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ATARI 810 DISK DRIVE

FIELD SERVICE MANUAL

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810 Disk Drive Field Service Manual

TABLE OF CONTENTS

Section	Title	Page
	INTRODUCTION	vii
1	THEORY OF OPERATION	1-1
	Functional Flow of the 810 Operator Functions Mechanical Characteristics Case Drive Mechanism Head Carriage Assembly Drive Motor Stepper Motor PCB Assemblies. Power Supply Power-Up Logic Electronics Clock G507 Microprocessor Unit (Microprocessor) Read-Only- Memory (ROM) Random Access Memory (RAM) 6532 Peripheral Interface Adaptor (PIA) 1771 Floppy Disk Controller (FDC) Write Erase Logic Write Protect Logic Read Logic Read Logic Read Logic Electrical Specifications Line Assignments Electrical Specifications Serial Bus Protocol	1-2 1-3 1-6 1-7 1-7 1-7 1-7 1-7 1-7 1-10 1-11 1-11 1-13 1-13 1-14 1-14 1-14 1-14 1-15 1-17 1-18 1-19 1-22 1-22 1-22 1-23 1-23
2	SILKSCREENS AND SCHEMATICS	2-1
3	TEST EQUIPMENT/DIAGNOSTIC TESTS Equipment Requirements Hook-Up Check of Mechanical Components Preventive Maintenance/Precautions Diagnostic Tests Power-Up Test Burn-In Test DOS Verification Procedure Alignment Program	3-1 3-1 3-1 3-1 3-1 3-1 3-2 3-2 3-5 3-7

ź

4

e

×

TABLE OF CONTENTS (Cont)

Section	Title	Page
4	DIAGNOSTIC FLOWCHARTS Overview The Swap-Out Procedure Replace in Order	4-1 4-1 4-1 4-1
5	SYMPTOM CHECKLIST Overview Side Board Failures Stepper Motor Circuit Power-up Logic and Data Interface Circuits Write Circuit Write Protect Circuit Read Circuit Central Processing System Rear Board Failures Drive Motor and Tach Feedback Circuit Power Supply Circuits Write Circuit Read Circuit Read Circuit Central Processing System	5-1 5-2 5-2 5-3 5-3 5-3 5-3 5-3 5-5 5-5 5-6 5-6 5-7 5-9 5-10
6	DISASSEMBLY/ASSEMBLY Static Protection in Work Area Safety Preventive Maintenance Precautions Disassembly Disk Drive Case Disassembly Common Baseplate and Front Panel Removal Common Baseplate and Front Panel Removal Side PCB and RF Shield Removal Rear PCB Removal Drive Mechanism Removal Drive Mechanism Component Disassembly Adjustments and Replacements Stepper Motor Positioning Band and Pulley Eject Spring Assembly Right Hand Guide/Write Protect Assembly Assembly Rear PCB Assembly	6-1 6-2 6-2 6-2 6-3 6-4 6-5 6-7 6-8 6-10 6-11 6-11 6-12 6-13 6-14
	Drive Mechanism Component Assembly Drive Belt Assembly Drive Mechanism Assembly Side PCB and RF Shield Assembly Common Baseplate and Front Panel Assembly Disk Drive Case Assembly	6-14 6-14 6-14 6-14 6-15 6-15

-

TABLE OF CONTENTS (Cont)

Section	Title	Page
7	PARTS LIST	7-1
8	APPENDIX A. Atari 810 Disk Drive Specifications B. 810 Analog Disk Drive C. Tandon Drive Mechanism	8-1 8-1 8B-1 8C-1
9	SERVICE BULLETINS	9-1

List of Illustrations

Figure

Title

Page

1-1	Simplified Block Diagram 1-2
1-2	System Hook up 1-3
1-3	Disk Drive Controls/Indicators 1-5
1-4	Disk Drive Outer Case
1-5	Disk Drive Mechanical Elements
1-6	Power Supply Block Diagram
17	Disk Drive Electropics
1 - 2	Write/Erzep Logic
1 0	Pand Lagin 110
1-7	Redu Logic
1-10	trase Head Gaps
21	
2-1	Subsequences 210 Side Board
2-2	Slikscreen 810 Side Board
2-3	I.C. Component Placement 810 Side Board 2-5
2-4	Schematic 810 Rear Board 2-6
2-5	Silkscreen 810 Rear Board 2-7
2-6	I.C. Component Placement Rear Board 2-8
2-7	Data Separator Schematic
2-8	Data Separator Silkscreen
2-9	Data Separator I.C. Component Placement
3-1	Channel A & B Probe Connections
3-2	Head Azimuth Waveform
3-3	Head Assembly - Component Identification
3-4	Cat's - Eye Pattern
3-5	Amplitude Variation of Cat's - Eve
3-6	Setscrew Location
3-7	Speed Adjustment Waveform
3-8	Head to Setscrew Clearance
2 0	
5-1	1 MHz Clock Signal at Pin 3 of 7105
5-2	Side Board Read Circuit Waveforms 5-10
5-3	Rear Board Write Circuit Waveforms 5-11
5-4	Poar Board Road Circuit Wayoforms 512
1-4	Real Duard Read Choune Wavelorins

310 Disk Drive Field Service Manual – v Revised 12/3/82 by ECN #0001

1 1

List of Illustrations

Figure	Title	Page
6-1 6-2 6-3 6-4 6-5 6-6 6-7	Disk Drive Case Disassembly Common Baseplate and Front Panel Removal Side PCB and RF Shield Removal Rear PCB Removal Drive Mechanism Removal Drive Belt Removal Positioning Band and Pulley Replacement	6-3 6-5 6-6 6-8 6-9 6-11 6-12
8B-1 8B-2 8B-3 8B-4 8B-5 8B-6 8B-7 8B-7 8B-3 8B-9 8B-10 8B-11	Schematic Power Supply	8B-3 8B-4 8B-5 8B-6 8B-7 8B-8 8B-9 8B-10 8B-31 8B-31 8B-32 8B-33
8C-1 8C-2 8C-3 8C-4 8C-5 8C-5 8C-6 8C-7 8C-8 8C-9	Tandon Drive Mechanism Upper Arm and Nuts Cat's -Eye Pattern Amplitude Variation of Cat's - Eyes Module Retaining Screws and Cam Screw Speed Adjustment Waveform Track 00 Stop Screw Write Protect Switch Assembly Upper Arm Assembly	8C-2 8C-6 8C-7 8C-8 8C-10 8C-11 8C-12 8C-13 8C-15

List of Tables

Title	2		Page
	1 -1 1 -2 1 -3 1 -4	FDC Registers/Contents Write/Erase Logic Read Logic Elements Serial Bus Line Assignments	1 - 1 6 1 - 1 8 1 - 20 1 - 22
	8C-1	Tandon/MPI Mechanical Differences	8C-3

2

Ĺ

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INTRODUCTION

The 810 Disk Drive Field Service Manual is a reference guide for you, the service technician. The information presented in this manual, when used in conjunction with ATARI training enables you to repair and maintain ATARI 810 Disk Drive units.

This Field Service Manual is organized in 11 sections:

- THEORY OF OPERATION Overview of how the 810 Disk Drive works and Ø what its basic assemblies look like.
- SILKSCREENS AND SCHEMATICS Electrical drawings and layouts of 0 printed circuit boards.
- TEST EQUIPMENT/DIAGNOSTIC TESTS Review of all Diagnostic Tests 0 available for diagnosing 810 Disk Drive problems.
- DIAGNOSTIC FLOWCHARTS Aids for troubleshooting the 810 Disk ۵ Drive.
- SYMPTOM CHECKLIST Failure information to assist the experienced e technician arrive at a rapid diagnosis of 810 Disk Drive problems.
- DISASSEMBLY/ASSEMBLY Detailed procedures for disassembling and 0 assembling the 810 Disk Drive.
- PARTS LIST Detailed breakdown of all parts used in the 810 Disk Drive. 6
- APPENDIX A Contains 810 mechanical and electrical specifications. Ø
- APPENDIX B Contains all procedures and information required to ഒ troubleshoot and repair the new ATARI 810 Analog Disk Drive.
- APPENDIX C Contains all procedures and information required to 0 troubleshoot and repair ATARI \$10 Disk Drives with the Tandon Drive Mechanism.

SERVICE BULLETINS - Section to be used to hold Field Change Orders, O Upgrade Bulletins and Tech Tips.

vii

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SECTION 1

THEORY OF OPERATION

OVERVIEW

The ATARI 810 Disk Drive is a record/playback device that allows information to be stored and retrieved quickly and accurately. The actual recording is much like a tape recording process, and is done on similar material. The data is magnetically recorded on a 5 1/4 inch diameter diskette. Each diskette can store 88K bytes of programs and/or data. The diskette is inserted through a door in the front panel of the drive unit. The 810 Disk Drive is used with a single ATARI 400 or 800 Computer with a minimum of 16K of RAM installed.

Figure 1-1 is a simplified block diagram of the functional flow of the 810.

810 Disk Drive Field Service Manual 1-1

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Figure 1-1. Simplified Block Diagram

Use Figure 1-1 as reference for the following paragraphs.

- Block I shows the Data Input/Output (I/O) connectors. They are the origin and destination of all data, commands and status.
- Block 2 shows the Microprocessor (MPU), Read-Only-Memory (ROM), Random-Access-Memory (RAM) and Peripheral Interface Adaptor (PIA) located on the Side Board. They process all commands and control data flow to and from the console.
- Block 3 shows the 1771 Floppy Disk Controller (FDC) located on the Side Board. The FDC controls data flow to and from the diskette.
- Block 4 shows the Analog Logic located on the Rear Board. The Analog Logic processes all data to and from the Read/Write Head.
- Block 5 shows the Stepper Motor and Drive Motor which are located in the Drive Mechanism. They receive signals from the PIA.
- Block 6 shows the Read/Write and Erase Head.

OPERATOR FUNCTIONS

Each 810 Disk Drive comes with an AC Power Adaptor and a Data Cord. Figure 1-2 shows how to connect the Disk Drive and computer console to make a complete system.



Figure 1-2. System Hook-up

The Controls/Indicators are located on the front and back panels of the 810. The front panel of the 810 contains the Busy Indicator Light, the Power Indicator Light, Power ON/OFF switch, door handle and door release lever. The rear panel of the 810 contains the Input/Output (I/O) connectors, Power-Jack, Drive Code Switch and Drive Code Number Diagram.

These functions are illustrated in Figure 1-3 and discussed in the following paragraphs.

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Front Panel

<u>The Busy Indicator Light</u> is lit whenever the drive is reading from or writing to a diskette. DO NOT OPEN THE DRIVE DOOR, TURN POWER OFF, OR ATTEMPT TO REMOVE THE DISKETTE WHEN THIS LIGHT IS ON!

The Power Indicator Light is lit whenever power to the Drive is on.

The Power ON/OFF switch is a toggle switch that is pushed up for ON, pushed down for OFF. ALWAYS insert or remove a diskette with Power ON.

The Door Handle is pushed down to close the door after a diskette is in the drive. Latch clicks when shut.

The Door Release Lever is pressed to open the drive door.

Back Panel

<u>The Input Output (I/O) connectors</u> are identical jacks for the data cords from the computer console or other peripheral devices. Connections may be made in any order with either jack.

The Power Jack is for the AC Power Adaptor.

<u>The Drive Code Switch</u> is a 4-position switch that tells the computer which drive it is communicating with.

Two switches (one black and one white) are visible in the circular cut-out on the drive rear panel. Using a pen or screwdriver, move the switches to the correct position on each drive being used.

Drive Code Number Diagram shows the correct positions of the Drive Code Switch to set the identification of the Drive (1 thru 4).

FRONT PANEL







Figure 1-3. ATARI 810 Disk Drive Control/Indicators

MECHANICAL

This section describes the mechanical characteristics of the 810 Disk Drive. For a general description of the 810, read both this section and the Electronic one which follows.

The 810 unit is composed of an outer case which houses the Drive Mechanism, Drive Motor, Head Carriage Assembly, Stepper Motor, and PCB Assemblies (Rear Board, Side Board and External Data Separator). Drives manufactured after September 1, 1981 contain this modification to the Side Board.

NOTE: The Appendix B (Section 8) contains the schematic for units with the External Data Separator.

Service Bulletins (Section 9) contain installation and troubleshooting information for units with the External Data Separator.

Case

The 810 outer case is two pieces of plastic (See Figure 1-4). The pieces are: 1) the top cover; and, 2) the lower cover which secures a mounting plate.



Figure 1-4. Disk Drive Outer Case

810 Disk Drive Field Service Manual 1-6

Figure 1-5 illustrates the mechanical elements of the 810 which are discussed in the following paragraphs.

Drive Mechanism

The Drive Mechanism provides mechanical and electronic linkage to the diskette. It is the physical assembly containing the Head Carriage Assembly, Drive Motor, Stepper Motor, and Write Protect sensor.

Head Carriage Assembly

The Head Carriage Assembly allows the head to be cycled across the diskette. It contains the Read/Write and Erase Head, the pressure pad and spring assembly.

Drive Motor

The Drive Motor is a DC motor which indirectly drives the diskette. It is attached by a drive belt to a flywheel which rotates the disk.

The DC motor includes an internal Tachometer, whose output is monitored in the Tach Feedback circuit. The Tach Feedback circuit senses changes in current and maintains a constant motor speed.

Light (LED) lites when power is turned on.

Stepper Motor

The Stepper Motor positions the head over a desired track. It is a four phase motor operating in a "two-phase on mode". Each change in phase rotates the Stepper Motor shaft. This circular motion is converted to linear motion by the positioning band/pulley assembly which links it to the head carriage.

The Stepper Logic is controlled by the PIA Chip. Four PIA signals act as the Stepper Motor's four phase inputs. These lines in various combinations, drive the Stepper Motor to reposition the Head Carriage Assembly from track to track.

PCB Assemblies (Rear Board, Side Board and External Data Separator)

The PCB Assemblies provide the connections for the logic circuits.

Rear Board

The Rear Board contains the power supply and all of the head Input/Output (I/O) support logic. The Rear Board is connected to the Drive Mechanism by the Drive Motor Harness (J103) and to the Head Carriage Assembly by the Head I/O Harness.



Figure 1-5. Disk Drive Mechanical Elements

Side Board

The Side Board processes all data, i.e., Commands, Data, Addresses, and Status.

It is connected to the Drive Mechanism by: 1) the Write Protect Wiring Harness; and, 2) the Stepper Motor Wiring Harness.

External Data Separator

NOTE: Units manufactured after September 1, 1981 contain an External Data Separator Board. If the unit you are servicing does not contain this modification on the sideboard; go to page 1-11.

The External Data Separator Board enhances the ability of the 1771 Floppy Disk Controller (FDC) to process data. It is installed in the Side Board where the FDC chip is usually installed.

POWER SUPPLY

The Power Supply provides the following voltages for use in the system:

- +5VDC (regulated) which provides logic voltage.
- +12VDC (regulated) which is used by the Floppy Disk Controller, Stepper Motor and Zero Crossing Detector
- -5VDC (Zener regulated) which is used by the Floppy Disk Controller.

The 120VAC which comes into the system is stepped down to 9VAC by an External transformer (See Figure 1-6).

The 9VAC is applied to the bridge rectifier on the rear PCB when the Power ON/OFF switch is turned ON. An internal 2 amp fuse in the AC adaptor provides current limiting protection.



Figure 1-6. Power Supply Block Diagram

Power-up Logic

The Disk Drive's Power-up Logic resets the 6507 microprocessor, Peripheral Interface Adaptor (PIA) and Data Interface section (1771 FDC and Analog circuitry) whenever the drive is turned on. In addition, the power-up logic circuit locks the Data Output Buffer off during the short period when the drive is turned on. This prevents random pulses generated by the drive's circuitry (during the initialization period) from being sent to the console.

The RESET logic returns the electrical circuits to their starting conditions.

ELECTRONICS

The 810 Disk Drive Electronics consist of eight major elements. These include:

• Power-up Logic - discussed in the Power Supply section.

The remaining seven elements are discussed in the following paragraphs. These elements are:

- Clock
- 6507 Microprocessor Unit (microprocessor)
- Read-Only Memory (ROM)
- Random Access Memory (RAM)
- 6532 Peripheral Interface Adaptor (PIA)
- 1771 Floppy Disk Controller (FDC)
- Read/Write and Erase Logic

Figure 1-7 is a block diagram of the \$10 Disk Drive Electronics.



Figure 1-7. Disk Drive Electronics

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Clock

The clock generator produces a continuous waveform which controls all signal transitions in the system. It provides timing controls for: 1) the 810 Disk Drive Logic; and, 2) the Read/Write operations to the diskette.

The drive's clock circuitry generates a crystal controlled 1 MHz and a 500 KHz signal. The 1 MHz signal is used by the 1771 Floppy Disk Controller (FDC) and the Write/Erase gate for data interface. The 500 KHz clock signal is used: 1) by the 6507 microprocessor; and, 2) to clock data into and out of the FDC.

6507 Microprocessor

The Disk Drive's 6507 microprocessor provides the primary decision making and computational capabilities for the drive. It is a self-contained microcomputer system on a single chip.

The microprocessor controls the sequence of system operations by putting addresses out to the program memory (ROM) and receiving instructions in return. It causes the system to perform the desired operation by reading an instruction (specific bit pattern) and executing that instruction. It then goes to the next instruction in the program and executes it.

The microprocessor:

- Controls data transfers through control of the common data and address buses.
- Monitors the Peripheral Interface Adaptor (PIA) for data transfers and status requests by the Computer Console.
- Provides control characters to notify the Computer Console of the status of operations performed and information received.
- Executes commands from the Computer Console.
- Controls the Stepper Motor Logic, Disk Drive Logic and Motor Logic, all of which are buffered in the PIA.
- Controls the 1771 Floppy Disk Controller (FDC).

The address bus, the bi-directional data bus, and the Read/Write line serve as parallel paths for data transfer in and out of the microprocessor and give it direct control over the central processing system. The address bus puts out addresses to control the source or destination of data transfers. The Read/Write line determines the direction in which data transfer occurs.

These addresses are derived from various sources within the microprocessor. During the instruction cycle from program memory (ROM), the addresses are usually derived from the program counter which controls the execution of sequential instructions. Addresses for data transfers between the microprocessor and RAM are usually derived from one of two sources: 1) directly from the program memory; or, 2) calculated by the microprocessor in the normal operation.

Read-Only Memory

The Disk Drive's Read-Only Memory (ROM) stores the sequence of instructions (program memory) that make up the 810's internal control software. It contains specific operating instructions used by the microprocessor to accomplish a variety of functions. These functions include telling the 1771 Floppy Disk Controller (FDC) what task to perform.

An important characteristic of the ROM chip is that the information is stored on a permanent basis. Turning OFF the power does not cause the loss of ROM information.

Random Access Memory (RAM)

The Disk Drive's Random Access Memory (RAM) is used by the microprocessor for temporary storage of input data, calculations and system information.

Data may be written into RAM as well as read from RAM by the microprocessor. The RAM identifies the type of data transfer by the Read/Write line. When the line is active high, the operation is to Read from memory and when the line is active low, the operation is to Write to memory. Turning the power OFF causes the loss of RAM information.

6532 Peripheral Interface Adaptor (PIA)

The 6532 Peripheral Interface Adaptor (PIA) is a buffering and signal formatting device with no decision making or computational capability. It is an Input/Output (I/O) device which acts as an interface between the 6507 microprocessor, the 810 system functions and the console.

The PIA:

- Applies the Console's serial outputs to the data and address buses when requested to do so by the drive's microprocessor unit.
- Provides 128 bytes of RAM for temporary storage of status information and data sent by the Data Interface section for application to the microprocessor.
- Monitors the 1771 Floppy Disk Controller.

- Acts as communication interface between the Computer Console and the microprocessor.
- Interfaces to the Stepper Motor Logic and Drive Motor Logic.

The microprocessor communicates with the PIA through eight data lines connected to the data bus. The microprocessor initiates communication by using its address lines to select or address the PIA.

The PIA provides 16 programmable bi-directional port lines to communicate with the Computer Console and perform the system functions. The port lines are divided into two 8-bit ports, PAO-PA7 and PBO-PB7. PA7 may also function as an interrupt input pin. The Interrupt Request (IRQ) line is used to inform the microprocessor when a device requires servicing.

1771 Floppy Disk Controller (FDC)

The 1771 Floppy Disk Controller (FDC) and the Read/Write and Erase Logic make up the Data Interface section which interfaces the Disk Drive's central processing system to the diskette.

The FDC is the main element of the Data Interface section. The FDC is a highly specialized microprocessor which has an arithmetic logic unit, comparator, and the necessary microprogram logic to control the Read/Write operation to the diskette.

The FDC:

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- Combines data, timing, and data validity pulses into the serial format for recording onto diskette.
- Separates the above signals and provides the output data in parallel during a read operation.
- Controls the Write and Erase logic circuitry during a Write operation.
- Generates the data validity codes (called Cyclic Redundancy Checks or CRCs) during a write operation, and checks them during a read operation.

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The microprocessor controls the FDC and can access any of the following registers located in the FDC: Track, Sector, Data, Command, and Status. Refer to Table 1-1 for a description of the contents of each register.

TABLE 1-1

FDC REGISTERS/CONTENTS

Register	Contents
Track	Current head address. Updated automatically as the head moves across the diskette.
Sector	Number of the sector being considered for a read or write operation.
Data	Information read from the diskette to be transferred to the microprocessor after the necessary serial-to- parallel conversion. The FDC receives data in parallel from the microprocessor and converts the data to serial for storage on the diskette.
Command	Instructions from the microprocessor which are interpreted by an internally controlled programmable logic array to generate the appropriate control signals for the logical operation to be performed.
Status	Condition of the system. After each command is executed, the control logic issues an interrupt to the microprocessor to allow examination of the status register for any errors before resetting the interrupt. Each of the eight bits in the staus register represents a different error condition.

The Floppy Disk Controller chip accesses data lines and provides data in bit complement form (1 for 0 and 0 for 1). The inversion is performed by the FDC firmware.

810 Disk Drive Field Service Manual 1-16

The FDC controls the following elements of the Data Interface section:

- Write/Erase Logic
- Write Protect Logic
- Read Logic
- Read/Write Head
- Erase Head

Write/Erase Logic

The Write/Erase Logic is used to record data from the Floppy Disk Controller to the diskette. It provides correct current and polarity to the Read/Write Head. (See Figure 1-8 for a block diagram of the Write/Erase Logic.) Table 1-2 describes the elements used in the Write/Erase Logic.



Figure 1-8. Write/Erase Logic Block Diagram

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TABLE 1-2

WRITE/ERASE LOGIC

Element	Function
Data gate	Converts the leading edge of the clock and data pulses into a single corresponding logic level.
High and Low Level Drivers	Determines the direction of current flow through the Write/Erase head.
Write Driver	Enables the High/Low Level Drivers and limits the write currents.
Write and Erase Gate	Turns on both the Write and Erase Drivers during a write operation and turns them off during a read operation
Erase Driver	Drives the Erase Head during a write operation.

Write-Protect Logic

The Write-Protect Logic prevents writing to a diskette by informing the Floppy Disk Controller when a write-protected diskette is inserted in the drive. Each diskette contains a notched area in the upper right hand corner which allows light from the LED to hit the base of the phototransistor. On a write-protected diskette the light is blocked by a tab or opaque material on the diskette. This turns off the phototransistor and transistor A106E. The input to inverter Z103D rises to a high which inverts the output to a low. The low input to the FDC signals that a write-protected diskette is inserted and the diskette is not written to.

Read Logic

The Read Logic is used to retrieve data from the diskette and input the data into the FDC. It shapes pulses into the correct format to be read by the FDC. (See Figure 1-9 for a block diagram of the Read Logic.) Table 1-3 describes the Read Logic Elements.



Figure 1-9. Read Logic Block Diagram

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TABLE 1-3

READ LOGIC ELEMENTS

Element	Function
Differential Amp	Initial amplification of Read/ Write head signals.
Differentiator	Squaring up the two differential amp outputs.
Zero Crossing Detector	The single output changes level whenever the two 180 degrees out-of-phase input signals cross their zero axis coincidentally. This eliminates false pulses caused by Read/Write Head signal decay, rather than intentional signal level changes.
Symmetry Amp	Ensures exact zero referencing of the signal.
Time Domain Filter	Trims and further shapes the signal.
Pulse Generator	Produces a single pulse out for each logic level transition at its output. This results in the reproduction of the original FDC signal.

Read/Write Head

The Read/Write Head is an electro-magnetic device used for interfacing with the magnetic recording media. It converts magnetic flux changes to electric current, and vice versa, through the use of a center tapped coil.

Current is passed through the windings on the head core. Data is written to the diskette surface by changing the direction of the current through the Read/Write Head. (Each flux change equals a data bit.)

