

COGAR SYSTEM 4 TEST LIBRARY

Manual No. A-201-1 September 1972

# COGAR SYSTEM 4 TEST LIBRARY

COGAR SYSTEM 4 IS A REGISTERED TRADEMARK OF COGAR CORPORATION

#### SYSTEM 4 TEST LIBRARY

This publication is a reference manual used to assist in the operation of the SYSTEM 4 Test Library. The Library demonstrates the ability of the SYSTEM 4 to self-diagnose and troubleshoot system failures.

The manual describes the operational procedures required to guide the user through the various programs supplied on the Test Library. Section I provides a general introduction to the library. Section II defines the diagnostic programs and provides operating procedures for each program. Section III contains operating procedures for the copy utility which is provided for back-up purposes.

Other publications relating to the software of the SYSTEM 4 are:

Programmer's Reference Manual; which contains information concerning the range of control available to the programmer in his programs, the testing and definitions of the instruction set repertoire, and the software techniques and methods which are unique to the SYSTEM 4.

Standard COGAR Library Functions; which contains descriptions and operating instructions for the Language Base Library and the I/O Libraries.

Batch Assembler Operating Instructions; which contains step-by-step instructions for creating a self-loading program tape, which has been assembled as part of an Object-String background.

# SYSTEM 4 TEST LIBRARY

# REFERENCE MANUAL

# TABLE OF CONTENTS

SE	CT	ION I. INTRODUCTION	
	Α.	FUNCTIONS AVAILABLE	7
	В.	INITIAL LOAD PROCEDURE	7
SE	CT	ION II. RETRIEVAL FUNCTION	
RE	TR	IEVAL FUNCTION	3
	Α.	PROCESSOR DIAGNOSTIC	3
		1. General Description	4
	В.	MEMORY TEST	5
		1. General Description	5 5 6
	C.	CREATE TEST TAPE	7
		1. General Description	7 9
	D.	ALTER/DISPLAY/MERGE1	0
		1. General Description.12. Operating Procedures.13. Control Keys.14. Error Conditions.1	2
	Ε.	I/O AVAILABILITY TEST	4
		1. General Description	

F.	IOS COMMANDER	
	1. General Description	16 17
G.	TAPE DIAGNOSTIC	18
	1. General Description	19
Н.	PEC I/O TEST	21
	1. General Description	21 24 24
SECT	ON III. COPY FUNCTION	
Α.	GENERAL DESCRIPTION2	26
В.	OPERATING PROCEDURES2	26
С.	TAPE ERROR CONDITION2	?7
SECT	DN IV. APPENDIX2	28

#### SECTION I

#### INTRODUCTION

The SYSTEM 4 Test Library is a Master Tape containing various diagnostics that will assist in analyzing suspected hardware problems. It also includes utility programs which supplement the diagnostic routines by allowing the user to create his own and specialized diagnostics. The utility programs provide such operations as: entering and recording data records, manipulating records from a pre-recorded cartridge, copying entire data or program cartridges, and entering and executing user-written programs.

### A. FUNCTIONS AVAILABLE

The two functions provided by the SYSTEM 4 Test Library are as follows:

### 1. Retrieval

Selection of this function provides the following diagnostic and utility programs:

