

COLECO INDUSTRIES INC.

5.25 INCH FLOPPY DISK DRIVE

REPAIR GUIDE

DOCUMENT #: 323 - 173.0

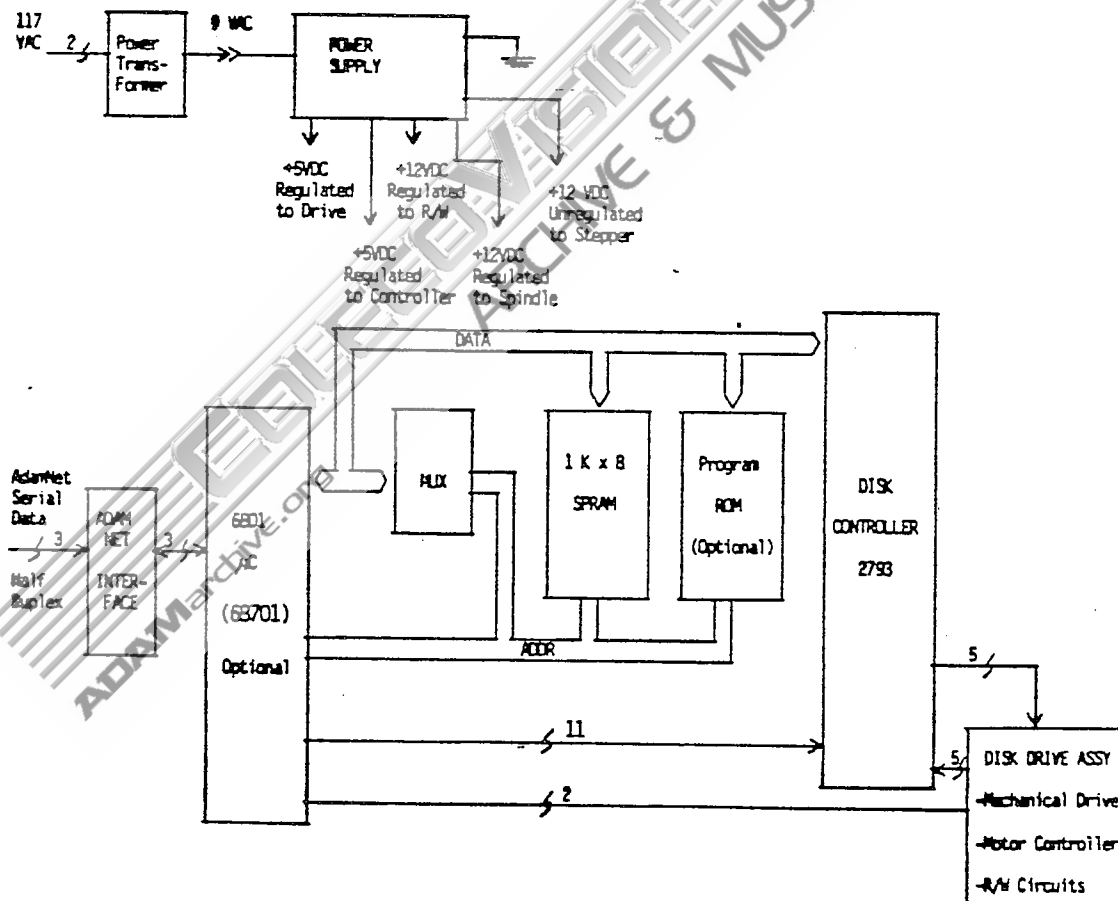
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CHAPTER 1. FUNCTIONAL BLOCK DIAGRAM

The 5.25 inch floppy disk drive is a stand-alone unit designed to be used as a peripheral to the Adam Computer System. Self contained, the disk drive has its own power supply, floppy disk controller, AdamNet interface circuitry, and housing. The disk, itself, is single-sided with a double density format. The unit utilizes an MPI Model 501C Drive. A functional diagram is shown in Figure 1 below.



CHAPTER 2. HOW TO USE THIS GUIDE

A. Confirm / Verify Problems Described

1. Inspect for physical damage as most probable cause of failures.
 - a. Check all connectors, wiring, and components for good connection.
 - b. Clean edge fingers and other contact points

B. Cautions.

1. Handle assemblies and components with care appropriate to avoid damage to static sensitive devices.
 - a. Testing must be performed at an ESD protected work station.
 1. Conductive mat/work surface.
 2. Properly grounded operator.
 3. No plastic tools e.g. desoldering tools.