Data is read from the diskette when signals from the head coil windings are applied to the differential amplifier.

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Erase Head

The Erase Head creates a guardband (a blank space between tracks) in order to prevent one recorded track from interfering with either the next inner or next outer track.

It straddles the Read/Write Head in such a way that after the data is written onto the diskette, the Erase Head "tunnel" narrows the track width, leaving guardbands between tracks (See Figure 1-10).



Figure 1-10. Erase Head Gaps

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810 Disk Drive Field Service Manual 1-21

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SERIAL BUS LINE ASSIGNMENTS

The computer communicates with peripheral devices over a serial port which consists of a serial DATA OUT (transmission) line, a serial DATA IN (receiver) line and miscellaneous control lines.

Data is transmitted and received as 8 bits of serial data (least significant bit sent first) preceded by a logic zero start bit and succeeded by a logic one stop bit. The serial DATA OUT is transmitted as a positive logic (+4v = one/true/high, Ov = zero/false/low). The serial DATA OUT line always assumes its new state when the serial CLOCK OUT line goes high; CLOCK OUT then goes low in the center of the DATA OUT bit time.

Table 1-5 describes the function of the serial bus connector pins.

TABLE 1-4

Serial Bus Line Assignments

Pin No.	Description
1	CLOCK IN is not used by the current DOS and peripherals. This line is reserved for future synchrous communications.
2	CLOCK OUT is the serial bus clock. CLOCK OUT goes high at the start of each DATA OUT bit and returns to low in the middle of each bit.
3	DATA IN is the serial bus data line to the computer.
4	GND is the signal/shield ground line.
5	DATA OUT is the serial bus data line from the computer.
6	GND is the signal/shield ground line.
7	COMMAND is normally high and goes low when a command frame is being sent from the computer.
8	MOTOR CONTROL is the cassette motor control line (high=on, low=off).
9	PROCEED- is not used by the current DOS and peripherals. This line is pulled high passively inside the 800.
10	+5v/READY indicates that the computer is turned on and ready. This line may also be used as a +5 volt supply of 50 ma. current rating for Atari peripherals only.
11	AUDIO IN accepts an audio signal from the cassette.
12	+12v supply for Atari peripherals only.
13	INTERRUPT- is not used by the current DOS or peripherals. This line is pulled high passively inside the 800.

There are no pin reassignments made in the serial bus cable, so pin 3, the computer's DATA IN line, is the peripheral's data output line; and similarly for pin 5.

810 Disk Drive Field Service Manual 1-22

SERIAL BUS ELECTRICAL SPECIFICATIONS

Peripheral Input:	VIH = 2.0v minimum VIL = 0.4v maximum
	IIH = 20uA maximum at VIH = 2.0v IIL = 5uA maximum at VIL = 0.4v
Peripheral Output (open collector bipolar):	VOH = 4.5v minimum with external 100K ohm pull-up VOL = 0.4v maximum at 1.6 mA
Vcc/READY	

Input: VIH = 2.0v minimum at IIH = 1ma maximum VIL = 0.4v maximum Input goes to logic zero when open

SERIAL BUS PROTOCOL

When a command line goes low, the computer console sends a command frame to all devices. The command provides the disk drive with the following information:

- Serial Bus Device ID
- Command
- Two bytes of auxiliary information
- Checksum.

The commands supported by the disk controller are: Get Sector, Put Sector, Put Sector with Verify, Status Request, and Format disk.

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SECTION 2

SILKSCREENS AND SCHEMATICS

On the following pages are representative silkscreens and schematics for the ATARI 810 Disk Drive. Minor variations in design may be encountered depending on the production date of the unit, but these schematics provide all details required for an indepth understanding of all 810 Disk Drive units.

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810 Disk Drive Field Service Manual 2-3 Figure 2-1. Schematic 810 Side Board

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Figure 2-2. Silkscreen 810 Side Board

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Figure 2-4. Schematic 810 Rear Board



Figure 2-5 Silkscreen 810 Rear Board

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810 Disk Drive Field Service Manual 2-7

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Figure 2-6 I.C. Component Placement 810 Rear Board

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Figure 2-7.Data Separator Schematic



Figure 2-8. Data Separator Silkscreen

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Figure 2-9. Data Separator I.C. Component Placement

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SECTION 3

TEST EQUIPMENT/DIAGNOSTIC TESTS

EQUIPMENT REQUIREMENTS:

You will need 14 basic pieces of equipment in order to analyze failures in the ATARI 810 Disk Drive. These items include:

- an ATARI 400 computer with 16K RAM
- a TV, properly adjusted
- a 15 MHz oscilloscope A+B mode, channel B invert
- a Digital Voltmeter
- a Frequency Counter
- a CPS 810 Diagnostic Cartridge
- an Alignment Diskette
- a Master Diskette
- a blank diskette
- an Atari pre-formatted diskette (P/N CX8101)
- a .050 inch Hex Driver
- assorted small tools
- an Atari 820, 822 or 825 Printer (optional)
- .010 feeler gauge

HOOK-UP

- Set up Disk Drive and computer according to procedures in 810 Disk Drive Operators Manual, Page 2.

To avoid intermittent failures, be certain all connections are secure.

CHECK OF MECHANICAL COMPONENTS

Before testing the unit, check to be certain these, mechanical components are functioning properly:

- o Check that the door handle clicks when it is closed.
- Check that the door opens when the door release lever is pressed and that the diskette is ejected if there is one in the drive.

PREVENTIVE MAINTENANCE/PRECAUTIONS

NOTE: Each unit which is disassembled must have Preventive Maintenance performed. See Section 6, Disassembly/Assembly for a summary of precautions and preventive maintenance instructions.

DIAGNOSTIC TESTS

The tests in this section are intended to assist you in diagnosing possible problems in the 810 Disk Drive. All Diagnostic Tests are reviewed in this section. Use it to familiarize yourself with each test. Section 4, Diagnostic Flowcharts, indicates when these tests are to be used during troubleshooting.

310 Disk Drive Field Service Manual 3-1

The Diagnostic Tests available are:

- o Power-up Test (observation of unit in operation)
- o Burn-In Test (uses CPS 810 Diagnostic Cartridge)
- o DOS Verification Procedure (uses blank diskette)
- o Alignment Program (uses CPS 810 Diagnostic Cartridge)

POWER-UP TEST

Purpose: To test the Disk Drive's Electronic Hardware Initialization and Reset. This test prepares the drive for the testing. The drive must pass this test before other tests are performed.

Special Tools Required: None

Procedure:

- 1. Connect Disk Drive to computer (Page 1-3).
- 2. Turn the Disk Drive power switch on.
- 3. Observe that the following occurs.
 - a. The Power LED lights.
 - b. The Busy LED lights.
 - c. The Drive Motor turns on.
 - d. The Head Carriage steps to track 0 (outer track).
 - e. Seven seconds pass, then the head carriage steps to track 39 (inner track) and the Drive Motor turns off.
- 4. This completes the Power-up Test.

BURN-IN TEST

Purpose: To test the Disk Drive's Read/Write accuracy, Track Alignment, speed adjustment and compatibility. Burn-In is used as both an incoming test and as a final test criteria.

Special Tools Required:

- o Atari CPS 810 Diagnostic Cartridge
 - o One Atari preformatted diskette (P/N CX8101) for each drive to be tested.

- o TV, properly adjusted
- o One Atari 820, 822 or 825 Printer (optional)
- NOTE: Hard copy is useful for diagnosing problems discussed in the flowcharts. You must use a printer when burning-in more than one unit to avoid losing data due to display scrolling.

Procedure:

- 1. Connect printer (optional) and TV to the computer and plug in AC adaptor for each.
- 2. Set Disk Drive code switch at correct position for (each) drive to be tested. Be sure Power is OFF when setting switch positions.
- 3. Connect (1-4) drives to computer and plug each one in. (810 Disk Drive Operators Manual, Page 3).
- 4. Power up Disk Drive(s), TV and printer (optional).
- 5. Insert CPS 810 Diagnostic Cartridge in the computer.
- 6. Power up the computer. The screen displays a menu of the diagnostic tests available.
- 7. Select Burn-in Test.
- 8. Follow the screen prompts as they appear.
- 9. The printout begins if a printer is connected and turned on.
- 10. Insert the Atari pre-formatted diskette(s) in the disk drive(s).
- 11. Press the **RETURN** key and the screen displays:

DRIVE I ONLINE or OFFLINE DRIVE 2 ONLINE or OFFLINE DRIVE 3 ONLINE or OFFLINE DRIVE 4 ONLINE or OFFLINE

12. Testing begins. The screen displays Testing Drive X/single density writing sector - XXX.

"DRIVE X" represents the first drive that is on-line and "SECTOR -XXX" represents the sector being written.

13. When all sectors are written, the test diskette is read and the screen displays:

READING SECTOR - 0C1E (TYP)

810 Disk Drive Field Service Manual 3-3

- 14. At the end of the testing, the word PASS will be printed on the printer and on the screen.
- 15. One pass takes approximately ten minutes. Each drive makes ten passes for approximately 1 3/4 hours of testing.
- 16. When the test is complete on drive 1, the word DONE is printed on the printer and on the screen.
- 17. Drive number 2 is tested next, then drive 3 and 4, or the next drive that is on-line.
- 18. After drive 4 has completed its testing, the header is displayed and the test stops, waiting for the RETURN key to be pushed and new drives to be tested.
- 19. Any errors display on the screen and the printer. Any error rejects a drive.
- 20. The BREAK key can be used to stop the testing during the READ or WRITE section.
- 21. After a maximum of five errors, testing is automatically halted on that drive and the next drive begins testing.
- 22. This completes the Burn-In Test.
- 23. Accept drives that have run error-free and put printout (if available) with drive.
- 24. Reject drives with one error and more.

TYPICAL RUN LISTING

ATARI 810 BURN-IN DISK TEST REV. E.

DRIVE 1 ONLINE

DRIVE 2 ONLINE

DRIVE 3 ONLINE

DRIVE 4 ONLINE

ATARI 810 BURN-IN DISK TEST REV. E.

TESTING DRIVE 1/SINGLE DENSITY

WRITING SECTOR - 02B5 FAIL - STATUS 90 DEVICE DONE ERROR

810 Disk Drive Field Service Manual 3-4

PATTERN - 92 PASS 01 10:29

WRITING SECTOR - 02C3 FAIL - STATUS 90 DEVICE DONE ERROR

WRITING SECTOR - 02B9 FAIL - STATUS 90 DEVICE DONE ERROR

PATTERN - 49 PASS 02 10:46

PATTERN - 55 PASS 03 10:32

WRITING SECTOR - 02C1 FAIL - STATUS 90 DEVICE DONE ERROR

PATTERN - AA PASS 04 10:41

PATTERN - FF PASS 05 10:36

ATARI 810 BURN-IN DISK TEST REV. E.

DOS VERIFICATION PROCEDURE

Purpose: To test the disk calibration in the user environment. Verifies that the drive can format, write and read the Disk Operating System (DOS) by re-booting DOS and executing it. Use this test only after the Power-up test has been successfully completed.

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Special Tools Required:

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- o Master Diskette (DOS)
- o Blank Diskette

Procedures:

NOTE: No Cartridge is required in the computer for this test.

- 1. Connect TV and Disk Drive to computer.
- 2. Power-up the Disk Drive and TV.
- 3. When the Disk Drive Busy Indicator Light (LED) goes OFF, insert the Master Diskette into the Disk Drive and close the door.
- 4. Turn on the computer and the system automatically "boots" DOS from the Master Diskette.
- 5. The screen displays the DOS menu.
- 6. Remove the Master Diskette from the drive.
- 7. Insert the blank diskette and close the Disk Drive door.
- 8. Press I and RETURN to format diskette.
- 9. The screen prompts "Which Drive To Format?" Type 1 to select disk drive number 1 and press RETURN.
- TYPE Y to specify yes to formatting disk drive number 1 and press RETURN. The DOS formats the diskette. This takes approximately 35 seconds. When the operation is complete, the screen prompts "Select Item".
- 11. Type H to write DOS on the new diskette and press RETURN.
- 12. Type Y to specify yes to copying the DOS on the new diskette and press RETURN. When the operation is complete, the screen prompts "Select Item".
- 13. Power the computer down by turning the ON/OFF switch OFF. Then turn the computer back on.
- 14. The screen should display the DOS menu at the completion of the Power-up sequence. This indicates the newly written- to diskette operates properly.
- 15. This completes the DOS Verification procedure.

810 Disk Drive Field Service Manual 3-6

ALIGNMENT PROGRAM

Purpose: To check and adjust speed, pad pressure and track alignment. This test also verifies head azimuth. This is a control program which positions the head carriage assembly at tracks 00, 01, 16, 32, 33 and 34. Each track has an analog signal on it which is used to display a specific waveform.

Special Tools Required:

- o 15 MHz oscilloscope A+B mode, channel B invert
- o 2 scope probes (if using X10 probes, be sure to compensate on the oscilloscope settings)
- o a Frequency Counter
- o CPS 810 Diagnostic Cartridge
- o Alignment Diskette
- o TV, properly adjusted
- o .050 inch Hex Driver
- o .010 inch feeler gauge

Five procedures make up the Align. 3K Head Position Program. They are:

- o Speed Adjustment
- o Head Azimuth Alignment
- o Head Load Pad Pressure
- o Head/Track Alignment
- o Track 00 Stop Adjustment

Set-up Procedures:

Perform the following set-up procedures before doing any of the tests which make up the Align. 3K Head Position Program.

- 1. Connect the Disk Drive and TV to the computer.
- 2. Remove the top cover from the drive to be tested.
- 3. Power up the oscilloscope and connect the probes to the following points on the Disk Drive rear board (See Figure 3-1).
 - *Channel A Probe to C-154 *Channel B Probe to C-155
- 4. Plug in the disk drive and turn it on. Turn on the TV.
- 5. Insert the CPS 810 Diagnostic Cartridge in the computer. Turn the computer on.
- 6. The menu displays.
- 7. Insert the alignment diskette.
- 8. When screen prompts, select the alignment program.

810 Disk Drive Field Service Manual 3-7

9. Press the BREAK key and the program stops, displaying the following prompt table:

Select Track

((Ø=Ø)		
(1=1)		
()	2=16)		
(3-32)		
(4	4=33)		
(5=34)		
((5=34 -> 16)		
(M=Return	to	Menu)

Proceed with each of the alignment procedures and adjustments as shown on the following pages.



Figure 3-1. Channel A&B Probe Connections

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SPEED ADJUSTMENT

Purpose: To check the motor speed and make any required adjustments.

Procedure:

I. Press the BREAK key to halt the program to allow a new track to be selected.

Connect the frequency counter probe to either C-154 or C-155 on the rear board. (Refer to Figure 3-1).

- 2. Set Frequency Counter Controls to the following settings:
 - A. 10k Resolution or 1 Second Sample Time
 - B. X1 attenuation or Maximum sensitivity
 - C. XI Probe (preferred)
- 3. Type the value '0' and press **RETURN**. Head begins reading track 0.
- 4. When the frequency counter is properly adjusted, a 60.2 KHz reading should be seen on counter. NOTE: Counter Calibration is critical to this procedure.
- NOTE: If a reading does not appear on the counter, input level is not high enough. Adjust the input level to counter.
- 5. The reading should be between 60.2 and 60.3 KHz.
- 6. If the reading is outside these tolerances, adjust the pot R-142.

HEAD AZIMUTH TEST

Purpose: To verify the head azimuth. If the azimuth is not within specification, the Drive Mechanism must be replaced.

Procedure:

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1. Press the break key to halt the program and allow a new track to be selected.

Set the oscilloscope controls to the following settings:

- * Display A+B
- * Channel A: Normal
- * Channel B: Inverted
- * Channel A&B Time .5ms/DIV (Calibrated)
- * Channel A&B Volts .2V/DIV (Calibrated)
- 2. Type the number 5 and press **RETURN** to position the head over track 34.
- 3. Make any minor adjustments on the scope to display the azimuth waveform. Compare the waveform on the scope with the waveform shown in Figure 3-2. This shows the acceptable range for the azimuth waveform.

Atari recommends replacement of the entire Drive Mechanism if the Azimuth is out of the specified range, due to the complexity of the adjustment. For this reason, be <u>certain</u> that the Azimuth is out of specification before replacement.



Figure 3-2. Head Azimuth Waveform

810 Disk Drive Field Service Manual 3-11 Revised 12/3/82 by ECN #0001

HEAD LOAD PAD PRESSURE

CAUTION: Adjustment of pad pressure requires great care and a light touch. Read all instructions thoroughly before attempting any adjustment.

Purpose: To check and adjust the head load pad pressure.

Procedures:

- 1. Press the BREAK key to halt the program and allow a new track to be selected.
- 2. Set the oscilloscope controls to the following settings:
 - * Display: A+B
 - * Channel A: Normal
 - * Channel B: Inverted
 - * Channel A&B Time .5ms/DIV (Calibrated)
 - * Channel A&B Volts .2V/DIV (Calibrated)
- 3. Type the number 4 and press RETURN to step the head to track 33.
- 4. A broadband display appears on the scope when set properly.
- 5. Obtain a maximum output amplitude by pressing lightly with one finger on the pressure pad arm (See Figure 3-3). An amplitude equal to or greater than 80% of maximum value is correct amplitude.
- 6. If the amplitude of the broad band waveform is not equal to or greater than 80%, continue with Steps 7-14.

NOTE: Remove the Alignment diskette and power the disk drive down (turn Power ON/OFF switch OFF) to perform the following steps.

- 7. Remove the dowel holding the pressure spring in place, then remove the pressure spring on the head carriage assembly (See Figure 3-3).
- 8. Remove the two screws and four washers holding the pressure pad to the head carriage assembly.
- 9. Lift the pressure pad arm away from the head carriage assembly.
- 10. Locate the spring steel tabs on the rear of the pressure pad arm. Bend both tabs slightly downward approximately 1/16 of an inch.
- 11. Install the pressure pad arm on the head carriage assembly.
- 12. Replace the two screws and four washers holding the pressure pad arm to the head carriage assembly. Be sure the pressure pad is positioned over the center of the head.

- 14. Power up the drive and insert the Alignment diskette. Retest by returning to Step 1 of this procedure. Repeat these procedures until the correct amplitude is achieved. Detail A Cover Plate Spring Steel Tabs Head Carriage Pressure Pressure Pad Arm Pad Pressure Spring Detail A READ/WRITE Head AND ERASE Carriage Head Assembly dowel
 - Figure 3-3. Head Assembly-Component Identification

13. Install the pressure spring on the head carriage assembly.

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HEAD/TRACK ALIGNMENT

Purpose: To check the head and track alignment and make any required adjustments.

Procedure:

- I. Press the BREAK key to halt the program and allow a new track to be selected.
- 2. Set the oscilloscope controls to the following settings:
 - * Display: A+B
 - * Channel A: Normal
 - * Channel B: Inverted
 - * Channel A&B Time 5ms/DIV (Fully Uncalibrated)
 - * Channel A&B Volt .1V/DIV (Calibrated)
- 3. Type the number 2 and press RETURN. Head begins reading track 16.
- 4. When the scope is properly adjusted a cat's-eye pattern similar to Figure 3-4 appears on the scope.



A = Amplitude



5. Compare the amplitude of the cat's-eye. If each cat's-eye lobe pattern is equal in amplitude or within 30% of each other, no adjustment is required. (Refer to Figure 3-5.) NOTE: The cat's eye pattern may be less stable than on a wide band oscilloscope.



Figure 3-5. Amplitude Variation of Cat's-Eye

- 6. If the cat's-eyes are not within tolerance, continue with the following steps. Follow the instructions with care and use a very light touch. This is a very delicate operation.
- 7. Loosen the Allen head setscrew holding the band pulley to the stepper motor shaft (See Figure 3-6). Note: To do this, let drive cycle, then loosen the allenhead setscrew.

8. Gripping the head assembly carefully, move the band pulley very slightly in either direction. Figure 3-5 illustrates the cat's-eye-lobe pattern when off track. Use this as a guide when moving the band pulley to balance cat's eyes.

NOTE: The track to track spacing is only 0.02083 inches. Move the band pulley a very small amount each time.

- 9. When cat's eyes are balanced, wait one cycle then tighten the setscrew on the band pulley to 2 inch-lbs of torque. The setscrew is brass and tightens with <u>little</u> pressure.
- 10. Type the number 6 and press RETURN to retest cat's-eyes alignment.
- 11. Repeat steps 3 through 10 until each cat's-eye-lobe pattern is equal in amplitude or within 80% of each other.



Figure 3-6. Setscrew Location

810 Disk Drive Field Service Manual 3-16

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TRACK 00 STOP ADJUSTMENT

Purpose: To check the setscrew rear stop and make any required adjustments. Skip this procedure if the Speed Adjustment is correct.

Procedure:

- 1. Press the BREAK key to halt the Align. 3K program and allow a new track to be selected.
- 2. Set the oscilloscope controls to the following settings:
 - * Display: A+B
 - * Channel A: Normal
 - * Channel B: Inverted
 - * Channel A&B Time 2us/DIV (Calibrated)
 - * Channel A & B Volt 50 mV/DIV (Calibrated)
- 3. Type the value 0 and press **RETURN**. Head begins reading track 0.
- 4. When the scope is properly adjusted, a 60.2 KHz waveform similar to Figure 3-7 appears on the screen.
- 5. If the waveform appears correctly no adjustment is required.
- 6. If the waveform does not appear correctly, check and adjust as needed for a 0.010 inch clearance between the setscrew and the rear corner of the head carriage plastic molding. (See Figure 3-8.)

This completes the Alignment Program.



Figure 3-7. Speed Adjustment Waveform

810 Disk Drive Field Service Manual 3-17

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810 Disk Drive Field Service Manual 3-18

SECTION 4

DIAGNOSTIC FLOWCHARTS

The Diagnostic Flowchart is intended to be easy to use and the primary aid when troubleshooting the 810 Disk Drive. Follow the prompts in the order presented. When a question is asked, follow the line from the box that best applies to your unit's condition. When that line terminates with a letter inside a circle, locate the letter on a different page and continue the diagnosis. The flowchart leaves nothing to chance, it tells you when to perform a specific test and when to replace components. Section 3, Test Equipment/Diagnostic Tests contains detailed instructions for each of the tests referenced in this section.

SWAP OUT PROCEDURE

At many places in the diagnostic flowchart, a box tells you to "swap out" a component, a chip, or a number of chips in a particular order. The "swap-out" instruction means that you should replace the indicated components (one at a time) with a known-good component of the same type. The 810 unit should then be tested with the new, knowngood component in place to see whether the swap out solved the problem being checked. If the swap out did not fix the problem, the known good component should be removed, and the original component reinserted. In this way, you avoid needlessly replacing good components.

REPLACE IN ORDER

The "replace in order" instruction means that you should replace the components indicated in the order listed until the result called out in the previous block is obtained.

N - Some lines terminate with an N inside a circle. When this occurs, call your Atari Repair Hotline.

Inside California (800) 672-1466

Outside California (800) 538-1535 (800) 538-1536

810 Disk Drive Field Service Manual 4-1

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810 Disk Drive Field Service Manual 4-2

Initial Power-Up Sequence



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Initial Power-Up Sequence (cont)



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Initial Power-Up Sequence (cont)



810 Disk Drive Field Service Manual 4-5



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DOS Verification Test



810 Disk Drive Field Service Manual 4-8

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Alignment Program (cont)



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Drive Motor Troubleshooting



810 Disk Drive Field Service Manual 4-12



810 Disk Drive Field Service Manual 4-13

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Write Protect Troubleshooting



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Speed Troubleshooting







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Fail Format Troubleshooting (cont)





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810 Disk Drive Field Service Manual 4-19 Revised 12/3/82 by ECN #0001

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SECTION 5

Symptom Checklist

The Symptom Checklist is designed to assist the experienced technician arrive at a rapid diagnosis for 810 Disk Drive problems. The checklist is not intended to replace the Diagnostic Flowchart as the primary troubleshooting guide, but rather, to supplement the flowchart. To save you time, Diagnostic Flowchart entry points are indicated on the checklist where applicable.

NOTE: Not all failures show Diagnostic Flowchart Entry Points.

Symptoms have been divided as follows:

Side Board Failures

- Stepper Motor Circuit
- Power-up Logic and Data Interface Circuits
- Write Circuit
- Write Protect Circuit
- Read Circuit
- Central Processing System

Rear Board Failures

- Drive Motor and Tach Feedback Circuit
- Power Supply Circuits
- Write Circuit
- Read Circuit

Drive Mechanism Failures

NOTE: Each circuit is referenced to coordinates on the approp iate schematic in Section 2, Silkscreens and Schematics.

Each symptom is accompanied by possible causes and the corrective action required.