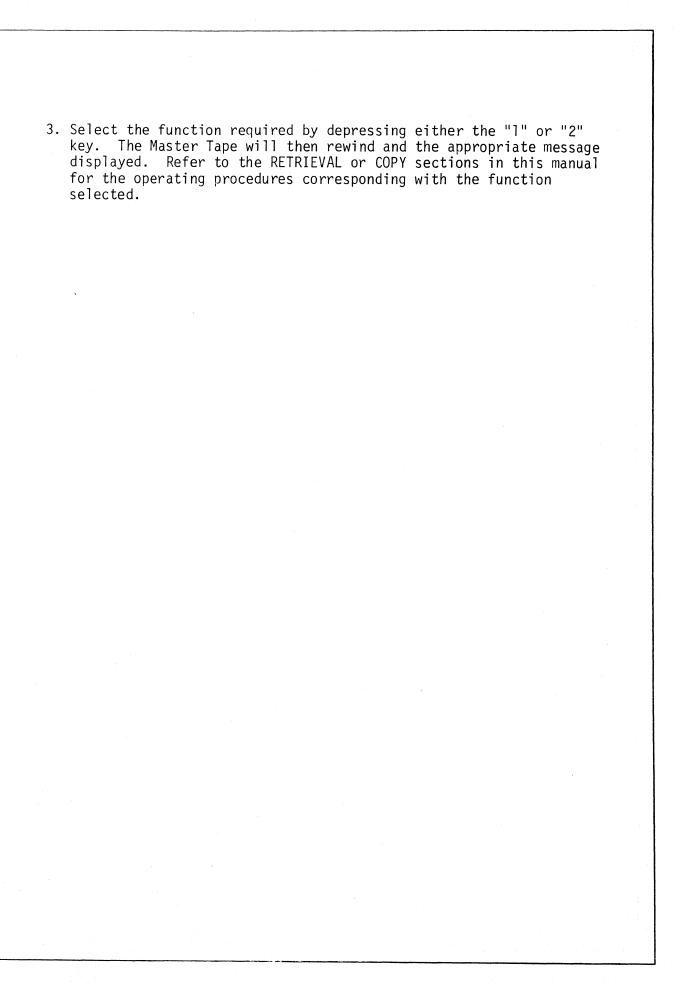
- a. Processor Diagnostic
- b. Memory Test
- c. Create Test Tape
- d. Alter/Display/Merge
- e. I/O Availability Test
- f. I/O Supervisor Commander
- q. Tape Diagnostic
- h. PEC I/O Test

#### 2. Copy

Selection of this function allows the user to copy the entire Test Library Master Tape.

### B. INITIAL LOAD PROCEDURE

- 1. Load the SYSTEM 4 Test Library Master Tape on Drive 2 and activate the PROGRAM LOAD toggle switch below the display screen (CRT).
- 2. The following message will then be displayed:



#### SECTION II

#### RETRIEVAL FUNCTION

The Retrieval function on the SYSTEM 4 Test Library provides a number of diagnostic programs for testing the hardware components of the SYSTEM 4.

If this function is selected when the Test Library is initialized (refer to INITIAL LOAD PROCEDURE, Section I, B.), the Master Tape will rewind and the following message displayed:

- 1. PROC. DIAG. 2. MEMORY TEST
- 3. CTT. 4. ADM.
- 5. I/O ON LINE? 6. IOS COMMANDER
- 7. TAPE DIAG. 8. PEC. I/O TEST

#### Figure 1.

Upon selection of one of the above options, the SYSTEM 4 Test Library Master Tape will automatically be searched until the test selected is located and loaded into memory.

Refer to the appropriate operating procedures section corresponding with the test selected.

## A. PROCESSOR DIAGNOSTIC (PROC. DIAG.)

# 1. General Description

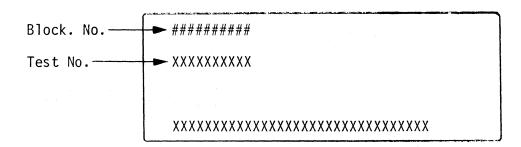
- a. The Processor Diagnostic provides a number of test records that will check all processor instructions.
- b. A series of tests are included on each test record. If any test should fail, an error indication is provided to aid in analyzing the processor area that produced the failure.
- c. A total of 84 tests are performed.

### 2. Operating Procedures

- a. After the Retrieval function has been chosen (refer to Section II Figure 1), depress the "1" Key (PROC. DIAG.). The Master Tape will then be searched until the Processor Diagnostic is found and loaded into memory.
- b. When the first record of the program is loaded, several tests are performed. If an error occurs, the error tone will be initialized (continuous keyboard "beep"). The Field Service Representative should then be notified to correct the problem.
- c. If no errors occur during the tests in the first record, the second record is loaded. The CRT should now display four lines (32 characters per line) with each character containing all bits of the 5 x 8 character matrix "on". If all bits are not "on" for <u>each</u> character, the Field Service Representative should be notified.
- d. Next, depress any key. A series of 16 test records containing the remainder of the processor diagnostics will be read and the tests performed. Should a processor error occur in any one of the tests, refer to the Processor Error Section (3.a.). If a tape error occurs while the tests are being loaded, refer to the Tape Error Section (3.b.). If all tests execute without any errors, the Master Tape will rewind and the display will contain 15 characters of all bits "on" in the first line and 32 characters of all bits "on" in the fourth line. All other locations will be blank.