C. Equipment Necessary to perform additional tests when symptom not listed.

1. Coleco SmartBasic cassette.
2. Recording Interchange Diagnostics (R.I.D.) Test Diskette. Reference R.I.D. Disk Drive Test Procedure (Log # 131.0, Appendix A).

D. Using customer description of problem and/or previous test results (see Chapter 4: Quick Overall Check), use Failure Index as diagnostic pointer to probable defects and cause.

E. Refer to MPI Product Manual for additional disk drive mechanical and read/write electronics.

CHAPTER 3. FAILURE INDEX

Recording Interchange Diagnostics (R.I.D.) Test

<u>Symptom</u>	<u>Cause</u>
A. Write Protect Test	
PASS	Good Disk Drive.
FAIL	1. Electronic component problem.
B. Disk Drive Speed	
PASS	Speed within tolerance + or - (%).
FAIL	3. Mechanical adjustment problem.
C. ABS Track Position	
PASS	Alignment within tolerance.
FAIL	3. Mechanical adjustment problem.
D. Track to Track Test	
PASS	Alignment within tolerance.
FAIL	3. Mechanical adjustment problem.
E. Motor Hysteresis Test	
PASS	Good disk drive.
FAIL	Mechanical adjustment problem.

R.I.D. Test Continued....

F. Tunnel Erase Test

PASS	Good disk drive.
FAIL	3. Mechanical adjustment.

G. Head Azimuth Test

PASS	Good disk drive.
FAIL	3. Mechanical adjustment problem.

H. Signal to Noise Test

PASS	Noise within tolerance.
FAIL	3. Mechanical adjustment problem.

I. Drive Clamping Test

PASS	Good disk drive.
FAIL	3. Mechanical adjustment problem.

Dual Disk Drive Burn-In Error Codes.

A. Write Protected Block #

PASS	No error.
FAIL	1. Electronic component problem.

B. Missing Media Block #

PASS	No error.
FAIL	1. Electronic component problem.

C. Cannot Find Block #

PASS	No error.
FAIL	1. Electronic component problem.
	3. Mechanical adjustment problem.

D. Device Time Out Error Block #

PASS	No Error.
FAIL	1. Electronic component problem.

Burn-In Error Codes Continued.. .

E. Data Compare Error Block #

PASS	No error.
FAIL	1. electronic component problem.

Write/Read Disk Drive Test Error Codes.

A. Data Compare Error

PASS	No error.
FAIL	1. electronic component problem.

B. Checksum Error

PASS	No error.
FAIL	1. electronic component problem.

C. Media Not Found

PASS	No error.
FAIL	1. electronic component problem.

D. Block # Error

PASS	No error.
FAIL	1. electronic component problem. 3. mechanical adjustment problem.

E. Write Protect Error

PASS	No error.
FAIL	1. electronic component problem.

