

DIAGNOSTIC MANUAL

1571/C128D VERSION 1.2/1.3

OCTOBER 1988

PN-314855-03

PN-314855-01 — Kit Disk Diagnostic 1571/C128D

includes

- PN-314855-02 — Diagnostic Disk 1571/C128D — Version 1.2**
- PN-314855-03 — Diagnostic Disk 1571/C128D — Version 1.3**
- PN-314855-03 — Diagnostic Manual 1571/C128D — Version 1.2**
- PN-970016-01 — 48 TPI Analog Align Disk**

Commodore Business Machines, Inc.

1200 Wilson Drive, West Chester, Pennsylvania 19380 U.S.A.

Commodore makes no expressed or implied warranties with regard to the information contained herein. The information is made available solely on an as is basis, and the entire risk as to quality and accuracy is with the user. Commodore shall not be liable for any consequential or incidental damages in connection with the use of the information contained herein. The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty as to quality or suitability of such replacement part. Reproduction or use without expressed permission, of editorial or pictorial content, in any matter is prohibited.

This manual contains copyrighted and proprietary information. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Commodore Electronics Limited.

Copyright © 1988 by Commodore Electronics Limited.
All rights reserved.

DIAGNOSTIC DISKETTE INTRODUCTION
VERSION 1.2

This manual was developed to aid you in the use of the Diagnostics available for Repair Troubleshooting of the CBM C128/C128D Consumer Product Line.

The manual is separated into four (4) sections.

- SECTION 1: This section contains Diagnostic and Test Programs to assist in troubleshooting of the CBM 1571 Single Disk Drive and the C128D Internal Drive.
- SECTION 2: This section contains Diagnostic and Test Programs to assist in troubleshooting the C64 Mode, 80 Column Mode and External RAM Expansion Cartridges of the C128 and C128D Systems.
- SECTION 3: This section contains some user friendly Disk Drive Utility Programs which should help you with day to day operations.
- SECTION 4: This section contains some of the most used Basic Commands of the C128 and C128D Systems.

The following listing is the directory of the Version 1.2 Diagnostic Diskette and a brief explanation of each Diagnostic Test. More detailed information is contained inside the manual.

Disk Name -- DIAGNOSTIC V 1.2

PGM 1	-- "SYSTEM.CONFIG"	** 1571/C128D	- Configuration Setup Options
PGM 2	-- "1571 MENU.C128"	** 1571/C128	- Diagnostic Test Option Menu
PGM 3	-- "1571 MENU.128D"	** 1571/C128D	- Diagnostic Test Option Menu
PGM 4	-- "SYSTEM TEST"	** 1571/C128D	- System Test
PGM 5	-- "GCR SOFT ERROR"	** 1571/C128D	- Final GCR Soft Error Test
PGM 6	-- "MFM SOFT ERROR"	** 1571/C128D	- Final MFM Soft Error Test
PGM 7	-- "LOGIC DIAGNOSTIC"	** 1571/C128D	- Logic Diagnostic Test
PGM 8	-- "ALIGNMENT/REPAIR"	** 1571/C128D	- Alignment/Repair Test
PGM 9	-- "C128 80 COLUMN"	** C128	- 80 Column Mode Test
PGM 10	-- "C128 C64 MODE"	** C128	- C64 Mode Test
PGM 11	-- "C128 RAM XPANDER"	** C128	- 1700/1750 RAM Expander Test
PGM 12	-- "128D 80 COLUMN"	** C128D	- 80 Column Mode Test
PGM 13	-- "128D C64 MODE"	** C128D	- C64 Mode Test
PGM 14	-- "128D RAM XPANDER"	** C128D	- 1700/1750 RAM Expander Test
PGM 15	-- "FILE COPY 1"	** 1571/C128D	- File Copy Utility
PGM 16	-- "FILE COPY 2"	** 1571/C128D	- File Copy Utility
PGM 17	-- "DISK FORMATTER"	** 1571/C128D	- Disk Format Utility
PGM 18	-- "FILE SCRATCHER"	** 1571/C128D	- File Scratch Utility
PGM 19	-- "FILE RESTORER"	** 1571/C128D	- Scratched File Restore Utility

DIAGNOSTIC DISKETTE INTRODUCTION
VERSION 1.2

PGM 20	--	"1571 SYSTEM.BIN1"	**	1571	-	System Test	-	Binary Data
PGM 21	--	"1571 SYSTEM.BIN2"	**	1571	-	System Test	-	Binary Data
PGM 22	--	"1571 SYSTEM.BIN3"	**	1571	-	System Test	-	Binary Data
PGM 23	--	"1571 GCR.BIN1"	**	1571	-	GCR Soft Error Test	-	Binary Data
PGM 24	--	"1571 GCR.BIN2"	**	1571	-	GCR Soft Error Test	-	Binary Data
PGM 25	--	"1571 GCR.BIN3"	**	1571	-	GCR Soft Error Test	-	Binary Data
PGM 26	--	"1571 MFM.BIN1"	**	1571	-	MFM Soft Error Test	-	Binary Data
PGM 27	--	"1571 MFM.BIN2"	**	1571	-	MFM Soft Error Test	-	Binary Data
PGM 28	--	"1571 MFM.BIN3"	**	1571	-	MFM Soft Error Test	-	Binary Data
PGM 29	--	"1571 MFM.BIN4"	**	1571	-	MFM Soft Error Test	-	Binary Data
PGM 30	--	"1571 LOGIC.BIN1"	**	1571	-	Logic Diagnostic Test	-	Binary Data
PGM 31	--	"1571 LOGIC.BIN2"	**	1571	-	Logic Diagnostic Test	-	Binary Data
PGM 32	--	"1571 ALIGN.BIN1"	**	1571	-	Alignment/Repair Test	-	Binary Data
PGM 33	--	"1571 ALIGN.BIN2"	**	1571	-	Alignment/Repair Test	-	Binary Data
PGM 34	--	"128D SYSTEM.BIN1"	**	C128D	-	System Test	-	Binary Data
PGM 35	--	"128D SYSTEM.BIN2"	**	C128D	-	System Test	-	Binary Data
PGM 36	--	"128D SYSTEM.BIN3"	**	C128D	-	System Test	-	Binary Data
PGM 37	--	"128D GCR.BIN1"	**	C128D	-	GCR Soft Error Test	-	Binary Data
PGM 38	--	"128D GCR.BIN2"	**	C128D	-	GCR Soft Error Test	-	Binary Data
PGM 39	--	"128D GCR.BIN3"	**	C128D	-	GCR Soft Error Test	-	Binary Data
PGM 40	--	"128D MFM.BIN1"	**	C128D	-	MFM Soft Error Test	-	Binary Data
PGM 41	--	"128D MFM.BIN2"	**	C128D	-	MFM Soft Error Test	-	Binary Data
PGM 42	--	"128D MFM.BIN3"	**	C128D	-	MFM Soft Error Test	-	Binary Data
PGM 43	--	"128D MFM.BIN4"	**	C128D	-	MFM Soft Error Test	-	Binary Data
PGM 44	--	"128D LOGIC.BIN1"	**	C128D	-	Logic Diagnostic Test	-	Binary Data
PGM 45	--	"128D LOGIC.BIN2"	**	C128D	-	Logic Diagnostic Test	-	Binary Data
PGM 46	--	"128D ALIGN.BIN1"	**	C128D	-	Alignment/Repair Test	-	Binary Data
PGM 47	--	"128D ALIGN.BIN2"	**	C128D	-	Alignment/Repair Test	-	Binary Data
PGM 48	--	"FILE COPY.BIN1"	**	1571/C128D	-	File Copy 2	-	Binary Data

TABLE OF CONTENTS
VERSION 1.2/1.3 DIAGNOSTIC TESTS

SECTION ONE

**DISK DRIVE DIAGNOSTIC
AND TEST PROGRAMS**

SYSTEM CONFIGURATION PROGRAM	.....	Page	1
1571/C128D DIAGNOSTIC MENU	.....	Page	2
1571/C128D SYSTEM TEST	.....	Page	1-1 thru 1-5
1571/C128D SOFT ERROR TEST	.....	Page	1-6 thru 1-11
1571/C128D LOGIC DIAGNOSTIC	.....	Page	1-12 thru 1-13
1571/C128D ALIGNMENT/REPAIR	.....	Page	1-14 thru 1-37

SECTION TWO

**COMPUTER DIAGNOSTIC
AND TEST PROGRAMS**

C128/C128D 80 COLUMN TEST	.....	Page	2-1
C128/C128D C64 MODE TEST	.....	Page	2-2
C128/C128D RAM EXPANSION TEST	.....	Page	2-3 thru 2-5

SECTION THREE

**DISK DRIVE
UTILITY PROGRAMS**

1571/C128D FILE COPY 1	.....	Page	3-1 thru 3-3
1571/C128D FILE COPY 2	.....	Page	3-4 thru 3-5
1571/C128D DISK FORMATTER	.....	Page	3-6 thru 3-7
1571/C128D FILE SCRATCHER	.....	Page	3-8
1571/C128D FILE RESTORER	.....	Page	3-9

SECTION FOUR

**COMMON BASIC
7.0 COMMANDS**

C128/C128D BASIC COMMANDS	Page	4-1 thru 4-4
---------------------------	-------	------	--------------

**SYSTEM CONFIGURATION SETUP
VERSION 1.2**

DESIGNED TO SET : SYSTEM TEST CONFIGURATION

**REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE**

The System Configuration Setup Program is used to set up all options available for complete system testing.

The System Configuration Setup Program can be loaded Two (2) Ways

1. If the Version 1.2 Diagnostic Diskette is in Device Number [8]
 - * Hold the (SHIFT KEY) Down and Press the (RUN STOP) Key
 - * Type DLOAD "SYSTEM.CONFIG" (Press RETURN)
 - When the (READY) Prompt Displays .. Type RUN (Press RETURN)

2. If the Version 1.2 Diagnostic Diskette is in Device Number [9]
 - * Type DLOAD "SYSTEM.CONFIG", U9 (Press RETURN)
 - When the (READY) Prompt Displays .. Type RUN (Press RETURN)

CONFIGURATION SETUP DEFAULT OPTIONS

- * Load From Device Number [8]
- * Run Tests Device Number [8]
- * System Type To Be Tested 1571

These settings may be changed utilizing the following options

- * Press (0) - Set Load Device Number
 - * This option is useful if you wish to test a C128D and the Internal Drive will not load. Tests may then be loaded from an External 1571
- * Press (1) - Set Test Device Number
 - * This option is useful if the Drive Under Test is set to Device [9]. Test may then be run on this drive without changing the Device Number.
- * Press (2) - Set Test System Type
 - * This option is used to set the System Type to be tested.
 - * This option is very important as it determines which Diagnostic Menu, (C128 or C128D), is loaded.

As options are selected they will be displayed on the screen

When the Test Configuration is correct

Press RETURN - Load System Menu

- * Loads the Diagnostic Menu for the Selected System

1571/C128D DIAGNOSTIC MENU
VERSION 1.2

DESIGNED TO LOAD : 1571 OR C128D DIAGNOSTIC PROGRAMS

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER (SELECTED)
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE

The Diagnostic Menus are used to Load Diagnostic Tests or Utilities from the Selected Load Drive. Because the Diagnostic Tests use Binary Files for correct operation

ALL TESTS MUST BE LOADED FROM THESE MENUS

DISK DRIVE TESTS WILL FAIL IF
DOUBLE SIDED/DOUBLE DENSITY TEST DISKETTES ARE NOT USED

DURING 1571 TESTING - A MESSAGE WILL BE DISPLAYED IF THE LATEST ROM
PART NUMBER 310654-05 IS NOT INSTALLED IN THE SYSTEM UNDER TEST
THIS IS JUST A USER NOTE AND WILL NOT STOP THE TEST FROM EXECUTING

1571/C128D DIAGNOSTIC MENU VERSION 1.2

- * Press (-) - Set Device # Under Test
- * Press (+) - Load C128D/1571 Diagnostic Menu
- * Press (1) - 1571/C128D System Test
- * Press (2) - 1571/C128D GCR Soft Error
- * Press (3) - 1571/C128D MFM Soft Error
- * Press (4) - 1571/C128D Logic Diagnostic
- * Press (5) - 1571/C128D Alignment/Repair
- * Press (6) - C128/C128D 80 Column Test
- * Press (7) - C128/C128D C64 Mode Test
- * Press (8) - C128/C128D RAM Expander Test
- * Press (0) - Display Utilities Menu

SYSTEM UNDER TEST = 1571 OR C128D
DEVICE # UNDER TEST = [8] or [9]

1571/C128D UTILITIES MENU VERSION 1.2

- * Press (-) - Set Device # Under Test
- * Press (+) - Load C128/1571 Diagnostic Menu
- * Press (1) - 1571/C128D File Copy 1
2-DRIVES REQUIRED
- * Press (2) - 1571/C128D File Copy 2
2-DRIVES REQUIRED
- * Press (3) - 1571/C128D Disk Formatter
- * Press (4) - 1571/C128D File Scratcher
- * Press (5) - 1571/C128D File Unscratcher
- * Press (0) - Display Diagnostic Menu

SYSTEM UNDER TEST = 1571 OR C128D
DEVICE # UNDER TEST = [8] or [9]

1571/C128D SYSTEM TEST

VERSION 1.2.1

DESIGNED TO TEST : 1571 SINGLE OR C128D INTERNAL DISK DRIVE

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
FORMATTED (WRITE-PROTECTED) DISKETTE
BLANK TEST DISKETTE
VERSION 1.2 DIAGNOSTIC DISKETTE

SYSTEM TEST OPTION MENU

- * Press (0) - Select Device Number >> [8] or [9]
- * Press (1) - Zero Stop Sensor Test
- * Press (2) - Write Protect Sensor Test
- * Press (3) - Read/Write Head Bump Test
- * Press (4) - Read/Write Test
- * Press (A) - All Above Tests
- * Press SPACE - Load Diagnostic Menu

SYSTEM TEST OPTION ONE -- SELECT DEVICE NUMBER

- * This option allows the System Test to be run on a system set to either Device Number [8] or [9].
- * Selected Device Number is Displayed

SYSTEM TEST OPTION TWO -- ZERO STOP SENSOR TEST

- * Insert a Formatted Write-Protected Diskette
- * Press SPACE - Start Testing
Begins Zero Stop Sensor Test
- * Press RETURN - Return to Menu
Displays System Test Main Menu

The Zero Stop Sensor Test checks for proper adjustment of the Zero Stop Sensor by looping, (5 Times), through the sensor to Zero Track and Reading a Pre-Written Mark on the Diskette.