#### 3. Error Conditions

- a. Processor Error -
  - 1) Indication When a processor error occurs, a continuous error tone is sounded and the following message is displayed:



NOTE: Block No. = The number of the block is indicated by the number of #'s replaced by a character with all bits "on".

Test No. = The number of the test is indicated by the number of X's replaced by a character with all bits "on".

2) Recovery - Depress any key to halt the error tone. Record the block number and test number to report to the Field Service Representative. To re-start the test, depress any key.

#### b. Tape Error -

- 1) Indication If a tape error should occur while the tests are being read from the Master Tape, one error "beep" will sound and the tape will stop.
- 2) Recovery Depress any key. This will back up the tape so that it may be re-read. By depressing another key, the tape will again be read and the test will resume.

#### B. MEMORY TEST

### 1. General Description

The Memory Test program provides a test of all memory locations by verifying that each byte of memory may contain any bit configuration.

#### 2. Operating Procedures

- a. After the Retrieval function has been chosen (refer to Section II-Figure 1), depress the "2" Key (MEMORY TEST). The Master Tape will be searched until the Memory Test program is found and loaded into memory. The Master Tape will then rewind and an intermittent keyboard "beep" will be sounded.
- b. To initialize the Memory Test, select the memory size to be tested by depressing one of the following keys:
  - 1) "4" for 4K memories
  - 2) "8" for 8K memories
  - 3) "9" for 16K memories
- c. As the test is running, various patterns are displayed. These patterns represent the data that is being stored and checked in each memory location. After a number of patterns, the screen will be blanked for approximately 30 seconds. The program will then sound one keyboard "beep" and re-start the test. To end the test, depress the SYSTEM RESET Button located below the CRT or load another program tape.

### 3. Error Conditions

- a. Indication If a memory failure is detected, a continuous error tone will sound. The first position on the screen contains the location of the failure as coded by the bit configuration.
- b. Example An example of a memory failure and the error display (first character on the screen) is as follows:

1 2 3 4 5

Decode Procedure - (location 0 is the top row)

- 1) Column 1 all bits will always be "on".
- 2) Column 2 base address (Page number refer to the Appendix (Section IV) for a table showing the base addresses for a 4K memory system). The decode of the example above (3.b.) is:

$$\begin{bmatrix}
 0_10 & 1_10_10 & 0_10_10_1 & 0 \\
 7 & 6 & 5 & 4 & 3 & 2 & 1 & 0
 \end{bmatrix} = 040$$

3) Column 3 - memory location. The decode of the example above (3.b.) is:

- 4) Column 4 disregard.
- 5) Column 5 disregard.

ANSWER: The memory failure occurred at Page 10, location 102 (octal notation).

### C. CREATE TEST TAPE (CTT)

### 1. General Description

- a. The Create Test Tape program is a utility that allows the operator to prepare the data cartridge required as input by the Tape Diagnostic Program (refer to Section II, G.) or any user-written program requiring a data file.
- b. The first three characters of each record are the record count. This count is incremented by one after every write operation.
- c. An End of Tape check is provided which stops the tape operation after 900 records and displays an end of tape message.

### 2. Operating Procedures

- a. After the Retrieval function has been chosen (refer to Section II Figure 1), depress the "3" Key (CTT). The Master Tape will then be searched until the Create Test Tape program is found and loaded into memory. The Master Tape will then rewind.
- b. The following message will be displayed:

CREATE TEST TAPE

KEYS 1,2,3,4,5,6 SELECT DECKS

1,2,3,4,5 OR 6

c. Select the deck required and mount the appropriate tape (a blank tape or one with previously created data).

d.	0nce	the	deck	selec	tion	is	made,	the	data	buffer	(I/O	area)
	is d	ispla	ayed	as fol	lows:	:						

000

Keying into this buffer may be done at this time.  $(\underline{\text{NOTE}}:$  The function keys shown in Section 3 should not be used). After 125 characters are keyed, they will automatically be written on the deck that was selected.

- e. Any (or all) of the following special functions may be selected before an I/O operation is performed:
  - 1) CTRL/PROG SELECT Keys (Hold down the CTRL Key and depress the PROG SELECT Key) I/O buffer will be filled with a test pattern.
  - 2) CTRL/BKSP FLD Keys (Hold down the CTRL Key and depress the BKSP FLD Key) Contents of I/O buffer will be shifted to the right one position after each write operation.
  - 3) CTRL/@ Keys (Hold down the CTRL Key and depress the @ Key) 1/2 inch inter-record gap is selected instead of 1.1 inch.