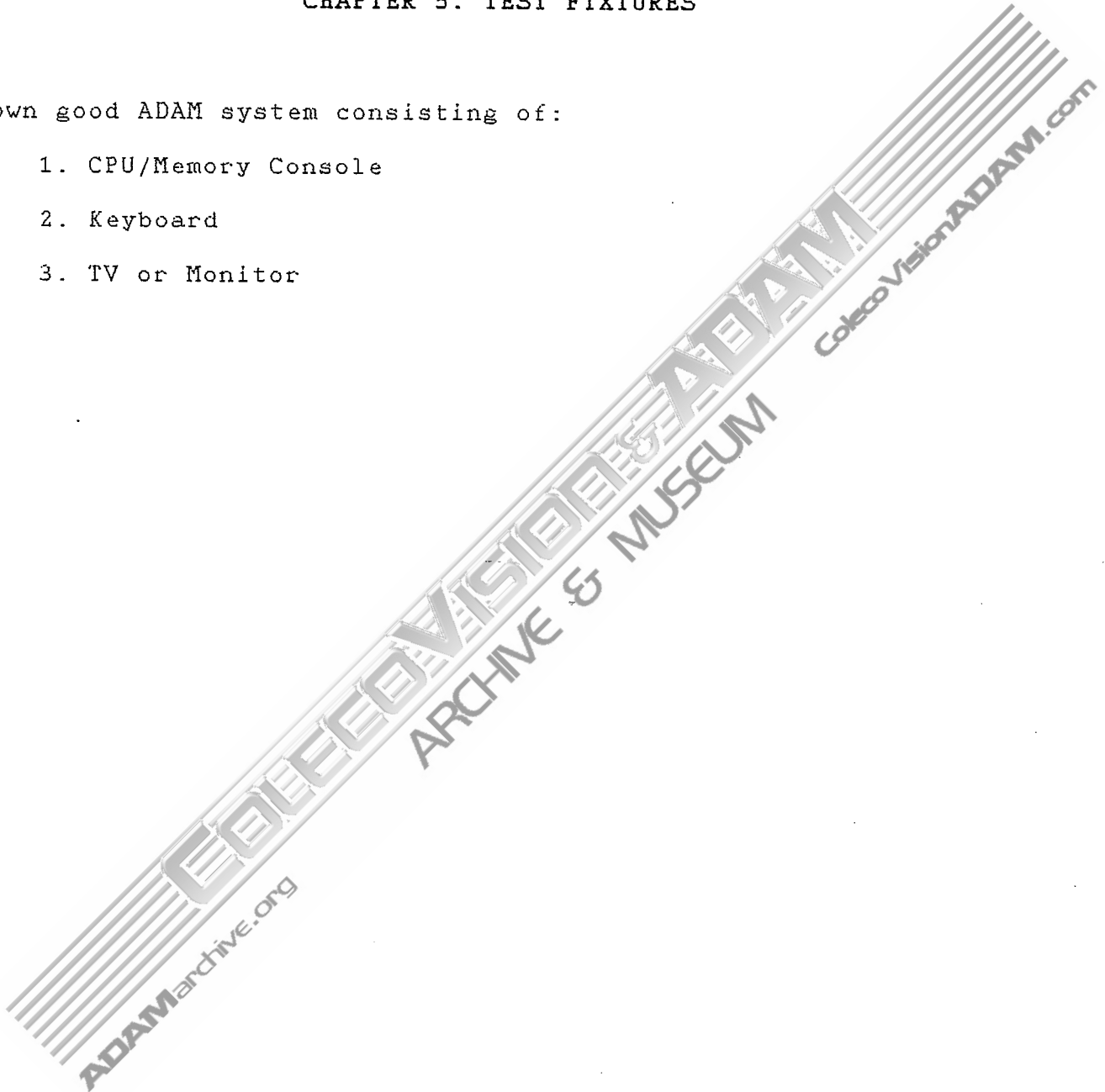
CHAPTER 4. QUICK OVERALL CHECK

- A. Check all system interconnections for integrity.
- B. Check power supply voltages at all PC Assemblies.
- C. Use a known good ADAM computer system and attempt to write and read from the suspect drive with the ADAM word processor.
- D. Use R.I.D. Test to highlight functional problems. Reference R.I.D. Test procedure (Log# 131.0, Appendix A.) Failures are detected by observing screen display.

CHAPTER 5. TEST FIXTURES

Known good ADAM system consisting of:

1. CPU/Memory Console
2. Keyboard
3. TV or Monitor



CHAPTER 6. SCHEMATIC AND ASSEMBLY DOCUMENTATION

A. Disk Controller

1. Assembly, Controller/Power Supply: 300011
2. Schematic, Controller/Power Supply: 300012

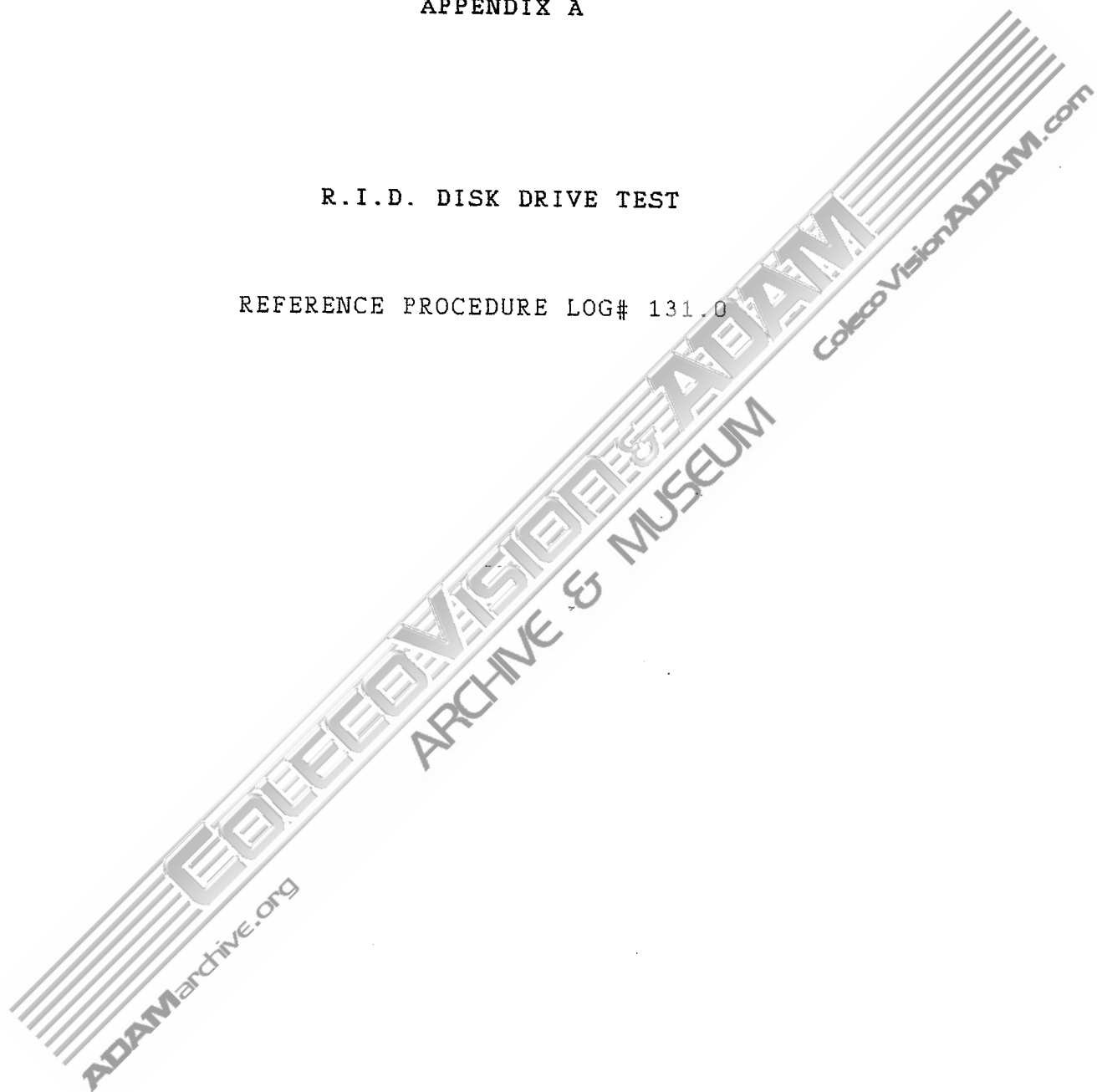
B. Additional Reference Documents

1. Delta/Gamma Schematic: 41843
2. MPI P/N 03029-001
5.25 Inch Slimline Flexible Disk Drive
Product Manual

APPENDIX A

R.I.D. DISK DRIVE TEST

REFERENCE PROCEDURE LOG# 131.0



APPENDIX B. FUNCTIONAL BLOCK DESCRIPTION

NOTE: This section describes the electrical interface requirements between the host system (Adam disk controller interface) and the 5.25" Slimline Series Disk Drives.

Electrical Interfacing

Interface connections are made thru two cables, the power cable and signal or I/O cable. The following paragraphs will describe each line on the interface cable.

All lines on the signal interface are digital (TTL open collector) in nature and provide either input signals to the drive or output status and data to the controller. Each line is paired with a ground line. All output lines are open collector outputs and must be properly terminated at the controller end. The signal interface cable should be 36 wire flat ribbon cable no more than 10 feet in length.

A. Line Termination

A signal on an input line will be received by a 74LS14 receiver at the drive and should be driven by a 7438 driver or equivalent by the user system. Likewise, an output signal from the drive will be driven by a 7438 and should be received by a 74LS14 or equivalent by the user system. All input signals are terminated directly by either a 150 ohm to +5v or 220/330 ohm resistor network. In multiple drive systems using daisy chain connections, all input lines should be terminated only at the last drive, while in star scheme connections, each individual drive should be terminated properly.