-----+
| FOR MOST ACCURATE TESTING THE FORMATTED DISKETTE BEING USED SHOULD |
| BE FORMATTED ON A KNOWN GOOD DRIVE OTHER THAN THE ONE UNDER TEST |
|-----+

FAILURE - DEFECTIVE, UN-FORMATTED OR UN-WRITE-PROTECTED DISKETTE
MIS-ADJUSTED ZERO STOP SENSOR OR DRIVE ALIGNMENT
DEFECTIVE ZERO STOP SENSOR OR CONTROL LOGIC

- * Pass/Fail Status is Displayed
- * Press RETURN - Return To Menu
Displays System Test Main Menu

1571/C128D SYSTEM TEST
VERSION 1.2.1

SYSTEM TEST OPTION THREE - WRITE PROTECT SENSOR TEST

- * Insert a Formatted Write-Protected Diskette
- * Press SPACE - Start Testing
Begins Write-Protect Sensor Test
- * Press RETURN - Return to Menu
Displays System Test Main Menu

The Write Protect Sensor Test checks for proper operation on the Write Protect Sensor by attempting a Format Operation on the Write-Protected Diskette and Reading the Error Channel.

| FOR MOST ACCURATE TESTING THE FORMATTED DISKETTE BEING USED SHOULD |
BE FORMATTED ON A KNOWN GOOD DRIVE OTHER THAN THE ONE UNDER TEST

FAILURE - DEFECTIVE, UN-FORMATTED OR UN-WRITE-PROTECTED DISKETTE
MIS-ADJUSTED ZERO STOP OR DRIVE ALIGNMENT
DEFECTIVE WRITE-PROTECT SENSOR OR CONTROL LOGIC

- * Pass/Fail Status is Displayed
- * Press RETURN - Return To Menu
Displays System Test Main Menu

SYSTEM TEST OPTION FOUR - ZERO STOP BUMP TEST

- * Insert a Formatted Write-Protected Diskette
- * Press SPACE - Start Testing
Begins Zero Stop Bump Test
- * Press RETURN - Return to Menu
Displays System Test Main Menu

The Zero Stop Bump Test checks for proper adjustment of the Zero Track Stop, in 1541 Mode, by bumping the Read/Write Head, (5 Times), against the Zero Stop and Reading a Pre-Written Mark on the Diskette.

| FOR MOST ACCURATE TESTING THE FORMATTED DISKETTE BEING USED SHOULD |
BE FORMATTED ON A KNOWN GOOD DRIVE OTHER THAN THE ONE UNDER TEST

FAILURE - DEFECTIVE, UN-FORMATTED OR UN-WRITE-PROTECTED DISKETTE
MIS-ADJUSTED ZERO STOP OR DRIVE ALIGNMENT
DEFECTIVE STEPPER MOTOR OR CONTROL LOGIC

- * Pass/Fail Status is Displayed
- * Press RETURN - Return To Menu
Displays System Test Main Menu

1571/C128D SYSTEM TEST
VERSION 1.2.1

SYSTEM TEST OPTION FIVE - READ/WRITE TESTS

- * Insert a Blank Test Diskette
- * Press (F) - Test Disk is Formatted
- * Press (U) - Test Disk is UnFormatted

If the (U)nformatted Option is selected (Recommended)

- * The Format Operation of the drive is checked by executing a GCR Format to all Tracks, (Upper and Lower), with an ID written to all sectors.
- * The GCR Read/Write Operations are tested by
 - * Opening a Write File - Writing Data to the File - Closing the File
 - * Opening a Read File - Reading and Verifying Data - Closing the File
 - * Scratching the File

FAILURE - DEFECTIVE TEST DISKETTE
MIS-ADJUSTED ZERO STOP OR DRIVE ALIGNMENT
DEFECTIVE DRIVE ASSEMBLY
DEFECTIVE READ/WRITE CONTROL LOGIC

- * The GCR 1541 Slow Mode is checked by
 - * Writing Data to Tracks 5, 15, 25, 35
 - * Reading and Verifying Data from Tracks 35, 25, 15, 5
- * The GCR Fast Mode is checked by
 - * Writing Data to Tracks 40, 50, 60, 70
 - * Reading and Verifying Data from Tracks 70, 60, 50, 40

FAILURE - TEST DISKETTE DEFECTIVE OR NOT DOUBLE SIDED/DOUBLE DENSITY
MIS-ADJUSTED ZERO STOP SENSOR OR DRIVE ALIGNMENT
DEFECTIVE DRIVE ASSEMBLY
DEFECTIVE READ/WRITE CONTROL LOGIC

- * The MFM Burst Format Operation is checked by Formatting

TRACK	BYTES/SECTOR
-----	-----
01	128
02	512
36	1024
37	256
38	512
39	128

**1571/C128D SYSTEM TEST
VERSION 1.2.1**

* The MFM Burst Read/Write Operations are checked by

* Writing, Reading and Comparing Data on

<u>SIDE</u>	<u>TRACK</u>	<u>BYTES/SECTOR</u>	<u>SIDE</u>	<u>TRACK</u>	<u>BYTES/SECTOR</u>
0	01	128	1	79	128
0	02	512	1	78	512
0	36	1024	1	77	256
0	37	256	1	76	1024
0	38	512	1	42	512
0	39	128	1	41	128

**FAILURE - TEST DISKETTE DEFECTIVE OR NOT DOUBLE SIDED/DOUBLE DENSITY
DEFECTIVE DRIVE ASSEMBLY
DEFECTIVE READ/WRITE CONTROL LOGIC**

COMPATIBILITY TEST

COMPATIBILITY TEST OPTION MENU

- * Press (8) - Second Drive Set to Device Number [8]
- * Press (9) - Second Drive Set to Device Number [9]
- * Press (S) - Skip Compatibility Test

COMPATIBILITY TEST OPTION ONE - SECOND DRIVE - DEVICE '8'
COMPATIBILITY TEST OPTION TWO - SECOND DRIVE - DEVICE '9'

These options allow the Data Written during the Read/Write Test to be verified on a second drive which may be set to either Device Number [8] or Device Number [9].

* This helps determine if Data Written on the drive under test can be read by other drives.

* The GCR 1541 Slow Mode Compatibility is checked by

* Reading and Verifying GCR Data, written during the Read/Write Test, from Tracks 5, 15, 25, 35

* The GCR 1571 Fast Mode Compatibility is checked by

* Reading and Verifying GCR Data, written during the Read/Write Test, from Tracks 40, 50, 60, 70

1571/C128D SYSTEM TEST
VERSION 1.2.1

* The Burst MFM Mode Compatibility is checked by

* Reading and Verifying MFM Data, written during the
Read/Write Test, from

<u>SIDE</u>	<u>TRACK</u>	<u>BYTES/SECTOR</u>	<u>SIDE</u>	<u>TRACK</u>	<u>BYTES/SECTOR</u>
0	01	128	1	79	128
0	02	512	1	78	512
0	36	1024	1	77	256
0	37	256	1	76	1024
0	38	512	1	42	512
0	39	128	1	41	128

FAILURE - MIS-ADJUSTED ZERO STOP OR ALIGNMENT ON ONE OF THE DRIVES
DEFECTIVE DRIVE ASSEMBLY IN ONE OF THE DRIVES

COMPATIBILITY TEST OPTION THREE - SKIP COMPATIBILITY TEST

This option allows the Compatibility Section of the Read/Write Test
to be skipped if a second drive is not available.

SYSTEM TEST RESULTS

- * System Test - Pass/Fail Status
- * Compatibility - Pass/Fail/Skipped Status
- * Press RETURN - Return to Menu
Displays System Test Main Menu

SYSTEM TEST OPTION SIX - ALL ABOVE TESTS

This option executes options (2-5) with a countdown between tests.

SYSTEM TEST OPTION SEVEN - LOAD DIAGNOSTIC MENU

- * Insert the Version 1.2 Diagnostic Diskette
- * Press (8) - Load the Diagnostic Menu from Device Number [8]
- * Press (9) - Load the Diagnostic Menu from Device Number [9]
- * Press RETURN - Return to Menu
Displays System Test Main Menu

1571/C128D GCR/MFM SOFT ERROR TEST
VERSION 1.2.1

DESIGNED TO TEST : 1571 SINGLE OR C128D INTERNAL DISK DRIVE

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
COMMODORE OR COMPATIBLE PRINTER (OPTIONAL)
40 COLUMN MONITOR OR TV SET
BLANK TEST DISKETTE
VERSION 1.2 DIAGNOSTIC DISKETTE

The **Soft Error Test** does an Extended Read/Write Performance Test on the Disk Drive under test.

The Two (2) **Soft Error Tests** on the Version 1.2 Diagnostic Test Menu are used to test both the GCR and MFM Modes of Operation.

-----+
| BOTH SOFT ERROR TESTS SHOULD BE RUN ON ALL UNITS IN FOR REPAIR |
+-----

INSERT BLANK TEST DISKETTE
BEFORE SELECTING ANY OPTIONS

GCR/MFM SOFT ERROR TEST OPTION MENU

- * Press RETURN - Start Test >> 50 PASS
- * Press (C) - Select Device Number >> [8] or [9]
- * Press (X) - Preliminary Test >> 2 PASS
- * Press (M) - Modified Tests
- * Press (0) - Read Test Results
- * Press SPACE - Load Diagnostic Menu

NOTE : IF A PRINTER IS CONNECTED
TEST RESULTS WILL BE PRINTED
RATHER THAN DISPLAYED

SOFT ERROR TEST OPTION ONE - START TEST (50 PASS)

This option is used for Final Soft Error Testing. At the end of 50 Passes, the test will terminate and the drive will be reset. All Test Results will be stored on the test diskette and read at test end using **Soft Error Test Option Five (Read Test Results)**.

- * To save Test Time, this option should be run only after the unit has passed the 2 Pass Preliminary Test (Soft Error Test Option Three)

-----+
| WHEN DOWNLOADING IS COMPLETE AND THE SOFT ERROR TEST OPTION MENU |
| IS DISPLAYED, THE TEST WILL RUN INTERNAL TO THE DRIVE AND THE |
| C128/C128D NEED NO LONGER BE CONNECTED, (1571 ONLY), UNTIL THE |
| TEST IS COMPLETE AND THE TEST RESULTS ARE READ. |
+-----

1571/C128D GCR/MFM SOFT ERROR TEST
VERSION 1.2.1

SOFT ERROR TEST OPTION TWO - SET DEVICE NUMBER UNDER TEST

This option allows the Soft Error Test to be run on a drive which is set to either Device Number [8] or [9].

SOFT ERROR TEST OPTION THREE - PRELIMINARY TEST

PRELIMINARY SOFT ERROR TEST OPTION MENU

- * Press RETURN - Start Test >> 2 Pass
 - * Press (A) - Alter Passes >> 2 Pass
 - * Press (0) - Read Test Results
 - * Press (X) - Return to Menu
- Displays Soft Error Test Main Menu

PRELIMINARY SOFT ERROR TEST OPTION ONE - START TEST 2 PASS

This option is used for Preliminary Soft Error Testing. At the end of the designated number of passes, displayed next to Alter Pass Option, the test will terminate and the drive will reset. Test Results are stored on the Test Diskette and read at test end using Option Three. (Read Test Results)

- * If the drive passes this Preliminary Test, the 50 Pass Soft Error Test (Soft Error Test Option One) should be run.

-----+-----
| WHEN DOWNLOADING IS COMPLETE AND THE SOFT ERROR TEST OPTION MENU |
| IS DISPLAYED, THE TEST WILL RUN INTERNAL TO THE DRIVE AND THE |
| C128/C128D NEED NO LONGER BE CONNECTED, (1571 ONLY), UNTIL THE |
| TEST IS COMPLETE AND THE TEST RESULTS ARE READ. |
|-----+-----

PRELIMINARY SOFT ERROR TEST OPTION TWO - ALTER PASSES

This option is used to set the Number of Passes the Soft Error Test is to execute.

- * Current Number of Passes is displayed next to option

PRELIMINARY SOFT ERROR TEST OPTION THREE - READ TEST RESULTS

This option is used to read and display Soft Error Test Results once the designated number of passes are complete.

- * Complete Error Reporting as well as Pass/Fail Status is displayed.
- * Refer to Soft Error Test Result Summary -- Page 1-9

SOFT ERROR TEST OPTION FOUR - MODIFIED TESTS

- * Press (C) - Create Custom Error Test
 - * Press (B) - Blink LED at Test End
 - * Press RETURN - Return to Menu
- Displays Soft Error Test Main Menu

1571/C128D GCR/MFM SOFT ERROR TEST
VERSION 1.2.1

MODIFIED SOFT ERROR TEST OPTION MENU - CREATE CUSTOM ERROR TESTS

This option allows Special Parameters to be selected to create a Custom Soft Error Test. The Parameter Options are as follows

1. NEW TEST OR CONTINUATION

When (N)ew is selected, the Error Log is cleared at the start of the test. When (C)ontinuous is selected, the existing Error Log is used as the starting condition and the test will continue from this point.

* If the Test Diskette has not previously been used in the Soft Error Test, the (N)ew Option must be selected.

2. SPECIFY PASS TYPE

The test may be set to (R)ead Only, (W)rite Only or Read With a Rewrite of Data per the selected Read to Write Pass Ratio.

* This Ratio Represents The Number Of Read Passes Per Each Write Pass. Maximum Read To Write Ration = 127

3. ENTER NUMBER OF PASSES DESIRED

This represents the Number of Passes the Soft Error Test will run.

* If the Test is to Conclude Itself, a Maximum of 500 Passes may be entered. If (0) is Entered, the Test Will Run Forever.