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SIDE BOARD FAILURES

Symptom	Possible Cause	Corrective Action	Diagnostic Flowchart Entry Point
	Stepper Motor Circuit	t (coordinates B,8)	
Will Not Step	J102 Connector	Be Sure All Connec- tions Are Tight.	P (Pg.4-19)
	PIA (A104)	Replace	P (Pg.4-19)
	Incorrect Voltage Levels	Normal Trouble- shooting Techniques	P (Pg.4-19)
Skips Tracks	Driver Transistors Q106- Q109	Replace Defective Transistor	P (Pg.4-19)
	PIA (A104)	Replace	P (Pg.4-19)

Power-Up Logic and Data Interface Circuits (coordinates B&C,6)

No Power LED	LED (CR108)	Replace	A (Pg. 4-3)
	No -5 Volts	Replace Zener Diode (CR107)	A (Pg. 4-3)
Does Not Respond	Transistor Array (A106)	Replace	
The Computer	PIA (A104)	Replace	
Motor Does Not Stop After Timeout	PIA (A104)	Replace ,	B (Pg. 4-6)
	Shield Shorting To +5 Volt Trace	Clip Shield So It Does Not Touch The +5V Trace	B (Pg. 4-6)
	Transistors Q110 or Q111	Replace	B (Pg. 4-6)

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Symptom	Possible Cause	Corrective Action	Diagnostic Flowchart Entry Point
	Write Circuit (coo	rdinates C, 4&3)	
Write Errors	1771 FDC (A105)	Replace	K (Pg.4-17)
Not Format on First Pass	Write/Erase or Data Gate (Z105)	Check For IMHz Clock Signal at Pin 3 or Replace	K (Pg.4-17)
	Incorrect Voltage Levels on IC's	Normal Trouble- shooting Techniques	K (Pg.4-17)
	Write Protect Circuit	(coordinates D,3&4)	
Error 144 Dur- ing Write or	J101 Connector	Be Sure All Con- nections Are Tight	I (Pg.4-15)
rormat Operation	Transistor Array (A106)	Replace	I (Pg.4-15)
	Inverter (7103)	Replace	I (Pg.4-15)
	1771 FDC (A105)	Replace	I (Pg.4-15)
	No +5 Volts	Normal Trouble shooting Techniques	I (Pg.4-15)

SIDE BOARD FAILURES (CONT)

Read Circuit (coordinates C,1-3)

Use the following Test Points for Waveform Comparison

See Figure 5-2 for Correct Waveforms

Z104 Pin 1 Z104 Pin 3 Z104 Pin 13

Z104 Pin 4

Z104 Pin 11 Replace Z104 or Q102

Replace Z104, Z101

Z103, Q103 or Q104

Failure to Read Any Diskette or Garbled Data Received From a Known Good Diskette

Ĺ 1 Pulse Generator

Time Domain Filter

Symmetry Amp (Z104C) 1771 FDC

Replace Z104 Replace

810 Disk Drive Field Service Manual 5-3

Central Processing System (coordinates C&D,4-8)

If the other circuits have been checked and found good, one of the IC's in this circuit is assumed to be defective.

FAILURES	POSSIBLE CAUSE
	Replace in order:
Power-Up Failures	1. PIA (A104)
Boot Errors	2. 1771 FDC (A105)
Stepper Motor Failures	3. Microprocessor 6507 (A101)
Drive Motor Failures	4. Custom ROM (A102)
I/O Failures	5. RAM 6810 (A103)
Drive Code Switch Not	6. NAND Gate CD4011 (Z102)
Recognized	7. Exclusive NOR Gate (Z104)
	8. Inverter (Z103)
	9. Check IMHz Clock (X101)

REAR BOARD FAILURES

Symptom	Possible Cause	Corrective Action	Diagnostic Flowchart Entry Point
Dr	ive Motor and Tach Feedback	Circuit (coordinates C&D),7-8)
Drive Motor Not Operating	Incorrect Voltage Levels	Normal Trouble shooting Techni- ques	G (Pg.4-12)
	Motor Control Line Not Going High	Check for Bad Con- nections at Pin 9 of J106 Connector	G (Pg.4-12)
	Transistor Array (A107)	Replace	G (Pg.4-12)
	Transistor (QI12)	Replace	G (Pg.4-12)
	Connector J103	Make Sure All Con- nections Are Tight	G (Pg.4-12)
Drive Motor	Transistor Array (A107)	Replace	G (Pg.4-12)
Sporadically	Transistor (Q112)	Replace	G (Pg.4-12)
	Speed Control Pot (R142)	Make Sure There Is No Glyptol On This Pot. If There Is, Replace Pot	G (Pg.4-12)
	Connector J103	Make Sure All Con- nections Are Tight	G (Pg.4-12)
Drive Motor Speed Varies	Speed Control Pot (R142)	Make Sure There Is No Glyptol On This Pot. If There Is, Replace Pot	M (Pg.4-9)
	Transistor Acray (A107)	Replace	M (Pg.4-9)
	Transistor (Q112)	Replace	M (Pg.4-9)
	Incorrect Voltage Levels	Normal Trouble shooting Techniques	M (Pg.4-9)

810 Disk Drive Field Service Manual 5-5

Symptom	Possible Cause	Corrective Action	Diagnostic Flowchart Entry Point
	Power Supply Circuits (coo	rdinates B&C,5-6)	
No Power or Blows Power Adaptor	Bridge Rectifier Diodes	Replace All The Diodes In The Bridge (CR111-114)	F (Pg.4-11)
	Power Adaptor	Replace	F (Pg.4-11)
No +5 Volts	Regulator 7805 (A108)	Replace	F (Pg.4-11)
No +12 Volts	Pass Transistor (Q113)	Replace	F (Pg.4-11)
	Regulator Circuit	Replace Q114 or Q115	F (Pg.4-11)
	12 Volt Doubler	Replace CR115,CR116 or C149	F (Pg.4-11)
No -5 Volts	-5 Volt Doubler	Replace CR117,CR118 or C151	F (Pg.4-11)
Drive Motor Speed Varies	3 Pin Molex Connectors J104 & J105	Make Sure Good Con- tact Is Being Made.	F (Pg.4-11)

REAR BOARD FAILURES (CONT)

Write Circuit (coordinates B,3)

Use the following Test Points for Waveform Comparison

See Figure 5-3 for Correct Waveforms

	A111 Pin 6 A111 Pin 12 Q117 Base	A111 Pin 9 Q116 Base	
Fails to Write	Write Driver (A111)	Replace	K (Pg.4-17)
Any sectors	Write Current Wrong	Check the Value of R167	K (Pg.4-17)
	Write & Data Gate Connections	Make Sure Pins 16-19 of J106 Are Making A Tight Connection	K (Pg.4-17)
	Incorrect Voltage Levels	Normal Trouble- shooting Techniques	K (Pg.4-17)
810 Disk Drive F	ield Service Manual 5-6		

REAR BOARD FAILURES (CONT)

Symptom	Possible Cause	Corrective Action	Diagnostic Flowchart Entry Point
	Write Circu	uit (cont)	
Fails to Write to Inner Tracks	Write Current Too High	Check the Value of R167	K (Pg.4-17)
(sectors 650-720)	Write Drivers (A111)	Replace	K (Pg.4-17)
	Incorrect Voltage Levels	Normal Trouble- shooting Techniques	К (Pg.4-17)
Fails to Write to Outer Tracks	Write Current Too Low	Check the value of R167	K (Pg.4-17)
(Sectors 0-80)	Write Drivers (A111)	Replace	K (Pg.4-17)
	Incorrect Voltage Levels	Normal Trouble- shooting Techniques	K (Pg.4-17)
Writes Garbled Data	Erase Drivers Q116-117	Replace Q116 or Q117	K (Pg.4-17)
	Incorrect Voltage	Normal Troubleshooting	g К(Pg.4-17)
	Read Circuit (co	oordinates C,1-3)	
****	Use the following Test Poin	ts for Waveform Compariso]**
	See Figure 5-4 for	Correct Waveforms	
	A109 Pin 7 A109 Pin 3 A109 Pin 2		
Fails to Read Inner Tracks (Sectors 650–720)	Differential Amp (A110)	Replace With A Higher Gain Transistor Array (C016821)	K (Pg.4-17)
Fails to Read Outer Tracks (Sectors 0–80)	Differential Amp (A110)	Replace with A Lower Gain Transistor Array (C010174)	K (Pg.4-17)

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Symptom	Possible Cause	Corrective Action	Diagnostic Flowchart Entry Point
Fails to Read Anything	Incorrect Voltage Levels	Normal Trouble- shooting Techniques	K (Pg.4-17)
	A110	Replace	K (Pg.4-17)
	Zero Crossing Detector (A109)	Replace	K (Pg.4-17)
	Read Circuit Modifications Not Made (refer to Service Bulletins, Section 9)	Double Check Modifi- cations for Correct- ness	K (Pg.4-17)

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Symptom	Possible Cause	Corrective Action	Diagnostic Flowchart Entry Point
Speed Varies	Drive Belt Tension	Replace Belt	D (Pg.4-9)
	Drive Motor Tach	Replace Drive Mechanism	D (Pg.4-9)
	Drive Motor Bearings	Replace Drive Mechanism	D (Pg.4-9)
Will Not Step Correctly	Stepper Motor	Replace Drive Mechanism	D (Pg9)
	Stepper Motor Band	Replace or Adjust Band Pulley (Pg. 6-11)	D (Pg.4-9)
	Head Carriage Assembly Hanging Up	Replace Drive Mechanism	D (Pg.4-9)
	Zero Track Adjustment	Perform Alignment Procedure	D (Pg.4-9)
Intermittent Read or Write Errors	Pressure Pad	Replace Pressure Pad	D (Pg.4-9)
	Burned Head	Replace Drive Mechanism	D (Pg.4-9)
	Dirty Read/Write Head	Clean With 91% Iso- propyl Alcohol	D (Pg.4-9)
Diskette Incompatibility	Radial Track Alignment Off	Perform Alignment Procedure	D (Pg.4-9)
	Head Azimuth Alignment	Replace Drive Mechanism	D (Pg.4-9)
Write Protect Not Working	Write Protect Photo Transistor	Replace Right Hand Guide/Write Protect Assembly (Pg. 6–13)	D (Pg.4-9)
Diskette Not Ejecting	Eject Spring Assy	Replace Eject Spring Assy (pg. 6–12)	D (Pg.4-9)

DRIVE MECHANISM FAILURES

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SYMPTOM CHECKLIST: WAVEFORMS



Figure 5-1. 1MHz Clock Signal at Pin 3 of Z 105



Figure 5-2. Sideboard Read Circuit Waveforms

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Figure 5-3. Rear Board Write Circuit Waveforms

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Figure 5-4. Rear Board Read Circuit Waveforms

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SECTION 6

DISASSEMBLY/ASSEMBLY

STATIC PROTECTION IN WORK AREA

Large Scale Integrated (LSI) chips can be damaged by static charges in their plastic packaging or by handling in normal work environments. It is necessary to establish a static-free work station. A work station for assembling static-sensitive materials should consist of an anti-stat poly table cover that is grounded to the metal on the table. In addition, the worker at the station should also be grounded, with a wrist strap, to the metal portion of the table. Note that the wrist grounding straps affect only the body of the service person, not the clothing. Therefore, short sleeves are preferred. If long sleeves are worn, they should be covered by an anti-stat gauntlet.

On static-sensitive work surfaces, all plastics except anti-static ones should be forbidden. Vinyl and mylar shop carriers pulled from a stack and laid casually on a board can destroy it. Styrene desoldering devices generate large static charges, particularly when triggered. Practically all plastic and plastic related materials generate tremendous charges and should not be permitted in the same room where static sensitive devices are being assembled or stored.

SAFETY

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As with any electronic equipment, precautions consistent with all standard industrial safety practices must be observed while maintaining the ATARI 810 Disk Drive. A current of 10mA can put the human heart in fibrillation and a current of only 100mA can cause it to stop completely. Since human skin resistance is normally about 300 ohms, any voltage in excess of 30 volts can be lethal.

Notices are included throughout this manual to alert you to problem areas or dangerous situations.

A WARNING statement precedes the text of a procedure that, if not strictly observed, could result in injury or death of the service technician.

A CAUTION statement precedes the text of a procedure that, if not strictly observed, could result in damage to or destruction of equipment hardware or software.

A NOTE statement highlights an essential operating or maintenance procedure, condition, or clarifying fact. Notes are also used to provide information that, though not necessary, is helpful to understanding a concept or completion of a procedure.

PREVENTIVE MAINTENANCE

Atari requires each 810 Disk Drive unit which is disassembled to have the following preventive maintenance performed:

- o Inspect the Read/Write Head to be certain it is clean. If necessary, clean the area using 91% isopropyl alcohol and a cotton swab.
- o Be certain guide rods are free of grease.
- o Inspect the pressure pad for excessive buildup of oxides or dirt. If necessary, replace the pressure pad.

PRECAUTIONS

When checking an 810 Disk Drive, take the following precautions:

- o Do not use oils or lubricating compounds of any kind on any of the drive's mechanical assembly.
- o Do not lift the pressure pad any further from the head carriage than the arm would be lifted during normal disk drive operation.
- o Take care if magnetized tools are used, since diskettes are present.

DISASSEMBLY

The disassembly procedure is divided into six levels. These levels are:

- o Disk Drive Case Disassembly
- o Common Baseplate and Front Panel Removal
- o Side PCB and RF Shield Removal
- o Rear PCB Removal
- o Drive Mechanism Removal
- o Drive Mechanism Component Disassembly

WARNING: Be sure the unit is unplugged from AC power before opening the outer case.

Use Figure 6-1 as reference for the following five steps.



Figure 6-1. Disk Drive Case Disassembly

- I. Disconnect the AC transformer power cord from the power jack at the rear of the drive chassis before opening the outer case.
- 2. Disconnect the data cord from the I/O connectors at the rear of the drive chassis.

- 3. With the Disk Drive rightside up on a suitable work surface, remove the four adhesive screw hole covers on the top cover.
- 4. Remove the four screws securing the top cover to the lower cover.
- 5. Remove the top cover and set it aside.

CAUTION: The record/playback and erase head subassembly is extremely sensitive to magnetic fields. DO NOT use magnetized tools or articles when working inside the drive case or near the drive mechanism.

Common Baseplate and Front Panel Removal

NOTE: Removal of either the Side Board, Rear Board or Drive Mechanism requires removal of their common base plate from the Disk Drive lower cover.

Use Figure 6-2 as reference for the following four steps.

- I. Disassemble the Disk Drive case.
- 2. Remove the five screws securing the common baseplate to the lower cover.
- 3. Carefully lift the baseplate from the lower cover. Note that each of the stand-offs in the lower cover is topped with a rubber washer. Be sure none of the rubber washers are stuck to the common baseplate. Remove any washers from the common baseplate and insert over the stand-off.

NOTE: As you lift the common baseplate from the lower cover, the front panel lifts out at the same time. Remove the front panel from the baseplate and set it aside.

4. Place the baseplate on a suitable static protected work surface.



Figure 6-2. Common Baseplate and Front Panel Removal

Side PCB and RF Shield Removal

Use Figure 6-3 as reference for the following nine steps.

- I. Disassemble the Disk Drive case.
- 2. Remove the common baseplate and front panel from the drive lower cover.



Figure 6-3. Side Board and RF Shield Removal

- 3. Disconnect the write protect wiring harness J101 black, green, blank, red, black) from the side board.
- 4. Disconnect the stepper motor wiring harness J102 black, white, red, green, brown from the side board.
- 5. Remove the three screws securing the side board and its center ground bracket to the common baseplate.

6. Grasp the side boardat both its front edge and its upper rear corner. Lift the PCB straight up to disengage its rear jack from the row of pins on the rear board(J106 - rear connector).

NOTE: You may have to rock the PCB slightly to overcome the jack-to-pin tension between the two PCBs.

After removing the Sideboard, be sure all the pins on connector J106 are straight. This prevents damage during reassembly.

7. Carefully straighten the three tabs securing the RF shield case halves together on the side board.

CAUTION: Excessive bending of the metal tabs canbreak them. DO NOT bend the tabs any more than necessary

- 8. Remove the two screws securing the case halves to the ground bracket and side board.
- 9. Carefully disengage the case halves from each other and the board. Set the case halves aside. Place the side board on a static protected work surface.

Rear PCB Removal

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Use Figure 6-4 as reference for the following eight steps.

- I. Disassemble the Disk Drive case.
- 2. <u>Remove the common baseplate and front panel from the drive lower cover.</u>
- 3. Remove the side board from the common baseplate.
- 4. Disconnect the drive motor wiring harness J103 from the rear board.
- 5. Disconnect the head I/O wiring harness J109 from the rear board.
- 6. Remove the four screws securing the rear board to the common baseplate.
- 7. Grasp the rear board on both side edges. Carefully lift the board <u>straight</u> <u>up far enough to disengage</u> the board's two right side jacks from the six device pins.





NOTE: You may have to rock the boardslightly to overcome the jack-to-pin tension between the board and the pins attached to the common baseplate.

8. Lift the rear board away from the baseplate at an angle from the side nearest the Drive Mechanism. Place the rear board on a suitable work surface.

Drive Mechanism Removal

Use Figure 6-5 as reference for the following eight steps.

- I. Disassemble the Disk Drive case.
- 2. Remove the common baseplate and front panel from the drive lower cover.

- 3. Remove the side board.
- 4. Remove the rear board.
- 5. Place the Drive Mechanism assembly upside down, exposing the four screws holding the Drive Mechanism to the common baseplate.
- 6. Remove the four screws that secure the Drive Mechanism to the baseplate. The screws are accessible only from the underside of the baseplate.



Figure 6-5. Drive Mechanism Removal

810 Disk Drive Field Service Manual 6-9 Revised 12/3/82 by ECN #0001 CAUTION: The Drive mechanism provides critical mechanical alignments necessary for proper Disk Drive operation. Be <u>very careful</u> not to jar or damage the drive mechanism or any of its associated subassemblies and components.

- 7. Place the Drive Mechanism and baseplate on a suitable work surface.
- 8. Separate the Drive Mechanism and common baseplate.

DRIVE MECHANISM COMPONENT DISASSEMBLY

Use the following procedures to disassemble the Drive Mechanism to replace individual components. The procedures described are:

- Drive Belt Removal
- Stepper Motor Positioning Band and Pulley Adjustment or Replacement

Drive Belt Removal

Use Figure 6-6 as reference for the following seven steps.

- 1. Disassemble the Disk Drive case.
- 2. Remove the common baseplate and front panel from the drive lower cover.
- 3. Remove the side board.
- 4. Remove the Drive Mechanism from the common baseplate
- 5. Carefully lay the Drive Mechanism on its side.
- 6. Locate the drive belt which runs between the drive motor pulley to the flywheel.
- 7. Remove the drive belt by rotating the large flywheel (marked for strobe) and easing the belt off the outside edge. This prevents stretching or damaging the belt.


Figure 6-6. Drive Belt Removal

To Replace Stepper Motor Positioning Band and Pulley

NOTE: AFTER ADJUSTMENT OR REPLACEMENT OF THE STEPPER MOTOR POSITIONING BAND AND PULLEY, THE HEAD MUST BE ALIGNED.

Use Figure 6-7 as reference for the following 10 steps.

- I. Remove the front and rear screws, washers and brackets that hold the positioning band to the head carriage assembly.
- 2. Loosen the Allen head setscrew and lift the positioning band and pulley from the stepper motor drive shaft.
- 3. Carefully install the new positioning band and pulley over the stepper motor drive shaft. Do not tighten the setscrew at this time.
- 4. Replace, but do not tighten the rear screw, washer and bracket that holds the positioning band to the head carriage assembly.
- 5. Align the front screw hole of the positioning band with the screw hole on the head carriage assembly.
- 6. Install the front screw, washer and bracket, but do not tighten.
- 7. Gently slide the head carriage assembly back and forth on the guide rods. This will center the band pulley on the stepper motor shaft.
- 8. Tighten the rear band retaining screw (use 6 inch lbs. torque).

810 Disk Drive Field Service Manual 6-11 Revised 12/3/82 by ECN #0001

- 9. Use a pointed tool such as a scribe to hook the small hole on the front end of the positioning band. Pull forward slightly on the band while tightening the front retaining screw (use 6 inch lbs. torque).
- 10. Tighten the Allen head setscrew on the stepper motor pulley (use 2 inch lbs. torque).

NOTE: BE SURE THAT THE BAND IS FLAT AND DOES NOT BIND.

To Adjust the Positioning Band and Pulley

Use Figure 6-7 as reference for the following steps.

Loosen: 1) the Allen head setscrew on the pulley; and, 2) the front and rear screws that hold the positioning band to the head carriage assembly.

Follow steps 7 through 10 in the preceding paragraph.



Figure 6-7. Positioning Band and Pulley Replacement

To Replace Eject Spring Assembly

- 1. To replace top latch release spring:
 - -- Remove the screw which holds the top latch release spring to the carrier assembly.
 - -- Remove the top latch release spring and replace it with a new one.
 - -- Insert and tighten the screw which holds it to the carrier assembly.

810 Disk Drive Field Service Manual 6-12

- 2. To replace the latch retaining spring:
 - -- Remove the screw which holds the latch retaining spring to the Drive Mechanism.
 - -- Remove the latch retaining spring and replace it with a new one. Be sure that it is flat. DO NOT BEND THE SPRING.
 - -- Insert and tighten the screw which holds it to the Drive Mechanism.
- 3. To replace the Ejector Block:
 - Loosen the setscrew on the bottom of the Drive Mechanism (in front of Stepper Motor).

- Remove the rod, spring and ejector block from the guides and replace them. Be sure that both ends of the new rod are even with the guides in the Drive Mechanism.
- Tighten the setscrew on the bottom of the Drive Mechanism.

To Replace the Right Hand Guide/Write Protect Assembly

- I. Remove the two screws which hold the assembly to the Drive Mechanism.
- 2. Remove the upper screw which holds the assembly to the front bezel.
- 3. Disconnect the two wiring harnesses from the assembly. Be sure to note polarity.

NOTE: Black and green on top. Red and black on bottom.

- 4. Remove the assembly and replace it with a new one.
- 5. Connect the two wiring harnesses to the new assembly. Be sure polarity is correct.
- 6. Insert and tighten the upper screw which holds the assembly to the front bezel.
- 7. Insert and tighten the two screws which hold the assembly to the Drive Mechanism.

ASSEMBLY

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The Assembly Procedure is divided into six levels. These levels are:

- Rear Board Assembly
- Drive Mechanism Component Assembly
- Drive Mechanism Assembly
- Side Board Assembly

810 Disk Drive Field Service Manual 6-13 Revised 12/3/82 by ECN #0001

- Common baseplate and front panel assembly.
- Disk Drive Case Assembly
 - WARNING: Be sure the unit is unplugged from the AC power before reassembling to any level.

Rear PCB Assembly

Use Figure 6-4 as reference for the following three steps.

- 1. Align the connectors J104 and J105 (on the rear board) with the pins on the voltage regulators (common baseplate).
- 2. Firmly press the connectors onto the pins, aligning the four screw holes with the common baseplate.
- 3. Insert and tighten the four screws which hold the rear board to the common baseplate.

DRIVE MECHANISM COMPONENT ASSEMBLY

Use the following procedures to replace or adjust components. The procedures are:

- Stepper Motor Positioning Band and Pulley Replacement or Adjustment (Page 6-11).
- Drive Belt Assembly

Drive Belt Assembly

Use Figure 6-6 as reference for the following three steps.

- 1. Lay the Drive Mechanism on its side.
- 2. Place the drive belt around the drive motor pulley.
- 3. Position the drive belt around the flywheel until the belt tightens. Carefully ease the belt onto the flywheel while rotating the flywheel.

Drive Mechanism Assembly

Use Figure 6-5 as reference for the following seven steps.

- 1. Carefully set the Drive Mechanism upside down on a clean, flat surface with the drive door facing toward you.
- 2. Place the common baseplate over the Drive Mechanism aligning the screw holes to the Drive Mechanism.
- 3. Center the flywheel in the large hole in the common baseplate.
- 4. Insert and tighten the four screws holding the common baseplate to the Drive Mechanism.

- 5. Turn the assembly right side up to connect the wiring harnesses.
- 6. Connect the Drive Motor Harness (yellow, blank, blue, red, black) to the rear PCB-J103.
- 7. Connect the Head I/O Harness (red, blank, blue, white, black) to the rear PCB-J109.

Side PCB and RF Shield Assembly

Use Figure 6-3 as reference for the following eight steps.