B. Input Lines

In multiple drive systems all input lines will go to all drives but only the selected drive will respond to these signals. A drive can be selected by a user assigned jumper installation in the drive and by activating the corresponding Drive Select input line. Input signal lines have the following specifications:

- A. Active or true - logical zero (0.0V to .4V)
- B. Inactive or false - logical one (2.5V to 5.25V)
- C. Input impedance - 150 ohm or 132 ohm for 220/330 termination.

C. Drive Select 1 - 4

The DRIVE SELECT lines provide a means of selecting and de-selecting the drives. Four separate DRIVE SELECT lines are provided so that up to four drives may be connected to a single controller. Jumpers 1-2, 3-4, 5-6, and 7-8 correspond to DRIVE SELECT 1, 2, 3, and 4, respectively. By placing only one of these jumpers in each drive, only one drive will be selected when activating any one of the DRIVE SELECT lines.

When the signal level is true (low), the disk drive electronics are activated, the head is loaded, and the drive is conditioned to respond to step or read/write commands. When the signal level is false (high), the input control lines and output status lines are disabled. A SELECT line must remain stable in the true (low) state until the execution of a step or read/write command is completed.

D. Motor On

This input is provided to extend the life of the DC spindle motor. The motor should be turned off if no activity is required after 10 revolutions of the diskette. A minimum of 0.5 seconds is required before performing a read or write after the MOTOR ON line is activated.

Direction Select

The direction of motion of the Read/Write head is defined by the state of this input line. A true (low) level defines direction as "IN" (towards center of the disk); a false (high) level defines the direction as "OUT".

Step

A single pulse on this input will move the Read/Write head one track in or out, dependent on the state of the DIRECTION SELECT line. The motion of the head is initiated on the trailing edge of STEP pulse. A minimum of a 0.2 μ s pulse width at a maximum frequency of 333 Hz for 96 tpi (3ms track to track); 167 Hz for 48 tpi (6ms track to track) should be maintained to assure step integrity.

Write Gate

When true, this input line permits writing of data. When inactive, it permits transmitting data to the controller. Allow a minimum of 1 ms after dropping WRITE GATE before expecting valid READ DATA.

Write Data

The frequency of the WRITE DATA is dependant upon the encoding scheme used, the density option exercised, and the data pattern to be written. The write oscillator frequency stability should be held to 0.1%. The data pulse width should be a minimum of 0.2 us and a maximum of 3.5 us wide. WRITE DATA is effective when WRITE GATE is true. It is recommended that the leading edge of the first WRITE DATA pulse occur no sooner than 4 us and no later than 8 us after the leading edge of the WRITE GATE true signal. The WRITE GATE false signal should occur no sooner than 4 us and no later than 8 us after the last data pulse.

Side Select

This input is used to select either the upper or lower head. A 35 usec delay should be allowed for the read amp to recover after a head select event occurs. Only then will valid data be present.

In Use (Alternate Input)

This line is connected to a driver which is reserved for custom features.

Output Signals

The control output signals are driven with an open-collector which is capable of sinking a max. of 48 ma current at logical zero. Logical zero is a true state with a max. voltage of 0.4V measured at the driver. When the line driver is in a logical one false state, the collector cutoff current is a max. of 250 ua.

Track 00

This output, when true, indicates that the Read/Write head(s) are located over TRACK 00.

Index/Sector

When utilizing a soft-sectored diskette, an INDEX pulse is transmitted to the controller once every revolution indicating the beginning of a track. If a hard-sectored diskette is utilized, one SECTOR pulse for every sector in addition to one INDEX pulse per revolution will be transmitted to the controller.

Write Protect

This interface signal is provided by the drive to give the user an indication that a write protected or read-only diskette has been installed. This output is false when the diskette is not write protected. This line may easily be used as a Disk Installed Indicator, if only write protected disks are used.

Read Data

This output represents digitized data as detected by the drive electronics. Information transmitted will be in the encoding scheme used. Pulse width of both clock and data bits will be 1 μ sec + or - 350 nsec. The leading edge of each READ DATA pulse represents the true position of the flux transition on the recording media.