4. WANT FORMATTING (Y/N)

If (Y)es is selected, the diskette will be formatted by the test. If (N)o is selected, the test will start without formatting.

* If the (N)ew Option was Previously Selected, (Y)es Must be Selected here.

5. TRACK SEQUENCE TO BE

This Option allows selection of the Track Testing Sequence.

* If (A)lternating is Selected, the Track Testing Sequence will Alternate between Sequential and Random after each pass.

* If (S)equential is Selected, the Tracks are Tested in Sequential Order. (GCR - Tracks 1 thru 70 --- MFM - Tracks 1-79)

* If (R)andom is Selected, the Tracks are Tested in a Random Fashion, Allowing Complete Exercise of the Stepper Motor.

6. RESET OR BLINK AT TEST END

This option allows the Drive LED Status to be set at Test End and starts execution of the Soft Error Test utilizing selected options

* If (R)eset is Selected, the Drive Will be Reset at Test End

* After Reset, all Disk Activity, including the Flashing Activity LED will cease.

* If (B)link is Selected, the Drive LED will Blink in a Series of (1) Flash Codes at Test End

* If (B)link is Selected, the Drive Must be Manually Reset before Test Results can be Read.

* 1571 - Turn Drive Power OFF And ON

* C128D - Press Drive Reset Switch

1571/C128D GCR/MFM SOFT ERROR TEST
VERSION 1.2.1

MODIFIED SOFT ERROR TEST OPTION TWO - BLINK/RESET LED AT TEST END

This option allows setting of the Drive LED Status at Test End

- * Press (B) - Blink LED at Test End
- * Press (R) - Reset LED at Test End

SOFT ERROR TEST OPTION FIVE - READ TEST RESULTS

IF A PRINTER IS CONNECTED, THE TEST RESULTS WILL BE PRINTED TO
HARD COPY -- THIS PRINTOUT SHOULD BE RETURNED TO THE CUSTOMER
WITH THE UNIT TO SHOW THE RESULTS OF FINAL TESTING

This option reads and displays the results of the **Soft Error Test**. These results are stored on the Test Diskette and updated at the end of each Completed Pass. Complete Error Reporting along with Pass/Fail Status are displayed as follows

SOFT ERROR TEST RESULT SUMMARY

1. NUMBER OF PASSES

The Total Number of Passes run.

- * All Tracks on the Diskette are Tested Each Pass
- * Minimum Number of Passes = One Complete Pass

2. TOTAL ERRORS

The Total Number of Errors encountered during the test.

- * This Count is Incriminated Only Once for each error regardless of the Number Of Retries Necessary to Recover the Error.
- * If this Count Reaches (1024), the Test Will Terminate
- * Maximum Errors = Total Passes divided by a Set Value

3. COUNTABLE ERRORS

The Total Number of encountered errors that required more than one (1) retry to recover.

- * Countable Errors = Total Errors minus Recovered Errors
- * Maximum Countable Errors = Total Passes divided by a Set Value

4. PASS/ERROR RATIO

The Number of Passes versus the Number of Encountered Errors

- * Pass/Error Ratio = Number of Passes divided by Countable Errors
- * Minimum Pass/Error Ratio = Number of Passes divided by a Set Value

5. FIRST PASS RETRIES

The Total Number of retries that were successful

- * This Value is a Measure of Diskette Quality as it will show how many Persistent Errors were Encountered
- * If this Value Reaches Five (5), a Defective Diskette is indicated and the test will terminate
- * First Pass Retries are Determined for the First Pass Only
First Pass Retries = Number of Retries minus First Retries

1571/C128D GCR/MFM SOFT ERROR TEST
VERSION 1.2.1

6. TRACK, ERRORS, FIRST PASS RETRIES

This listing breaks down all Encountered Errors on a Per Track Basis.

- * A Defective Diskette is indicated by Errors Concentrated on the Same Track or Adjacent Tracks
- * Displayed Only if at Least One Error was encountered

7. ERROR TYPE, OPERATION, ERRORS

This listing breaks down Total Errors according to Type of Error, Operation Being Performed when the error occurred and Number of Encountered Errors per type as follows

* HEADER BLOCK NOT FOUND

- * The Header Block Identifier could not be found

* NO SYNC CHARACTER

- * A Sync Mark, (10 or More Consecutive 1 Bits), on a given track could not be found within a predetermined amount of time and a Time Out has occurred

* DATA BLOCK NOT FOUND

- * A Decoded 8 Bit Byte read from the diskette did not compare to a Present Block Identifier

* DATA BLOCK CHECKSUM ERROR

- * The Calculated Checksum of a 256 Byte Data Block did not match the Actual Checksum Read from the diskette

* VERIFY ERROR AFTER WRITE

- * The Data just Written to a sector of the diskette when Read Back, does not verify with Data Stored in Disk Memory

* WRITE PROTECT ERROR

- * A Write Operation to the diskette cannot be performed due to
- * Write-Protect Tab installed on the Diskette
- * Defective Write-Protect Sensor
- * Displayed Only During the MFM Soft Error Test

* HEADER CHECKSUM ERROR

- * The Header Checksum, Stored in Disk Memory, when EORed with an Independent Checksum does not compare

* ID MISMATCH ERROR

- * The Disk IDs, Read from the Header Block, did not compare with the Disk IDs Stored in Disk Memory.
- * Displayed Only During the MFM Soft Error Test

* DATA DECODE ERROR

- * The GCR Bytes, when converted to their Original Binary Form, did not compare to the Original Binary Code Written
- * Displayed Only During the GCR Soft Error Test

- * Data Block Checksum Errors and Data Decode Errors are normally caused by Random Electrical Noise and will usually Recover in One (1) Retry

1571/C128D GCR/MFM SOFT ERROR TEST
VERSION 1.2.1

OPERATION

- * **READ** - Data is Read and Verified against Expected Data
- * **WRITE** - Data is Written, Stored in Disk Memory, Read Back and Compared to Disk Memory Data
- * **SEEK** - The Read/Write Head is moved to a Predetermined Track

8. ERROR TIME

The Total Number of Errors per each 10 Passes

- * **An Increasing Error Rate indicates a Bad Diskette or a Gradually Failing System**

9. RECOVERY COUNT

The Total Number of Retries Required to Recover Encountered Errors

- * **A Persistent Error, one Requiring More Than One (1) Retry, or More Than Twenty (20) Errors Recovered in the First Retry is normally a sign of a Defective Drive Mechanism Or Marginal Components**
- * **Maximum Retries = Ten (10) before an error is considered a Hard Error in which case the unit will fail the Soft Error Test**

10. PASS/FAIL

The Bottom Line whether or not the System Under Test has Passed the **Soft Error Test** for the Allotted Number of Passes and the Final Status of Test Results

SOFT ERROR TEST OPTION SIX - LOAD DIAGNOSTIC MENU

- * **Insert the Version 1.2 Diagnostic Diskette**
- * **Press (8) - Load the Diagnostic Menu from Device Number [8]**
- * **Press (9) - Load the Diagnostic Menu from Device Number [9]**
- * **Press RETURN - Return to Menu**
Displays Soft Error Test Main Menu

1571/128D LOGIC DIAGNOSTIC
VERSION 1.2.1

DESIGNED TO TEST : 1571 SINGLE OR C128 INTERNAL DISK DRIVE

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE

The Logic Diagnostic is designed to test the Main Control Chips on the System Under Test utilizing a Flash Code on the Activity LED.

LOGIC DIAGNOSTIC OPTION MENU

- * Press (0) - Select Device Number >> [8] or [9]
- * Press RETURN - Start Diagnostic Test
- * Press SPACE - Load Diagnostic Menu

LOGIC DIAGNOSTIC OPTION ONE - SET DEVICE NUMBER UNDER TEST

This option allows the Logic Diagnostic to be run on a System set to Device Number [8] or [9].

LOGIC DIAGNOSTIC OPTION TWO - START DIAGNOSTIC TEST

ROM FAILURES WILL OCCUR IF OUT-DATED ROMS ARE INSTALLED

VALID ROMS -- 1571 - PART NUMBER 310654-03 / 310654-05
C128D - PART NUMBER 318047-01

This option Downloads the Diagnostic Code to the Test System.

- * If the Download is successful the Activity LED should be flashing at a consistent rate.
- * Press (Y)es or (N)o
 - * If the Activity LED is not flashing at a constant rate after the Download is complete, a Download Failure has occurred and (N)o should be selected.
- * If a Download Failure occurs the drive must be Reset before the Download may again be attempted. Reset the drive by
 - * 1571 - Turn the Power OFF then ON
 - * C128D - Press the Drive RESET SWITCH
- * Press RETURN - Retry Download
- * A Total Of Three (3) Attempts May Be Made Before The System Is Determined To Have A Hard Failure
- * Press RETURN - Return to Menu
- * Displays Logic Diagnostic Main Menu

**1571/128D LOGIC DIAGNOSTIC
VERSION 1.2.1**

* If (Y)es is selected, the Activity LED Flash Sequence is interpreted using the Error Flash Code Chart

ERROR FLASH CODE CHART				
FLASH CODES	1571 IC FAILURE	1571 IC LOCATION	128D IC FAILURE	128D IC LOCATION
1 FLASH	SYSTEM OK	NO FAILURE	SYSTEM OK	NO FAILURE
2 FLASHES	DOS ROM	U02	DOS ROM	U102
3 FLASHES	DOS RAM	U03	DOS RAM	U103
4 FLASHES	6522 VIA	U04	6522 VIA	U104
5 FLASHES	6522 VIA	U09	6522 VIA	U106
6 FLASHES	6526/8520	U20	ILLEGAL	
7 FLASHES	WD1770	U11		
7 FLASHES			5710 FDC	U107

ONCE A SUCCESSFUL DOWNLOAD IS COMPLETE THE LOGIC DIAGNOSTIC WILL OPERATE COMPLETELY INTERNAL TO THE DRIVE AND THE C128 (1571 ONLY) NO LONGER NEED BE CONNECTED

* Press RETURN - Return To Menu
Displays Logic Diagnostic Main Menu

LOGIC DIAGNOSTIC OPTION THREE - LOAD DIAGNOSTIC MENU

* Once The Logic Diagnostic Code Has Been Downloaded, The Drive Must Be Reset Before Any Disk Access Can Be Accomplished

- * 1571 - Turn Drive Power OFF and ON
- * C128D - Press Drive RESET SWITCH

* Press (8) - Load Diagnostic Menu from Device Number [8]
* Press (9) - Load Diagnostic Menu from Device Number [9]
* Press RETURN - Return To Menu
Displays Logic Diagnostic Main Menu

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

DESIGNED TO TEST : 1571 SINGLE OR C128D INTERNAL DISK DRIVE

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
DUAL TRACE SCOPE
VOLT METER (OPTIONAL)
40 COLUMN MONITOR OR TV SET
48 TPI ALIGNMENT DISKETTE
** P/N 970016-01 OR 314863-01
VERSION 1.2 OR 1.3 DIAGNOSTIC DISKETTE

ALIGNMENT REPAIR TEST OPTION MENU

- * Press (0) - Select Device Number >> [8] or [9]
- * Press (1) - Drive Alignment
- * Press (2) - Zero Stop Test/Adjust
- * Press (3) - Stepper Motor Slew
- * Press (4) - Stepper Motor Logic
- * Press (5) - Data Bus Write Check
- * Press (6) - Drive Motor Logic
- * Press (7) - Head Select Format
- * Press (8) - Side Select Logic
- * Press (9) - Load Diagnostic Menu

ALIGNMENT REPAIR TEST OPTION ONE - SELECT TEST DEVICE NUMBER

This option allows the Alignment/Repair Test to be run on a System set to either Device Number [8] or [9]

ALIGNMENT REPAIR TEST OPTION TWO - DRIVE ALIGNMENT

- * Press (T) - Select Alignment Disk (Version 1.3 ONLY)
314863-01/970016-01 NOW SELECTED
- * Press (S) - Display Scope Settings
- * Press (D) - Dis-Assembly & Setup
- Press (A) - Alignment (ALPS)
- * Press (N) - Alignment (NEWTRONICS)

- * Press RETURN - Return to Menu
Displays Alignment/Repair Test Main Menu

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

1571/C128D RADIAL ALIGNMENT SCOPE SETTINGS

1. Set Both Channels To AC Scale
 2. Set Both Channels To 50 MV/DIV
 3. Invert Channel 2
 4. Differentially Add Both Channels
 5. Set Sweep To 20 MS/DIV
 6. Set Trigger To Auto Mode
 7. Remove any Diskette Installed in the Drive
 8. Make Sure Drive Power Is OFF (1571 Only)
- * Press SPACE - Dis-Assembly & Setup
 - * Press RETURN - Return To Menu
 - ** Displays Alignment/Repair Test Main Menu

**1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

1571/C128D DIS-ASSEMBLY AND SET-UP PROCEDURES

1. 1571 ONLY - Make Sure Alignment/Repair Main Menu is Displayed
2. 1571 ONLY - Turn Drive Power OFF
C128D ONLY - Turn System Power OFF
3. DisConnect Power Cable and Serial Cable (If Applicable)
4. 1571 ONLY - Remove the Four (4) Screws from the Bottom Case and Remove the Top Case from the unit
C128D ONLY - Remove the Five (5) Screws from around the Top Case and Remove Top Case from the unit
5. 1571 ONLY - Remove the Drive FacePlate and Set it Beside the Unit
6. 1571 ONLY - Remove the Four (4) Power Supply Mounting Screws, Remove the Power Supply and Set it Beside the Unit
7. NEWTRONICS - Remove the Four (4) Drive Mounting Screws
8. Remove the Two (2) Shield Screws and Remove the Drive Shield
* The Drive Shield may not be installed in all units
9. NEWTRONICS - Remove the Drive Assembly and Set it on its Side. The Disk Locking Lever must be removed before the Drive is Removed and should be Re-Installed after the Drive is Removed
10. Connect Scope Probes As Follows

1571	C128D
Probe 1 -- Pin 13 -- Hybrid IC Location (U7)	Probe 1 -- Rear Lead -- Choke Location (L101)
Probe 2 -- Pin 14 -- Hybrid IC Location (U7)	Probe 1 -- Rear Lead -- Choke Location (L102)