- 1. Place the RF shield halves on the side PCB as shown in Figure 6-3.
- 2. Align the two screw holes on the ground bracket with the holes on the RF Shield case halves and the side PCB.
- 3. Insert and tighten the two screws securing the ground bracket to the case halves and the side PCB.
- 4. Align the connector J106 (Side Board) over the row of pins on the rear board.
- 5. Firmly press the connector onto the pins, aligning the screw holes with the common base plate.
- 6. Insert and tighten the three screws holding the side board and center ground bracket to the common baseplate.
- 7. Connect the Stepper Motor wiring harness (black, white, red, green, brown) to the side board J102
- 8. Connect the Write Protect wiring harness (black, green, blank, red, black) to the side board.

Common Baseplate and Front Panel Assembly

Use Figure 6-2 as reference for the following six steps.

- 1. Place common baseplate in the lower cover.
- 2. Align the five screw holes in the common baseplate with the screw holes in the lower cover.
- 3. Grasp the front panel bezel and lift the front of the baseplate approximately one inch from the lower cover.
- 4. Place the front panel over the front panel bezel align the openings over the BUSY light, Power Light, and Power ON/OFF switch.
- 5. Lower the Common Baseplate and slide the front panel into the notches at the side of lower cover.
- 6. Replace the five screws securing the common baseplate to the lower cover.

810 Disk Drive Field Service Manual 6-15 Revised 12/3/82 by ECN #0001

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Disk Drive Case Assembly

Use Figure 6-1 as reference for the following five steps.

- 1. Place the top cover over the Drive Mechanism, aligning the two covers.
- 2. Replace the four screws in the holes on the top cover.
- 3. Place the hole cover labels over the four holes.
- 4. Insert the data cord into the I/O Connector on the rear of the disk drive.
- 5. Connect the AC power cord into the power jack at the rear of the drive chassis.

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Assy	Part No.	Description	Item No.
	C014319 CA017964	AC POWER ADAPTOR AC POWER ADAPTOR (NEW UNIT) (PKGD.)	EARLY UNIT PLUGS INTO WALL ELECTRICAL OUTLET
BOTTOM BOTTOM	C017945 88-1004 88-1010	AC POWER ADAPTOR (NOT PKGD.) RUBBER FEET MOUNTING PAD	(ALT FOR P/N C016848)
BOTTOM BOTTOM BOTTOM	C014324 C016848 CA014158 CA014318	FOOT PLUG LOWER ASSY FASTENER BASE ASSY	(ALT LISTED)
DATA SEP	14-5103	RESISTOR 10K	R202
DATA SEP	14-5182	RESISTOR 1.8K	R200,201
DATA SEP	14-5221	RESISTOR 220 OHM	R205
DATA SEP	14-5472	RESISTOR 4.7K	R206
DATA SEP	14-5473	RESISTOR 47K	R203,204
DATA SEP	31-1N914	DIODE 1N914	CR200 (ALT. FOR
			CO60607)
DATA SEP	34-2N3904	TRANSISTOR 2N3904	Q200
DATA SEP	C014179-08	CAP. CERAMIC AXIAL 82PF $(50V)$	C201
DATA SEP	C014181-01	CAP. CERAMIC AXIAL $.0010F(25V)$	C_{203} 205 207
DATA SEP	C014181-02	CAP CERAMIC AXIAL $1_{\rm UF}$ (25V)	$C_{200}, 200, 201$
DATA SEP	C014329	IC FDC 1771	A203 (DATA SEP
			INSTALLED)
DATA SEP	C014384	INDUCTOR FERRITE BEAD	L200
DATA SEP	C014386-02	SOCKET IC (14 PIN)	XA201,205,207,208
DATA SEP	C014386-03	SOCKET IC (16 PIN)	XA204,206
DATA SEP	C014386-09	SOCKET IC (40 PIN)	XA203
DATASEP	C016018	(NYMPH 040)	X200
DATA SEP	C016045	IC 74LS74	A201,207
DATA SEP	C017096	IC 74LS04	A208
DATA SEP	C017097	IC 74LS08	A205
DATA SEP	C017100	IC 74LS193 ,	A204,206
DATA SEP	C017511	SHIELD INSULATOR PAD	D 102
DATASEP	CU17521	DIP HEADER (40 PIN)	P103
DATA SEP	CO60607	DIODE (1N/1/18)	CR200 ALTLISTED
DISK DR.	CA014072	DISK DRIVE ASSY MPI	
FINAL	CA014156-02	ATARI HCD 810 DISK DRIVE ASSY	NOT PKGD. (UNIT
			WITH MPI DISK
			DRIVE ASSY)
MOUNT	78-74001	CABLE TIE	
MOUNT	C012972	COMMON BASE	A 1 0 9
MOUNT	C014348	VOLTAGE REGULATOR (5V)(78MO)	A108
MOUNT	C014736 C014712	VOLTACE RECULATOR 7812 (12V)	Q11J
MOUNT	C017194	MOUNTING PLATE COMMON	
MOUNT	CA014160	MOUNTING PLATE ASSY	UNIT WITH MPI
			DRIVE MECHANISM
MOUNT	C014138	GROUND BRACKET	

810 Disk Drive Field Service Manual 7-1 Revised 12/3/82 by ECN #0001

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Assy	Part No.	Description	Item No.	
PANEL PANEL REAR	C012976 CA014159 14 -5 101	DISK PANEL PRIMARY PANEL ASSY (FRONT) RESISTOR 100 OHM	MPI UNIT MPI UNIT R138,147,162,	
REAR	14-5102	RESISTOR 1K	163,174 R137,149,151,	
REAR	14-5103	RESISTOR 10K	154,156 R140,143,152,153	
REAR REAR REAR REAR REAR REAR REAR REAR	14-5104 14-5105 14-5132 14-51R1 14-5202 14-5220 14-5221 14-5222 14-5222 14-5241 14-5331 14-5332 14-5333 14-5392 14-5472 14-5751 14-5752 15-5360 19-411504 21-101474 31-1N4001 31-1N914 34-2N3904 CA014833 CA015326	RESISTOR 100K RESISTOR 1 MEG RESISTOR 1.3K RESISTOR 1.1 OHM RESISTOR 2K RESISTOR 22 OHM RESISTOR 220 OHM RESISTOR 220 OHM RESISTOR 2.2K RESISTOR 2.2K RESISTOR 2.40 OHM RESISTOR 3.0 OHM RESISTOR 3.3K RESISTOR 3.3K RESISTOR 3.3K RESISTOR 3.9K RESISTOR 3.9K RESISTOR 4.7K RESISTOR 7.50 OHM RESISTOR 7.5K RESISTOR	157,158,165,166 R175,176 R144 R167 R139 R150 R173 R141 R145,159,160,171 R148 R146 R155 R177 R161 R164,168 R170 R169 R172 R142 C152 CR109,115-118 CR110,119,120 (ALT FOR P/N C060607) Q116,117	
REAR	FC100027	TRANSISTOR HEATSINK ASSY TRANSISTOR ARRAY	A107,110*	
*USE ON PRE-ANALOG 810'S WITHOUT DATA SEP.				
REAR	C016821	TRANSISTOR ARRAY	A107,110** (MUST <u>NOT</u> BE RCA BRAND PARTS)	
**USE ON PRE-ANALOG 810'S WITH DATA SEP.				
REAR	C010174	TRANSISTOR ARRAY	111 (MUST <u>NOT</u> BE RCA BRAND PARTS)	
REAR REAR REAR REAR REAR REAR REAR REAR	C010394 C012995 C014179-08 C014180-05 C014180-08 C014181-01 C014181-02 C014181-03 C014181-05 ive Field Service	CAP. POLY FILM .22UF (100V) CONNECTOR RT ANGLE (13 PIN) CAP. CERAMIC AXIAL 82PF (50V) CAP. CERAMIC AXIAL 220PF (50V) CAP. CERAMIC AXIAL .0047uF (50V) CAP. CERAMIC AXIAL .001uF (25V) CAP. CERAMIC AXIAL .01uF (25V) CAP. CERAMIC AXIAL .1uF (25V) CAP. CERAMIC AXIAL .22uF (25V) Manual 7-2	C145,158 (ALT LISTED) J107,108 C159 C153) C157 C120,154-156 C147 C144,161,163 C145,158, (ALT FOR P/N C010394)	

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Assy	Part No.	Description	Item No.
REAR	CO14351	TRANSISTOR	Q112 (PART OF)
REAR	C014332	IC LM311N	A109
REAR	34-2N3904	TRANSISTOR 2N3904	Q116,117
REAR	C014368	CAP. ELEC RADIAL 470uF (16V)	C150,151
REAR	C014386-01	SOCKET IC (8 PIN)	XA109
REAR	C014386-02	SOCKET IC (14 PIN)	XA107,110,111
REAR	C014392	CAP. ELEC RADIAL 10uF (16V)	C143,160
REAR	C014394	TRANSISTOR MPS-A06	Q114,115
REAR	C014398	DIODE MR501	CR111-114
REAR	C014703	INDUCTOR 680uH	L103
REAR	C014715	POWER JACK	J110
REAR	C014716-03	CONNECTOR (3 PIN)	J104,105
REAR	C014719-02	CONNECTOR (5 PIN)	J103,109
REAR	C014719-03	CONNECTOR (23 PIN)	J106
REAR	C014725	SWITCH LOGIC	S101
REAR	C014780	CAP. ELEC RADIAL 4700uF (25V)	C146,148,149
REAR	C014798	HEATSINK	Q112 (PART OF)
REAR	C014796	RIVET NYLON	Q112 (PART OF)
			(ALT FOR P/N C015344)
REAR	C015344	RIVET NYLON	(ALTERNATE LISTED)
REAR	C015505	CAP. ELEC RADIAL 47uF (16V)	C142
SIDE	14-5102	RESISTOR 1K	R118,121-124,129
SIDE	14-5103	RESISTOR 10K	R105,109,113,134
SIDE	14-5104	RESISTOR 100K	R135,136
SIDE	14-5151	RESISTOR 150 OHM	R117 ·
SIDE	14-5152	RESISTOR 1.5K	R114
SIDE	14-0103	RESISTOR 15K	R108,112
SIDE	14-21R1	RESISTOR I.I OHM	R125
SIDE	14-0221	RESISTOR 220 OHM	R103
SIDE	14-5224	RESISTOR 220K	R12/
SIDE	14-22/1	RESISTOR 270 OHM	R120,126
SIDE	14-24/2	RESISTOR 27 K	R131
SIDE	14-2221	RESISTOR 330 ORM	R152 D115
SIDE	14-2222	DESISTOR 32V	
SIDE	14-5393	DESISTOR JAK	R111 R10/
SIDE	14-5071	RESISTOR 470 OHM	R104
SIDE	14-5477	RESISTOR # 7K	R110 116 128 133
SIDE	14-5473	RESISTOR 47K	R119,130
SIDE	14-5562	RESISTOR 5.6K	R101.102
SIDE	14-5750	RESISTOR 75 OHM	R175
SIDE	31-1N4001	DIODE 1N4001	CR101-104, 106
SIDE	31-1N914	DIODE 1N914	CR120,121,122
SIDE	C018991	TRANSISTOR 2N3906	0101,103,104
SIDE	34-2N3904	TRANSISTOR 2N3904	Q102,105,110,111
SIDE	C010174	TRANSISTOR ARRAY	A106
SIDE	CA014834	PC BOARD SIDE ASSY.	
		(DATA SEP. INSTALLED)	

810 Disk Drive Field Service Manual 7-3 Revised 12/3/82 by ECN #0001

5

Assy	Part No.	Description	Item No.
SIDE SIDE SIDE SIDE	CA015325 C010447 C010745 C010750	LED AND STANDOFF ASSY TRANSISTOR ARRAY 4077 IC MPU 6507 IC PIA 6532	CR105,108 Z104 A101 A104
SIDE SIDE SIDE SIDE	C011299 C011465-01 C014069 C014136	IC CUSTOM ROM HEX CMOS INVERTER 4069 STANDOFF LED RE SHIELD INSIDE	A102 Z103 CR105,108 (PART OF)
SIDE SIDE SIDE	C014137 C014179-02 C014179-03	RF SHIELD OUTSIDE/TRACE CAP. CERAMIC AXIAL 47PF (50V) CAP. CERAMIC AXIAL 10PF (50V)	C101,103,119,131 C122
SIDE SIDE SIDE SIDE	C014179-04 C014179-07 C014180-03 C014180-07	CAP. CERAMIC AXIAL 35PF (50V) CAP. CERAMIC AXIAL 62PF (50V) CAP. CERAMIC AXIAL 100PF (50V) CAP. CERAMIC AXIAL 470PF (50V)	C141 C105 C110,130,139,140 C106
SIDE SIDE	C014180-10 C014181-01	CAP. CERAMIC AXIAL 390PF (50V) CAP. CERAMIC AXIAL .001uF (25V)	C111 C113,116-118 123-129,134-138
SIDE	C014181-03	CAP. CERAMIC AXIAL .luF (25V)	C102,104,107-109 114,115,133
SIDE SIDE SIDE SIDE SIDE SIDE SIDE SIDE	C014316 C014328 C014329 C014333 C014334 C014369 C014379 C014386-02 C014386-07 C014386-07 C014386-08 C014386-09 C014394 C014397-01 C014702 C014717-01 C014777 C014719-02	CRYSTAL 1 MHz TRANSISTOR ARRAY 6810 IC FDC 1771 TRANSISTOR ARRAY 4011 TRANSISTOR ARRAY 4013 CAP. ELEC RADIAL 4.7uF (35V) RESISTOR NETWORK (9 x 4.7K) INDUCTOR FERRITE BEAD SOCKET IC (14 PIN) SOCKET IC (24 PIN) SOCKET IC (24 PIN) SOCKET IC (28 PIN) SOCKET IC (28 PIN) TRANSISTOR MPS-A06 SWITCH POWER INDUCTOR AXIAL LEAD 470uH CONNECTOR (23 PIN) DIODE LED CONNECTOR (5 PIN)	X101 A103 A105 Z102 Z101,105 C132 R176 L102,103 XA106,XZ101-105 XA102,103 XA101 XA104,105 Q106-109 S102 L101 P101 CR105,108 (PART OF) J101,102
SIDE SIDE SIDE	C014808-01 C017520 CO60607	DIODE ZENER (5.1V) IN5231B Socket DIP (40 PIN) DIODE (1N4148)	CR107 J103 CR120,121,122 (ALT LISTED)
TOP TOP DISK DRIVE DISK DRIVE DISK DRIVE	CA014157 C014105 C014106 FC100031 FA100032 FA100033	UPPER ASSY PANEL LABEL COVER HOLE COVER LABEL MPI DRIVE BELT MPI LOAD PAD ASSEMBLY MPI RT. HAND GUIDE/WRITE PROTECT ASSY	

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Assy	Part No.	Description	Item No.
DISK DRIVE	FA100035	MPI EJECTOR ASSY	
DISK DRIVE	FA100034	MPI BAND/PULLEY ASSY	

810 Disk Drive Field Service Manual Revised 12/3/82 by ECN #0001 7-5

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APPENDIX A

ATARI 810 DISK DRIVE

Mechanical and Electrical Specifications

Height	4.5 Inches
Width	9.5 Inches
Depth	12 Inches
Weight	5 Pounds
Power Adaptor	
Input	120 Volts AC, 60 Hz
Output	9 Volts AC, 1.7 Amps
Power Usage	20 Watts
Approvals	UL and CSA
Clocking Frequency	I MHz Crystal Controlled Oscillator
Media	ANSI Standard 5.25" Floppy Diskette
Track Density	48 TPI
Recording Density	2,938 BPI. (MAX)
Flux Density	5,876 FCI. (MAX)
Recording Format	·
	Single Sided Single Density (128 Bytes/Sector) FM Encoding Method Soft Sectored 40 Tracks (18 Sectors/Track) Total of 720 Sectors
Disk Rotational Speed	238 RPM ± 1%

810 Disk Drive Field Service Manual Revised 12/3/82 by ECN #0001

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Mechanical and Electrical Specification (Cont)

Average Latency	100 Milliseconds	
Read/Write Head Gap	.013 Inches	
Guard Band	.008 Inches	
Average Data Transfer Rate	6K Baud (19.2K Baud max.)	
Pad Pressure	17 Grams	
Head Life	20,000 Hours (Normal Use)	
Media Life	3 x 10 ⁶ Passes On A Single Track	
Power-up Delay	0.5 Seconds	
Minimum Data Access Time	236 Milliseconds	
Head Loading Time	35 Milliseconds	
Head Settling Time	15 Milliseconds	
Track to Track Access Time	5 Milliseconds	
Temperature		
Operating	0 to 50 Degrees Centigrade	
Non-Operating	-45 to 71 Degrees Centigrade	
Relative Humidity		
Operating	8% to 80% (Non-Condensing)	
Non-Operating	8% to 90% (Non-Condensing)	
Altitude	•	
Operating	-500 Feet to 10,000 Feet	
Non-Operating	-1,000 Feet to 50,000 Feet	
MTBF	9,000 Hours	
MTTR	l Hour	

8-2

APPENDIX B 310 AMALOG DISK DRIVE

Overview

Appendix B provides the information necessary to troubleshoot and repair the Atari 810 Analog Disk Drive. Included in this appendix are: 810 Analog Disk Drive Silkscreens/Schematics, complete Diagnostic Flowcharts, Disassembly/Assembly instructions, a complete Parts List and Mechanical/Electrical specifications.

Changes in the Analog Disk Drive are:

- 1. A Power Supply Board now bolts onto the common baseplate where the Rear Board used to be. The Power Supply Board contains:
 - a) a redesigned Power Supply.
 - b) a Tachometer/Speed Switch I.C. (frequency to voltage converter) added as the Tach circuit to stabilize the motor speed.

- 2. An Analog Board now bolts to the top of the Drive Mechanism. This board contains the Analog circuitry which used to be on the Rear Board. The major changes are to the Read/Write circuitry. The Analog Board contains:
 - a) op-amps and discrete transistors in place of transistor arrays.
 - b) a multiplexor chip for switching the Read/Write amplifiers.
- 3. a 10 pin flat cable connects the Analog Board to the Power Supply Board. Note: for plug orientation, red wire is on pin 1.

The 810 Analog Disk Drive uses the same Diagnostic Tests as the original 810 Disk Drive but requires different flowcharts because component location is different.

NOTE: For the Alignment Program, hook oscilloscope or frequency counter probes to Test Points 2 and 3 on the Analog Board.

When a flowchart instructs you to perform a specific test, you are referred to Section 3, 810 Disk Drive Field Service Manual. Section 3 reviews all the tests needed to diagnose possible problems in both original 810 Disk Drive units and 810 Analog Disk Drive units.

When a line in the flowchart terminates with a letter inside a circle, note that a page number is near it. Turn to that page within this appendix and continue the diagnosis. All the flowcharts needed to diagnose possible 310 Analog Disk Drive problems are complete in this Appendix.

38-1

SILKSCREENS AND SCHEMATICS

On the following pages are representative silkscreens and schematics for the ATARI 810 Analog Disk Drive. Minor variations in design may be encountered depending on the production date of the unit, but these schematics provide all details required for an in-depth understanding of ATARI 810 Analog Disk Drive Units.



Figure 3B-1. Schematic Power Supply

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Figure 8B-2. Silkscreen Power Supply

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Figure 88-3. Schematic Analog Board.

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Figure 8B-4. Silkscreen Analog Board

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Figure 8B-6. Silkscreen 810 Sideboard. 810 ANALOG DISK DRIVE 8B-8



Figure 8B-7. Schematic 810 External Data Separator



Figure 8B-8. Silkscreen 810 External Data Separator.

DIAGNOSTIC FLOWCHARTS

The Diagnostic Flowchart is intended to be easy to use and the primary aid when troubleshooting the 810 Analog Disk Drive. Follow the prompts in the order presented. When a question is asked, follow the line from the box that best applies to your unit's condition. When that line terminates with a letter inside a circle, note that a page number is near it (i.e., pg. 8B-12). Turn to that page within this appendix, locate the letter in another circle, and continue the diagnosis. The flowchart leaves nothing to chance, it tells you when to perform a specific test and when to replace components. Section 3, 810 Disk Drive Field Service Manual contains detailed instructions for each of the tests referenced in this section.

SWAP OUT PROCEDURE

At many places in the diagnostic flowchart, a box tells you to "swap out" a component, a chip, or a number of chips in a particular order. The "swap-out" instruction means that you should replace the indicated components (one at a time) with a known-good component of the same type. The 810 unit should then be tested with the new, knowngood component in place to see whether the swap out solved the problem being checked. If the swap out did not fix the problem, the known good component should be removed, and the original component reinserted. In this way, you avoid needlessly replacing good components.

REPLACE IN ORDER

The "replace in order" instruction means that you should replace the components indicated in the order listed until the result called out in the previous block is obtained.

N - Some lines terminate with an N inside a circle. When this occurs, call your Atari Repair Hotline.

> Inside California (800) 672-1466

Outside California (800) 538-1535 (800) 538-1536

810 ANALOG DISK DRIVE

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Initial Power-Up Sequence



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Initial Power-Up Sequence (cont)



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Initial Power-Up Sequence (cont)



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Burn-In Test



DOS Verification Test



810 ANALOG DISK DRIVE

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No Power Troubleshooting



NOTE: Numbers in **bold type** indicate power supply components only. In later revisions these numbers will be changed o eliminate confusion with sideboa d component numbers.

*Replace these components before plugging in another adaptor.

33

Drive Motor Troubleshooting



NOTE: Numbers in **bold** type indicate power supply components only. In later revisions these numbers will be changed to eliminate confusion with sideboard component numbers.

310 ANALOG DISK DRIVE

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Write Logic Troubleshooting



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8B-23

j.

Write Protect Troubleshooting



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Speed Troubleshooting

only. J Can Speed Yes Adjust Speed Be Adjusted Correctly? Pg. 3-9 No Does the Voltage on Pin 7 of A100 No Vary When R104 Replace R104 is Turned? Yes 144 123 Is Waveform 27 at Test Point 8 No Replace Drive Correct? See Mechanism. Figure. Yes Does Frequency D 200 at Test Point 9 Pg. <u>8B-18</u> Increase & De-NO crease When R104 is Varied? See Figure. 200 200 200 Yes Replace Q100: Replace A100

Pg. 3B-18

NOTE: Numbers in bold typ indicate power supply component only. In later revisions thes numbers will be changed t eliminate confusion with sideboar component numbers.



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Fail Format Troubleshooting (cont)



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Fail Format Troubleshooting (cont)



810 ANALOG DISK DRIVE

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Stepper Motor Troubleshooting



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DISASSEMBLY PROCEDURE FOR THE 810 ANALOG DISK DRIVE

Note: Instructions for Disassembly/Assembly of the Disk Drive case, common baseplate/front panel and side PCB are in Atari 810 Disk Drive Field Service Manual, Section 6, pg. 6-3 to 6-7.

WARNING: Be sure unit is unplugged before disassembling or re-assembling to any level.

POWER SUPPLY BOARD REMOVAL

Use Figure 8B-9 as reference for the following seven steps.

- I. Disassemble the Disk Drive case.
- 2. Remove the common baseplate and front panel from the Disk Drive lower cover.
- 3. Remove the side PCB from the common baseplate.
- 4. Remove the four screws securing the rear Power Supply board to the common baseplate.
- 5. Remove the two screws holding the 5 Volt Regulator and 12 Volt Regulator to the common baseplate.
- 6. Disconnect the two wiring harnesses plugged into the Power Supply board (J102 & J103). Be sure to note the polarity and location for Reassembly (See Detail in Figure 8B-9).
- 7. Lift the board straight up and away from the baseplate and place it on a suitable work surface.



Figure 8B-9. Power Supply Board Removal

DISASSEMBLY PROCEDURE FOR THE 810 ANALOG DISK DRIVE

ANALOG BOARD REMOVAL

Use Figure 8B-10 as reference for the following four steps.

- 1. Disassemble the Disk Drive case.
- 2. Unplug the two wiring harnesses from the Analog Board (J201 & J209). Be sure to note the polarity for Reassembly (See Detail in Figure 8B-10).
- 3. Remove the two screws holding the Analog Board to the Drive Mechanism.
- 4. Lift the board straight up and place it on a suitable work surface.



Base Plate

Figure 8B-10. Analog Board Removal

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DISASSEMBLY PROCEDURE FOR THE 810 ANALOG DISK DRIVE

DRIVE MECHANISM REMOVAL

Use Figure 8B-11 as reference for the following seven steps.

- I. Disassemble the Disk Drive case.
- 2. Remove the common baseplate and front panel from the Disk Drive lower cover.
- 3. Remove the Analog PCB from the top of the Drive Mechanism.
- 4. Unplug the two wiring harnesses on the Power Supply Board (J102 and J103). Be sure to note the location and polarity for reassembly (See Detail in Figure 8B-11).
- 5. Place the Drive Mechanism and common baseplate assembly upside down on the work surface, exposing the four screws holding the Drive Mechanism to the baseplate.
- 6. Remove the four screws that secure the Drive Mechanism to the baseplate.
- 7. Lift the baseplate straight off the Drive Mechanism.