To reset the special function(s) that you have selected (as shown above) and re-initialize the deck selection (refer to 2.b.), hold down the CTRL Key and depress the START Key.

### 3. <u>Control Keys</u>

The following function keys are provided:

### NOTE:

a. CTRL/XXX requires that the CTRL Key and the control key specified be simultaneously depressed.

b. CTRL/XXX, Y requires that the CTRL Key and the control key specified be simultaneously depressed. Release the two keys and then depress the third key (Y) specified.

c. XXX, Y requires that the first key (XXX) be depressed, then

the second key (Y).

FUNCTION	CONTROL KEYS
Dot fill I/O Buffer	LEFT ZERO
Memory (I/O buffer) Backspace	CORR
Read Continuous	CTRL/REL
Read one record	REL, REL
Read previous record	REL, B
Rewind deck selected	CTRL/EOJ
Search high-speed fwd. over 20 records	CTRL/S, F
Search high-speed rev. over 20 records	CTRL/S, B
Space-fill I/O buffer & write to tape	SKIP
Tape Backspace	BKSP REC
Write continuous	CTRL/DUP
Write End of File record	END FILE
Write End of Text	CTRL/END FILE
Write one record	DUP

### 4. Program Notes

- a. End of Tape Procedure
  - 1) Upon reading an end of tape record, the tape operation will halt and the following will be displayed:

EOT	•••••
•••••	• • • • • • • • • • • • • • • • • • • •
• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •
• • • • • • • • • • • • • • • • • • • •	

- 2) Depression of any key will display the initial message (refer to 2.b.).
- b. After completing a search operation, the previously read information will still be displayed. A tape read operation will display the block searched to.

### D. ALTER/DISPLAY/MERGE (ADM)

# 1. <u>General Description</u>

- a. The Alter/Display/Merge program allows the operator to perform the following operations:
  - 1) Alter selective memory locations from the keyboard.
  - 2) Display memory locations or tape records read.
  - 3) Read or write data on tape cartridges.
  - 4) Enter and execute a user-written program.

b. When displayed, the memory addresses are specified as a five-digit octal location in the following format: PP-LLL (where P = the memory page, and L = the memory location). The memory contents contained in the octal memory locations as specified above are displayed as a three-digit octal number. The format for a typical memory display is:

PP-LLL XXX YYY

The above display is interpreted as follows:

P = memory page

L = memory location

X = memory location contents

Y = memory location +001 contents

- c. The display areas utilized are: (in octal notation)
  - 1) Page 01-000 thru Page 01-177. This area is displayed when a tape read or tape copy function is selected.
  - 2) Page 00-200 thru Page 00-377. This area is used to display the address and contents of eight consecutive memory locations when the Alter or Display mode is selected.
- d. The Alter/Display/Merge program is located in Page 14-000 thru Page 17-375 (octal). This should be noted whenever the Alter selection is made.

#### 2. Operating Procedures

- a. After the Retrieval function has been chosen (refer to Section II Figure 1), depress the "4" Key (ADM.). The Master Tape will then be searched until the ADM program is located and loaded into memory. The Master Tape will then rewind.
- b. The next display will show the memory contents of locations 000 thru 007 of Page 00. You should then remove the Master Tape and load any tapes necessary for your job.

### 3. Control Keys

The following tables contain the keyboard control keys provided for the various functions:

 $\underline{\text{NOTE}}$ : a) X, Y requires that the first key (X) be depressed and

released. Then depress the second key (Y).
b) X, Y, Z requires that the first key (X) be depressed and released. Then depress the second key (Y) and release.
Next, depress the third key (Z).

# TAPE OPERATIONS

<u>FUNCTION</u>		CONTR	OL KEYS
Backspace Drive 1 one	record	BKSP	RECORD, A
Backspace Drive 2 one	record	BKSP	RECORD, B
Copy 1 thru 9 records Drive 2 to Drive 1	from	c, 1	9
Copy 15 records from Drive 2 to Drive 1		C, A	
Copy file from Drive 2 to Drive 1 (256 record		C, F	
Halt Tape Operation		Н	
Read one record from D (store data in Page Ol		E	
Rewind Drive 1		R, A	
Rewind Drive 2		R, B	
Skip 1 thru 9 records	on Drive 1	S, A,	1 9
Skip 1 thru 9 records	on Drive 2	S, B,	1 9
Skip 15 records on Dri	ve 1	s, A,	A
Skip 15 records on Dri	ve 2	S, B,	Α
Skip file on Drive 1 (	256 records)	S, A,	F
Skip file on Drive 2 (	256 records)	S, B,	F
Write one record on Dr (data from Page 01)	rive l	W	

#### DISPLAY OPERATIONS

### **FUNCTION**

### CONTROL KEYS

Display an address.

