NOTICE

To use the A800 with the Apple you must have a copy of Apple DOS 3.3. This is available from your dealer and was included when you purchased your Apple five inch disk drive.

Vista DOS is not compatible with Apple DOS 3.2; it is only compatible with Apple DOS 3.3. If you have been running your Apple system with 5 1/4" drives and Apple DOS 3.2, you must use the Apple DOS MUFFIN program to upgrade all of your data disks from Apple DOS 3.2 to Apple DOS 3.3. You should upgrade all of your disks before you begin the procedures in this section. Read Appendix K (pages 192-4) of the Apple DOS Manual for complete instructions on the use of MUFFIN to convert Apple 3.2 to 3.3 disks. Once all of your Apple 3.2 disks have been upgraded, you are ready to follow the procedures in the installation section.

To run the A800 under the CP/M operating system, you must have the Microsoft Z80 Softcard, which comes with Digital Research CP/M Version 2.20B. Additionally, your Apple must be equipped with a 16K RAM Card. Vista suggests the Apple Language Card or the Microsoft 16K RAM Card.

To use your A800 with Apple Pascal, you must have Apple Pascal Version 1.1 and a 16K RAM Card as mentioned above.

Global Acknowledgements:

Apple is a registered trademark of Apple Computer Inc.
CP/M is a registered trademark of Digital Research.
SoftCard is a trademark of Microsoft.
Z-80 is a registered trademark of Zilog, Inc.

VISTA COMPUTER CO. 120-DAY WARRANTY.

Vista Computer Company (hereinafter referred to as "Vista") warrants all the products it manufactures to be free from defects in material and workmanship for a period of 120 days from shipment or for such longer period as stated in the product data sheet or catalog.

If any equipment fails within this warranty period, a Material Return Authorization (MRA) number must be obtained from Vista. This MRA number must be referenced in any documents related to the defective material and be clearly marked on the outside of the box in which it is to be shipped, freight prepaid, to Vista. Vista will promptly repair or replace the defective merchandise, at Vista's discretion, and return the equipment to the purchaser, freight prepaid. Any equipment returned which has been submitted to misuse or abuse shall be treated as out of warranty.

For out of warranty items, the procedure outlined above applies except that any repairs will be billed to the customer on a time and materials basis, and that the repaired equipment will be returned freight collect. All workmanship on repaired equipment and any replaced parts shall receive an additional 90-days warranty or the balance of the original purchase warranty, which-ever is longer.

Vista's manufacturing, technical support and sales facilities are open for your assistance from 8am to 5pm, Monday through Friday. MRA numbers and other information may be obtained by telephone. Call (714) 953-0523.

No other warranties are expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

In no event will Vista be liable for consequential damages even if Vista has been advised of the possibility of such damages. Some states do not allow the exclusion or limitation of consequential damage, so the above exclusion or limitation may not apply to you.

IMPORTANT NOTICE

Diskette Terminology

Reference is made throughout this manual to various
types of diskettes from various manufacturers. We will
refer to "Distribution", "Patch" and "Work" diskettes
when issuing instructions for you to follow.

1. Distribution Disks:

These include Apple DOS 3.3, Microsoft 2.20B CP/M and
Apple Pascal 1.1 .

2. Patch Disks:

These are disks supplied by Vista Computer Co and
include Apple DOS 3.3 A800 Patch Version 1.2, Apple
Pascal 1.1, A800 Attach Version 1.2 and DRI CP/M
Version 2.20B A800 BIOS Patch Version 1.3 .

3. Work disks:

These are blank disks which, during operation, will
have various files copied to them from both
Distribution and Patch disks.

CONTENTS

MANUAL VERSION 3.0
UPDATED MAY, 1982

INTRODUCTION

The Model A800 floppy disk controller is Vista's cost-effective solution to increasing the memory storage capacity of your Apple II computer without having to invest in a larger, costlier system.

Our double-density eignt inch controller enables access of up to five megabytes of on-line storage through conventional disk operating system commands. The controller interfaces to all Shugart/ANSI (Qume) standard eight inch floppy disk drives, also available from Vista.

The controller operates at a DMA transfer rate of 1.0ms per byte, using all the standard Apple DOS commands. Compatibility with all three major operating systems (Apple DOS 3.3, Apple UCSD Pascal 1.1 and Microsoft CP/M 2.2) allows uninterrupted use of your existing software including your five inch drives. The controller's on-board support Prom allows complete five and eight inch support without increasing the operating system's memory usage.