11. Connect Power Cable and Serial Cable, (If Applicable)
12. 1571 ONLY - Turn Drive Power ON
13. C128D ONLY - Turn System Power ON, Load System Configuration, Select C128D as SYSTEM TYPE, Load C128D Diagnostic Menu, Load Alignment/Repair Test
14. Select Drive Alignment Option From Diagnostic Menu
15. Insert 48 TPI Alignment Diskette

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

RADIAL ALIGNMENT

48 TPI ALIGNMENT DISK -- MUST BE INSTALLED

- * Press (A) - Alignment (ALPS)
- * Press (N) - Alignment (NEWTRONICS)

- * Press RETURN - Return To Menu
- * Displays Alignment/Repair Test Main Menu

The Read/Write Head should step to Track 1

**FAILURE - DEFECTIVE DRIVE MECHANISM (STEPPER MOTOR)
DEFECTIVE STEPPER MOTOR CONTROL LOGIC**

- * Press SPACE - Step To Track 17

RADIAL ALIGNMENT TEST OPTION MENU

- * Press (+) - Step Head IN
- * Press (-) - Step Head OUT
- * Press (I) - Hysterisis IN (VERSION 1.3 ONLY)
- * Press (O) - Hysterisis OUT (VERSION 1.3 ONLY)
- * Press (R) - Restore TRACK 13/17 (VERSION 1.3 ONLY)
- * Press (0) - Align Head LOWER
- * Press (1) - Align Head UPPER
- * Press RETURN - Return To Menu
- * Displays Alignment/Repair Test Main Menu

RADIAL ALIGNMENT TEST OPTION ONE - STEP HEAD IN

This Option will Step the Read/Write Head IN (Toward The Center) of the Diskette One Track at a time

RADIAL ALIGNMENT TEST OPTION TWO - STEP HEAD OUT

This Option will Step the Read/Write Head OUT (Toward The Outside) of the Diskette One Track at a time

RADIAL ALIGNMENT TEST OPTION THREE - HYSTERISIS IN

This Option Steps the Read/Write Head IN Three Tracks and Back to the Original Alignment Track

- * When the Head Returns to the Alignment Track the CAT EYES should be Visible and With-In the Allowed Limits

RADIAL ALIGNMENT TEST OPTION FOUR - HYSTERISIS OUT

This Option Steps the Read/Write Head OUT Three Tracks and Back to the Original Alignment Track

- * When the Head Returns to the Alignment Track the CAT EYES should be Visible and With-In the Allowed Limits

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

RADIAL ALIGNMENT TEST OPTION FIVE - RESTORE TRACK 13/17

This Option Steps the Read/Write Head to Track 1 and Back to the Original Alignment Track

* When the Head Returns to the Alignment Track the CAT EYES should be Visible and With-In the Allowed Limits

RADIAL ALIGNMENT TEST OPTION SIX - ALIGN HEAD LOWER

1571/C128D RADIAL ALIGNMENT CHECK -- LOWER HEAD

CAT EYES SHOULD BE VISIBLE AND WITHIN 10% AMPLITUDE OF EACH OTHER

* The Peak-To-Peak Level MUST be at least 200 MV

1. IF CAT EYES ARE NOT VISIBLE

* Press (+) - Step the Read/Write Head IN

* Press (-) - Step the Read/Write Head OUT

2. IF CAT EYES ARE NOT VISIBLE WITHIN TWO (2) STEPS EITHER WAY

* Refer to Upper Head Alignment Check - Page 1-19

3. IF CAT EYES ARE VISIBLE BUT ARE NOT WITHIN 10% AMPLITUDE OF EACH OTHER

* Refer to Radial Alignment Procedures - Page 1-20

4. IF CAT EYES ARE VISIBLE AND ARE WITHIN 10% AMPLITUDE OF EACH OTHER

* Refer to Upper Head Alignment Check - Page 1-19

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

RADIAL ALIGNMENT TEST OPTION SEVEN - ALIGN HEAD UPPER

1571/C128D RADIAL ALIGNMENT CHECK -- UPPER HEAD

1. Select Option Four - Upper Head Alignment
2. Remove the 48 TPI Alignment Diskette and Re-Insert it Upside Down (ALIGNMENT DISK P/N 970016-01 OR VERSION 1.2 ONLY)
3. Press SPACE - Step Head to Track 13
(ALIGNMENT DISK P/N 970016-01 OR VERSION 1.2 ONLY)
CAT EYES SHOULD BE VISIBLE AND WITHIN 10% AMPLITUDE OF EACH OTHER
* The Peak-To-Peak Level MUST be at least 200 MV
4. IF CAT EYES ARE NOT VISIBLE
* Press (+) - Step the Read/Write Head IN
* Press (-) - Step the Read/Write Head OUT
5. IF CAT EYES ARE NOT VISIBLE WITHIN TWO (2) STEPS EITHER WAY BUT WERE VISIBLE ON THE LOWER HEAD ALIGNMENT CHECK

FAILURE - DEFECTIVE DRIVE ASSEMBLY - READ/WRITE HEAD
DEFECTIVE CONTROL OR READ/WRITE LOGIC
6. IF CAT EYES ARE NOT VISIBLE WITHIN TWO (2) STEPS EITHER WAY AND WERE NOT VISIBLE ON THE LOWER HEAD ALIGNMENT CHECK

FAILURE - DEFECTIVE ALIGNMENT DISKETTE
DEFECTIVE DRIVE ASSEMBLY - READ/WRITE HEAD
DEFECTIVE CONTROL OR READ/WRITE LOGIC
7. IF CAT EYES ARE VISIBLE BUT NOT WITHIN 10% AMPLITUDE OF EACH OTHER
* Refer to Radial Alignment Procedures - Page 1-20
8. CAT EYES ARE VISIBLE AND WITHIN 10% AMPLITUDE OF EACH OTHER

* DRIVE ALIGNMENT IS OK !!! OK !!! OK !!! OK !!! OK !!!
9. Press RETURN - Return To Menu
Displays Alignment/Repair Main Menu

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

1571 / C128D RADIAL ALIGNMENT PROCEDURES

CAT EYES SHOULD BE VISIBLE AND WITHIN 10% AMPLITUDE OF EACH OTHER
* The Peak-To-Peak Level MUST be at least 200 MV

1. IF THE CAT EYES ARE WITHIN 10% AMPLITUDE OF EACH OTHER
* Refer to Step 5
2. IF THE CAT EYES ARE NOT WITHIN 10% AMPLITUDE OF EACH OTHER
* Loosen the two (2) Stepper Motor Mounting Screws and:
* NEWTRONICS - Turn the Stepper Motor
* ALPS - Slide the Stepper Motor
While Observing the CAT EYES Signal
3. WHEN THE CAT EYES ARE WITHIN 10% AMPLITUDE OF EACH OTHER
* Hold the Stepper Motor in place and tighten the Stepper Motor Mounting Screws
* If the CAT EYES do not stay the same, the Stepper Motor has moved when the Mounting Screws were tightened and must be Re-Adjusted
4. SELECT OPTION SEVEN - UPPER HEAD ALIGNMENT
* The 48 TPI Alignment Diskette must be Turned Now
* Alignment Diskette P/N 970016-01 ONLY
5. PRESS SPACE TO STEP TO TRACK 13
* Alignment Diskette P/N 970016-01 ONLY
6. IF THE CAT EYES ARE NOT WITHIN 10% AMPLITUDE OF EACH OTHER
* Loosen the two (2) Stepper Motor Mounting Screws and:
* NEWTRONICS - Turn the Stepper Motor
* ALPS - Slide the Stepper Motor
While Observing the CAT EYES Signal
7. WHEN THE CAT EYES ARE WITHIN 10% AMPLITUDE OF EACH OTHER
* Hold the Stepper Motor in place and tighten the Stepper Motor Mounting Screws
* If the CAT EYES do not stay the same, the Stepper Motor has moved when the Mounting Screws were tightened and must be Re-Adjusted
8. SELECT OPTION SIX TO RE-CHECK THE LOWER HEAD ALIGNMENT
* If the Lower Head Alignment is Off, it may be necessary to adjust the Stepper Motor for the best possible results of both the Upper and Lower CAT EYES Signals
9. When Alignment of both heads is complete

*** ALIGNMENT IS OK !!! ALIGNMENT IS OK !!! ***
11. Press RETURN - Return to Menu
* Displays Alignment/Repair Main Menu

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

ALIGNMENT/REPAIR TEST OPTION THREE - ZERO STOP TEST/ADJUST

ZERO STOP TEST OPTION MENU

- * Press (C) - Check Zero Stop
- * Press (A) - Adjust Zero Stop (ALPS)
Refer to Page 1-22 - Zero Stop DisAssembly & Setup
Refer to Page 1-23 - Zero Stop Adjustment Procedures
- * Press (N) - Adjust Zero Stop (NEWTRONICS)
Refer to Page 1-22 - Zero Stop DisAssembly & Setup
Refer to Page 1-23 - Zero Stop Adjustment Procedures
- * Press (R) - Radial Alignment
Refer to Page 1-16 - Radial Alignment DisAssembly & Setup
- * Press RETURN - Return to Menu
Displays Alignment/Repair Test Main Menu

ZERO STOP TEST OPTION ONE - CHECK ZERO STOP

- * Insert a Formatted Write-Protected Diskette
- * Press RETURN - Check Zero Stop

The Zero Stop Test checks for proper adjustment of the Zero Track Stop, in 1541 Mode, by bumping the Read/Write Head, (5 Times), against the Zero Stop and reading a Pre-Written Mark on the diskette.

-----+-----
| FOR ACCURATE TESTING, THE FORMATTED DISKETTE BEING USED SHOULD |
| BE FORMATTED ON A KNOWN GOOD DRIVE OTHER THAN THE ONE UNDER TEST |
+-----+-----

**FAILURE - DEFECTIVE OR UN-FORMATTED TEST DISKETTE
MIS-ADJUSTED ZERO STOP OR ALIGNMENT
DEFECTIVE READ/WRITE OR CONTROL LOGIC**

If Zero Stop Test Passes

- * Press RETURN - Return to Menu
Displays Alignment/Repair Test Main Menu

If a Failure Occurs on Zero Stop Test

- * Press (R) - Retry Zero Stop Test
ReTest Zero Stop
- * Press (A) - Adjustment Options
- * Press RETURN - Return to Menu
Displays Main Alignment/Repair Test Menu

ADJUSTMENT OPTIONS

- * Press (A) - Adjust Zero Stop (ALPS)
Refer to Page 1-22 - Zero Stop DisAssembly & Setup
Refer to Page 1-23 - Zero Stop Adjustment Procedures
- * Press (N) - Adjust Zero Stop (NEWTRONICS)
Refer to Page 1-22 - Zero Stop DisAssembly & Setup
Refer to Page 1-23 - Zero Stop Adjustment Procedures

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

1571/C128D ZERO STOP DIS-ASSEMBLY AND SET-UP PROCEDURES

1. 1571 ONLY - Make Sure Alignment/Repair Main Menu is Displayed
2. 1571 ONLY - Turn Drive Power OFF
C128D ONLY - Turn System Power OFF
3. Disconnect Power Cable and Serial Cable (If Applicable)
4. 1571 ONLY - Remove the Four (4) Screws from the Bottom Case
and Remove the Top Case from the unit
C128D ONLY - Remove the Five (5) Screws from around the
Top Case and Remove Top Case from the unit
5. 1571 ONLY - Remove the Drive FacePlate and Set it
Beside the Unit
6. Remove the Two (2) Shield Screws and Remove the Drive Shield
* The Drive Shield may not be installed in all units
7. Connect Power Cable and Serial Cable, (If Applicable)
8. 1571 ONLY - Turn Drive Power ON
9. C128D ONLY - Turn System Power ON, Load System Configuration,
Select C128D as SYSTEM TYPE, Load C128D Diagnostic
Menu, Load Alignment/Repair Test
10. Select Zero Stop Test/Adjust Option from Diagnostic Menu

1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

1571/C128D ZERO STOP ADJUSTMENT PROCEDURES

DO NOT ADJUST THE STOP UNTIL RADIAL ALIGNMENT IS CORRECT

1. Loosen the two (2) Stop Fixing Screws and rotate the Stop Plate all the way towards the rear of the drive
 - * Press SPACE - Set Zero Stop
2. The Stepper Pulley will rotate to the Adjustment Position
3. NEWTRONICS - Slide the Stop forward and use a Standard Feeler Gauge, to adjust the Stop to .006 - .010 of an inch (.008 is Optimal)
4. NEWTRONICS - Tighten the two (2) Stop Fixing Screws
 - * The Head Must Not Move When The Screws Are Tightened
5. ALPS - Gently press down at the Top Center of the Stop Plate until it stops
6. ALPS - Tighten the two (2) Stop Fixing Screws (REAR SCREW FIRST)
 - * The Head Must Not Move When The Screws Are Tightened
7. Press SPACE - Re-Check Stop Adjust
 - * If the Zero Stop Test Fails
Repeat Steps 1 thru 4 until Adjustment is correct
 - * If the Zero Stop Test Passes
 - * Press RETURN - Return to Menu
 - Displays Alignment/Repair Test Main Menu

ALIGNMENT/REPAIR TEST OPTION FOUR - STEPPER MOTOR SLEW

STEPPER MOTOR SLEW TEST OPTION MENU

- * Press (0) - Step Head Tracks 1-35
- * Press RETURN - Return to Menu
- Displays Alignment/Repair Test Main Menu

STEPPER MOTOR SLEW TEST OPTION ONE - STEP HEAD TRACKS 1-35

The Stepper Motor Slew Test checks proper operation of the Stepper Motor by Slewing the Read/Write Head between Track 1 and Track 35, (Inner and Outer Tracks). The Read/Write Head should move smoothly and freely with no sticking or binding of the Stepper Mechanism.