F, followed by page and location (octal).

Display contents of consecutive memory locations.

D

### ALTER OPERATIONS

#### **FUNCTION**

#### CONTROL KEYS

Enter address to be altered.

A, followed by page and location (octal).

Enter new contents.

Function 1 followed by desired value (must enter data for the location and location +001)

### EXECUTE PROGRAM MODE

#### FUNCTION

#### CONTROL KEYS

Execute user's program (starting in POI, 000).

Χ

NOTE: The program referred to above (Execute Program Mode) is entered from the keyboard during the Alter mode or read in from a user's program tape. The starting location of the user's program <u>must</u> be at Page 01,

location 000.

### 4. Error Conditions

a. Indication - Whenever a tape read or write error occurs, the following message is displayed:

TAPE ERROR

DEPRESS ERROR RESET KEY

TO RESTART PROGRAM

b. Recovery - Depress the ERROR RESET Key. You may then continue your job.

#### E. I/O AVAILABILITY TEST (I/O ON LINE?)

#### 1. General Description

- a. The I/O Availability Test program performs two functions:
  - 1) Determine whether or not the system in use is equipped with a serial I/O interface.
  - 2) Informs the user of any I/O devices available.
- b. The second test (I/O devices available) runs continuously until another program is loaded or the SYSTEM RESET Button below the CRT is depressed. Therefore, a current list of available devices (represented by the octal address of each) is always displayed as devices are added to or removed from the I/O cable.

#### 2. Operating Procedures

- a. After the Retrieval function has been chosen (refer to Section II Figure 1), depress the "5" Key (I/O ON LINE?). The Master Tape will then be searched until the I/O Availability Test is found.
- b. As the program is being loaded into memory, the first test is performed. This test determines whether or not the system is equipped with a serial I/O interface.

If it is not, the following message is displayed:

THIS MACHINE IS NOT EQUIPPED WITH A SERIAL I/O INTERFACE

The program will then halt. If any key is depressed at this time, the test will be repeated.

- c. Once the first test is passed, the Master Tape rewinds and the I/O devices available are determined. This is performed by polling the 64 I/O addresses sequentially.
- d. If a valid response is received, the address is added to the following message:

OCTAL ADDRESS OF AVAILABLE I/O

DEVICES: XX

Where XX =

Address available in octal notation.

Up to thirty addresses may be displayed at one time. This number is dictated by the number of addresses that can be simultaneously displayed. If more than thirty valid responses are received, the following message is displayed:

OCTAL ADDRESS OF AVAILABLE I/O

DEVICES: THERE ARE MORE THAN

THIRTY DEVICES AVAILABLE

Depression of any key at this time will continue the test.

e. If no valid responses are received after polling the 64 I/O addresses, the following message is displayed:

OCTAL ADDRESS OF AVAILABLE I/O

DEVICES: THERE ARE NO DEVICES

AVAILABLE

If at any time while this message is displayed, a device is connected to the I/O cable, the address will be displayed as shown in step "d".

#### F. IOS COMMANDER

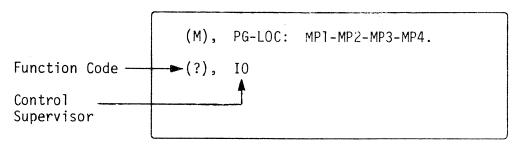
### 1. General Description

- a. The IOS Commander provides keyboard entry of any DPL-2 instruction in octal notation.
- b. Two control supervisors are provided when entering and executing an instruction:
  - 1) IO This supervisor should be used when executing a DPL-2 I/O instruction (any Group 1 or Group 4 DPL-2 instruction refer to SYSTEM 4 Instruction Reference Card for instructions in these groups.).
  - 2) DP This supervisor is used to execute <a href="mailto:any">any</a> DPL-2 instruction.
- c. An instruction entered may be executed one time or continuously.