This concludes the Disassembly procedures for the 810 Analog Disk Drive.



Base Plate

Figure 8B-11. Drive Mechanism Removal.

DRIVE MECHANISM ASSEMBLY

Use Figure 8B-11 as reference for the following six steps.

- 1. Carefully set the Drive Mechanism upside down on a clean, flat surface with the drive door facing you. NOTE: Be sure the Analog Board is <u>not</u> attached to the Drive Mechanism.
- 2. Place the common baseplate over the Drive Mechanism, aligning the four screw holes to the Drive Mechanism.
- 3. Center the flywheel in the large hole in the common baseplate.
- 4. Insert and tighten the four screws holding the common baseplate to the Drive Mechanism.
- 5. Turn the assembly right side up to connect the wiring harnesses.
- 6. Connect the two wiring harnesses on the Power Supply Board (J102 and J103). Be sure the location and polarity are the same as before disassembly (See Detail in Figure 8B-11).

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ANALOG BOARD ASSEMBLY

Use Figure 8B-10 as reference for the following three steps.

- 1. Align the two screw holes on the Analog Board to the Drive Mechanism.
- 2. Insert and tighten the two screws.
- 3. Connect the two wiring harnesses (J201 and J209) from the Analog Board. Be sure the polarity is the same as before desassembly (See Detail in Figure 8B-10).

POWER SUPPLY BOARD ASSEMBLY

Use Figure 8B-9 as reference for the following four steps.

- 1. Align the six screw holes on the Power Supply Board to the common baseplate.
- 2. Insert and tighten the two screws holding the 5Volt Regulator and 12 Volt Regulator to the common baseplate.
- 3. Insert and tighten the four screws holding the Power Supply Board to the common baseplate.
- 4. Connect the two wiring harnesses (J102 and J103) to the Power Supply Board. Be sure the location and polarity is the same as before disassembly (See Detail in Figure 88-9).

This concludes the Assembly procedure for the 810 Analog Disk Drive.

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Assy	Part No.	Description	Location
	CA014122	I/O Cable Assy	
	CA017964	AC Adaptor (Pkgd)	
	C017945	AC Power Adaptor	
		(Same As CA017964-Unpkgd)	
Ana P/S	14-5102	Resistor ¼W IK	R103,105,110,111
Ana P/S	14-5105	Resistor ¼W 1 Meg	R101,107
Ana P/S	14-5154	Resistor %W 150K	R108
Ana P/S	14-5222	Resistor ¼W 2.2K	R112,113
Ana P/S	14-5223	Resistor ¼W 22K	R102,114
Ana P/S	14-5471	Resistor ¼W 470 Ohm	R106,109
Ana P/S	15-51R0	Resistor 1/2W 1 Ohm	R100
Ana P/S	31-1N4001	Diode 1N4001	CR104.105
Ana P/S	34-2N3904	Transistor 2N3904	0101.102
Ana P/S	C012995	Connector Rt Angle (13 pin)	1107.108
Ana P/S	C014180-11	Cap Ceramic Axial 022uE (50V)	C106
Ana P/S	C014180-16	Cap. Ceramic Axial JuE (50V)	C105
Ana P/S	C01/(181-02)	Cap. Ceramic Axial $\Omega_{\rm UF}$ (25V)	C102.114
Ana P/S	C01/131-02	Cap. Ceramic Axial JuE $(25V)$	C102,114
Ana P/S	$C01/181_05$	Cap. Ceramic Axial $22 \text{ uF}(25\text{V})$	C109
Ana P/S	C01/(3)/8	Voltage Regulator 7805 (5V)	
Ana P/S	C01/350	Transistor	0112
Ana P/S	C014368	Cap Elec Radial (170 uE (16V)	C116 117
Ana P/S	C014384	Inductor Ferrite Bood	1101
Ana P/S	C01/386 01	Socket IC (8 pip)	
Ana P/S	C014392	Con Elec Radial 10 μ E (16V)	C107
Ana P/S	C014398	Diada MR 501	CR100-103
Ana P/S	C01/712	Voltage Regulator 7812 (12V)	
Apa P/S	C014715	Power Jack	7110
Ana P/S	$C014719_{-}02$	Connector (5 pip)	1103
Ana P/S	C014719-03	Connector (23 pin)	1106
Ana P/S	C014719-10	Connector (10 pin)	1102
Ana P/S	C014725	Switch Logic	5102
Ana P/S	$C014780_{-02}$	Cap Elec Radial 4700 uE (25V)	C110 112
Ana P/S	C014796	Eastener Latching	Alternate for
/ (14)	6614776	rastener batening	C015344
Ana P/S	C014798	Heatsink	Part of O100
Ana P/S	C015344	Rivet Nylon	
Ana P/S	C015505	Cap Elec Radial 47 uE (16V)	C100.101
Ana P/S	C016028	Test Points	TP1-9
Ana P/S	C016364	Diode Schottky (1N5818)	CR106.107
Ana P/S	C016569	Cap Taptalum Axial LuE (20V)	C103
Ana P/S	C017101	IC I M2917-8	A100
Ana P/S	C017949-01	Resistor Variable 1K	R104
Ana P/S	C017952	Inductor 3.3 uH	1.102
Ana P/S	C017954	Cap. Polvester Avial 01 uF (25V)	C104
Ana P/S	C017957	Cap. Flec Radial $4700 \text{ uF} (35\text{V})$	C113
Ana P/S	CA016530	Transistor Assy	0100
Ana P/S	CA017937	PC Board Analog Power Supply	~ • • •
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810 ANALOG DISK DRIVE Revised 12/3/82 by ECN #0001

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Analog 14-5100 Resistor %W 10 Ohm R200 Analog 14-5102 Resistor %W 10K R200 Analog 14-5103 Resistor %W 10K R204,205 Analog 14-5123 Resistor %W 10K R204,205 Analog 14-5202 Resistor %W 22 Ohm R226 Analog 14-5202 Resistor %W 22 Ohm R226 Analog 14-5220 Resistor %W 220h R213 Analog 14-5220 Resistor %W 20hm R226 Analog 14-572 Resistor %W 20hm R214,216 Analog 14-5712 Resistor %W 470 Ohm R225 Analog 14-5612 Resistor %W 63 Ohm R211 Analog 14-5622 Resistor %W 630 Ohm R207,208 Analog 14-5630 Resistor %W 230 Ohm R206 Analog 14-5750 Resistor %W 320 Ohm R207,208 Analog 14-2142 Resistor %W 320 Ohm R227 Analog 14-2142 Resistor %W 36 Ohm R227 <t< th=""><th>Assy</th><th>Part No.</th><th>Description</th><th>Location</th></t<>	Assy	Part No.	Description	Location
Analog 14-5102 Resistor % W 1K R202 Analog 14-5103 Resistor % W 10K R204,205 Analog 14-5123 Resistor % W 12K R223 Analog 14-5220 Resistor % W 2K R201, Analog 14-5220 Resistor % W 22 Ohm R226 Analog 14-5220 Resistor % W 220K R213 Analog 14-5302 Resistor % W 47 Ohm R225 Analog 14-5472 Resistor % W 47 Ohm R224 Analog 14-5472 Resistor % W 47 Ohm R214,216 Analog 14-5621 Resistor % W 6.2K R215,217 Analog 14-5630 Resistor % W 680 Ohm R211 Analog 14-5631 Resistor % W 680 Ohm R211 Analog 14-5631 Resistor % W 50 Ohm R206 Analog 14-5750 Resistor % W 36 Ohm R217 Analog 14-2142 Resistor % W 36 Ohm R217 Analog 14-7190 Resistor % W 36 Ohm R218 Analog 014179-08 Cap. Ceramic Axial 320F (50V) C201-205 <td>Analog</td> <td>14-5100</td> <td>Resistor ¼W 10 Ohm</td> <td>R200</td>	Analog	14-5100	Resistor ¼W 10 Ohm	R200
Analog 14-5103 Resistor %W 10K R207,205 Analog 14-5123 Resistor %W 12K R223 Analog 14-5202 Resistor %W 2K R201, Analog 14-5202 Resistor %W 2C Ohm R226 Analog 14-5220 Resistor %W 22 Ohm R226 Analog 14-5421 Resistor %W 470 Ohm R212,220 Analog 14-5471 Resistor %W 470 Ohm R225 Analog 14-5471 Resistor %W 470 Ohm R224 Analog 14-5421 Resistor %W 470 Ohm R224 Analog 14-5622 Resistor %W 51K R214,216 Analog 14-5631 Resistor %W 63 Ohm R207,203 Analog 14-5632 Resistor %W 520 Ohm R207,204 Analog 14-5750 Resistor %W 320 Ohm R207,208 Analog 14-5821 Resistor %W 320 Ohm R207,204,205 Analog 14-5821 Resistor %W 320 Ohm R207,204,205 Analog 14-5821 Resistor %W 320 Ohm R207,204,205 Analog 14-5821 Resistor %W 320 Ohm R2	Analog	14-5102	Resistor %W 1K	R 202
Analog 14-5123 Resistor KW 12K R223 Analog 14-5202 Resistor KW 2K R201, Analog 14-5220 Resistor KW 22 Ohm R226 Analog 14-5220 Resistor KW 22 Ohm R223 Analog 14-5224 Resistor KW 22 Ohm R226 Analog 14-5471 Resistor KW 470 Ohm R225 Analog 14-5471 Resistor KW 4.7K R214,216 Analog 14-5472 Resistor KW 6.2K R215,217 Analog 14-5620 Resistor KW 68 Ohm R211 Analog 14-5621 Resistor KW 68 Ohm R206 Analog 14-5621 Resistor KW 50 Ohm R206 Analog 14-5750 Resistor KW 36 Ohm R227 Analog 14-2142 Resistor KW 36 Ohm R227 Analog 14-2142 Resistor KW 36 Ohm R227 Analog C014130-13 Cap. Ceramic Axial 320Pf (50V) C209 Analog C014180-16 Cap. Ceramic Axial 320Pf (50V) C206 Analog C014180-17 Cap. Ceramic Axial .10F (50V) C207<	Analog	14-5103	Resistor %W 10K	R 204 205
Analog 14-5202 Resistor %W 2K R201, Analog 14-5220 Resistor %W 22 Ohm R226 Analog 14-5220 Resistor %W 22 Ohm R213 Analog 14-5220 Resistor %W 22 Ohm R213 Analog 14-5472 Resistor %W 3K R212,220 Analog 14-5472 Resistor %W 4.7K R214,216 Analog 14-5472 Resistor %W 5.1K R224 Analog 14-5630 Resistor %W 6.8 Ohm R211 Analog 14-5631 Resistor %W 75 Ohm R206,200 Analog 14-5631 Resistor %W 75 Ohm R207,208 Analog 14-5750 Resistor %W 75 Ohm R207,208 Analog 14-5821 Resistor %W 76 Ohm R227	Analog	14-5123	Resistor %W 12K	R 223
Analog 14-5220 Resistor %W 22 Ohm R226 Analog 14-5224 Resistor %W 22 Ohm R213 Analog 14-5224 Resistor %W 22 Ohm R213 Analog 14-5224 Resistor %W 22 Ohm R213 Analog 14-5247 Resistor %W 470 Ohm R225 Analog 14-5471 Resistor %W 5.1K R214,216 Analog 14-5512 Resistor %W 6.2K R215,217 Analog 14-5681 Resistor %W 630 Ohm R209,210 Analog 14-5681 Resistor %W 52 Ohm R206 Analog 14-5681 Resistor %W 52 Ohm R207,208 Analog 14-5750 Resistor %W 32 Ohm R207 Analog 14-5750 Resistor %W 36 Ohm R227 Analog 14-7750 Resistor %W 36 Ohm R227 Analog C01479-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 320pF (50V) C210 Analog C014180-15 Cap. Ceramic Axial .01uF (50V)	Analog	14-5202	Resistor WW 2K	R 201
Analog 14-5224 Resistor W 12 OK R213 Analog 14-5302 Resistor %W 32 OK R213,220 Analog 14-5302 Resistor %W 470 Ohm R225 Analog 14-5472 Resistor %W 470 Ohm R224 Analog 14-5472 Resistor %W 680 Ohm R214,216 Analog 14-5622 Resistor %W 680 Ohm R209,210 Analog 14-5681 Resistor %W 75 Ohm R206 Analog 14-5750 Resistor %W 75 Ohm R207,208 Analog 14-5821 Resistor %W 75 Ohm R207,208 Analog 14-5750 Resistor %W 75 Ohm R207,208 Analog 14-5821 Resistor %W 75 Ohm R207,208 Analog 14-5821 Resistor %W 75 Ohm R207 Analog 14-5821 Resistor %W 36 Ohm R227 Analog 14-5821 Resistor %W 36 Ohm R227 Analog C014179-03 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-15 Cap. Ceramic Axial 30	Analog	14-5220	Resistor %W 22 Obm	p_{22}
Analog 14-5302 Resistor W 20 K R212,220 Analog 14-5471 Resistor % W 470 Ohm R225 Analog 14-5471 Resistor % W 470 Ohm R225 Analog 14-5472 Resistor % W 47K R214,216 Analog 14-5512 Resistor % W 62K R213,217 Analog 14-5622 Resistor % W 63 Ohm R209,210 Analog 14-5681 Resistor % W 60 Ohm R209,210 Analog 14-5750 Resistor % W 30 Ohm R207,208 Analog 14-5750 Resistor % W 30 Ohm R207,208 Analog 14-5821 Resistor % W 30 Ohm R227 Analog 14-2142 Resistor % W 30 Ohm R227 Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 320F (50V) C215 Analog C014180-13 Cap. Ceramic Axial 300F (50V) C209 Analog C014180-15 Cap. Ceramic Axial 300F (50V) C210 Analog C014180-15	Analog	14-5774	Resistor WW 220K	D 21 2
Natiog 14-3971 Resistor % W 470 Ohm R212,220 Analog 14-3471 Resistor % W 470 Ohm R224 Analog 14-5472 Resistor % W 470 Ohm R224 Analog 14-5622 Resistor % 62K R214,216 Analog 14-5622 Resistor % 62K R211,217 Analog 14-5630 Resistor % 62K R211,217 Analog 14-5621 Resistor % 62K R211,217 Analog 14-5750 Resistor % 060 Ohm R209,210 Analog 14-5821 Resistor % 075 Ohm R206 Analog 14-5750 Resistor % 075 Ohm R206 Analog 14-5821 Resistor % 075 Ohm R206 Analog 14-5821 Resistor % 075 Ohm R207,208 Analog 14-5821 Resistor % 075 Ohm R207 Analog 14-1914 Diode 1N914 CR202,204,205 Analog C014180-13 Cap. Ceramic Axial 320F (50V) C210 Analog C014180-15 Cap. Ceramic Axial -0014 (50V) <td< td=""><td>Analog</td><td>14-5302</td><td>Resistor WW 2K</td><td>R213 D212 220</td></td<>	Analog	14-5302	Resistor WW 2K	R213 D212 220
Analog 14-5472 Resistor % 4.7K R214,216 Analog 14-5512 Resistor % 4.7K R214,216 Analog 14-5622 Resistor % 680 Ohm R211 Analog 14-5622 Resistor % 680 Ohm R211 Analog 14-5621 Resistor % 680 Ohm R211 Analog 14-5700 Resistor % 620 Ohm R209,210 Analog 14-5811 Resistor % 820 Ohm R207,208 Analog 14-5521 Resistor % 820 Ohm R207,208 Analog 14-5700 Resistor % 830 Ohm R227 Analog 014180-14 Repo Cap. Ceramic Axial 320F (50V) C215 Analog C014180-13 Cap. Ceramic Axial 300F (50V) C210,205 Analog C014180-15 Cap. Ceramic Axial .01uF (50V) C206,208,213,21,42,16 Analog	Analog	14-502	Resistor XW 470 Obm	RZ1Z,ZZU
Natiog 14-5912 Resistor % W 4/K R214,216 Analog 14-5622 Resistor % W 6.2K R215,217 Analog 14-5620 Resistor % W 6.2K R211 Analog 14-5631 Resistor % W 6.2K R211 Analog 14-5631 Resistor % W 680 Ohm R209,210 Analog 14-5750 Resistor % W 320 Ohm R206 Analog 14-5750 Resistor % W 320 Ohm R207,208 Analog 14-521 Resistor % W 320 Ohm R227 Analog 14-5361 Resistor % W 320 Ohm R227 Analog 15-5360 Resistor % W 36 Ohm R227 Analog 15-5360 Resistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 30pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 30pF (50V) C207 Analog C014180-14 Cap. Ceramic Axial .010F (5V) C202,204,205 Analog C014180-15 Cap. Ceramic Axial .010F (5V) C202,203,204 Analog C014181-02	Analog	14-2471	Resistor % W 470 Onm	R223
Analog 14-5622 Resistor % W 5.1K R224 Analog 14-5622 Resistor % W 6.2K R211 Analog 14-5630 Resistor % W 68 Ohm R211 Analog 14-5631 Resistor % W 68 Ohm R211 Analog 14-5631 Resistor % W 75 Ohm R206 Analog 14-5831 Resistor % W 320 Ohm R206 Analog 14-2142 Resistor % W 320 Ohm R207,208 Analog 14-2142 Resistor % W 320 Ohm R227 Analog 15-5360 Resistor % W 36 Ohm R227 Analog 01479-08 Cap. Ceramic Axial 320F (50V) C215 Analog C014179-08 Cap. Ceramic Axial 300F (50V) C209 Analog C014180-13 Cap. Ceramic Axial 300F (50V) C210 Analog C014180-14 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-15 Cap. Ceramic Axial .101uF (50V) C211,212,217 Analog C014181-02 Cap. Ceramic Axial .101uF (50V) C202,203,204 Analog	Analog	14-2472	Resistor % 4./K	R214,216
Analog 14+5622 Resistor % W 6.2 K R211 Analog 14+5680 Resistor % W 680 Ohm R211 Analog 14+5750 Resistor % W 75 Ohm R206 Analog 14-5750 Resistor % W 320 Ohm R207,208 Analog 14-5750 Resistor % W 320 Ohm R227 Analog 14-5750 Resistor % W 320 Ohm R227 Analog 14-5750 Resistor % W 360 Ohm R227 Analog 014179-08 Cap. Ceramic Axial 300 F (50V) C215 Analog C014180-13 Cap. Ceramic Axial 300 F (50V) C207 Analog C014180-15 Cap. Ceramic Axial .001 F (50V) C207 Analog C014181-02 Cap. Ceramic Axial .01 F (50V) C203,204 Analog C014181-07 Cap. Elec Radial .10F (50V) C206,208,213, Analog C014181-07 Cap. Elec Radial .10F (25V) C202,205	Analog	14-2212	Resistor % W J.IK	R224
Analog 14+5601 Resistor % W 680 Ohm R211 Analog 14+5750 Resistor % W 680 Ohm R209,210 Analog 14-5750 Resistor % W 820 Ohm R209,210 Analog 14-5821 Resistor % W 820 Ohm R207,208 Analog 14-5821 Resistor % W 820 Ohm R207,208 Analog 14-5821 Resistor % W 36 Ohm R227 Analog 14-5821 Resistor % W 36 Ohm R227 Analog 14-5760 Resistor % W 36 Ohm R227 Analog 31-1N914 Diode 1N914 CR202,204,205 Analog C014179-08 Cap. Ceramic Axial 320F (50V) C215 Analog C014180-13 Cap. Ceramic Axial 300 F (50V) C210 Analog C014180-15 Cap. Ceramic Axial .001 UF (50V) C207,208 Analog C014180-15 Cap. Ceramic Axial .01 UF (25V) C203,204 Analog C014181-02 Cap. Ceramic Axial .01 UF (25V) C202,205,208,213, Analog C014181-07 Cap. Elec Radial .47 UF (25V) C202,205,208,213, Analog C014181-07 Cap. Elec Radial .10 UF (15V)	Analóg	14-0622	Resistor % W 6.2K	R215,217
Analog 14-3631 Resistor %W 680 Ohm R209,210 Analog 14-3750 Resistor %W 75 Ohm R206 Analog 14-5821 Resistor %W 1,4K ± 2% R218 Analog 14-2142 Resistor %W 36 Ohm R227,208 Analog 15-5360 Resistor %W 36 Ohm R227 Analog 31-1N914 Diode 1N914 CR202,204,205 Analog C014179-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 320pF (50V) C210 Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-15 Cap. Ceramic Axial .01uF (50V) C203,204 Analog C014181-07 Cap. Ceramic Axial .1uF (50V) C203,204 Analog C014181-07 Cap. Elec Radial .47uF (25V) C206,208,213, 214,216 Analog C014336-01 Socket IC (8 pin) XA201 Analog C014336-03 Socket IC (14 pin) XA202,203 Analog C014336-03 Socket IC (16 pin) XA201	Analog		Resistor % 68 Ohm	R211
Analog 14-7/30 Resistor & W 75 0 hm R206 Analog 14-2142 Resistor & W 20 0 hm R207,208 Analog 14-2142 Resistor & W 36 0 hm R227 Analog 15-5360 Resistor & W 36 0 hm R227 Analog 31-1N914 Diode 1N914 CR202,204,205 Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 320F (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C210 Analog C014180-16 Cap. Ceramic Axial .01uF (50V) C211,212,217 Analog C014180-16 Cap. Ceramic Axial .01uF (50V) C207,208,213, Analog C014181-02 Cap. Ceramic Axial .1uF (50V) C203,204 Analog C014181-02 Cap. Ceramic Axial .1uF (25V) C206,208,213, Analog C014181-07 Cap. Elec Radial .47uF (25V) C206,208,213, Analog C014322 IC LM311 A201 Analog C014386-01 Socket IC (18 pin)	Analog	14-3681	Resistor %W 680 Ohm	R209,210
Analog 14-3821 Resistor %W 820 Chm R207,203 Analog 14-32142 Resistor %W 1,4K ± 2% R218 Analog 15-5360 Resistor %W 36 Ohm R227 Analog 31-1N914 Diode 1N914 CR202,204,205 Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 680pF (50V) C209 Analog C014180-15 Cap. Ceramic Axial .01uF (50V) C207 Analog C014180-15 Cap. Ceramic Axial .01uF (50V) C210 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C206,208,213, Analog C014181-03 Cap. Ceramic Axial .1uF (25V) C202,205 Analog C014181-07 Cap. Elec Radial .47uF (25V) C206,208,213, Analog C014322 IC LM311 A201 Analog C014336-01 Socket IC (8 pin) XA201 Analog C014336-03 Socket IC (14 pin) XA202,203 Analog C014326 Connector Rt Angle (5 pin) J209	Analog	14-5/50	Resistor %W 75 Ohm	R206
Analog 14-2142 Resistor %W 1.4K ± 2% R218 Analog 15-5360 Resistor %W 36 Ohm R227 Analog 31-1N914 Diode 1N914 CR202,204,205 Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 300pF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .001uF (50V) C207 Analog C014181-02 Cap. Ceramic Axial .01uF (50V) C207 Analog C014181-03 Cap. Ceramic Axial .01uF (25V) C206,208,213, Analog C014181-03 Cap. Ceramic Axial .1uF (25V) C206,208,213, Analog C014181-07 Cap. Elec Radial .47uF (25V) C206,208,213, Analog C014322 IC LM311 A201 Analog C014386-01 Socket IC (14 pin) XA201 Analog C014386-03 Socket IC (14 pin) XA201 Analog C014392 Cap. Elec Radial 10uF (16V) C200,2	Analog	14-5821	Resistor %W 820 Ohm	R207,208
Analog 15-5360 Resistor ½W 36 Ohm R227 Analog 31-1N914 Diode 1N914 CR202,204,205 Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 300pF (50V) C209 Analog C014180-15 Cap. Ceramic Axial 01UF (50V) C210 Analog C014180-16 Cap. Ceramic Axial .01UF (50V) C211,212,217 Analog C014181-02 Cap. Ceramic Axial .01UF (50V) C203,204 Analog C014181-02 Cap. Ceramic Axial .1UF (25V) C206,208,213, Analog C014181-07 Cap. Elec Radial .47uF (25V) C206,208,213, Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA201 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014386-02 Socket IC (16 pin) XA204 <td>Analog</td> <td>14-2142</td> <td>Resistor %W 1.4K ± 2%</td> <td>R218</td>	Analog	14-2142	Resistor %W 1.4K ± 2%	R218
Analog 31-1N914 Diode 1N914 CR 202,204,205 (Alternate for P/N C060607) Analog C014991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 300pF (50V) C210 Analog C014180-15 Cap. Ceramic Axial .01uF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .01uF (25V) C203,204 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C206,208,213, 214,216 Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205 Analog C014386-01 Socket IC (18 pin) XA201 Analog C014386-03 Socket IC (14 pin) XA202,203 Analog C014322 Cap. Elec Radial 10uF (16V) C200,201 Analog C014386-03 Socket IC (14 pin) XA204 Analog C014386-03 Socket IC (16 pin) J201 Analog C014721-03 Connector Rt	Analog	15-5360	Resistor ½W 36 Ohm	R227
Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 82pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 630pF (50V) C209 Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .01uF (50V) C203,204 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C206,208,213, Analog C014181-07 Cap. Ceramic Axial .1uF (25V) C202,205, Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205, Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (16 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA201 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (5 pin) J201 Analog C014721-04 Connector Rt Angle (10 Pin)	Analog	31-1N914	Diode 1N914	CR202,204,205
Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 30pF (50V) C210 Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .01uF (50V) C211,212,217 Analog C014181-02 Cap. Ceramic Axial .01uF (55V) C203,204 Analog C014181-02 Cap. Ceramic Axial .1uF (52V) C202,203,204 Analog C014181-07 Cap. Ceramic Axial .1uF (52V) C202,203,204 Analog C014322 IC LM311 A201 Analog C014386-01 Socket IC (18 pin) XA201 Analog C014386-02 Socket IC (16 pin) XA201 Analog C014322 Cap. Elec Radial 10uF (16V) C200,201 Analog C014322 Cap. Elec Radial 10uF (16V) C200,201 Analog C014322 Cap. Elec Radial 10uF (16V)				(Alternate for
Analog C018991 Transistor 2N3906 Q201-205 Analog C014179-08 Cap. Ceramic Axial 82pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 680pF (50V) C207 Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .01uF (50V) C203,204 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C203,204 Analog C014181-03 Cap. Ceramic Axial .1uF (25V) C202,205 Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205 Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (18 pin) XA201 Analog C014386-03 Socket IC (14 pin) XA201 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (5 pin) J201 <td></td> <td></td> <td></td> <td>P/N C060607)</td>				P/N C060607)
Analog C014179-08 Cap. Ceramic Axial 32pF (50V) C215 Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 300pF (50V) C210 Analog C014180-14 Cap. Ceramic Axial 680pF (50V) C210 Analog C014180-16 Cap. Ceramic Axial .001uF (50V) C207 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C203,204 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C206,208,213, Analog C014181-07 Cap. Ceramic Axial .1uF (25V) C202,205 Analog C014322 IC LM311 A201 Analog C014386-01 Socket IC (18 pin) XA201 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014392 Cap. Elec Radial 10uF (16V) C200,201 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014721-03 Connector Rt Angle (10 Pin)	Analog	C018991	Transistor 2N3906	Q201-205
Analog C014180-13 Cap. Ceramic Axial 330pF (50V) C209 Analog C014180-14 Cap. Ceramic Axial 680pF (50V) C210 Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .01uF (50V) C211,212,217 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C203,204 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C202,203,204 Analog C014181-07 Cap. Ceramic Axial .1uF (25V) C202,205 Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205 Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-03 Socket IC (14 pin) XA202,203 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C016028 Test Points TP1-12 Analog C016028 Test Points <	Analog	C014179-08	Cap. Ceramic Axial 82pF (50V)	Č215
Analog C014180-14 Cap. Ceramic Axial 680pF (50V) C210 Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .1uF (50V) C211,212,217 Analog C014181-02 Cap. Ceramic Axial .1uF (50V) C203,204 Analog C014181-02 Cap. Ceramic Axial .1uF (25V) C206,208,213, Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA201 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014748-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm)	Analog	C014180-13	Cap. Ceramic Axial 330pF (50V)	C209
Analog C014180-15 Cap. Ceramic Axial .001uF (50V) C207 Analog C014180-16 Cap. Ceramic Axial .01uF (50V) C211,212,217 Analog C014181-02 Cap. Ceramic Axial .01uF (50V) C203,204 Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C206,208,213, Analog C014181-07 Cap. Ceramic Axial .1uF (25V) C206,208,213, Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014392 Cap. Elec Radial 10uF (16V) C200,201 Analog C014392 Cap. Elec Radial 10uF (16V) C200,201 Analog C014721-03 Connector Rt Angle (10 Pin) J209 Analog C014808-06 Diode Zener 1N5235B (6.3V) CR203 Analog C01628 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Induc	Analog	C014180-14	Cap. Ceramic Axial 680pF (50V)	C210
Analog C014180-16 Cap. Ceramic Axial .1uF (50V) C211,212,217 Analog C014181-02 Cap. Ceramic Axial .1uF (50V) C203,204 Analog C014181-03 Cap. Ceramic Axial .1uF (25V) C206,208,213, Analog C014181-07 Cap. Elec Radial .47uF (25V) C206,208,213, Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (8 pin) X A201 Analog C014386-02 Socket IC (14 pin) X A202,203 Analog C014386-03 Socket IC (16 pin) X A204 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014808-06 Diode Zener 1N5235B (6.8V) CR203 Analog C01628 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017950 IC CMOS Analog Multi- A204 Analog C017950 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C017956 Voltage Regulator 79L05 VR201 <	Analog	C014180-15	Cap. Ceramic Axial .001uF (50V)	C207
Analog C014181-02 Cap. Ceramic Axial .01uF (25V) C203,204 Analog C014181-03 Cap. Ceramic Axial .01uF (25V) C206,208,213, Analog C014181-07 Cap. Ceramic Axial .01uF (25V) C202,205 Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017950 IC CMOS Analog Multi- A204 Analog C017950 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C017956 Voltage Regulator 79L05 VR201 Analog C017936 PC Board Analog A102,202,4205 <td>Analog</td> <td>C014180-16</td> <td>Cap. Ceramic Axial JuE (50V)</td> <td>C211 212 217</td>	Analog	C014180-16	Cap. Ceramic Axial JuE (50V)	C211 212 217
Analog C014181-03 Cap. Ceramic Axial JuF (25V) C206,208,213, 214,216 Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205 Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- plexer (4052) A204 Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C017936 PC Board Analog CR202,204,205	Analog	C014181-02	Cap Ceramic Axial OluF (25V)	C203 204
Analog C011101 CD Cap. Coraline (AMar.101 (2077)) 214,216 Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA201 Analog C014386-03 Socket IC (16 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-03 Connector Rt Angle (10 Pin) J201 Analog C014028 Test Points TP1-12 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- plexer (4052) A204 Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C017936 PC Board Analog CR202,204,205	Analog	C014181-03	Cap Ceramic Axial JuE (25V)	C205,204
Analog C014181-07 Cap. Elec Radial .47uF (25V) C202,205 Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA202,203 Analog C014386-02 Socket IC (16 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014808-06 Diode Zener 1N5235B (6.8V) CR203 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- A204 Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607			Cap: Ceranne Axiai : Iui (254)	2100,200,210,
Analog C0141312 C202,203 Analog C014332 IC LM311 A201 Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014392 Cap. Elec Radial 10uF (16V) C200,201 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014808-06 Diode Zener 1N5235B (6.8V) CR203 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- A204 Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 Analog CA017936 PC Board Analog	Analog	$C014181_{-07}$	Cap Elec Radial 174E (2511)	C202 205
Analog C014386-01 Socket IC (8 pin) XA201 Analog C014386-02 Socket IC (14 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014392 Cap. Elec Radial 10uF (16V) C200,201 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014808-06 Diode Zener 1N5235B (6.8V) CR203 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- A204 Plexer (4052) Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 Analog CA017936 PC Board Analog CA017936	Analog	C014332		C202,200
AnalogColl+930-01Socket IC (8 pm)XA201AnalogC014386-02Socket IC (14 pin)XA202,203AnalogC014386-03Socket IC (16 pin)XA204AnalogC014392Cap. Elec Radial 10uF (16V)C200,201AnalogC014721-03Connector Rt Angle (5 pin)J209AnalogC014721-04Connector Rt Angle (10 Pin)J201AnalogC014808-06Diode Zener 1N5235B (6.8V)CR203AnalogC016028Test PointsTP1-12AnalogC017948-01Inductor 150uH (7 Ohm)L201,202AnalogC017948-02Inductor 680uH (30 Ohm)L203,204AnalogC017950IC CMOS Analog Multi- plexer (4052)A202,203AnalogC017951IC NE592A202,203AnalogC017956Voltage Regulator 79L05VR201AnalogCA017936PC Board AnalogCR202,204,205	Analog	C014386.01	Seclart IC (2 nin)	A201 X 4 201
Analog C014386-02 Socket IC (14 pin) XA202,203 Analog C014386-03 Socket IC (16 pin) XA204 Analog C014392 Cap. Elec Radial 10uF (16V) C200,201 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014808-06 Diode Zener 1N5235B (6.8V) CR203 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- plexer (4052) A204 Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 Analog CA017936 PC Board Analog CA017936	Analog	C01/386 02	Socket IC (8 pm)	XA201 XA202 202
AnalogColt4380-03Socket IC (16 pin)XA204AnalogC014392Cap. Elec Radial 10uF (16V)C200,201AnalogC014721-03Connector Rt Angle (5 pin)J209AnalogC014721-04Connector Rt Angle (10 Pin)J201AnalogC014808-06Diode Zener 1N5235B (6.8V)CR203AnalogC016028Test PointsTP1-12AnalogC016364Diode Schottky 1N5818CR201AnalogC017948-01Inductor 150uH (7 Ohm)L201,202AnalogC017950IC CMOS Analog Multi- plexer (4052)A202,203AnalogC017951IC NE592A202,203AnalogC017956Voltage Regulator 79L05VR201AnalogC066607Diode (1N4148)CR202,204,205AnalogCA017936PC Board AnalogPC Board Analog	Analog	$C01/1386_02$	Socket IC (14 pin)	XA202,203
Analog C014721-03 Cap. Elec Radial 100F (16V) C200,201 Analog C014721-03 Connector Rt Angle (5 pin) J209 Analog C014721-04 Connector Rt Angle (10 Pin) J201 Analog C014808-06 Diode Zener 1N5235B (6.8V) CR203 Analog C016028 Test Points TP1-12 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- A204 Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 Analog CA017936 PC Board Analog CR202,204,205	Analog	C014382		XA204
AnalogC014721-05Connector Rt Angle (5 pin)J209AnalogC014721-04Connector Rt Angle (10 Pin)J201AnalogC014808-06Diode Zener 1N5235B (6.8V)CR203AnalogC016028Test PointsTP1-12AnalogC016364Diode Schottky 1N5818CR201AnalogC017948-01Inductor 150uH (7 Ohm)L201,202AnalogC017948-02Inductor 680uH (30 Ohm)L203,204AnalogC017950IC CMOS Analog Multi- plexer (4052)A202,203AnalogC017951IC NE592A202,203AnalogC017956Voltage Regulator 79L05VR201AnalogC060607Diode (1N4148)CR202,204,205AnalogCA017936PC Board AnalogCR202,204,205	Applog	C014772	Cap. Elec Radial TOUF (16V)	C200,201
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AnalogC014808-06Diode Zener 1N5235B (6.8V)CR203AnalogC016028Test PointsTP1-12AnalogC016364Diode Schottky 1N5818CR201AnalogC017948-01Inductor 150uH (7 Ohm)L201,202AnalogC017948-02Inductor 680uH (30 Ohm)L203,204AnalogC017950IC CMOS Analog Multi- plexer (4052)A202,203AnalogC017951IC NE592A202,203AnalogC017956Voltage Regulator 79L05VR201AnalogC060607Diode (1N4148)CR202,204,205AnalogCA017936PC Board AnalogPC Board Analog	Analog	C014721-04	Connector Rt Angle (10 Pin)	J201
AnalogC016028Test PointsTP1-12AnalogC016364Diode Schottky 1N5818CR201AnalogC017948-01Inductor 150uH (7 Ohm)L201,202AnalogC017948-02Inductor 680uH (30 Ohm)L203,204AnalogC017950IC CMOS Analog Multi- plexer (4052)A204AnalogC017951IC NE592A202,203AnalogC017956Voltage Regulator 79L05VR201AnalogC060607Diode (1N4148)CR202,204,205AnalogCA017936PC Board AnalogCR202,204,205	Analog	C014808-06	Diode Zener 1N5235B (6.8V)	CR203
Analog C016364 Diode Schottky 1N5818 CR201 Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- A204 plexer (4052) Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 (Alternate listed) Analog CA017936 PC Board Analog PC Board Analog PC Board Analog	Analog	C016028	lest Points	TP1-12
Analog C017948-01 Inductor 150uH (7 Ohm) L201,202 Analog C017948-02 Inductor 680uH (30 Ohm) L203,204 Analog C017950 IC CMOS Analog Multi- A204 plexer (4052) A202,203 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 Analog CA017936 PC Board Analog CR202,204,205	Analog	C016364	Diode Schottky IN5818	CR201
AnalogC01/948-02Inductor 680uH (30 Ohm)L203,204AnalogC017950IC CMOS Analog Multi- plexer (4052)A204AnalogC017951IC NE592A202,203AnalogC017956Voltage Regulator 79L05VR201AnalogC060607Diode (1N4148)CR202,204,205AnalogCA017936PC Board AnalogCR202,204,205	nnaiog	CU1/948-01	Inductor 150uH (7 Ohm)	L201,202
AnalogC017950IC CMOS Analog Multi- plexer (4052)A204AnalogC017951IC NE592A202,203AnalogC017956Voltage Regulator 79L05VR201AnalogC060607Diode (1N4148)CR202,204,205AnalogCA017936PC Board Analog(Alternate listed)	Analog	C01/948-02	Inductor 680uH (30 Ohm)	L203,204
Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 Analog CA017936 PC Board Analog	Analog	C017950	IC CMOS Analog Multi-	A204
Analog C017951 IC NE592 A202,203 Analog C017956 Voltage Regulator 79L05 VR201 Analog C060607 Diode (1N4148) CR202,204,205 Analog CA017936 PC Board Analog Alternate listed)			plexer (4052)	
AnalogC017956Voltage Regulator 79L05VR201AnalogC060607Diode (1N4148)CR202,204,205AnalogCA017936PC Board Analog(Alternate listed)	Analog	C017951	IC NE592	A202,203
AnalogC060607Diode (1N4148)CR202,204,205AnalogCA017936PC Board Analog(Alternate listed)	Analog	C017956	Voltage Regulator 79L05	VR201
Analog CA017936 PC Board Analog (Alternate listed)	Analog	C060607	Diode (1N4148)	CR202,204,205
Analog CA017936 PC Board Analog				(Alternate listed)
	Analog	CA017936	PC Board Analog	