FAILURE - DEFECTIVE DRIVE ASSEMBLY (STEPPER MOTOR)
DEFECTIVE STEPPER MOTOR CONTROL LOGIC

**1571/128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

ALIGNMENT/REPAIR TEST OPTION FIVE - STEPPER MOTOR LOGIC

STEPPER MOTOR LOGIC TEST OPTIONS

- * Press (+) - Step Head IN
- * Press (-) - Step Head OUT
- * Press RETURN - Return to Menu
Displays Alignment/Repair Main Menu

STEPPER MOTOR LOGIC OPTION ONE - STEP READ/WRITE HEAD IN
STEPPER MOTOR LOGIC OPTION TWO - STEP READ/WRITE HEAD OUT

These options allow the Read/Write Head to be Stepped In/Out one Track at a time.
When the Head is Stepped, the Status of the STP 0 and STP 1 Signals (0 or 1) , will be displayed. Using a Scope or Meter, verify the Measured Signal with the Expected Signal from the Stepper Motor Control Logic Chart.

INCORRECT SIGNALS NORMALLY INDICATE A DEFECTIVE COMPONENT

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

1571 STEPPER MOTOR CONTROL LOGIC -- BASIC CHART 1					
STP 0 DISPLAY	STP 1 DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	INCORRECT PROBABLE	SIGNAL FAILURE
0	0	U7 - 25,28	0 VDC	SEE ADVANCED CHART 1	
0	0	U7 - 24,27	+5 VDC	SEE ADVANCED CHART 1	
0	1	U7 - 24,27	0 VDC	SEE ADVANCED CHART 1	
0	1	U7 - 25,28	+5 VDC	SEE ADVANCED CHART 1	
1	0	U7 - 24,25	0 VDC	SEE ADVANCED CHART 1	
1	0	U7 - 27,28	+5 VDC	SEE ADVANCED CHART 1	
1	1	U7 - 24,25	+5 VDC	SEE ADVANCED CHART 1	
1	1	U7 - 27,28	0 VDC	SEE ADVANCED CHART 1	

* SIGNALS FROM BASIC CHART 2 MUST BE MEASURED WHILE ONE OF THE KEYS, (+) OR (-), IS BEING HELD DOWN AND THE READ/WRITE HEAD IS STEPPING

1571 STEPPER MOTOR CONTROL LOGIC -- BASIC CHART 2		
CHECK CONNECTOR	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
CN5 - PIN 1	+5 VDC LEVEL WITH +12 VDC LEVEL PULSE	SEE ADVANCED CHART 2

* IF ALL BASIC SIGNALS ARE CORRECT AND THE HEAD STILL DOES NOT STEP, A DEFECTIVE DRIVE MECHANISM IS NORMALLY INDICATED

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

1571 STEPPER MOTOR CONTROL LOGIC -- ADVANCED CHART 1				
***** INCORRECT STP 0 OR STP 1 SIGNALS FROM BASIC CHART 1 *****				
STP 0 DISPLAY	STP 1 DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
0	0	U4 - 10	0 VDC	U4 - U13 - U17
0	0	U4 - 11	0 VDC	U4 - U13 - U14 - U8
0	0	U13 - 3	+5 VDC	U13 - U6
0	0	U7 - 23	0 VDC	U6 - U7
0	0	U7 - 30	0 VDC	U13 - U7
0	0	U7 - 29	+1 VDC	U6 - U7
0	0	U7 - 31	+1 VDC	U8 - U7
0	0	U7 - 25,28	0 VDC	U7
0	0	U7 - 24,27	+5 VDC	U7
0	1	U4 - 10	0 VDC	U4 - U13 - U17
0	1	U4 - 11	+5 VDC	U4 - U13 - U14 - U8
0	1	U13 - 3	0 VDC	U13 - U6
0	1	U7 - 23	+1 VDC	U6 - U7
0	1	U7 - 30	+1 VDC	U13 - U7
0	1	U7 - 29	0 VDC	U6 - U7
0	1	U7 - 31	0 VDC	U8 - U7
0	1	U7 - 25,28	+5 VDC	U7
0	1	U7 - 24,27	0 VDC	U7
1	0	U4 - 10	+5 VDC	U4 - U13 - U17
1	0	U4 - 11	0 VDC	U4 - U13 - U14 - U8
1	0	U13 - 3	0 VDC	U13 - U6
1	0	U7 - 23	+1 VDC	U6 - U7
1	0	U7 - 30	0 VDC	U13 - U7
1	0	U7 - 29	0 VDC	U6 - U7
1	0	U7 - 31	+1 VDC	U8 - U7
1	0	U7 - 24,25	0 VDC	U7
1	0	U7 - 27,28	+5 VDC	U7
1	1	U4 - 10	+5 VDC	U4 - U13 - U17
1	1	U4 - 11	+5 VDC	U4 - U13 - U14 - U8
1	1	U13 - 3	+5 VDC	U13 - U6
1	1	U7 - 23	0 VDC	U6 - U7
1	1	U7 - 30	+5 VDC	U13 - U7
1	1	U7 - 29	+5 VDC	U6 - U7
1	1	U7 - 31	0 VDC	U8 - U7
1	1	U7 - 24,25	+5 VDC	U7
1	1	U7 - 27,28	0 VDC	U7

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

* SIGNALS FROM ADVANCED CHART 2 MUST BE MEASURED WHILE ONE OF THE KEYS, (+) OR (-), IS BEING HELD DOWN AND THE HEAD IS STEPPING

1571 STEPPER MOTOR CONTROL LOGIC -- ADVANCED CHART 2		
***** INCORRECT STEPPER MOTOR SIGNAL FROM BASIC CHART 2 *****		
CHECK IC PINS	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
U13 - 4	0 VDC LEVEL WITH +5 VDC LEVEL PULSE	U13 - U22
U16 - 13	0 VDC LEVEL WITH +5 VDC LEVEL PULSE	U22 - U16
U16 - 12	+12 VDC LEVEL WITH 0 VDC LEVEL PULSE	U16 - Q1
CHECK CONNECTOR	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
CN5 - PIN 1	+5 VDC LEVEL WITH +12 VDC LEVEL PULSE	Q1 - CR10 - DRIVE

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

C128D STEPPER MOTOR CONTROL LOGIC -- BASIC CHART 1				
STP 0 DISPLAY	STP 1 DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
0	0	U109 - 12,14	+5 VDC	SEE ADVANCED CHART 1
0	0	U109 - 13,15	+1 VDC	SEE ANVANCED CHART 1
0	1	U109 - 13,15	+5 VDC	SEE ADVANCED CHART 1
0	1	UI09 - 12,14	+1 VDC	SEE ADVANCED CHART 1
1	0	U109 - 13,14	+5 VDC	SEE ADVANCED CHART 1
1	0	U109 - 12,15	+1 VDC	SEE ADVANCED CHART 1
1	1	U109 - 12,15	+5 VDC	SEE ADVANCED CHART 1
1	1	U109 - 13,14	+1 VDC	SEE ADVANCED CHART 1

* SIGNALS FROM BASIC CHART 2 MUST BE MEASURED WHILE ONE OF THE KEYS, (+) OR (-), IS BEING HELD DOWN AND THE READ/WRITE HEAD IS STEPPING

C128D STEPPER CONTROL LOGIC -- BASIC CHART 2		
CHECK CONNECTOR	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
CN15 - PIN 1	+5 VDC LEVEL WITH +12 VDC LEVEL PULSE	SEE ADVANCED CHART 2

* IF ALL BASIC SIGNALS ARE CORRECT AND THE HEAD STILL DOES NOT STEP, A DEFECTIVE DRIVE MECHANISM IS NORMALLY INDICATED

1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

C128D STEPPER MOTOR CONTROL LOGIC -- ADVANCED CHART 1				
***** INCORRECT STP 0 OR STP 1 SIGNALS FROM BASIC CHART 1 *****				
STP 0 DISPLAY	STP 1 DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
0	0	U104 - 10	0 VDC	U104 - U111
0	0	U104 - 11	0 VDC	U104 - U113 - U111
0	0	U111 - 8	0 VDC	U111 - U110
0	0	U110 - 5	0 VDC	U110 - U109
0	0	U110 - 12	+5 VDC	U110 - U109
0	0	U113 - 12	+5 VDC	U113 - U109
0	0	U113 - 10	0 VDC	U113 - U109
0	0	U109 - 12,14	+5 VDC	U109 - BAD DRIVE
0	0	U109 - 13,15	+1 VDC	U109 - BAD DRIVE
0	1	U104 - 10	0 VDC	U104 - U111
0	1	U104 - 11	+5 VDC	U104 - U113 - U111
0	1	U111 - 8	+5 VDC	U111 - U110
0	1	U110 - 5	+5 VDC	U110 - U109
0	1	U110 - 12	0 VDC	U110 - U109
0	1	U113 - 12	0 VDC	U113 - U109
0	1	U113 - 10	+5 VDC	U113 - U109
0	1	U109 - 12,14	+1 VDC	U109 - BAD DRIVE
0	1	U109 - 13,15	+5 VDC	U109 - BAD DRIVE
1	0	U104 - 10	+5 VDC	U104 - U111
1	0	U104 - 11	0 VDC	U104 - U113 - U111
1	0	U111 - 8	+5 VDC	U111 - U110
1	0	U110 - 5	+5 VDC	U110 - U109
1	0	U110 - 12	0 VDC	U110 - U109
1	0	U113 - 12	+5 VDC	U113 - U109
1	0	U113 - 10	0 VDC	U113 - U109
1	0	U109 - 12,15	+1 VDC	U109 - BAD DRIVE
1	0	U109 - 13,14	+5 VDC	U109 - BAD DRIVE
1	1	U104 - 10	+5 VDC	U104 - U111
1	1	U104 - 11	+5 VDC	U104 - U113 - U111
1	1	U111 - 8	0 VDC	U111 - U110
1	1	U110 - 5	0 VDC	U110 - U109
1	1	U110 - 12	+5 VDC	U110 - U109
1	1	U113 - 12	0 VDC	U113 - U109
1	1	U113 - 10	+5 VDC	U113 - U109
1	1	U109 - 12,14	+5 VDC	U109 - BAD DRIVE
1	1	U109 - 13,15	+1 VDC	U109 - BAD DRIVE

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

* SIGNALS FROM ADVANCED CHART 2 MUST BE MEASURED WHILE ONE OF THE KEYS, (+) OR (-), IS BEING HELD DOWN AND THE HEAD IS STEPPING

C128D STEPPER MOTOR CONTROL LOGIC -- ADVANCED CHART 2 ***** INCORRECT STEPPER MOTOR SIGNAL FROM BASIC CHART 2 *****		
CHECK IC PINS	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
U111 - 3	+5 VDC LEVEL WITH 0 VDC LEVEL PULSE	U111 - U110
U110 - 13	0 VDC LEVEL WITH +5 VDC LEVEL PULSE	U110 - U109
U109 - 11	+12 VDC LEVEL WITH 0 VDC LEVEL PULSE	U109 - Q101
CHECK CONNECTOR	EXPECTED SIGNAL	INCORRECT SIGNAL PROBABLE FAILURE
CN15 - PIN 1	+5 VDC LEVEL WITH +12 VDC LEVEL PULSE	Q101- BAD DRIVE

1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

ALIGNMENT/REPAIR TEST OPTION SIX - DATA BUS WRITE CHECK

| WARNING -- WARNING -- WARNING -- WARNING |
DISKETTE MUST BE REMOVED FROM THE DRIVE BEFORE RUNNING THIS TEST

DATA BUS WRITE TEST OPTIONS

- * Press (M--) - Return to Menu
 Displays Alignment/Repair Test Main Menu
- * Enter HEX Data ? FF0
 - * Input a two (2) Character HEX Code (00 - FF)
 - Followed by the Side Selection (0 or 1)
 - Example .. FF0 Entered = HEX FF on Side 0

The Data Bus Write Test verifies proper Data Bus Operation by setting the Data Lines to a Known Condition. When a HEX Code is input the Status of the Data Bus is Displayed in Binary Format, (0 = Low 1 = High).

Use a Scope to Verify the Measured Data with the Expected Data from the Data Bus Write Chart.

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

1571 DATA BUS WRITE CHART

CHECK FOR DATA LINES HELD HIGH --- INPUT HEX CODE '00'

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
00000000	U4 - 2,3,4,5 6,7,8,9	LOW	DC	U4 - U6
00000000	U6 - 37	LOW	DC	U6 - U14
00000000	U6 - 38	HIGH	DC	U6 - U14
00000000	U7 - 9	LOW	DC	U14 - U7
00000000	U7 - 10	HIGH	DC	U14 - U7
00000000	U7 - 6	0 V ANALOG	AC	U7 - CR3 - CR4 BAD DRIVE
00000000	U7 - 8	0 V ANALOG	AC	U7 - CR7 - CR8 BAD DRIVE

CHECK FOR DATA LINES HELD LOW --- INPUT HEX CODE 'FF'
NOTE: HEX 'FF' DATA IS APPROXIMATELY DOUBLE HEX '55' DATA

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
11111111	U4 - 2,3,4,5 6,7,8,9	HIGH	DC	U4 - U6
11111111	U6 - 37,38	SERIAL DATA	DC	U6 - U14
11111111	U7 - 9,10	SERIAL DATA	DC	U14 - U7
11111111	U7 - 6	ANALOG DATA	AC	U7 - CR3 - CR4 BAD DRIVE
11111111	U7 - 8	ANALOG DATA	AC	U7 - CR7 - CR8 BAD DRIVE

CHECK FOR ALTERNATING DATA LINES --- INPUT HEX CODE '55'
NOTE: HEX '55' DATA IS APPROXIMATELY HALF OF HEX 'FF' DATA

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
01010101	U4 - 2,4,6,8	HIGH	DC	U4 - U6
01010101	U4 - 3,5,7,9	LOW	DC	U4 - U6
01010101	U6 - 37,38	SERIAL DATA	DC	U6 - U14
01010101	U7 - 9,10	SERIAL DATA	DC	U14 - U7
01010101	U7 - 6	ANALOG DATA	AC	U7 - CR3 - CR4 BAD DRIVE
01010101	U7 - 8	ANALOG DATA	AC	U7 - CR7 - CR8 BAD DRIVE

1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

ALIGNMENT/REPAIR TEST OPTION SIX - DATA BUS WRITE CHECK

| WARNING -- WARNING -- WARNING -- WARNING |
DISKETTE MUST BE REMOVED FROM THE DRIVE BEFORE RUNNING THIS TEST

DATA BUS WRITE TEST OPTIONS

- * Press (M--) - Return to Menu
 Displays Alignment/Repair Test Main Menu
- * Enter HEX Data ? FF0
 - * Input a two (2) Character HEX Code (00 - FF)
 - Followed by the Side Selection (0 or 1)
 - Example .. FF0 Entered = HEX FF on Side 0

The Data Bus Write Test verifies proper Data Bus Operation by setting the Data Lines to a Known Condition. When a HEX Code is input the Status of the Data Bus is Displayed in Binary Format, (0 = Low 1 = High).