#### 2. Operating Procecures

a. After the Retrieval function has been chosen (refer to Section II - Figure 1), depress the "6" Key (IOS COMMANDER). The Master Tape will then be searched until the IOS Commander is found and loaded into memory. The Master Tape will then rewind.

b. The following message will be displayed:



### 3. <u>Control Keys</u>

The following function control keys are available:

FUNCTION	CONTROL KEY
Display data buffer (I/O area)	D
Enter DPL-2 instruction from keyboard	А
Execute instruction once	<b>E</b>
Execute instruction continuously until any key is depressed	G
Rewind mini-deck selected	F
Select alternate control supervisor	PROG SELECT

# 4. <u>Sample Entry</u>

a. The first step in entering a DPL-2 instruction is to select the control supervisor required (refer to General Description - b.). Depression of the PROG SELECT Key will change the control supervisor from IO to DP and vice versa.

b. Next, depress the "A" Key to enter the DPL-2 instruction from the keyboard (See Control Keys section for other function keys available). The following will be displayed:

(M), PG-LOC: MP1-MP2-MP3-MP4.

(A), IO ????????????.

You will notice that the function code on the second line that previously contained a question mark (?) (to the left of the IO indication) contains an "A". To the right of the IO indication are 15 question marks (?). This indicates that the IO supervisor is ready to accept a DPL-2 instruction in octal representation.

- c. Key the DPL-2 instruction using the following example as a guide:
  - 1) FUNCTION REQUIRED read a 128 character record from Drive 1.
  - 2) CRT DISPLAY AFTER KEYBOARD ENTRY -

(M), PG-LOC: MP1-MP2-MP3-MP4.

(A), IO 017-200-001-000.

NOTE: The hyphens (-) shown on line 2 are automatically entered by the program.

- 3) EXECUTE THE INSTRUCTION Depress the "E" Key. One record will then be read from Drive 1 and the function code (on line 2) will contain an "E".
- G. TAPE DIAGNOSTIC (TAPE DIAG.)
  - 1. General Description
    - a. The Tape Diagnostic program exercises the mini-tape read, write and high-speed search functions.
    - b. Error counts are kept for read and write retries and search errors. These counters help to evaluate tape deck performance.

### 2. Operating Procedures

- a. After the Retrieval function has been chosen (refer to Section II Figure 1), depress the "7" Key (TAPE DIAG.). The Master Tape will then be searched until the Tape Diagnostic program is found and loaded into memory. The Master Tape will then rewind.
- b. After the program load, the CRT will be blanked. You should then load a data tape (created by the Create Test Tape Program CTT) containing 400 records on Drive 1 and a blank tape on Drive 2.
- c. Depress any key. The data tape on Drive 1 will be read, and the records written to Drive 2. The record being written will be displayed.
- d. Every 15 records, there is a forced write retry on Drive 2. Every 20 records, there is a high-speed search forward 20 records and a high-speed search reverse 20 records on Drive 1. This search test will continue until 300 records have been transferred to Drive 2. After the 300 records have transferred, the remainder of the records will be copied until a total of 400 records are written to Drive 2.
- e. When 400 records have been written to Drive 2, both tapes will rewind and the following error count notification is displayed:

l	WBAAARETRY
ı	RABBBRETRYCCFSSDRS
	EEE

The above message is interpreted as follows:

AAA = number of retries on Drive 2

BBB = number of retries on Drive 1

CC = number of forward search errors

DD = number of reverse search errors

EEE = pass number (number of times 400 records have been transferred from Drive 1 to Drive 2 and then from Drive 2 back to Drive 1).

f. At this time, depress any key twice. This will initialize the test exactly the same way as described above, except that Drive 2 is read and Drive 1 is written. After 400 records have been transferred from Drive 2 to Drive 1, the test may be executed again (from Drive 1 to Drive 2). Each time the test is run, the same statistics as described in Section 2.e. are displayed.

#### NOTE:

- 1) After the data is transferred from Drive 1 to Drive 2, the first two characters displayed on line 1 (refer to 2.e.) will be WB (Write Drive 2 or "B") and the third line will contain RA (Read Drive 1 or "A") in the first 2 positions.
- 2) After the data is transferred from Drive 2 to Drive 1, the first two characters of line 1 (refer to 2.e.) will be WA (Write Drive 1 or "A") and the third line will contain RB (Read Drive 2 or "B") in the first 2 positions.
- 3) The error status indications will be reset to zero at the beginning of each test.