810 ANALOG DISK DRIVE

3B-38

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Assy	Part No.	Description	Location
Analog	CA017947	Interconnect Cable (Connects	
		Analog to Analog P/S) (Specify	
_		MPI Drive Mech.)	
Bottom	88-1004	Rubber Feet	(Alternate for
			P/N C016848)
Bottom	88-1010	Mounting Pad	
Bottom	C014324	Boss Fastener	
Bottom	C016028	Post Header	
Bottom	C016848	Foot Plug	(Alternate
			Listed)
Bottom	CA014158	Lower Assy	
Bottom	CA014318	Fastener Base Assy	
Bottom	C012972	Common Base	
Data Sep	14-5103	Resistor ¼W 10K	R202
Data Sep	14-5182	Resistor %W 1.8K	R200,201
Data Sep	14-5221	Resistor ¼W 220 Ohm	R205
Data Sep	14-5472	Resistor ¼W 4.7K	R206
Data Sep	14-5473	Resistor ¼W 47K	R203,204
Data Sep	31-1N914	Diode 1N914	CR200 (Alternate
			for P/N C060607)
Data Sep	34-2N3904	Transistor 2N3904	0200
Data Sep	C014179-08	Cap. Ceramic Axial 82pF (50V)	Č201
Data Sep	C014181-01	Cap. Ceramic Axial .001uF (25V)	C208
Data Sep	C014181-02	Cap. Ceramic Axial .01uF (25V)	C203.205.207
Data Sep	C014181-03	Cap. Ceramic Axial JuE (25V)	C200.202.204.206
Data Sen	C014329	IC FDC 1771	A 203
Data Sen	C014384	Inductor Ferrite Bead	1,200
Data Sep	C014386-02	Socket IC (14 pin)	XA201.205.207.208
Data Sep	C014386-03	Socket IC (16 pin)	X A 204 206
Data Sep	$C014386_09$	Socket IC (40 pin)	X A 203
Data Sep	C016018	Crystal 4 000000 Mbz	X200
Data Sep	C016045	IC 741 S74	A 201 207
Data Sep	C017096	IC 741 S04	A 208
Data Sep	C017097	IC 741 S08	A 20.5
Data Sep	C017100	IC 741 \$193	A 204 206
Data Sep	C017511	Shield Insulator Pad	1120+,200
Data Sep	C017521	DIP Header (14) pin post)	P103
Data Sep	C060607	Diade $(1N/41/48)$	CR200 (Alternate
Data ocp	6000007	Diode (114+148)	listed)
Data Sen	CA017231	PC Board Data Separator	
Disk Dr	CA014072	Dick Drive Acey MPI	
Final	CA014139_01	Atori HCD \$10 Dick Dive	(With MPI Drive)
Final	CA01/(156.02)	Atari HCD 810 Disk Dive	(With MPI Drive)
1 11/01	\bigcirc $(\bigcirc$ $(\bigcirc$ $)$ $)$ $)$ $)$ $(\bigcirc$ $)$ $)$ $(\bigcirc$ $)$ $)$ $(\bigcirc$ $)$ $(\bigcirc$ $)$ $)$ $(\bigcirc$ $)$ $(\bigcirc$ $)$ $(\bigcirc$ $)$ $(\bigcirc$ $)$ $)$ $(\bigcirc$ $)$ $()$ $(\bigcirc$ $)$ $()$ $()$ $()$ $()$ $()$ $()$ $()$	Man HOD OTA DI2K DI1AG	

810 ANALOG DISK DRIVE Revised 12/3/82 by ECN #0001

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Assy	Part No.	Description	Location
Mount	78-74001	Cable-tie	
Mount	C012972	Common Base	
Mount	C017194	Mounting Plate Common	
Mount	CA014160-02	Mounting Plate Assy	(Unit with MPI
		8	Drive Mechanism)
Panel	C012976	Disk Panel Primary (MPI Drive)	
Panel	CA014159-02	Panel Assy	(Front) (MPI Drive)
Side	C014777	Diode LED	CR105.108 (Part of)
Side	C014069	Standoff LED	CR105.108 (Part of)
Side	CA014834	PC Board Side Assy	(Data Sen, installed)
Side/Shield	14-5102	Resistor %W 1K	R118 121 - 124 129
Side/Shield	14-5103	Resistor %W 10K	R105 109 113 134
Side/Shield	14-5104	Resistor %W 100K	R135 136
Side/Shield	14-5151	Resistor %W 150 Ohm	R117
Side/Shield	14-5152	Resistor %W 1.5K	P11/
Side/Shield	14-5153	Resistor WW 15K	
Side/Shield	14-5221	Resistor WW 220 Obm	D103
Side/Shield	14_5224	Resistor KW 220 Onn	R103
Side/Shield	14-5271	Resistor KW 270 Ohm	R127
Side/Shield	14-5273	Resistor KW 27V	R120,126
Side/Shield	1/1 5331	Resistor 1/4 W 27 R	RIJI
Side/Shield	14-2221	Resistor AW 330 Unm	R132
Side/Shield	14-222	Resistor 4W 3.3K	RIIS
Side/Shield	14-2222	Resistor 4W 33K	RIII
Side/Shield		Resistor 4W 39K	R104
Side/Shield	14-2471	Resistor % W 470 Ohm	R106
	14-24/2	Resistor % W 4./K	R110,116,128,133
	14-54/3	Resistor % W 47K	R119,130
	14-5562	Resistor &W 5.6K	R101,102
	14-5750	Resistor ¼W 75 Ohm	R175
Side/Shield	31-1N914	Diode 1N914	CR120,121,122
	•		(Alternate for
C: J . / CL : 11	21 114001		P/N C060607)
	31-IN4001	Diode IN4001	CR101-104,106
Side/Shield		Transistor 2N3906	Q101,103,104
	34-2N 3904	Transistor 2N3904	Q102,105,110,111
Side/Shield	C010174	Transistor Array	A106
	C010447	Iransistor Array 4077	Z104
	C010745	IC MPU 6507	A101
Side/Shield	C010750	IC PIA 6532	A104
	C011299	IC Custom ROM	A102
	C011465-01	HEX CMOS Inverter 4069	Z103
Side/Shield	C014136	RF Shield Inside/Component	
Side/Shield	C014137	RF Shield Outside/Trace	
	C014138	Ground Bracket	
Side/Shield	C014179-02	Cap. Ceramic Axial 47pF (50V)	C101,103,119,131
Side/Shield	CU141/9-03	Cap. Ceramic Axial 10pF (50V)	C122
Side/Shield	C014179-04	Cap. Ceramic Axial 33pF (50V)	C141
Side/Shield	C0141/9-07	Cap. Ceramic Axial 62pF (50V)	C105
Side/Shield	C014180-03	Cap. Ceramic Axial 100 pF (50V)	C110,130,139,140
Side/Shield	C014180-07	Cap. Ceramic Axial 470pF (50V)	C106

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8B-40

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Assy	Part No.	Description	Location
Side/Shield	<u>C014180-10</u>	Cap. Ceramic Axial 390pF (50V)	CIII
Side/Shield	C014181-01	Cap. Ceramic Axial .001uF (25V)	C113,116-118,
		•	123-129,134-138
Side/Shield	C014181-03	Cap. Ceramic Axial .1uF (25V)	C102,104,107-
			109,114,115,133
Side/Shield	C014316	Crystal 1.000000 Mhz	X101
Side/Shield	C014328	Transistor Array 6810	A103
Side/Shield	C014333	Transistor Array 4011	Z102
Side/Shield	C014334	Transistor Array 4013	Z101,105
Side/Shield	C014369	Cap. Elec Radial 4.7uF (35V)	C132
Side/Shield	C014379	Resistor Network (9 X 4.7K)	R176
Side/Shield	C014384	Inductor Ferrite Bead	L102,103
Side/Shield	C014386-02	Socket IC (14 pin)	XA106,XZ101-105
Side/Shield	C014386-07	Socket IC (24 pin)	XA102,103
Side/Shield	C014386-08	Socket IC (28 pin)	XA101
Side/Shield	C014386-09	Socket IC (40 pin)	XA104
Side/Shield	C014394	Transistor MPS-A06	Q106-109
Side/Shield	C014397-02	Switch Power	S102
Side/Shield	C014702	Inductor Axial 470uH	L101
Side/Shield	C014717-01	Connector (23 pin)	P101
Side/Shield	C014719-02	Connector (5 pin)	J101,102
Side/Shield	C014808-01	Diode Zener IN5231B (5.1V)	CR107
Side/Shield	C017520	Socket DIP (40 pin)	J103
Side/Shield	C060607	Diode (1N4148)	CR120,121,122
			(Alternate listed)
Side/Shield	CA015325	LED & Standoff Assy	CR105,108
Side/Shield	CA060149	PC Board Side Shield Assy	
Тор	C014105	Panel Label Cover	
Тор	C014106	Hole Cover Label	
Тор	CA014157	Upper Assy	
Disk Drive	FC100031	MPI Drive Belt	
Disk Drive	FA100032	MPI Load Pad Assembly	
Disk Drive	FA100033	MPI Rt. Hand Guide/Write	
		Protect Assy	
Disk Drive	FA100035	MPI Ejector Assy	
Disk Drive	FA100034	MPI Band/Pully Assy	

810 ANALOG DISK DRIVE Revised 12/3/82 by ECN #0001

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ATARI 810 DISK DRIVE

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Height	4.5 Inches
Width	9.5 Inches
Depth	12 Inches
Weight	5 Pounds
Power Adaptor	
Input	120 Volts AC, 60 Hz
Output*	9 Volts AC, 3 Amps
Power Usage*	30 Watts
Approvals*	UL
Clocking Frequency	l MHz Crystal Controlled Oscillator
Media	ANSI Standard 5.25" Floppy Diskette
Track Density	48 TPI
Recording Density	2,938 BPI. (MAX)
Flux Density	5,876 FCI. (MAX)
Recording Format	•
	Single Sided Single Density (128 Bytes/Sector) FM Encoding Method Soft Sectored 40 Tracks (18 Sectors/Track) Total of 720 Sectors
Disk Rotational Speed	288 RPM ± 1%
Average Latency	100 Milliseconds

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*Analog Differences

Mechanical and Electrical Specifications (Cont)

Read/Write Head Gap		.013 Inches	
Guard Band		.008 Inches	
Average Data	Transfer Rate	6K Baud (19.2K Baud max.)	
Pad Pressure		17 Grams	
Head Life		20,000 Hours (Normal Use)	
Media Life		3 x 10 ⁶ Passes On A Single Track	
Power-up Dela	ay	0.5 Seconds	
Minimum Data	a Access Time	236 Milliseconds	
Head Loading Time		35 Milliseconds	
Head Settling Time		15 Milliseconds	
Track to Track Access Time		5 Milliseconds	
Temperature			
Operatir	ng	0 to 50 Degrees Centigrade	
Non-Op	erating	-45 to 71 Degrees Centigrade	
Relative Hum	idity		
Operati	ng	8% to 80% (Non-Condensing)	
Non-Op	erating	8% to 90% (Non-Condensing)	
Altitude		•	
Operati	ng	-500 Feet to 10,000 Feet	
Non-Op	erating	-1,000 Feet to 50,000 Feet	
MTBF		9,000 Hours	
MTTR		l Hour	

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810 ANALOG DISK DRIVE

8B-43

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-14

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APPENDIX C

ATARI 810 Disk Drive units containing the Tandon Drive Mechanism

Appendix C provides the information necessary to troubleshoot and repair Atari 810 Disk Drives with the Tandon Drive Mechanism instead of the Micro Peripherals, Inc. (MPI) Drive Mechanism.