Use a Scope to Verify the Measured Data with the Expected Data from the Data Bus Write Chart.

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

1571 DATA BUS WRITE CHART

CHECK FOR DATA LINES HELD HIGH --- INPUT HEX CODE '00'

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
00000000	U4 - 2,3,4,5 6,7,8,9	LOW	DC	U4 - U6
00000000	U6 - 37	LOW	DC	U6 - U14
00000000	U6 - 38	HIGH	DC	U6 - U14
00000000	U7 - 9	LOW	DC	U14 - U7
00000000	U7 - 10	HIGH	DC	U14 - U7
00000000	U7 - 6	0 V ANALOG	AC	U7 - CR3 - CR4 BAD DRIVE
00000000	U7 - 8	0 V ANALOG	AC	U7 - CR7 - CR8 BAD DRIVE

CHECK FOR DATA LINES HELD LOW --- INPUT HEX CODE 'FF'
NOTE: HEX 'FF' DATA IS APPROXIMATELY DOUBLE HEX '55' DATA

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
11111111	U4 - 2,3,4,5 6,7,8,9	HIGH	DC	U4 - U6
11111111	U6 - 37,38	SERIAL DATA	DC	U6 - U14
11111111	U7 - 9,10	SERIAL DATA	DC	U14 - U7
11111111	U7 - 6	ANALOG DATA	AC	U7 - CR3 - CR4 BAD DRIVE
11111111	U7 - 8	ANALOG DATA	AC	U7 - CR7 - CR8 BAD DRIVE

CHECK FOR ALTERNATING DATA LINES --- INPUT HEX CODE '55'
NOTE: HEX '55' DATA IS APPROXIMATELY HALF OF HEX 'FF' DATA

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
01010101	U4 - 2,4,6,8	HIGH	DC	U4 - U6
01010101	U4 - 3,5,7,9	LOW	DC	U4 - U6
01010101	U6 - 37,38	SERIAL DATA	DC	U6 - U14
01010101	U7 - 9,10	SERIAL DATA	DC	U14 - U7
01010101	U7 - 6	ANALOG DATA	AC	U7 - CR3 - CR4 BAD DRIVE
01010101	U7 - 8	ANALOG DATA	AC	U7 - CR7 - CR8 BAD DRIVE

1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

CHECK FOR ALTERNATING DATA LINES --- INPUT HEX CODE 'AA'				
NOTE: HEX 'AA' DATA LOOKS EXACTLY THE SAME AS HEX '55' DATA				
DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
10101010	U4 - 2,4,6,8	LOW	DC	U4 - U6
10101010	U4 - 3,5,7,9	HIGH	DC	U4 - U6
10101010	U6 - 37,38	SERIAL DATA	DC	U6 - U14
10101010	U7 - 9,10	SERIAL DATA	DC	U14 - U7
10101010	U7 - 6	ANALOG DATA	AC	U7 - CR3 - CR4 BAD DRIVE
10101010	U7 - 8	ANALOG DATA	AC	U7 - CR7 - CR8 BAD DRIVE
CHECK FOR DOUBLING DATA LINES --- INPUT HEX CODE '66'				
NOTE: HEX '66' DATA IS DIRECTLY INVERSE TO HEX '99' DATA				
DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
01100110	U4 - 2,5,6,9	LOW	DC	U4 - U6
01100110	U4 - 3,4,7,8	HIGH	DC	U4 - U6
01100110	U6 - 37,38	SERIAL DATA	DC	U6 - U14
01100110	U7 - 9,10	SERIAL DATA	DC	U14 - U7
01100110	U7 - 6	ANALOG DATA	AC	U7 - CR3 - CR4 BAD DRIVE
01100110	U7 - 8	ANALOG DATA	AC	U7 - CR7 - CR8 BAD DRIVE
CHECK FOR DOUBLING DATA LINES --- INPUT HEX CODE '99'				
NOTE: HEX '99' DATA IS DIRECTLY INVERSE TO HEX '66' DATA				
DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
10011001	U4 - 2,5,6,9	HIGH	DC	U4 - U6
10011001	U4 - 3,4,7,8	LOW	DC	U4 - U6
10011001	U6 - 37,38	SERIAL DATA	DC	U6 - U14
10011001	U7 - 9,10	SERIAL DATA	DC	U14 - U7
10011001	U7 - 6	ANALOG DATA	AC	U7 - CR3 - CR4 BAD DRIVE
10011001	U7 - 8	ANALOG DATA	AC	U7 - CR7 - CR8 BAD DRIVE

1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

C128D DATA BUS WRITE CHART

CHECK FOR DATA LINES HELD HIGH --- INPUT HEX CODE '00'

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
00000000	U104 - 2,3,4,5 6,7,8,9	LOW	DC	U104 - U105
00000000	U105 - 35	LOW	DC	U105 - U113 - U111
00000000	U113 - 8	LOW	DC	U113 - U111
00000000	U111 - 6	HIGH	DC	U111 - U108

DATA BUS DISPLAY	CHECK CONNECTOR	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
------------------	-----------------	-----------------	------------	-----------------------------------

00000000	CN12 - 1,9	0 V ANALOG	AC	U108 - BAD DRIVE
----------	------------	------------	----	------------------

CHECK FOR DATA LINES HELD LOW --- INPUT HEX CODE 'FF'
NOTE: HEX 'FF' DATA IS APPROXIMATELY DOUBLE HEX '55' DATA

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
11111111	U104 - 2,3,4,5 6,7,8,9	HIGH	DC	U104 - U105
11111111	U105 - 35	SERIAL DATA	DC	U105 - U113 - U111
11111111	U113 - 8	SERIAL DATA	DC	U113 - U111
11111111	U111 - 6	SERIAL DATA	DC	U111 - U108

DATA BUS DISPLAY	CHECK CONNECTOR	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
------------------	-----------------	-----------------	------------	-----------------------------------

11111111	CN12 - 1,9	ANALOG DATA	AC	U108 - BAD DRIVE
----------	------------	-------------	----	------------------

CHECK FOR ALTERNATING DATA LINES --- INPUT HEX CODE '55'
NOTE: HEX '55' DATA IS APPROXIMATELY HALF HEX 'FF' DATA

DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
01010101	U104 - 2,4,6,8	HIGH	DC	U104 - U105
01010101	U104 - 3,5,7,9	LOW	DC	U104 - U105
01010101	U105 - 35	SERIAL DATA	DC	U105 - U113 - U111
01010101	U113 - 8	SERIAL DATA	DC	U113 - U111
01010101	U111 - 6	SERIAL DATA	DC	U111 - U108

DATA BUS DISPLAY	CHECK CONNECTOR	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
------------------	-----------------	-----------------	------------	-----------------------------------

01010101	CN12 - 1,9	ANALOG DATA	AC	U108 - BAD DRIVE
----------	------------	-------------	----	------------------

1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1

CHECK FOR ALTERNATING DATA LINES --- INPUT HEX CODE 'AA'				
NOTE: HEX 'AA' DATA LOOKS EXACTLY THE SAME AS HEX '55' DATA				
DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
10101010	U104 - 2,4,6,8	LOW	DC	U104 - U105
10101010	U104 - 3,5,7,9	HIGH	DC	U104 - U105
10101010	U105 - 35	SERIAL DATA	DC	U105 - U113 - U111
10101010	U113 - 8	SERIAL DATA	DC	U113 - U111
10101010	U111 - 6	SERIAL DATA	DC	U111 - U108
DATA BUS DISPLAY	CHECK CONNECTOR	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
10101010	CN12 - 1,9	ANALOG DATA	AC	U108 - BAD DRIVE
CHECK FOR DOUBLING DATA LINES ---- INPUT HEX CODE '66'				
NOTE: HEX '66' DATA IS DIRECTLY INVERSE TO HEX '99' DATA				
DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
01100110	U104 - 2,5,6,9	LOW	DC	U104 - U105
01100110	U104 - 3,4,7,8	HIGH	DC	U104 - U105
01100110	U105 - 35	SERIAL DATA	DC	U105 - U113 - U111
01100110	U113 - 8	SERIAL DATA	DC	U113 - U111
01100110	U111 - 6	SERIAL DATA	DC	U111 - U108
DATA BUS DISPLAY	CHECK CONNECTOR	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
01100110	CN12 - 1,9	ANALOG DATA	AC	U108 - BAD DRIVE
CHECK FOR DOUBLING DATA LINES --- INPUT HEX CODE '99'				
NOTE: HEX '99' DATA IS DIRECTLY INVERSE TO HEX '66' DATA				
DATA BUS DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
10011001	U104 - 2,5,6,9	LOW	DC	U104 - U105
10011001	U104 - 3,4,7,8	HIGH	DC	U104 - U105
10011001	U105 - 35	SERIAL DATA	DC	U105 - U113 - U111
10011001	U113 - 8	SERIAL DATA	DC	U113 - U111
10011001	U111 - 6	SERIAL DATA	DC	U111 - U108
DATA BUS DISPLAY	CHECK CONNECTOR	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
10011001	CN12 - 1,9	ANALOG DATA	AC	U108 - BAD DRIVE

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

ALIGNMENT/REPAIR TEST OPTION SEVEN - DRIVE MOTOR LOGIC

The **Drive Motor Logic Test** checks for proper operation of the Drive Motor Control Logic by allowing the Drive Motor to be turned either **OFF** or **ON** and displaying the current status.

Use a Scope or Meter to verify the Measured Signal with the Expected Signal from the Drive Motor Control Logic Chart.

DRIVE MOTOR LOGIC OPTION MENU

- * Press (1) - Turn Motor ON
- * Press (0) - Turn Motor OFF
- * Press RETURN - Return to Menu
Displays Alignment/Repair Main Menu

1571 DRIVE MOTOR CONTROL LOGIC CHART				
DRIVE MOTOR DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
OFF	U4 - 12	LOW	DC	U4 - U16
OFF	U16 - 10	HIGH	DC	U16 - BAD DRIVE
ON	U4 - 12	HIGH	DC	U4 - U16
ON	U16 - 10	LOW	DC	U16 - BAD DRIVE

C128D DRIVE MOTOR CONTROL LOGIC CHART				
DRIVE MOTOR DISPLAY	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
OFF	U104 - 12	LOW	DC	U104 - U112
OFF	U112 - 2	HIGH	DC	U112 - BAD DRIVE
ON	U104 - 12	HIGH	DC	U104 - U112
ON	U112 - 2	LOW	DC	U112 - BAD DRIVE

ALIGNMENT/REPAIR TEST OPTION EIGHT - HEAD SELECT FORMAT

The **Head Select Format Test** checks Read/Write Capabilities by Formatting each side of the diskette individually.

* Formatting is done in the 1541 Mode Only

When the Format is complete, both the Disk Directory as well as the Expected Directory are displayed and **Must Match**.

HEAD SELECT FORMAT OPTION MENU

- * Press (0) - Format Lower Head
- * Press (1) - Format Upper Head
- * Press RETURN - Return to Menu
Displays Alignment/Repair Main Menu

**1571/C128D ALIGNMENT/REPAIR TEST
VERSION 1.2.1/1.3.1**

ALIGNMENT/REPAIR TEST OPTION NINE - SIDE SELECT LOGIC

The Side Select Logic Test checks for proper operation of the Drive Side Select Logic by turning each Head, (Upper and Lower), on individually.

SIDE SELECT LOGIC OPTION MENU

- * Press (0) - Select Side '0' (Lower)
- * Press (1) - Select Side '1' (Upper)
- * Press RETURN - Return to Menu
Displays Alignment/Repair Main Menu

Use a Scope or Meter to verify the Measured Signal with the Expected Signal from the Side Select Control Logic Chart.

1571 SIDE SELECT LOGIC CHART				
SIDE SELECTED	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
0	U9 - 4	LOW	DC	U9 - U8 - U17
0	U8 - 6	HIGH	DC	U8 - Q2
0	U7 - 4	HIGH	DC	Q2 - U7
1	U9 - 4	HIGH	DC	U9 - U8 - U17
1	U17 - 4	LOW	DC	U17 - U8
1	U8 - 12	HIGH	DC	U8 - Q3
1	U7 - 4	HIGH	DC	Q3 - U7
C128D SIDE SELECT LOGIC CHART				
SIDE SELECTED	CHECK IC PINS	EXPECTED SIGNAL	SCOPE MODE	INCORRECT SIGNAL PROBABLE FAILURE
0	U106 - 4	LOW	DC	U106 - U108
0	U108 - 20	LOW	DC	U108 - BAD DRIVE
0	U108 - 22	HIGH	DC	U108 - BAD DRIVE
1	U106 - 4	HIGH	DC	U106 - U108
1	U108 - 20	HIGH	DC	U108 - BAD DRIVE
1	U108 - 22	LOW	DC	U108 - BAD DRIVE

ALIGNMENT/REPAIR TEST OPTION TEN - LOAD DIAGNOSTIC MENU

- * Insert Version 1.2/1.3 Diagnostic Diskette
- * Press (8) - Load From Device >> [8]
- * Press (9) - Load From Device >> [9]
Loads Version 1.2/1.3 Diagnostic From Selected Device Number
- * Press RETURN - Return To Menu
Displays Alignment/Repair Main Menu

C128/C128D 80 COLUMN TEST
VERSION 1.2.1

DESIGNED TO TEST : 80 COLUMN MODE OF THE C128 OR C128D

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
80 COLUMN RGB MONITOR (OPTIONAL)
VERSION 1.2 DIAGNOSTIC DISKETTE

The 80 Column Test is used to verify proper operation of the 80 Column Video Controller and Local 80 Column Video RAM of the C128 or C128D

* All Displays Are In HEX Format

During Run Time, the tests being run are displayed and can be Interpreted as

C128 - Memory Range - 4K Block, (1-4), of RAM Under Test
C128D - Memory Range - 16K Block, (1-4), of RAM Under Test
Address - Current Address in Block Being Tested
Data - Current Data Being Read or Written
R/W - Current Operation (Read/Write) Being Executed

Block Write - Writes Displayed Data to Displayed Address
Block Copy - Copies Data, (Reads/Writes), at Displayed Address

C128 - U22 8563 Pass/Fail - Result of 80 Column Video Chip Test
C128D - U22 8568 Pass/Fail - Result of 80 Column Video Chip Test

C128 - U23 4416 Pass/Fail - Result of 4x16 RAM Chip Test
C128D - U23 4464 Pass/Fail - Result of 4x64 RAM Chip Test

C128 - U25 4416 Pass/Fail - Result of 4x16 RAM Chip Test
C128D - U25 4464 Pass/Fail - Result of 4x64 RAM Chip Test

PASS xxxx - Number of Completed Passes Run
TIME xx:xx:xx - Total Run Time of 80 Column Test

- * Any IC Flagged with a Fail Message must be replaced
- * If an 80 Column RGB Monitor is connected, the ASCII Character of the Data being executed will be displayed.
- * The System Must be Powered Down to Exit This Test

**C128/C128D C64 MODE TEST
VERSION 1.2.1**

DESIGNED TO TEST : C64 MODE OF THE C128 OR C128D

**REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE**

The C64 Mode Test is used as Burn-In Diagnostic to verify proper operation of the C64 Mode of the C128 or C128D.

