. Boot your PC.
3. Insert the ICOM40 disk into drive A.
4. Read the README file on the ICOM40 disk by entering:  
`X> TYPE A:README`

5. Choose a directory on a DOS disk in which you want the executable file ICOM.EXE installed. A DOS disk is a floppy disk or fixed disk which contains the DOS operating system.
6. Copy ICOM.EXE from the ICOM40 disk to the chosen directory on the DOS disk using the DOS COPY command. For example, suppose the DOS disk is in drive C and the chosen directory is \USR\TEKPRODS\ICOM. For this example, use the following command:

`X> COPY A:ICOM.EXE C:\USR\TEKPRODS\ICOM`

7. Make sure that you have a CONFIG.SYS file in your root directory. Also make certain that the parameters in your CONFIG.SYS file are as large as those in the CONFIG.DOC file supplied on the ICOM40 disk. If the parameters are not as large, you must edit your CONFIG.SYS file to include the parameters already in CONFIG.DOC.

If your file system does not have a CONFIG.SYS file, create one by copying CONFIG.DOC into CONFIG.SYS in the root directory. To create the file, enter:

`X> COPY A:CONFIG.DOC C:\CONFIG.SYS`

### NOTE

*Copying CONFIG.DOC into CONFIG.SYS in the root directory will destroy any existing CONFIG.SYS file in the root directory.*

8. Determine if you want ICOM40 to be configured with non-default values. To configure ICOM40 with non-default values, you must include the parameters in an AUTOEXEC.BAT file in your root directory. See the following discussion entitled "Setting The Logical Assignments".

If you already have an AUTOEXEC.BAT file in the root directory, edit AUTOEXEC.BAT to include the desired parameters and values. The file AUTOEXEC.DOC in the ICOM40 package includes sample entries to be used in the AUTOEXEC.BAT file. The sample values given are the same as the default values assumed by ICOM.

If you don't have an AUTOEXEC.BAT file, you can still change the values of one or more of the variables used by ICOM. To change these values, copy AUTOEXEC.DOC into AUTOEXEC.BAT and edit it to contain only the variables and the appropriate values. To make the copy, enter:

```
X> COPY A: AUTOEXEC.DOC C:\AUTOEXEC.BAT
```

#### NOTE

*Copying AUTOEXEC.DOC into AUTOEXEC.BAT in the root directory will destroy any existing AUTOEXEC.BAT file in the root directory.*

9. Reboot your PC if you now have a new or updated CONFIG.SYS or AUTOEXEC.BAT file.

ICOM40 is now installed. Refer to "Setting Up The 8540" for information about establishing the communication between the PC and the 8540.

## Setting the Logical Assignments

ICOM40 is configured with default values used to determine its operating environment. If you want values other than the listed default values, set the following DOS environment variables using the DOS **SET** command.

- ICOMPRT—the name of the port to be connected to the 8540. The default value of ICOMPRT is COM1.
- ICOMSPEED—the baud rate of the 8540 to be attached to the PC port. The ICOMSPEED value must match the baud rate set by the 8540 REMOTE BAUD rear panel switch. The default value is 9600.
- ICOMPATH—the path to the channel file HSI.TMP used by ICOM40 whose default location is the root directory.
- ICOMRETRY—the number of retransmissions attempted in case of error. The variable's default value is 5.
- ICOMFTYPE—the type of file (binary or ASCII) that will be created by an 8540 SVC operation. This variable's default value is binary.

The variables' logical assignments are explained in the following paragraphs.

## The ICOMPORt and ICOMSPEED Variables

The ICOMPORt variable specifies the DOS logical device name (such as COM1) that ICOM40 uses to communicate to the 8540. If the ICOMPORt isn't specified ICOM40 automatically uses COM1. To use a different port (such as COM2), the following command must be included in the AUTOEXEC.BAT file.

```
SET ICOMPORt=COM2
```

The ICOMSPEED variable specifies the ICOMPORt's baud rate (such as 9600 baud). If ICOMSPEED does not exist, ICOM40 assumes 9600 baud. To use a different value (such as 2400 baud), the following command must be included in the AUTOEXEC.BAT file:

```
SET ICOMSPEED=2400
```

You may use baud rates of 110, 150, 300, 600, 1200, 2400, 4800, or 9600. The baud rate of the PC port must match the REMOTE BAUD switch setting on the 8540 rear panel.