The Tandon Drive Mechanism is plug-in compatible with existing Atari 810 Disk Drives with no change in the unit's electronics. To troubleshoot these units use the procedures for troubleshooting the Atari 810 Analog Disk Drive. Note that at some points there will be different procedures due to the mechanical differences between the MPI and the Tandon Drive Mechanism.

This Appendix is divided as follows:

- 1. Table 3C-1 shows Tandon/MPI Mechanical differences.
- 2. Page 8C-4 to 8C-16 gives step by step procedures and adjustments which are different for units which contain the Tandon Drive Mechanism.
- 3. Page 8C-17 to 8C-35 contains <u>all</u> of the flowcharts you will need in order to troubleshoot units which contain the Tandon Drive Mechanism.

Use Figure 8C-1 as reference for Tandon/MPI mechanical differences discussed in Table 8C-1.

8C-1



Figure 8C-1. Tandon Drive Mechanism

TABLE 8C-1

TANDON/MPI MECHANICAL DIFFERENCES

TANDON

	TANDON	MPI
EDONT	Operated by a front latch.	Operated by a door release lever.
BEZEL	No diskette eject mechanism. Raise the front latch to access diskette. Plastic guides and front latch in- hibitor position the diskette.	Contains a diskette eject mechanism.
UPPER	Contains no pressure spring.	Contains pressure spring assembly.
ASSEMBLY	which secure the upper	Adjust pressure spring.
Program)	(See Pg 8C-5 for instructions)	(See Page 3-12 for instructions)
STEPPER MOTOR ADJUSTMENT	Adjust by turning the cam screw at rear of Drive Mechanism.	Adjust by loosening setscrew to move Stepper Band Pulley.
(Alignment Program)	(See Page 8C-7 for instructions)	(See Page 3-14 for instructions)
TRACK 00 STOP (Alignment	Adjust by monitoring increase and decrease in waveform amplitude.	Adjust for 0.010 clearance.
Program)	(See Page 8C-11 for instructions)	(See Page 3-17 for instructions)
WRITE	Microswitch Assembly	Phototransistor
CIRCUIT	(See Page 8C-13 for adjustment and replacement instructions)	

Test Equipment/Diagnostic Tests

To analyze failures in units containing the Tandon Drive Mechanism, use the equipment and Diagnostic Tests described in Section 3, page 3-1 to 3-18 with the following exceptions:

Adjustment methods are different for three alignment program procedures:

The procedures affected are:

- Head Load Pad Pressure (pg. 3-12) •
- .
- Head/Track Alignment (pg. 3-14) Track 00 Stop Adjustment (pg. 3-17)

Follow the instructions on the next pages for these adjustments.

NOTE: Use Test Points 2 & 3 on the Analog Board for Alignment Program procedures.

3C-4

HEAD LOAD PAD PRESSURE

CAUTION: Adjustment of pad pressure requires great care and a light touch. Read all instructions thoroughly before attempting any adjustment.

Purpose: To check and adjust the head load pad pressure.

Procedure:

- 1. Press the BREAK key to halt the program and allow a new track to be selected.
- 2. Connect the oscilloscope probes to test points 2 and 3 on the Analog Board.

Set the oscilloscope control to the following settings:

Display: A+B Channel A: Normal Channel B: Inverted Channel A&B Time .5ms/Div (Calibrated) Channel A&B Volts .2v/Div (Calibrated)

- 3. Type the number 4 and press RETURN to step the head to track 33.
- 4. A broadband display appears on the scope when set properly.
- 5. Obtain a maximum output amplitude by pressing lightly with one finger on the pressure pad arm (See Figure 8C-2). An amplitude equal to or greater than 80% of maximum value is correct amplitude.
- 6. If the amplitude of the broadband waveform is not equal to 80%, continue with Steps 7-11.
- 7. Turn the two (2) nuts that attach the upper arm to the carriage assembly counter-clockwise one-quarter (1/4) turn (See Figure 8C-2). Use a 3/16" nut driver.
- 8. While monitoring the output, move the upper arm around the axis of the head until the output is the highest.
- 9. While holding the arm in the highest output position, turn the two (2) nuts that attach the upper arm to the carriage assembly clockwise.

- 10. Return to step 1 of this procedure to verify that the correct amplitude is obtained.
- 11. If correct amplitude cannot be obtained, replace the Upper Arm Assembly.



Figure 8C-2. Upper Arm and Nuts

HEAD/TRACK ALIGNMENT

Purpose: To check the head and track alignment and make any required adjustments.

Procedure:

- 1. Press the BREAK key to halt the program and allow a new track to be selected.
- 2. Connect the oscilloscope probes to test points 2 and 3 on the Analog Board.

Set the oscilloscope controls to the following settings:

Display: A+B Channel A: Normal Channel B: Inverted Channel A&B Time 5ms/DIV (Fully Uncalibrated) Channel A&B Volt .1V/DIV (Calibrated)

- 3. Type the number 2 and press RETURN. Head begins reading track 16.
- 4. When the scope is properly adjusted a cat's-eye pattern similar to Figure 8C-3 appears on the scope.



A = Amplitude

Figure 8C-3. Cat's-Eye Pattern

8C-7

5. Compare the amplitude of the cat's-eyes. If each cat's-eye lobe pattern is equal in amplitude or within 80% of each other, no adjustment is required (See Figure 8C-4).



Figure 8C-4. Amplitude Variation of Cat's-Eyes.

- 6. If the cat's-eyes are not within tolerance, continue with the following steps. Follow the instructions with care and use a very light touch. This is a very delicate operation.
- 7. Press the BREAK key to halt the program.
- 8. When the busy light turns off, remove the Alignment diskette.
- 9. Power the disk drive down by turning the Power ON/OFF switch OFF.
- 10. Remove the bottom cover from the Disk Drive (See Page 6-4).
- 11. <u>Carefully</u> remove the three screws holding the Drive Mechanism to the common baseplate. Note that there are four screw holes in the baseplate the right rear screw (viewed from unit front) is no longer inserted.
- 12. Tip the Drive Mechanism on its side and loosen (DO NOT REMOVE) the two bottom module retaining screws (See Figure 8C-5). Turn the screws counterclockwise one-half turn with a Phillips screwdriver.
- 13. Turn the Drive Mechanism right-side up and place it on the common baseplate. Be sure no wiring harnesses are loose.
- 14. Turn the top module retaining screw <u>counterclockwise</u> one-half turn with a Phillips screwdriver (See Figure 8C-5).
- 15. Power up the disk drive and insert the Alignment Diskette when the busy light goes out.
- 16. Press the BREAK key, then type the number 2. Head begins reading track 16.
- 17. Turn the Cam screw (See Figure 8C-5) with a flatblade screwdriver to adjust for proper cat's-eyes pattern.
- 18. When the proper cat's-eyes pattern is obtained, tighten the top module retaining screw.
- 19. Press the BREAK key. When the busy light turns off, remove the Alignment Diskette.
- 20. Power the disk drive down by turning the Power ON/OFF switch OFF.
- 21. Turn the Drive Mechanism over and tighten the two bottom module retaining screws.
- 22. <u>Carefully</u> replace and tighten the three screws holding the Drive Mechanism to the common baseplate.
- 23. Power up the Disk Drive and return to Step 1 to re-check cat's-eyes pattern.





TRACK 00 STOP ADJUSTMENT

Purpose: To check the setscrew rear stop and make any required adjustments. Skip this procedure if the Speed Adjustment is correct.

NOTE: The Track 00 stop screw should be adjusted after the Cats-Eyes pattern is adjusted or the carriage seeks to a track lower than Track 00.

Procedure:

- 1. Press the BREAK key to halt the Align.3K program and allow a new track to be selected.
- 2. Connect the oscilloscope probes to test points 2 and 3 of the Analog Board.

Set the oscilloscope controls to the following settings:

Display: A+B Channel A: Normal Channel B: Inverted Channel A&B Time 2us/DIV (Calibrated) Channel A&B Volt 50 mV/DIV (Calibrated)

- 3. Type the value 0 and press RETURN. Head begins reading track 0.
- 4. When the scope is properly adjusted, a 60.2 KHz waveform similar to Figure 8C-6 appears on the screen.



Figure 8C-6 Speed Adjustment Waveform

TANDON DRIVE MECHANISM Revised 12/3/82 by ECN #0001

8C-11

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- 5. If the waveform appears correctly no adjustment is required.
- 6. With the Oscilloscope probes hooked up to test points 2 and 3 on the Analog Board observe the waveform on track 0 of the Alignment Diskette.
- 7. Turn the Track 00 stop screw <u>counterclockwise</u> two turns with a .050" Allen Wrench (See Figure 8C-7).



Figure 8C-7. Track 00 Stop Screw.

- 8. Slowly turn the Track 00 stop screw <u>clockwise</u> until the output amplitude shown on the scope begins to decrease.
- 9. Turn the Track 00 stop screw <u>counterclockwise</u> until the amplitude stops increasing.
- 10. Turn the Track 00 stop screw <u>counterclockwise</u> an additional one-eighth (1/8) turn.

This completes the Track 00 stop adjustment.

TANDON DRIVE MECHANISM8C-12

The following pages contain adjustment and replacement procedures.

To Adjust the Write Protect Switch

Use Figure 8C-8 as reference for the following steps.



Figure 8C-8. Write Protect Switch Assembly

- 1. Loosen the adjustment screw that attaches the Write Protect Switch Assembly to the side of the Drive Mechanism.
- 2. Move the switch up or down, as required. Check to be sure that the switch moves when the Write Protect arm is pushed down and that it makes a clicking sound.

To Replace the Write Protect Switch

Use Figure 8C-8 as reference for the following steps.

- 1. Disconnect the wiring harness from the Power Supply board. (Be sure to note the polarity and location.)
- 2. Disengage the cable harness from both the base and the back of the Drive Mechanism.
- 3. Remove the screw holding the mounting bracket to the base of the Drive Mechanism.
- 4. Remove the old Write Protect Switch Assembly from the mounting bracket and replace with the new Write Protect Switch Assembly.
- 5. Position the Write Protect Switch Assembly at the left side of the Drive Mechanism. Tighten the screw holding the mounting bracket to the base of the Drive Mechanism.
- 6. Be sure the adjustment is correct (See Write Protect Adjustment instructions).
- 7. Test the Write Protect circuit using both a write protected diskette and a non-write protected diskette.
To Replace Upper Arm Assembly:

Use Figure 8C-9 as reference for the following steps.



Figure 8C-9. Upper Arm Assembly

- 1. Remove the Analog Board from the Drive Mechanism.
- 2. Close the door to the Drive Mechanism.
- 3. Remove the two nuts that attach the Upper Arm to the Carriage Assembly.
- 4. Carefully remove the spring retainer and spring.
- 5. Remove the Upper Arm Assembly and replace with the new Upper Arm Assembly.

- 6. Set the spring and spring retainer in place. Be sure that the spring is seated at both ends.
- 7. Install the two setscrews that hold the Upper Arm Assembly and spring retainer in place.
- 8. Visually align the pressure pad with the head, then tighten the two setscrews.
- 9. Put a diskette in the unit and check to be sure the felt pad clears the diskette when the front door is opened.
- 10. Install the Analog Board on the Drive Mechanism.

DIAGNOSTIC FLOWCHARTS

The Diagnostic Flowchart is intended to be easy to use and the primary aid when troubleshooting the 810 Disk Drive containing the Tandon Drive Mechanism. Follow the prompts in the order presented. When a question is asked, follow the line from the box that best applies to your unit's condition. When that line terminates with a letter inside a circle, note that a page number is near it (i.e., pg. 8C-18). Turn to that page within this appendix, locate the letter in another circle, and continue the diagnosis. The flowchart leaves nothing to chance. It tells you when to perform a specific test and when to replace components. Section 3, Test Equipment/Diagnostic Tests contains detailed instructions for each of the tests referenced in this section.

NOTE: Pages 8C-4 to 8C-16 explain step by step adjustment methods which are different from MPI adjustments due to mechanical differences in the Tandon Drive Mechanism.

SWAPOUT PROCEDURE

Many places in the diagnostic flowchart, a box tells you to "swapout" a component a chip, or a number of chips in a particular order. The "swapout" instruction means that you should replace the indicated components (one at a time) with a known-good component of the same type. The 810 unit should then be tested with the new, known-good component in place to see whether the swapout solved the problem being checked. If the swapout did not fix the problem, the known good component should be removed, and the original component reinserted. In this way, you avoid needlessly replacing good components.

REPLACE IN ORDER

The "replace in order" instruction means that you should replace the components indicated in the order listed until the result called out in the previous block is obtained.

N - Some lines terminate with an N inside a circle. When this occurs, call your Atari Repair Hotline.

Inside California (800) 672-1466

Outside California (800) 538-1535



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NOTE: Numbers in **bold type** indicate power supply components 'only. In later revisions these numbers will be changed to eliminate confusion with sideboard component numbers.

TANDON DRIVE MECHANISM Revised 12/3/82 by ECN #0001 8C-19

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Initial Power-Up Sequence (cont)



8C-20

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TANDON DRIVE MUCHANISM Revised 12/3/32 by ECN #0001

Burn-In Test





TANDON DRIVE MECHANISM Revised 12/3/82 by ECN #0001 SC-23

Alignment Program



8C-24

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Alignment Program (cont)



No Power Troubleshooting



Drive Motor Troubleshooting



NOTE: Numbers in bold type indicate power supply components only. In later revisions these numbers will be changed to eliminate confusion with sideboard component numbers.

TANDON DRIVE MECHANISM Revised 12/3/32 by ECN #0001

Write Logic Troubleshooting



TANDON DRIVE MECHANISM

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TANDON DRIVE MECHANISM Revised 12/3/82 by ECN #0001

Write Protect Troubleshooting



Speed Troubleshooting

NOTE:

Numbers in bold type

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indicate power supply components only. In later revisions these J numbers will be changed eliminate confusion with sideboard component numbers. Can Speed Adjust Speed Be Adjusted Yes Correctly? Pg. 3-9. No Does the Voltage on Pin 7 of A100 No Vary When R104 Replace R104 is Turned? Yes Is Waveform at Test Point 8 No Replace Drive Correct? See Mechanism Figure. Yes Does Frequency at Test Point 9 Pg. <u>8C-2</u>4 Increase & Decrease When R104 is Varied? - 61 See Figure. Yes Replace Q100 Replace A100 Pg. 3C-24

TANDON DRIVE MECHANISM Revised 12/3/82 by ECN #0001

8C-31

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Fail Format Troubleshooting



TANDON DRIVE MECHANISM

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Fail Format Troubleshooting (cont)



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Fail Format Troubleshooting (cont)



TANDON DRIVE MECHANISM

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TANDON DRIVE MECHANISM Revised 12/3/82 by ECN #0001

Assy	Part No. CA014122 CA017964 C017945	Description 170 Cable Assy AC Adaptor (Pkgd) AC Power Adaptor	Location
Apa P/S	14 5102	(Same As CAU17964-Onpkgd) Resistor KW IK	R103 105 110 111
Ana P/S	14-5105	Resistor WW 1 Meg	R101 107
Ana P/S	14-5154	Resistor %W 150K	R102,107
Ana P/S	14-5222	Resistor WW 2 2K	R112.113
Ana P/S	14-5223	Resistor %W 22K	R102.114
Ana P/S	14-5471	Resistor %W 470 Ohm	R106.109
Ana P/S	15-51R0	Resistor ½W 1 Ohm	R100
Ana P/S	31-1N4001	Diode 1N4001	CR104.105
Ana P/S	34-2N3904	Transistor 2N3904	0101.102
Ana P/S	C012995	Connector Rt Angle (13 pin)	J107,108
Ana P/S	C014180-11	Cap. Ceramic Axial .022uF (50V)	C106
Ana P/S	C014180-16	Cap. Ceramic Axial .1uF (50V)	C105
Ana P/S	C014181-02	Cap. Ceramic Axial .01uF (25V)	C102,114
Ana P/S	C014181-03	Cap. Ceramic Axial .1uF (25V)	C108,111,115
Ana P/S	C014181-05	Cap. Ceramic Axial .22 uF (25V)	C109
Ana P/S	C014348	Voltage Regulator 7805 (5V)	J104
Ana P/S	C014350	Transistor	Q112
Ana P/S	C014368	Cap. Elec Radial 470 uF (16V)	C116,117
Ana P/S	C014384	Inductor Ferrite Bead	L101
Ana P/S	C014386-01	Socket IC (8 pin)	XA100
Ana P/S	C014392	Cap. Elec Radial 10 uF (16V)	C107
Ana P/S	C014398	Diode MR 501	CR100-103
Ana P/S	C014/12	Voltage Regulator 7812 (12V)	J105
Ana P/S	C014715	Power Jack	
Ana P/S	C014719-02	Connector (5 pin)	J105
Ana P/S	C014719-03	Connector (23 pin)	J100
Ana P/S	C014719-10	Connector (10 pin)	5102
And P/S	C014729	Con Elec Radial $/1700 \text{ uE} (25\text{V})$	
Ana P/S	C014780-02	Eastener Latching	Alternate for
rina r j S	60147.70	rastenet Eatening	C015344
Ana P/S	C014798	Heatsink	Part of O100
Ana P/S	C015344	Rivet Nylon	
Ana P/S	C015505	Cap. Elec Radial 47 uF (16V)	C100.101
Ana P/S	C016028	Test Points	TP1-9
Ana P/S	C016364	Diode Schottky (1N5818)	CR106,107
Ana P/S	C016569	Cap. Tantalum Axial 1 uF (20V)	C103
Ana P/S	C017101	IC LM2917-8	A100
Ana P/S	C017949-01	Resistor Variable 1K	R104
Ana P/S	C017952	Inductor 3.3 uH	L102
Ana P/S	C017954	Cap. Polyester Axial .01 uF (25V)	C104
Ana P/S	C017957	Cap. Elec Radial 4700 uF (35V)	C113
Ana P/S	CA016530	Transistor Assy	Q100
Ana P/S	CA017937	PC Board Analog Power Supply	7.000
Analog	14-5100	Resistor ¼W 10 Ohm	R200

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Part No.	Description	Location
14-5102	Resistor %W 1K	R202
14-5103	Resistor %W 10K	R204,205
14-5123	Resistor %W 12K	R223
14-5202	Resistor ¼W 2K	R201,
14-5220	Resistor ¼W 22 Ohm	R226
14-5224	Resistor ¼W 220K	R213
14-5302	Resistor %W 3K	R212.220
14-5471	Resistor %W 470 Ohm	R225
14-5472	Resistor %W 4.7K	R214.216
14-5512	Resistor %W 5.1K	R774
14-5622	Resistor %W 6.2K	R215.217
14-5680	Resistor %W 68 Ohm	R211
14-5681	Resistor %W 680 Ohm	R209 210
145750	Resistor %W 75 Ohm	R206
14-5821	Resistor %W 820 Ohm	R200 R207 208
14-7142	Resistor $WW + 4K + 2\%$	R207,203
15-5360	Resistor WW 36 Ohm	N210 D 227
31_1N914	Diodo 1N91/	CD202 2011 205
21-111217	Didde Hypit	(Alternate for
		(Alternate for
C018991	Transistor 2NI3906	C201 205
C014179-08	$C_{2R} = C_{2R} C_{2R} = C_{2R} C_{2R} = C_{2R} C_{2R} = C_{2R} $	Q201-205
C01/(180-13)	Cap. Ceramic Axial $320\pi F(50V)$	C21)
C01/(180-1)	Cap. Ceramic Axial SSOP $(50V)$	C209
C01/180 15	Cap. Ceramic Axial 680pr $(50V)$	C210
C01/(180-16)	Cap. Ceramic Axial $10010F(50V)$	C207
C014180-16	Cap. Ceramic Axial .10F (50V)	C211,212,21/
C014181-02	Cap. Ceramic Axial July (25V)	C203,204
C014181-03	Cap. Ceramic Axial . LuF (25V)	C206,208,213,
C01/1191 07		214,216
C014131-07	Cap. Elec Radial .4/UF (25V)	C202,205
C014332	IC LM311	A201
C014386-01	Socket IC (8 pin)	XA201
C014386-02	Socket IC (14 pin)	XA202,203
C014386-03	Socket IC (16 pin)	XA204
C014392	Cap. Elec Radial 10uF (16V)	C200,201
C014721-03	Connector Rt Angle (5 pin)	J209
C014/21-04	Connector Rt Angle (10 Pin)	J201
C014808-06	Diode Zener $1N5235B(6.8V)$	CR203
C016028	lest Points	1P1-12
C016364	Diode Schottky IN5818	CR201
C017948-01	Inductor 150uH (7 Ohm)	L201,202
C017948-02	Inductor 680uH (30 Ohm)	L203,204
C017950	IC CMOS Analog Multi-	A204
0017051	plexer (4052)	
C017951	IC NE592	A202,203
C017956	Voltage Regulator 79L05	VR201
CU6U6U/	U10de (1N4148)	CR202,204 205
C 101702/		(Alternate isted)
CAU17336	PC Board Analog	
UVE MECHANISM	8C-37	
	Part No. 14-5102 14-5103 14-5123 14-5202 14-5220 14-5224 14-5224 14-5224 14-5302 14-5471 14-5472 14-5472 14-5622 14-5680 14-5681 14-2142 15-5360 31-1N914 C018991 C014179-08 C014180-13 C014180-14 C014180-15 C014180-15 C014180-16 C014181-07 C014322 C014181-07 C014386-03 C014392 C014386-03 C014392 C014386-03 C014392 C014386-03 C014386-03 C014392 C014386-03 C014386-03 C014392 C014386-03 C014392 C014386-03 C014392 C014386-03 C014392 C014392 C014386-03 C014392 C014386-03 C014392 C014386-03 C014392 C014386-03 C014392 C014392 C014386-03 C014386-03 C014392 C014386-03 C017956 C060607 CA017936	Part No. Description 14-5102 Resistor %W 1K 14-5103 Resistor %W 12K 14-5123 Resistor %W 22K 14-5202 Resistor %W 22 Ohm 14-5220 Resistor %W 22 Ohm 14-5220 Resistor %W 22 Ohm 14-5220 Resistor %W 470 Ohm 14-5471 Resistor %W 470 Ohm 14-5472 Resistor %W 470 Ohm 14-5471 Resistor %W 470 Ohm 14-5472 Resistor %W 630 Ohm 14-5512 Resistor %W 630 Ohm 14-5621 Resistor %W 820 Ohm 14-5621 Resistor %W 820 Ohm 14-5750 Resistor %W 820 Ohm 14-5760 Resistor %W 820 Ohm 14-2142 Resistor %W 36 Ohm 14-2142 Resistor %W 36 Ohm 14-149-08 Cap. Ceramic Axial 82pF (50V) C014180-15 Cap. Ceramic Axial 101r (50V) C014180-16 Cap. Ceramic Axial .01uF (25V) C014181-07 Cap. Ceramic Axial .01uF (25V) C014131-07 Cap. Elec Radial .47uF (25V) C014336-01 Socket IC