- * When C64 Mode Test is run, the system under test is switched to the C64 Mode and the test is Auto-Executed.
- * The rows of squares displayed during Test Run Time represent ICs with the Numbers Displayed representing IC Locations on the PCB.
- * Defective ICs are Indicated by Blacking Out the Corresponding Locations on the Screen
- * Testing of the SID IC is done by Audible Tones Only
- * For more detailed testing, use the C128/C128D Diagnostic Cartridge
- * The System Must be Powered Down to Exit This Test

**C128/C128D RAM EXPANDER TEST
VERSION 1.2.1**

DESIGNED TO TEST : 1700 OR 1750 EXTERNAL RAM EXPANDER

**REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
MODEL 1700 OR 1750 RAM EXPANSION MODULE
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE**

-----+-----
| THE 1700/1750 RAM EXPANDER WILL NOT OPERATE PROPERLY WITH THE REV 6 |
| PCB, (C128 ONLY), INSTALLED. IF THIS PROBLEM ARISES, THE PCB MUST |
| BE REPLACED WITH A REV 7 PCB OR HIGHER |
+-----+-----

THE RAM EXPANSION MODULE MUST BE INSERTED IN THE SYSTEM UNDER TEST
BEFORE POWER IS APPLIED AND THE RAM EXPANDER TEST IS LOADED

The RAM Expander Test is used to Diagnose Failures of the RAM ICs, any ROM which may be installed and the REC, (RAM Expansion Controller), in the Model 1700, (128K), or 1750, (512K), RAM Expansion Modules

The RAM Expansion Test Auto-Executes when loaded and displays a picture of the RAM Expansion Module.

- * If a Failure Occurs during Test Run Time, the IC Location Displays in Reverse Field and a 'BD' (BAD), message is displayed in the Defective IC Location.
- * If No Failure is detected, an 'OK' is displayed
- * The Number Displayed in the Upper Left Hand Corner of the screen is the Test Version Number and does not effect Diagnostic Testing
- * The Size of the Module Under Test, (1700 - 128K or 1750 - 512K), is displayed in the Upper Right Hand Corner of the screen
 - * If Incorrect Size Is Displayed, It May Indicate a Defective REC
- * The Number of Completed Cycles, 'COUNT', is displayed in the Lower Left Hand Corner of the screen
 - * Cycle Time is dependant on the Size of the Expansion Module
- * Two (2) Clocks, (AM and PM), are displayed in the Bottom Right Hand Corner of the screen
 - * AM Clock = Internal Time Of Day Clock of 6526 CIA Location U1
 - * PM Clock = Internal Time Of Day Clock of 6526 CIA Location U4
 - * CIAs are Located on the Main PCB of the C128 or C128D
 - * These Two (2) Clocks must display the EXACT SAME TIME during Diagnostic Run Time and Increment as the Test Continues

TIME-OF-DAY-CLOCK FAILURES

- * Incorrect AM Clock - Possible 6526 CIA Failure - Location U1
- * Incorrect PM Clock - Possible 6526 CIA Failure - Location U4
- * Incorrect Both Clocks - Possible 60 HZ TOD Input Failure

**C128/C128D RAM EXPANDER TEST
VERSION 1.2.1**

8726 REC (RAM EXPANSION CONTROLLER)

The REC is a DMA Device used to Transfer Blocks of Data between the C128 or C128D and the Expansion RAM.

- * The Verify Option is tested by Testing Both Verify and Verify Error Conditions with the Interrupts ON.
 - * This Detects the Majority of REC Failures
 - * If either test Fails, the REC is 'BAD'
 - * If both Verify Conditions are met the Test Continues

- * The Swap Option is tested by Loading the Expansion RAM with a Pre-Selected Random Pattern, Clearing the Host RAM, Swapping RAM and Comparing the Two RAM Areas.
 - * If either RAM Area does not compare to the Pattern, the REC is 'BAD'
 - * If both RAM Areas Compare to the Pattern, the REC is 'OK'

Although some REC Failures are not so easily detected, many time they may be determined by the Overall Test Results

- * Example: BAD RAM Patterns for Bank 0 Match Bank 1

C128 / C128D HOST RAM

The Architecture of the 1700/1750 RAM Expansion Module requires an Area of RAM within the C128 or C128D to be allocated. This RAM is referred to as the Host RAM. Since the Test Data is first placed in this area and Transferred to the RAM Expander for testing and back again, it is necessary to insure that the Host RAM functions properly.

- * The Host RAM is Tested using the C128/C128D Diagnostic Cartridge
- * A Failure in the Host RAM will cause Incorrect Results to be displayed during the RAM Expansion Test

RAM EXPANSION TEST

A Test Pattern is placed in the First Memory Location in Host RAM where it is duplicated to fill the remaining area. When this is complete, the Host RAM is Transferred to the RAM Expander. This Transfer Procedure is duplicated until all Banks of the Expansion RAM are filled. After a Set Time, to allow for Refresh, the Data is Transferred back to the Host RAM and Compared to the Test Byte.

- * If Data Read = Data Written - RAM is 'OK'
- * If Data Read <> Data Written - RAM is 'BAD'

DYNAMIC RAM

Because the 1700/1750 RAM Expander uses Dynamic RAM, a Refresh Cycle must occur at least every Two (2) MilliSeconds. This is the Time Most RAM Failures Occur.

- * Each Test in the RAM Expansion Diagnostic allows for RAM Refresh
- * Displayed Failures are Valid Only For The First Pass after which
 - * Defective ICs should be Replaced and the Test Re-Started
 - * Further Testing will Display Incorrect Results

**C128/C128D RAM EXPANDER TEST
VERSION 1.2.1**

CUSTOM TEST PATTERN TESTING

The RAM Expansion Test Pattern Table is Located between 2261 and 2274 HEX (Inclusive). This table contains the Bit Patterns used for RAM Expansion Testing.

If a different Test Pattern is desired

- * Insert Version 1.5 Diagnostic Diskette in Load Drive
 - * C128 - Type DLOAD "C128 RAM XPANDER" Press RETURN
 - * C128D - Type DLOAD "128D RAM XPANDER" Press RETURN
 - * Type POKE 8801, (Enter Decimal Test Pattern) Press RETURN
 - * Type RUN Press RETURN
- * The RAM Expansion Test will now be executed using the Selected Test Pattern.

EXTERNAL ROM TEST

Although the External ROM, (Location U18 of Expansion PCB), is not currently used, the RAM Expansion Test includes a test to Detect Failures on any ROM which may be used in the future.

The ROM is Tested by adding the contents of each address to a value equal to the sum of the data in all preceding addresses. This is referred to as a 'CHECKSUM' and the value is displayed, in HEX Format.

- * The Displayed Checksum may change from one Pass to another as only an Empty Slot is being read, however it should be consistent between different RAM Expanders.
- ** A Checksum which is Not Consistent between different RAM Expanders may Indicate a Defective PLA on Main PCB of the C128 or C128D.

- * The System Must be Powered Down to Exit This Test

1571/C128D FILE COPY 1
VERSION 1.2.1

DESIGNED TO COPY : FILES FROM ONE DRIVE TO ANOTHER

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (MANDATORY)
1571 SINGLE DISK DRIVE (C128 ONLY)
DATA DISKETTE
BLANK DISKETTE
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE

-----+
| THE DRIVES BEING USED MUST BE SET TO DIFFERENT DEVICE NUMBERS |
-----+

The File Copy 1 Program is the same as the Universal Disk-File Copy Program on the 1581 Test Demo Diskette.

The Program allows Disk Files from one drive to be copied to another drive connected VIA the Serial Bus.

FILE COPY OPTIONS

CHANGE DEVICE NUMBER OPTION

- * If (Y)es is selected
 - * Input the Original Device Number
 - * Input the New Device Number
 - * Turn Power OFF to all Drives except the one to be changed
 - * Press SPACE - Change Device Number

- * If (N)o is selected
 - * Select Partition Options

PARTITION OPTIONS

-----+
| THE PARTITION OPTIONS ARE VALID FOR THE 1581 ONLY AND |
| REQUIRES A PARTITION TO PREVIOUSLY HAVE BEEN CREATED |
-----+

- * If (Y)es is selected
 - * Enter Name of Partition to Open
 - * Select Read From or Write To Option
 - * If (R)ead is selected
 - * Selected Files will be Read from the Partition
 - * If (W)rite is selected
 - * Selected Files will be Written to the Partition
 - * Select File Transfer Options

- * If (N)o is selected
 - * Select File Transfer Options

1571/C128D FILE COPY 1
VERSION 1.2.1

FILE TRANSFER OPTIONS

- * Input Copy From Unit (Source Drive Device Number)
 - * Data Diskette Must be Inserted in Source Drive
- * Input Drive Number (Always [0] For 1571 or C128D)
- * Input Copy To Unit (Destination Drive Device Number)
 - * Blank Diskette Must be Inserted in Destination Drive
 - * Write-Protect Tab Must be Closed
- * Input Drive Number (Always [0] For 1571 or C128D)

NAME-SEARCH PATTERN OPTION

- * If a File Name is Entered, only that file will be displayed for the File Copy Selection Option
- * If Selected Characters are entered followed by an [*] Symbol, only files which begin with these characters will be displayed for the File Copy Selection Option
- * If RETURN is selected, all files will be displayed for the File Copy Selection Option

FILE COPY SELECTION OPTION

The Selected Files will be displayed as

File Size	File Name	File Type
-----------	-----------	-----------

- * Press (Y)es if you wish to copy the displayed file
- * Press (N)o if you wish to skip the displayed file
- * Press (Y)es followed by RETURN at any file to copy all remaining files
- * Press (N)o followed by RETURN at any file to skip all remaining files

DESTINATION DISK NEW OPTION

If the Destination Diskette is Blank or the Information Contained is no longer required, Select (Y)es here

If the Destination Diskette Contains Valid Data and files are to be added, Select (N)o here

If (Y)es is selected

- * Enter the Name and ID to be assigned to the Destination Diskette
 - * The Name is limited to (16) Characters, and may be either Alpha or Numeric
 - * The ID Must be (2) Characters, and may be either Alpha or Numeric but should not be a combination of the two

When the Format of the Destination Diskette is complete

- * Blocks Free is displayed -- (Blocks Free Should = 1328)
- * File Copy will begin

1571/C128D FILE COPY 1
VERSION 1.2.1

If (N)o is selected

- * Blocks Free are Displayed
- * File Copy Begins

FILE COPY

The files being copied are displayed as

- * Source File Size - Number of Blocks in Source File
- * Source File Name - Name of Source File being copied
- * Source File Type - Type of Source File being copied
 - * SEQ = Sequential REL = Relative PGM = Program USR = User
- * Destination File Size - Number of Blocks copied
 - * If Source File Size <> Destination File Size after the file has been copied, an error has occurred during the copy

ANOTHER COPY OPTION

- * If (Y)es is selected, File Copy 1 ReStarts and you are ready to make another copy
- * If (N)o is selected, File Copy 1 will Terminate

C128/C128D FILE COPY 2
VERSION 1.2.1

DESIGNED TO COPY : FILES FROM ONE DRIVE TO ANOTHER

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (MANDATORY)
1571 SINGLE DISK DRIVE (C128 ONLY)
DATA DISKETTE
FORMATTED DISKETTE
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE

THE DRIVES BEING USED MUST BE SET TO DIFFERENT DEVICE NUMBERS

THE DISKETTE IN THE DESTINATION DISKETTE MUST BE FORMATTED
PRIOR TO ATTEMPTING TO COPY FILES TO IT

The File Copy 2 Program is a File Copy Utility Program to allow files from one drive to be copied to another drive connected VIA the Serial Bus.