#### 3. Error Conditions

a. Indication - if any irrecoverable tape errors should occur on either drive, the following will be displayed:

WX.CCCC.DDDDD.YYYRETRY	
••••••	
RZ.CCCC.DDDDD.YYYRETRYYYFSYYRS	
###YYY	

The above message is interpreted as follows:

X = Drive written (A = Drive 1, B = Drive 2)

Z = Drive read (A = Drive 1, B = Drive 2)

Y = Statistics as described in 2.e.

CCCC = RNWY. This indicates that a tape runaway has occurred on either the write (line 1) or read (line 3) drive.

. ( Lephno or Poed Alevino

- DDDDD = 8RTRY. This indicates that a retry was performed eight times on either a read or write command and could not be performed successfully. (If indication is on line 1, a write error has occurred. If on line 2, a read error has occurred).
  - ### = The block number that caused the error. This number may not be displayed if the beginning of the record caused the error.
- b. Recovery If either irrecoverable error occurs, (RNWY or 8RTRY) both operations will halt and the message as described in Section 3.a. will be displayed. Depressing any key at this time will rewind both drives. The Tape Diagnostic program should then be reloaded.

#### H. PEC I/O TEST

### 1. General Description

- a. The PEC I/O TEST program tests all read/write functions of the "maxi" tape drive.
- b. This test provides special operating modes useful in isolating hardware malfunctions.

### 2. Operating Procedures

- a. After the Retrieval function has been chosen (refer to Section II Figure 1), depress the "8" Key (PEC.I/O TEST). The Master Tape will then be searched until the PEC I/O TEST is found and loaded into memory. The Master Tape will then rewind.
- b. The following message will be displayed:

MAXI-TAPE READ/WRITE TEST

FUNCTION KEY DEFINITION

"SPACE TO TURN PAGE"

PROG. SEL = ALTERNATE: INST/RUN

- c. Depression of the SPACE BAR at this time will display the first in a series of 5 messages that contain all function keys available. Depress the SPACE BAR to display the next message. After the 5 function key messages have been displayed, the initial message (refer to 2.b.) will be displayed.
- d. If the PROG SELECT Key is depressed (rather than the SPACE BAR) after the initial message (refer to 2.b.), the following message will be displayed:

ADDRESS ??

STATUS BITS 76543210

STATUS REPLY 00000000

DISPLAY: CTL/S=STATUS CTL/D=DATA

The only keys functional at this time are:

PROG SELECT = returns to first message (2.b.)

HOM = resets address keyed

Numeric Keys = enters the maxi-tape address (00-77 Octal)

e. Enter the address required and depress the START Key. The following control keys will then be operational:

NOTE: CTRL/XXX requires that the CTRL Key and the control key specified be depressed simultaneously.

FUNCTION	CONTROL KEYS	
"Back-Up" one record	BKSP RECORD	
Check Status (loop)	MINUS	
Correct character in display (I/O) area	CORR	
Delete CRC Xmit Check	CTRL/MINUS	
Delete retry on Tape Error	ERROR	
Dot fill display (I/O) area	SKIP	

FUNCTION

CONTROL KEYS

Erase Tape

CTRL/LEFT ZERO

I/O Address (loop)

**START** 

Initialize Address Entry

HOM

Load test pattern into display I/O area

CTRL/PROG SELECT

Read Continuously

CTRL/REL

Read one record

REL

Retry Continuously

CTRL/ERROR

Rewind

EOJ ·

Rewind with interlock

CTRL/E0J

Shift write (I/O area) buffer

BKSP FIELD

Write Continuously

CTRL/DUP

Write File Mark

END FILE

Write one record

DUP

Write retry

CTRL/BKSP RECORD

NOTE: All undefined keys entered will be placed in the data buffer.

- f. There are two display functions provided as shown on the fourth line of the message (refer to 2.d.):
  - 1) Status Depression of the CTRL/S Keys will display the current status.
  - 2) Data Depression of the CTRL/D Keys will display the contents of the data buffer. You may then enter new data or return to the "address" message (2.d.) by depressing the HOM Key.

NOTE: The above two options may only be used after the address is entered and the START Key is depressed.