TO: G. BUICKUS
FROM: K. BYRNE
DATE: 9/24/84
SUBJECT: R.I.D. DISK DRIVE TEST PROCEDURE

PG 1 OF 2

ASSEMBLY NO.7817
LOG NO.131.0

SET-UP: WITH C.P.U. POWER "OFF" AND DISK DRIVE POWER "OFF" PLUG DISK DRIVE ADAM-NET CORD INTO "INPUT" PORT LOCATED ON BACK OF DRIVE PLUG THE OTHER END INTO FRONT PORT OF C.P.U. LABELED "KEYBD". PLUG TRANSFORMER CORD INTO DISK DRIVE POWER PORT LOCATED ON BACK OF DRIVE. PLACE DISK DRIVE SELECT SWITCH ALSO LOCATED ON BACK OF DRIVE TO THE "#1" POSITION. ENSURE KEYBD. AND POWER ARE CONNECTED. DISK DRIVE DOOR IS TO BE LEFT OPEN. TURN DRIVE POWER "ON", SWITCH LOCATED ON FRONT OF DRIVE. POWER L.E.D. WILL LIGHT. TURN POWER TO C.P.U. "ON", INSERT "BASIC" TAPE IN DATA DRIVE. PRESS "COMPUTER" RESET. AFTER TAPE HAS LOADED, BASIC LOGO WILL APPEAR ON SCREEN. PLACE R.I.D. DISKETTE IN DRIVE, CLOSE DOOR.

a) TYPE ON KEYBD. (IN CAPS) LOAD HELLO (SPACE) D5 THEN PRESS "RETURN".

SETUP IS NOW READY TO RUN R.I.D. TEST. PROCEED TO NEXT SECTION.

PROCEDURE

OBSERVATION

1) TYPE ON KEYBD. (IN CAPS)
RUN THEN PRESS "RETURN".

1a) MESSAGE "COLECO GOLD
STANDARD RECORDING INTER-
CHANGE DIAGNOSTIC TEST"
WILL APPEAR. THE FOLLOWING
TESTS WILL BE RUN AND DIS-
PLAYED ON SCREEN.
WRITE PROTECT TEST
DISK DRIVE SPEED
ABS TRACK POSITION
TRACK TO TRACK TEST
TUNNEL ERASE TEST
HEAD AZIMUTH TEST
SIGNAL NOISE TEST
DRIVE CLAMPING TEST

b) IF DRIVE PASSES ALL TESTS
THE WORD "PASS" WILL APPEAR
NEXT TO EACH TEST TITLE. THE
MESSAGE:
"THIS DISK DRIVE HAS PASSED
ALL GOLDEN STANDARD TEST-
ING" WILL APPEAR.

c) IF DRIVE FAILS AT ANY POINT
THE SCREEN WILL DISPLAY A
FLASHING FAILURE MESSAGE
AND A PROMPT FOR OPERATOR
"I.D." NUMBER.

2) FOR A FAILURE TYPE IN
YOUR OPERATOR I.D. NUMBER
PRESS "RETURN"

d) PRINTER WILL PRINT FAILURE
MESSAGE AND I.D. NUMBER.

PROCEDURE

OBSERVATION

- 3) AFTER "IN USE" L.E.D.
IS OFF OPEN DOOR.
REMOVE R.I.D. TEST DISKETTE.
TURN DISK DRIVE POWER "OFF".
UNPLUG DRIVE FROM TRANSFORMER
AND ADAM-NET CORD. CATEGORIZE
DRIVE i.e. PASS/FAIL.
- 4) CONNECT NEXT DISK DRIVE UNDER
TEST WITHOUT TURNING C.P.U.
POWER OFF. ENSURE DISK DRIVE
POWER IS "OFF" AND DRIVE SELECT
SWITCH IS TO DRIVE #1. PLUG TRANSFORMER
AND ADAM-NET CABLES TO PORTS ON
DISK DRIVE AS OUTLINED IN SETUP
OF PREVIOUS PAGE. WITH DRIVE
DOOR OPEN TURN DRIVE POWER
"ON". INSERT DISKETTE, CLOSE
DOOR AND PROCEED TO STEP #1
OF PROCEDURE.

K. Byrne 9/27/84 *K. Kelly* 9-27-84
K. BYRNE K. KELLY
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APPROVAL 9-27-84