FILE COPY 2 OPTIONS

FILE TRANSFER OPTIONS

- * Input Source Disk Unit (Source Drive Device Number)
 - * Data Diskette Must be Inserted in the Source Drive
- * Input Destination Disk Unit (Destination Drive Device Number)
 - * Formatted Diskette Must be Inserted in the Destination Drive
 - * Write-Protect Tab Must be OPEN
- * Template or RETURN
 - * If a File Name is Entered, only that file will be displayed for the File Copy Selection Option
 - * If Selected Characters are entered followed by an [*] Symbol, only files which begin with these characters will be displayed for the File Copy Selection Option
 - * If RETURN is selected, all files will be displayed for the File Copy Selection Option
- * If the Destination Diskette is Not Formatted, a Read Error will be displayed here

FILE COPY READ OPTION

- * The Directory of Selected Files is read and Number of Files Targeted for copying is displayed

C128/C128D FILE COPY 2
VERSION 1.2.1

FILE COPY SELECTION

- * Press (Y)es if you wish to copy the displayed file
- * Press (N)o if you wish to skip the displayed file
- * Files to be selected will be displayed as
 - * Source File Name - Name of File for Selection
 - * Source File Type - Type of File for Selection
 - * SEQ = Sequential REL = Relative PGM = Program USR = User
- * File Copy 2 will begin

FILE COPY

The files being copied are displayed as

- * Now Copying - Name of Source File being copied

ANOTHER COPY OPTION

- * More (Y/N)
 - * If (Y)es is selected, File Copy 2 ReStarts and you are ready to make another copy
 - * If (N)o is selected, File Copy 2 will Terminate

1571/C128D DISK FORMATTER
VERSION 1.2.1

DESIGNED TO FORMAT: A BLANK DISKETTE

REQUIRED EQUIPMENT: C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
BLANK TEST DISKETTE
40 COLUMN MONITOR OR TV SET
VERSION 1.2 DIAGNOSTIC DISKETTE

The Disk Formatter Program is a Disk Utility Program to allow Blank Diskettes to be Formatted under program control.

DISK FORMATTER OPTIONS

- * Press (0) - Select Device Number >> [8] or [9]
- * This option allows a diskette to be formatted in a Drive set to either Device Number [8] or [9]

SELECT FORMAT MODE

- * Press (S) - Slow Mode
- * Formatting will be done in the 1541 Slow Mode
- * Press (F) - Fast Mode
- * Formatting will be done in the 1571 Fast Mode
- * Press SPACE - Load Diagnostic Menu
- * Insert Version 1.2 Diagnostic Diskette
- * Press (8) - Load From Device # >> [8]
- * Loads Version 1.2 Diagnostic Menu From Device Number [8]
- * Press (9) - Load From Device # >> [9]
- * Loads Version 1.2 Diagnostic Menu From Device Number [9]
- * Press Return - Return To Menu
- * Displays Disk Formatter Main Menu

FORMAT INFORMATION

- * Disk Name - Enter Name to be assigned to the diskette
- * The Disk Name is limited to a maximum of (16) Characters and may be either Alpha or Numeric
- * Disk ID - Enter ID to be assigned to the diskette
- * The ID must be (2) Characters and may be either Alpha or Numeric but not a combination of the two
- * Press (F) - Information is Correct
- * Begin Formatting Diskette

-----+-----
| WARNING - FORMATTING DESTROYS ALL DATA STORED ON DISKETTE |
-----+-----

- * Press (A) - Wrong Information Entered
- * Do Not Format Diskette
- * Press RETURN - Return To Menu
- * Displays Disk Formatter Main Menu

1571/C128D DISK FORMATTER
VERSION 1.2.1

SCREEN DISPLAY

Disk Name (Name Assigned to the Diskette)
Format Speed (Fast or Slow)
ID Code (ID Assigned to the Diskette)
Device Number (Device Number of Formatting Drive)
Disk Status (Good / Bad)

* Press RETURN - Return To Menu
Displays Disk Format Main Menu

1571/C128D FILE SCRATCHER
VERSION 1.2.1

DESIGNED TO SCRATCH: FILES FROM A DATA DISKETTE

REQUIRED EQUIPMENT : C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
DATA DISKETTE
VERSION 1.2 DIAGNOSTIC DISKETTE

The File Scratcher Program is a Disk Utility Program to allow Files to be Scratched under Program Control.

FILE SCRATCHER OPTIONS

- * Press (0) - Select Device Number >> [8] or [9]
 - * This option allows Files to be Scratched from a Device set to either Device Number [8] or [9]
- * Press RETURN - Start Scratcher
Displays Prompts for Input Information
- * Press SPACE - Load Diagnostic Menu
 - * Insert Version 1.2 Diagnostic Diskette
 - * Press (8) - Load From Device # >> [8]
 - * Loads Version 1.2 Diagnostic Menu From Device Number [8]
 - * Press (9) - Load From Device # >> [9]
 - * Loads Version 1.2 Diagnostic Menu From Device Number [9]
 - * Press Return - Return To Menu
Displays File Scratcher Main Menu

FILE SCRATCHER INFORMATION

- * File Name - Enter Name of File to be Scratched
 - * The File must be Entered Exactly as it is Named on the Diskette
- * Press (S) - Information is Correct - Scratch The File
- * Press (A) - Wrong Information Entered - Do Not Scratch File
- * Press RETURN - Return To Menu
Displays File Scratcher Main Menu

SCREEN DISPLAY

Scratching File (Name Of File Being Scratched)
Device Number (Device Number of Drive)
Disk Status (Good / Bad)

- * Press RETURN - Return To Menu
Displays File Scratcher Main Menu
- * If a File has been scratched, the BAM will be updated before the File Scratcher Main Menu is Displayed

1571/C128D FILE RESTORER
VERSION 1.2.1

DESIGNED TO RECOVER: SCRATCHED FILES FROM A DATA DISKETTE

REQUIRED EQUIPMENT : C128 OR C128D COMPUTER
1571 SINGLE DISK DRIVE (C128 ONLY)
40 COLUMN MONITOR OR TV SET
DATA DISKETTE
VERSION 1.2 DIAGNOSTIC DISKETTE

The File Restorer Program is a Disk Utility Program to allow
Scratched Files to be to be Restored to Usable Condition

-----+
| IF ANY TYPE OF DISK WRITE OPERATION, SUCH AS SAVING A FILE |
| OR BAM UPDATING, IS DONE AFTER THE FILE IS SCRATCHED, THE |
| FILE MAY NO LONGER BE ABLE TO BE RESTORED |
+-----

FILE RESTORER OPTIONS

- * Disk Unit NR (8-11)
 - * Device Number of the Drive for File Recovery
- * Disk Drive NR (0/1)
 - * Always [0] For 1571/C128D
- * Insert Diskette for File Recovery
 - * Press ANY KEY

FILE RESTORER INFORMATION

- * File Name - Enter Name of File to be Recovered
 - * If a File Name is entered, the File will be displayed along with Track and Sector where the File is Stored with a Recovery Option
 - * If Selected Characters are entered followed by [*], all Scratched Files beginning with these characters will be displayed along with Track and Sector where the File is Stored with a Recovery Option
 - * If RETURN is Pressed at the [*] Prompt, all Scratched Files will be displayed along with Track and Sector where the File is Stored with a Recovery Option

RECOVERY OPTION

- * Press (Y)es - Restore Displayed File
- * Press (N)o - Skip Displayed File
- * If (Y)es is selected
 - * Enter File Type to be Restored
 - * SEQ = Sequential File PRG = Program File USR = User File
 - REL = Relative File CBM = Boot File
- * Status of Selected File is displayed
- * Press (Y)es - Select more files for recovery
- * Press (N)o - Terminate File Restorer

C128/C128D BASIC 7.0 COMMANDS
VERSION 1.2

The following are some of the most common Basic Commands used in the operation of the C128 and C128D Computers. Also listed is a format example of each command.

For more detailed operation commands, please refer to the C128 or C128D System Guide.

COMMAND FUNCTION	COMMAND FORMAT
<p>[FORMAT] or [NEW] a Blank Diskette</p>	<p>HEADER "Disk Name", Dx, ID, Udn</p> <ul style="list-style-type: none"> * Disk Name = Any Combination of Digits or Letters (Max 16 Characters) * x = Drive Number (Optional) (Always [0] for 1571/C128D) * ID = Any (2) Digits or Numbers (Must be Two Characters) * dn = Device Number of Drive (Optional if Device Number [8])
<p>Example: To FORMAT a Diskette with the Disk Name [COMMODORE] with an ID [BM] in Drive [0] of Device Number [8]</p> <p style="margin-left: 40px;">HEADER "COMMODORE", D0, IBM - Press RETURN AT THE [ARE YOU SURE] ? PROMPT - Press [Y] - Press RETURN</p> <p>Example: To FORMAT a Diskette with the Disk Name [COMMODORE] with an ID [BM] in Drive [0] of Device Number [9]</p> <p style="margin-left: 40px;">HEADER "COMMODORE", D0, IBM, U9 - Press RETURN AT THE [ARE YOU SURE] ? PROMPT - Press [Y] - Press RETURN</p>	
COMMAND FUNCTION	COMMAND FORMAT
<p>[SAVE] a Program to a Formatted Diskette</p>	<p>DSAVE "Program Name", Dx, Udn</p> <ul style="list-style-type: none"> * Program Name = Any Combination of Digits or Letters (Max 16 Characters) * x = Drive Number (Optional) (Always [0] for 1571/C128D) * dn = Device Number of Drive (Optional if Device Number [8])
<p>Example: To SAVE a Program called [COMMODORE] to Drive [0] on Device Number [8]</p> <p style="margin-left: 40px;">DSAVE "COMMODORE", D0 - Press RETURN</p> <p>Example: To SAVE a Program called [COMMODORE] to Drive [0] on Device Number [9]</p> <p style="margin-left: 40px;">DSAVE "COMMODORE", D0, U9 - Press RETURN</p>	

C128/C128D BASIC 7.0 COMMANDS
VERSION 1.2

COMMAND FUNCTION	COMMAND FORMAT
<p>[LOAD] a Program from a Data Diskette</p>	<p>DLOAD "Program Name", Dx, Udn</p> <ul style="list-style-type: none"> * Program Name = Name of Program to be Loaded (Spelling Must Be Exact) * x = Drive Number (Optional) (Always [0] for 1571/C128D) * dn = Device Number of Drive (Optional if Device Number [8])
<p>Example: To LOAD a Program called [COMMODORE] from Drive [0] on Device Number [8]</p> <p style="padding-left: 40px;">DLOAD "COMMODORE", D0 - Press RETURN</p> <p>Example: To LOAD a Program called [COMMODORE] from Drive [0] on Device Number [9]</p> <p style="padding-left: 40px;">DLOAD "COMMODORE", D0, U9 - Press RETURN</p>	
COMMAND FUNCTION	COMMAND FORMAT
<p>[RENAME] a File to Another Name</p>	<p>RENAME Dx, "Old Name" to "New Name", Udn</p> <ul style="list-style-type: none"> * x = Drive Number (Mandatory) (Always [0] for 1571/C128D) * Old Name = Original Name of File * New Name = New Name of File * dn = Device Number of Drive (Optional if Device Number [8])
<p>Example: To RENAME a File called [COMMODORE] to [CBM] on Drive [0] of Device Number [8]</p> <p style="padding-left: 40px;">RENAME D0, "COMMODORE" to "CBM" - Press RETURN</p> <p>Example: To RENAME a File called [COMMODORE] to [CBM] on Drive [0] of Device Number [9]</p> <p style="padding-left: 40px;">RENAME D0, "COMMODORE" to "CBM", u9 - Press RETURN</p>	

C128/C128D BASIC 7.0 COMMANDS
VERSION 1.2

COMMAND FUNCTION	COMMAND FORMAT
<p>[INITIALIZE] the Disk Drive</p>	<p>OPEN 1, dn, 15: PRINT #1, "Ix" CLOSE 1</p> <p>* dn = Device Number of Drive (Mandatory) * x = Drive Number (Mandatory) (Always [0] for 1571/C128D)</p>
<p>Example: To INITIALIZE Drive [0] of Device Number [8]</p> <p style="padding-left: 40px;">OPEN 1,8,15: PRINT #1, "I0" - Press RETURN CLOSE 1 - Press RETURN</p> <p>Example: To INITIALIZE Drive [0] of Device Number [9]</p> <p style="padding-left: 40px;">OPEN 1,9,15: PRINT #1, "I0" - Press RETURN CLOSE 1 - Press RETURN</p>	
COMMAND FUNCTION	COMMAND FORMAT
<p>[DIRECTORY] Read Directory of the Diskette</p>	<p>DIRECTORY Dx, Udn</p> <p>* x = Drive Number (Optional) (Always [0] for 1571/C128D) * dn = Device Number of Drive (Optional if Device Number [8])</p>
<p>Example: To Read the DIRECTORY from Drive [0] of Device Number [8]</p> <p style="padding-left: 40px;">DIRECTORY D0 - Press RETURN</p> <p>Example: To Read the DIRECTORY from Drive [0] of Device Number [9]</p> <p style="padding-left: 40px;">DIRECTORY D0, U9 - Press RETURN</p>	

**C128/C128D BASIC 7.0 COMMANDS
VERSION 1.2**

COMMAND FUNCTION	COMMAND FORMAT
<p>[SCRATCH] a File From a Data Diskette</p>	<p>SCRATCH "File Name", Dx, Udn</p> <ul style="list-style-type: none"> * File Name = Name of File to be Scratched * x = Drive Number (Optional) (Always [0] for 1571/C128D) * dn = Device Number of Drive = (Optional if Device [8])
<p>Example: To SCRATCH a File named [COMMODORE] from Drive [0] of Device Number [8]</p> <p>SCRATCH "COMMODORE", D0 - Press RETURN AT THE [ARE YOU SURE] ? PROMPT - Press [Y] - Press RETURN</p> <p>Example: To SCRATCH a File named [COMMODORE] from Drive [0] of Device Number [9]</p> <p>SCRATCH "COMMODORE", D0, U9 - Press RETURN AT THE [ARE YOU SURE] ? PROMPT - Press [Y] - Press RETURN</p>	

To All Service Centers:

Although Extensive Testing was done on the Diagnostic Tests contained on the Version 1.2 and 1.3 Diagnostic Test Diskettes, it is still possible that some errors may exist.


**If Errors are discovered during Diagnostic Testing
Please fill out the attached form and return it to**

**COMMODORE BUSINESS MACHINES
ATTN: BRUCE MORTENSON
1200 WILSON DRIVE
WEST CHESTER, PA 19380**

All Reported Errors will be validated and if the Program is changed, the Updated Program will be put on the CSIN Network for Downloading.

Please provide as much of the requested information as possible to allow us to provide the Updates to the field as quickly as possible to help all Commodore Service Centers.

Regards

A handwritten signature in cursive script, appearing to read "Bruce Mortenson", with a long horizontal line extending to the right.

Bruce Mortenson