### 3. Special Function Modes

- a. NO RETRY (ERROR Key) This mode inhibits the read or write retries that are normally performed when a tape error occurs. Instead of retrying, the program proceeds to the next record to continue reading or writing.
- b. RETRY CONTINUOUSLY (CTRL/ERROR Keys) In this mode, a tape error will result in continuous retries at reading or writing the record as long as the tape error occurs or until a key is depressed. This mode is operative only with a continuous read or write selection (CTRL/REL or CTRL/DUP).
- c. DELETE CRC CHECK (CTRL/MINUS Keys) This mode eliminates the software CRC Check that is normally made after each read or write operation.

#### 4. Error Conditions

Error messages are self-explanatory and displayed when appropriate. Special error cases are described below:

- a. Status Reply XXXXXXXX after depressing the START Key (I/O address (loop)) indicates an irrecoverable hardware malfunction.
- b. Write tape errors are as follows:
  - TAPE ERROR 1 = error detected during write (before the read after write check was started). Probable cause: Timing.
  - TAPE ERROR 2 = error detected during the read after write check. Probable cause: Parity.
  - TAPE ERROR 3 = error detected at end of read after write check. Probable cause: CRC or LRC.
- c. An error message of CRC NOT RCVD when attempting to write means either a status byte was received instead of one of the two CRC bytes or a data byte was received when the final status was due.

### 5. Program Notes

- a. After each function is performed, the complete binary status received from the I/O is displayed (Status Reply on the third line refer to 2.d. message).
- b. Block count is reset by rewind, rewind with interlock, HOM or PROG SELECT.
- c. Block count is not incremented during a retry.
- d. The data buffer entry point is not cleared by a write operation. Thus, the buffer may be partially filled, a write performed, then additional entries made.
- e. When a software CRC Check fails, the program calculated CRC is displayed in the following bit sequence: P76543210.

### SECTION III

#### COPY FUNCTION

#### A. GENERAL DESCRIPTION

The COPY FUNCTION is a special program designed exclusively for copying the Test Library Master Tape (for back-up purposes). Due to the unique characteristics of the test records contained in the various diagnostic programs, an attempt to copy the Test Library with standard copy utilities would result in a tape error.

#### B. OPERATING PROCEDURES

- 1. After the Master Tape has been loaded into memory, and the initial message displayed (refer to INITIAL LOAD PROCEDURE, Section I.B.), select the COPY function (2) (COPY).
- 2. The following message will then be displayed:

MOUNT SCRATCH TAPE ON DRIVE # 1,
PRESS 'START' TO CONTINUE....

- 3. Load a blank tape on Drive 1 and depress the START Key.
- 4. The Master Tape on Drive 2 will then be copied onto Drive 1.
- 5. After the last record has been transferred, the following message is displayed:

BUILD RUN HAS BEEN COMPLETED....

OUTPUT FROM THE RUN IS ON DR. #1

6. Remove the copy from Drive 1 and mark it accordingly. To assure that the copy operation was performed correctly, execute the program load procedure.

### C. TAPE ERROR CONDITION

1. If an irrecoverable tape error should occur, both tapes will rewind and the following message will be displayed:

TAPE ERROR - RESTART JOB!

2. Reload the SYSTEM 4 Test Library Tape and restart the job (refer to Section I.B.1.).

SECTION IV

### **APPENDIX**

		S#0	S#1
L#0	R-	000	040
	I-	002	042
	D-	003	043
L#1	R-	004	044
	I-	006	046
	D-	007	047
L#2	R-	010	050
	I-	012	052
	D-	013	053
L#3	R-	014	054
	I-	016	056
	D-	017	057
L#4	R-	020	060
	I-	022	062
	D-	023	063
L#5	R-	024	064
	I-	026	066
	D-	027	067
L#6	R-	030	070
	I-	032	072
	D-	033	073
L#7	R-	034	074
	I-	036	076
	D-	037	077

	S#0	S#1
L#0	P00	P10
L#1	P01	Pll
L#2	P02	P12
L#3	P03	P13
L#4	P04	P14
L#5	P05	P15
L#6	P06	P16
L#7	P07	P17

BASE ADDRESS

PAGE NUMBER

The above tables show the relationship between the base address and page numbers for a 4K memory (in octal notation). Refer to the SYSTEM 4 Instruction Card for extending the notations to 16K.

Manual No. A-201-1

September 1972

COGAR INFORMATION SYSTEMS, INC.

COSBY MANOR ROAD UTICA, NEW YORK 13502 (315) 797-5750