## The ICOMPATH Variable

The ICOMPATH variable tells ICOM40 where to place the temporary file HSI.TMP, which contains the 8540's channel information. If ICOMPATH does not exist, ICOM40 places HSI.TMP in the root directory .

To specify a different path to HSI.TMP (such as \USR\TMP), place the following command in your AUTOEXEC.BAT file:

```
SET ICOMPATH=\USR\TMP
```

## The ICOMRETRY Variable

If a transmission error is detected when a message is sent between the PC and the 8540, the internal message is retransmitted a number of times before you receive an error message. The ICOMRETRY variable tells ICOM40 the number of times to try sending the message. If ICOMRETRY does not exist, ICOM40 defaults to a value of 5.

To set the ICOMRETRY variable, place the following command in your AUTOEXEC.BAT file.

```
SET ICOMRETRY=20
```

## The ICOMFTYPE Variable

The ICOMFTYPE variable specifies what type of file (binary or ASCII) will be created on your DOS system using the 8540's SVC capability. ICOMFTYPE has a default value of binary. To set the file type to ASCII, place the following command in your AUTOEXEC.BAT file:

```
SET ICOMFTYPE=ASCII
```

## Setting Up the 8540

The 8540 must be in TERM mode using the REMOTE port to communicate with ICOM40 on the PC.

The following procedure uses the PC to program the STARTUP string on the 8540. The 8540 STARTUP string is stored in the 8540 EEPROM and executed each time the 8540 is rebooted or turned on. This procedure sets the STARTUP string so that the 8540 will automatically start up in TERM mode, rather than in LOCAL mode.

1. Connect the PC port selected as ICOMPORT on the PC to the 8540's TERMINAL port (on the 8540 rear panel) using an RS-232 cable. Use the DOS **MODE** command on the PC to set ICOMPORT to the correct baud rate. The baud rate should be the same as that selected by the TERMINAL BAUD switch on the 8540 rear panel. For example:

```
X> MODE COM1:2400,E,7,1
```

2. Start up the 8540, as described in your *8540 Integration Unit System Users Manual*.
3. Copy the SET8540 file (on the ICOM40 disk) to ICOMPORT. For example:

```
X> COPY A:SET8540 COM1:
```

4. Move the RS-232 cable from the 8540 TERMINAL connector to the 8540 REMOTE connector(J101 or J102). Set the 8540 REMOTE BAUD switch to the value selected for ICOMSPEED Set the 8540 REMOTE MODE SELECT switch to CTRL.
5. Reboot the 8540 to execute the STARTUP string.
6. Enter:

```
X> ICOM sel
```

7. The 8540 should respond with the following message at the PC:

no emulator

If the above message appears, the 8540 is properly set up and the remaining steps do not apply. If ICOM40 hangs or an error message appears on the screen, the 8540 STARTUP string may have been programmed to automatically start up in TERM mode using the HSI port. The following steps are necessary to force the 8540 to LOCAL mode so the STARTUP string can be reprogrammed.

8. Turn off the 8540.

**WARNING**

*To avoid personal injury, never remove the top cover with main power ON.*

9. Set switch S1100-1 on the 8540's System Controller Board to 1 (open). Your *8540 Integration Unit Installation Guide* tells how to set this switch. Setting the switch to 1 disables the effect of any existing STARTUP string.
10. Turn on the power to the 8540.
11. Repeat the above steps 1 through 4 to program the STARTUP string with the required command. Reenable the STARTUP string with the following steps.
12. Turn off the 8540.