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	<u>Assy</u> Analog	Part No. CA017947	Description Interconnect Cable (Connects	Location
			Analog to Analog P/S) (Specify Tandon Drive Mech.)	
47e	Bottom	88-1004	Rubber Feet	(Alternate for
				P/N C016848)
	Bottom	88-1010	Mounting Pad	
	Bottom	C014324	Boss Fastener	
	Bottom	C016028	Post Header	
	Bottom	C016848	Foot Plug	Listed)
	Bottom	CA014158	Lower Assy	
	Bottom	CA014318	Fastener Base Assy	
	Bottom	C012972	Common Base	
	Data Sep	14-5103	Resistor %W 10K	R202
	Data Sep	14-5182	Resistor %W 1.8K	R200,201
	Data Sep	14-5221	Resistor %W 220 Ohm	R205
	Data Sep	14-5472	Resistor %W 4.7K	R206
	Data Sep	14-5473	Resistor ¼W 47K	R203,204
	Data Sep	31-1N914	Diode 1N914	CR200 (Alternate
				for P/N C060607)
	Data Sep	34-2N3904	Transistor 2N3904	Q200
	Data Sep	C014179-08	Cap. Ceramic Axial 82pF (50V)	C201
	Data Sep	C014181-01	Cap. Ceramic Axial .001uF (25V)	C208
	Data Sep	C014181-02	Cap. Ceramic Axial .01uF (25V)	C203,205,207
	Data Sep	C014181-03	Cap. Ceramic Axial .1uF (25V)	C200,202,204,206
	Data Sep	C014329	IC FDC 1771	A203
	Data Sep	C014384	Inductor Ferrite Bead	L200
	Data Sep	C014386-02	Socket IC (14 pin)	XA201,205,207,208
	Data Sep	C014386-03	Socket IC (16 pin)	XA204,206
	Data Sep	C014386-09	Socket IC (40 pin)	XA203
	Data Sep		Crystal 4.000000 Mhz	X200
	Data Sep	C015045	IC 74L574	A201,207
	Data Sep	C017097		A 20 5
	Data Sep	C017100	10.742308	A 20/1 20/2
	Data Sep	C017511	Shield Insulator Pad	A204,200
	Data Sep	C017521	DIP Header (I/A pip post)	PIA3
	Data Sep	C060607	Diode (1N4148)	CR200 (Alternate
	Data Sep	6000007	Blode (11(+1+0)	listed)
	Data Sep	CA017231	PC Board Data Separator	
	Disk Drive	FA100197	Disk Drive Assy (Tandon)	
	Final	CA014139-02	Atari HCD 810 Disk Drive	(With Tandon Drive)
	Final	CA014156-01	Atari HCD 810 Disk Drive	(With Tandon Drive)

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<u>Assy</u> Mount	Part No. 78-74001	Description Cable tie	Location
Mount	C012972	Common Base	
Mount	C01719/	Mounting Dists Common	
Mount	CA01/1/4	Mounting Plate Common	
mount	CA014160-01	Mounting Plate Assy	(With Landon Drive Mechanism)
~ Panel	C014026	Disk Panel Secondary (Tandon Drive)	
~ Panel	CA014159-01	Panel Assy	Tandon Drive
Side	C014777	Diode LED	CR105,108 (Part of)
Side	C014069	Standoff LED	CR105,108 (Part of)
Side	CA014834	PC Board Side Assy	(Data Sep installed)
Side/Shield	14-5102	Resistor %W 1K	R118.121-124.129
Side/Shield	14-5103	Resistor %W 10K	R105,109,113,134
Side/Shield	14-5104	Resistor %W 100K	R135,136
Side/Shield	14-5151	Resistor %W 150 Ohm	R117
Side/Shield	14-5152	Resistor %W 1.5K	R114
Side/Shield	14-5153	Resistor %W 15K	R108 112
Side/Shield	14-5221	Resistor %W 220 Ohm	R103
Side/Shield	14-5224	Resistor %W 220K	R127
Side/Shield	14-5271	Resistor %W 270 Ohm	R120 126
Side/Shield	14-5273	Resistor %W 27K	R131
Side/Shield	14-5331	Resistor %W 330 Ohm	R137
Side/Shield	14-5332	Resistor WW 3 3K	D115
Side/Shield	14-5333	Resistor VW 33K	
Side/Shield	14-5393	Resistor %W 39K	
Side/Shield	14-5471	Resistor WW 470 Obm	
Side/Shield	14-5472	Resistor % W // 7K	D110 116 128 122
Side/Shield	14-5473	Resistor % W 47K	D110120
Side/Shield	14-5562	Resistor /4 W 4/ K	R117,150
Side/Shield	14-5750	Resistor // W 75 Obm	R101,102
Side/Shield	31-1N914	Diada 1 N91/	CD120 121 122
order officia	51-114514	Diode 110914	(Alternate for
			(Alternate for
Side/Shield	31_1N#001	Diada 1NU(001	P/N C060607)
Side/Shield	CO18991	Transister 2N2906	CRIUI-104,106
Side/Shield	34_2N3904	Transistor 2N3904	Q101,103,104
Side/Shield	C010174	Transistor Array	Q102,103,110,111
Side/Shield	C010447	Transistor Array 4077	7104
Side/Shield	C010745	IC MPLL (507	2104
Side/Shield	C010750		A101 A10#
Side/Shield	C011299	IC FIA 6002	A104
Side/Shield	C011200	HEX CMOS Jamastra (1000)	A102
Side/Shield	C01/(136)	DE Shield Inderter 4069	2105
Side/Shield	C01/137	RF Shield Inside/Component	
Side/Shield	C01/1138	Cround Brocket	
Side/Shiald	C01/1179 02	Ground bracket	C101 103 110 131
Side/Shiald	C01/179.02	Cap. Ceramic Axial $4/pr(50V)$	(101,102,119,13)
Side/Shield	C01+177-07	Cap. Ceramic Axial Tupr (50V)	
Sida/Shiald	C01/179.07	Cap. Ceramic Axial 33pF (50V)	
proc/spice	CU141/J-U/	Cap. Ceramic Axial 62pF (50V)	C105

TANDON DRIVE MECHANISM Revised 12/3/82 by ECN #0001 8C-39

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Assy	Part No.	Description	Location
Side/Shield	<u>C014180</u> -03	Cap. Ceramic Axial 100 pF (50V)	<u>C110,130,139,140</u>
Side/Shield	C014180-07	Cap. Ceramic Axial 470pF (50V)	C106
Side/Shield	C014180-10	Cap. Ceramic Axial 390pF (50V)	C111
Side/Shield	C014181-01	Cap. Ceramic Axial .001uF (25V)	C113,116-118,
			123-129,134-138
Side/Shield	C014181-03	Cap. Ceramic Axial .1uF (25V)	C102,104,107-
		·	109,114,115,133
Side/Shield	C014316	Crystal 1.000000 Mhz	X101
Side/Shield	C014328	Transistor Array 6810	A103
Side/Shield	C014333	Transistor Array 4011	Z102
Side/Shield	C014334	Transistor Array 4013	Z101,105
Side/Shield	C014369	Cap. Elec Radial 4.7uF (35V)	C132
Side/Shield	C014379	Resistor Network (9 X 4.7K)	R176
Side/Shield	C014384	Inductor Ferrite Bead	L102,103
Side/Shield	C014386-02	Socket IC (14 pin)	XA106,XZ101-105
Side/Shield	C014386-07	Socket IC (24 pin)	XA102,103
Side/Shield	C014386-08	Socket IC (28 pin)	XA101
Side/Shield	C014386-09	Socket IC (40 pin)	XA104
Side/Shield	C014394	Transistor MPS-A06	Q106-109
Side/Shield	C014397-02	Switch Power	S102
Side/Shield	C014702	Inductor Axial 470uH	L101
Side/Shield	C014717-01	Connector (23 pin)	P101
Side/Shield	C014719-02	Connector (5 pin)	J101,102
Side/Shield	C014808-01	Diode Zener 1N5231B (5.1V)	CR107
Side/Shield	C017520	Socket DIP (40 pin)	J103
Side/Shield	C060607	Diode (1N4148)	CR120,121, 122
			(Alternate listed)
Side/Shield	CA015325	LED & Standoff Assy	CR105,108
Side/Shield	CA060149	PC Board Side Shield Assy	
- Top	C014105	Panel Label Cover	
• Тор	C014106	Hole Cover Label	
Тор	CA014157	Upper Assy	
Drive	FA100193	Write Protect Switch Assy	
Drive	FA100194	SSR Upper Arm Assy	
Drive	FC100195	Irack 00 Stop	
Drive	FC100196	Drive Belt	
Drive	FA100197	Disk Drive Assy	

SECTION 9

SERVICE BULLETINS

This section is to be used by you to file the three classifications of service bulletins which are periodically released by the Manager of Technical Support.

The following are brief descriptions of each classification:

FIELD CHANGE ORDER

A Field Change Order describes hardware or software changes to ATARI Computer products and instructs how to implement these changes.

To indicate your required action, a Field Change Order is issued as one of the following two categories:

MANDATORY - This identifies a failure mode which affects reliability and describes a procedure to correct the failure. This procedure must be performed on all units serviced or repaired.

AS FAILS - This identifies a failure mode which affects reliability and describes a procedure to correct the failure mode. This procedure must be performed on on an as fails basis.

UPGRADE BULLETIN

An Upgrade Bulletin describes product improvements or modifications which the consumer may wish to purchase. These Bulletins allow you to modify the customer's unit to add capabilities which may not have been available when the unit was originally manufactured.

TECH TIP

A Tech Tip is a document of a general nature which transmits routine service or repair information. By communicating methods developed since you attended training classes, Tech Tips aid to continuously improve repair skills and increase knowledge of ATARI Computer Products.

Other times, Tech Tips alert you to units which have been modified and are now standard from ATARI Manufacturing, but are different from many existing units and require different repair techniques.

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Consumer Product Service Manager of Tehnical Support FIELD CHANGE ORDER number_1

MODEL: Atari 810 Disk Drive

DATE: May 28, 1982

SUBJECT:

Rear Board, Molex Connectors Removal

CHANGE DESCRIPTION:

New units manufactured by Atari have the two Molex Connectors (J104 and J105) removed from the 810 rear printed circuit board. The connector removal eliminates intermittent connections which causes the Disk Drive to fail because of speed drift. The 5 Volt Regulator (A108) and the Pass Transistor (Q113) are soldered directly to the rearboard. This Field Change Order instructs Service Centers who will be repairing the 810 Disk Drive.

<u>Atari Part Number</u>	**	Molex Connector 5 Volt Regulator Pass Transistor	CO14716-03 CO14348 CO14786
Part Location	676	Rearboard Locations J104 and J105	CA014833
	-	Base Plate Locations A108 and Q113	C012972

REMOVAL/INSTALLATION PROCEDURES:

For removal, installation, troubleshooting, and testing, observe warnings or cautions stated in Atari 810 Disk Drive Field Service Manual. Before a chip or board is added to or removed from the system, power the system down. Follow instructions for disassembly and reassembly of unit (Field Service Manual).

Remove Rearboard

Desolder Molex Connectors (C014716-03), from locations J104 and J105 on rearboard

Remove 5 volt regulator from location A108 on base plate.

Bend the leads on 5 volt regulator and pass transistor and position so that when soldered to the rearboard, the leads come over the top of the rearboard and allowing components to be mounted to the base plate.

Solder 5 volt regulator and pass transistor to rearboard.

Replace rearboard, apply a thin film of Heat Transfer Compound between A108 and Q113, and base plate before securing components to the base plate.



Consumer Product Service Manager of Tehnical Support FIELD CHANGE ORDER number_

MODEL: Atari 810 Disk Drive

DATE:

Note that the Voltage Regulator (A108) and the Pass Transistor (Q113) are fastened to the base plate. In order to remove the Rearboard, you must remove the mounting screws from each. Remember to use Heat Sink Compound when replacing the Rearboard before securing the mounting screws. (Refer to Tech Tip #1.)

Use procedures as outlined in the Atari 810 Field Service Manual, check the disk drive speed.

TESTING PROCEDURES:

Following standard test procedures outlined in Atari 810 Disk Drive Field Service Manual.

Diagnostic Testing - Use Flawtest III and Align 3K Disk Alignment Program.



Consumer Product Service Manager of Tehnical Support UPGRADE BULLETIN

number

MODEL: ATARI 400/800 COMPUTERS

DATE:

May 28, 1982

SUBJECT:

GTIA Chip

CHANGE DESCRIPTION:

New units manufactured by Atari contain the Graphic Television Interface Adapt (GTIA) chip on the CPU printed circuit board. The GTIA chip is an enhancement of the Color Television Interface Adapter (CTIA) chip and may be purchased as an upgrade to existing units.

Part Location - CPU printed circuit board location A301.

INSTALLATION PROCEDURES:

For troubleshooting, installation, and testing, observe warnings or cautions stated in Atari Home Computer Division 400/800 Home Computer System Field Service Manual. Before a chip or board is added to or removed from the system, power the system down.

Follow disassembly instructions in 400/800 Field Service Manual.

Remove CO12295 from location A301 on CPU printed circuit board.

Install CO14805 in location A301 on CPU printed circuit board.

TESTING PROCEDURES:

Follow standard Test Procedures using Atari Stand Alone Test (Diagnostic) as outlined in Atari 400/800 Computer System Service Manual.

CONSUMER INFORMATION:

The GTIA chip adds three graphics modes accessible with BASIC for a total of eleven different graphics modes in BASIC and 256 different colors.

The GTIA chip is fully compatible with software written to run on existing CTIA units. Software which is written to run on the GTIA chip using its enhanced features is not displayed correctly with CTIA units.



Consumer Product Service

Manager of Tehnical Support

UPGRADE BULLETIN

number __

MODEL: Atari 810 Disk Drive

DATE: May 28, 1982

SUBJECT:

810 Disk Drive, ROM, Revision C,

UPGRADE DESCRIPTION:

New units manufactured by Atari contain a Revision C ROM (CO11299C) on the sideboard (CAO14834). This new ROM improves diskette sector layout and gives faster access time. Consumers may wish to replace old ROM revisions (CO11299B) with Revision C ROM for improved Disk Drive performance. This Upgrade Bulletin instructs Service Dealers who install this component.

Old Atari Part Number - COll299B

New Atari Part Number - COll299C

Part Location - Sideboard, CAO14834 Location A102

INSTALLATION PROCEDURES

For troubleshooting, installation and testing observe warnings and cautions stated in Atari Home Computer Division 810 Disk Drive Service Manual. Before a chip or board is added to or removed from the unit, power the system down. Follow instructions in Section 5-13 for diassembly and reassembly of unit.

Remove CO11299B from Location A102 on sideboard, and insert CO11299C.

TESTING PROCEDURES

Follow standard test procedures outlined in Atari 810 Disk Drive Field Service Manual.

Diagnostic Testing - Use Flawtest III and Align. 3K Disk Alignment Program.

CONSUMER INFORMATION

An 810 Disk Drive with the Revision C ROM and DOS 2 offers improved speed performance by improving the sector layout on diskettes. This makes it possible to store and retrieve information more rapidly than was possible using the old sector layout.



Consumer Product Service Manager of Tehnical Support UPGRADE BULLETIN

number_

MODEL: Atari 810 Disk Drive

DATE:

COMPATIBILITY WITH DISKETTES USING THE OLD SECTOR LAYOUT.

Data stored on diskettes using the old sector layout can be read or written to using the upgraded drives. The speed will not be improved.

PARTS DISPOSITION

Not Applicable.

ENCLOSURES:

Sideboard Silk Screen

A Viener Commercial and Company



Silkscreen 810 Side Board

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TECH TIP

number

MODEL: Atari 810 Disk Drive

DATE: April 2, 1982

SUBJECT:

Atari 810 Disk Drive, Rear Board Molex Connectors

DESCRIPTION:

New Atari 810 Disk Drive Rearboards are assembled with the two 3 Pin Molex Connectors (J104 and J105) removed. The 5 Volt Regulator (A108) and the Pass Transistor (Q113) are now soldered directly to the Rearboard (see Silk Screen on back).

Parts Removed:

Atari P/N C014716-03 (2)

Part Location:

810 Disk Drive - Rearboard Location J104 and J105.

TROUBLESHOOTING AND MAINTENANCE PROCEDURES:

For troubleshooting, maintenance, and testing, observe warnings and cautions in the Atari 810 Home Computer System Service Manual.

Note that the Voltage Regulator (A108) and the Pass Transistor (Q113) are fastened to the base plate. In order to remove the Rearboard you must remove the mounting screws from each. Remember to use Heat Sink Compound when replacing the Rearboard, before securing the mounting screws.

TESTING PROCEDURES:

ENCLOSURES:



810 Rear Board Silk Screen

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TECH TIP

number_

MODEL:

Atari 400/800 Computers

May 28, 1982

SUBJECT:

Revision B, Operating System ROMS.

DESCRIPTION:

New Atari 400/800 computers contain Revision B ROMs — a refined version of an Operating System ROM, which has a different checksum from Revision A ROMs. When replacing these components, <u>do not mix revision levels</u>. System will not operate if Revision A is paired with Revision B.

Parts:

Old ROMS: C012499A and C014599A

Rev B ROMS: C012499B and C014599B

Part Location:

400 Computer System - Motherboard location A103 (CO14599) and A104 (CO12499)

800 Computer System - Personality Board Location A401 (CO14599) and A403 (CO12499).

You can recognize the new part in this manner:

Top is imprinted with a copyright symbol followed by 1981 Atari.

TROUBLESHOOTING AND MAINTENANCE PROCEDURES:

For troubleshooting, maintenance and testing, observe warnings and cautions stated in Atari 400/800 Home Computer System Service Manual. Before a component or board is added to or removed from the system, power the system down.

If ROM chips are defective or if printer overprints (hiccups), replace ROM chips.



number_

MODEL: Atari 810 Disk Drive

DATE: May 28, 1982

SUBJECT:

810 Disk Drive units containing the following:

- Data Separator Board added to sideboard.
- Sideboard stepper motor circuit voltage increase to regulated 12 volts DC.
- New power adaptor to provide increased current required by the above modifications.

DESCRIPTION:

New 810 Disk Drive units manufactured by Atari contain a Data Separator Board added to the sideboard, modifications to the stepper motor circuit to increase voltage, and a new power adaptor. This Tech Tip instructs those who are repairing 810 Disk Drives containing these modifications.

The parts affected are:

Data Separator Board	CA017231
Sideboard	CAO14834
Power Supply	CO16804

Part Location - P103 on Data Separator Board, Atari Part No. CAO17231, plugs into the sideboard location A105 on Atari Sideboard Part No. CAO14834, where FDC 1771 (Floppy Disk Controller) is usually installed.

TROUBLESHOOTING AND MAINTENANCE PROCEDURES:

For troubleshooting, maintenance, and testing, observe warnings and cautions stated in Atari 810 Disk Drive Field Service Manual. Before a board is added to or removed from the unit, power the system down.

If a board is suspected, follow the standard troubleshooting procedure outlined in Atari 810 Disk Drive Field Service Manual, to check circuitry and alignment. If circuitry and alignment check out but board has many 144 errors or many intermittent errors, swap the data separator board in the unit with a known good one. This procedure isolates the problem to a faulty data separator board or faulty side board.

Use procedure outlined in Atari 810 Disk Drive Field Service Manual.

NOTE: These boards cannot be installed in the existing socket in sideboards not designed for data separator. Doing so may result in shorts or intermittent failures.



Atari 810 Disk Drive MODEL:

number.

DATE:

TESTING PROCEDURE:

Use standard test procedures outlined in the Atari 810 Disk Drive Field Service Manual.

Diagnostic Testing - Use Flawtest III and Align 3K Disk Alignment Program.

810 DATA SEPARATOR SILKSCREEN



10191 (3/82)



TECH TIP

number_

MODEL:

DATE:

SUBJECT:

Data Reliability on the 810 Analog Disk Drive

810 Analog Disk Drive

DESCRIPTION:

810 Analog Drives (those manufactured after August 1981) that exhibit diskette compatability problems, and/or troubles in formatting new diskettes, should have the Write Current Resistor (R218) replaced with a 1.4K ohm resistor.

Part Removed:

2K ohm 1/4W 5% Resistor Atari P/N 14-5202

Replace With:

1.4K ohm 1/4W 2% Resistor Atari P/N 14-2142

Part Location:

810 Analog Board location R218

TESTING AND TROUBLESHOOTING:

Follow the Diagnostic Flowchart and Troubleshooting Guide for the Analog Disk Drive in the 810 Service Manual.

ENCLOSURES:

Schematic and Silkscreen:

Analog Board - CA017935 Rev. 5

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10191 (3/82)



Schematic Analog Board.

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Consumer Product Service

Manager of Tehnical Support

TECH TIP

number __

ATARI

MODEL :

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DATE: 11/17/82

SUBJECT:

Reformatting Preformatted Diskettes

DESCRIPTION:

Because the format on preformatted diskettes in effect becomes the standard for inthe-field disk drive testing, they must be created on master duplicating machines. These diskettes must hever be reformatted. If a diskette is reformatted by another source, it becomes useless for the test intended.

Unfortunately, there is no way to know if a "Preformatted Diskette" has been reformatted. The possible results of reformatting a "Preformatted Diskette" or not using a preformatted diskette are:

- 1) You may replace a drive mechanism when no problem exists.
- 2) You may misalign the heads, thus making your customer's diskette library unusable on the "fixed" disk drive.

DO NOT USE A REFORMATTED PREFORMATTED TO ALIGN OR TROUBLESHOOT AN \$10 DISK DRIVE.

DIFFICULTY REPORTING:

If you have any questions or need further clarification concerning this Tech Tip, call the ATARI Tech-Line Specialist:

Inside California (800) 672-1466

Outside California (800) 538-1535



number

MODEL: Atari 810 Disk Drive

DATE: April 2, 1982

SUBJECT:

Atari 810 Disk Drive, Rear Board Molex Connectors

DESCRIPTION:

New Atari \$10 Disk Drive Rearboards are assembled with the two 3 Pin Molex Connectors (J104 and J105) removed. The 5 Volt Regulator (A108) and the Pass Transistor (Q113) are now soldered directly to the Rearboard (see Silk Screen on back).

Parts Removed:

Atari P/N C014716-03 (2)

Part Location:

810 Disk Drive - Rearboard Location J104 and J105.

TROUBLESHOOTING AND MAINTENANCE PROCEDURES:

For troubleshooting, maintenance, and testing, observe warnings and cautions in the Atari 810 Home Computer System Service Manual.

Note that the Voltage Regulator (A108) and the Pass Transistor (Q113) are fastened to the base plate. In order to remove the Rearboard you must remove the mounting screws from each. Remember to use Heat Sink Compound when replacing the Rearboard, before securing the mounting screws.

TESTING PROCEDURES

ENCLOSURES:



number ____

MODEL: Atari 810 Disk Drive

DATE: May 28, 1982

SUBJECT:

810 Disk Drive units containing the following:

- Data Separator Board added to sideboard.
- Sideboard stepper motor circuit voltage increase to regulated 12 volts DC.
- New power adaptor to provide increased current required by the above modifications.

DESCRIPTION:

New 810 Disk Drive units manufactured by Atari contain a Data Separator Board added to the sideboard, modifications to the stepper motor circuit to increase voltage, and a new power adaptor. This Tech Tip instructs those who are repairing 810 Disk Drives containing these modifications.

The parts affected are:

Data Separator Board	CA017231
Sideboard	CAO14834
Power Supply	CO16804

Part Location - P103 on Data Separator Board, Atari Part No. CAO17231, plugs into the sideboard location A105 on Atari Sideboard Part No. CAO14834, where FDC 1771 (Floppy Disk Controller) is usually installed.

TROUBLESHOOTING AND MAINTENANCE PROCEDURES:

For troubleshooting, maintenance, and testing, observe warnings and cautions stated in Atari 810 Disk Drive Field Service Manual. Before a board is added to or removed from the unit, power the system down.

If a board is suspected, follow the standard troubleshooting procedure outlined in Atari 810 Disk Drive Field Service Manual, to check circuitry and alignment. If circuitry and alignment check out but board has many 144 errors or many intermittent errors, swap the data separator board in the unit with a known good one. This procedure isolates the problem to a faulty data separator board or faulty side board.

Use procedure outlined in Atari 810 Disk Drive Field Service Manual.

NOTE: These boards cannot be installed in the existing socket in sideboards not designed for data separator. Doing so may result in shorts or intermittent failures.



number_

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MODEL: DATE: 11/17/82

SUBJECT:

Data Reliability on the 810 Analog Disk Drive

DESCRIPTION:

810 Analog Drives (those manufactured after August 1981) that exhibit diskette compatability problems, and/or troubles in formatting new diskettes, should have the Write Current Resistor (R218) replaced with a 1.4K ohm resistor.

Part Removed:

2K ohm 1/4W 5% Resistor Atari P/N 14-5202

Replace With:

1.4K ohm 1/4W 2% Resistor Atari P/N 14-2142

Part Location:

810 Analog Board location R218

TESTING AND TROUBLESHOOTING:

Follow the Diagnostic Flowchart and Troubleshooting Guide for the Analog Disk Drive , in the 810 Service Manual.

ENCLOSURES:

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Schematic and Silkscreen:

Analog Board - CA017935 Rev. 5

10191 (3/82)



number

ATARI 810 DISK DRIVE MODEL: DATE: 11/17/82

SUBJECT:

Reformatting Preformatted Diskettes

DESCRIPTION:

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Inside California (800) 672-1466

Outside California (800) 538-1535