**WARNING**

*To avoid personal injury, never remove top cover with the main power ON.*

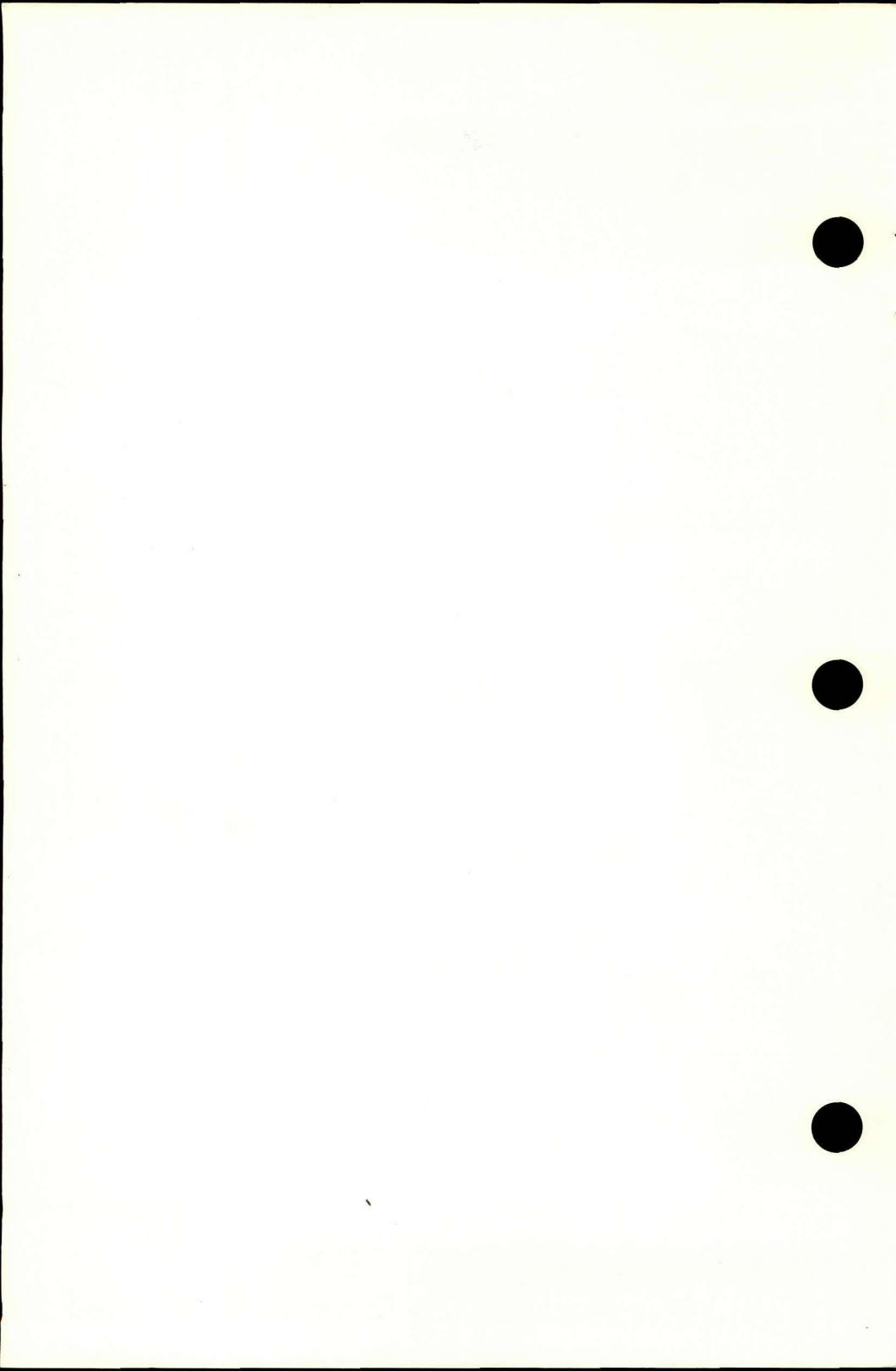
13. Set switch S1100-1 on the 8540's System Controller Board to 0 (closed). Your *8540 Integration Unit Installation Guide* tells how to set this switch.
14. Turn on the power to the 8540.
15. Repeat steps 6 through 7.

If step 7 again fails, contact your nearest Tektronix service center.

## **NOTES**

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