For your convenience, Vista has provided complete documentation with your controller. Please pay special attention to sections I and II for correct installation of hardware and software.

To make sure you receive news of related developments by Vista, please complete and mail the warranty registration card at the back of this manual.

1.0 INSTALLATION

1.1 Hardware Installation

1.1.1 Connecting the Controller Cable

The 50 pin flat cable connecting Vista's A800 controller to the disk drives consists of:

* 50 pin flat cable (up to 10' long at the last drive)
* 50 pin female header connector (on controller end)
* 50 pin female edge connectors (1 per 8" drive)

1. To connect the controller cable to the controller, make sure you orient pin one (near the tapered end of the board).
2. Gently mate the header connector with the row of pins on the controller board. Make sure the connector is firmly seated.

If you decide to make your own controller cable, do not make it longer than 10' at the last drive. Also, ensure the female header connector plugs into the board without any clearance problems (do not bend any components). Note that pin one on the cable (marked with a stripe) must be aligned with pin one of the edge connectors and the header connector.

WARNING: Drives with reversed cables can destroy the data on your disk. Check for properly connected drives in the following way:

* Be sure there are no diskettes in your drives.
* Turn the drive power switch to ON but do not turn on the Apple.
* If the red lights in the drive doors come on, you've got one end of the cable backwards.
* Re-check your work and try this same test again when you think you have properly hooked up the cables.

1.1.2   Installing the Controller in the Apple II

CAUTION

Removal or insertion of the circuit board while power
is on can cause permanent damage to the circuit board
and the Apple II.

1.   Turn the power switch at the back of the Apple OFF.
The power light at the bottom left of the keyboard
should be out.

2.   Remove the Apple lid (in the top center of the
case) by lifting under the rear edge and sliding
backwards.

3.   Position and insert the controller card:

The controller may be inserted in any of the slots at
the rear of the Apple motherboard, except slot 0. We
suggest you use slot 5 for compatibility with CP/M and
Pascal.

Hold the card firmly, with the red and green LEDs
facing you and seat the card into the slot you have
selected. Do not rock the card sideways but a little
forward and backward pressure may be necessary to en-
sure it is fully seated.

4.   Connect the controller cable to the disk drive(s):

Connect the cable edge connector(s) to the disk
drive(s) according to the drive maunfacturers
instructions.

1.2   Software Installation

1.2.1   Outline

Vista's A800 controller board allows the concurrent
operation of your existing five inch disk drives with
the eight inch drives you are adding to the Apple II
computer.

The software comprises a modified disk operating system and a format program for initializing eight inch disks. With a few exceptions, the capabilities and operation of this modified system are the same as the Apple 3.3 DOS.

1.2.2   Apple DOS 3.3 Installation

Before you start, here are a few words about what you are trying to accomplish and how.   You purchased a Master Apple DOS 3.3 diskette from Apple.   You received a Vista DOS modification diskette with your controller. In compliance with Apple Computer's DOS copyright, the Vista Software disk does not contain a DOS.   It does have programs that are essential to the building and maintaining of an 8" Apple DOS system diskette.

In order to accomplish the goal of creating an 8", Master DOS diskette, you need to copy the DOS onto the Vista diskette, modify DOS for use with 8" double density drives, format a blank 8" diskette, and copy the modified DOS over to the 8" diskette.

1.2.2.1 Step by Step Installation

The following instructions are for those operating with a single disk drive.

STEP I - Creating the 5" A800 DOS Initialization disk

1. Boot your DOS 3.3 System Master diskette from Apple

2. Type RUN COPYA

3. You will see the following statements on the screen. Answer each with a <RETURN> (Press return key)

```
ORIGINAL SLOT: DEFAULT=6    <RETURN>
DRIVE: DEFAULT 1            <RETURN>
DUPLICATE SLOT: DEFAULT=6   <RETURN>
DRIVE: DEFAULT=2            Type "1"

    ----<RETURN> to begin copy----
```

4. Remove the DOS 3.3 System Master diskette and insert the Vista DOS 3.3 Patch diskette in the disk drive.

5. The program is ready to start copying. Follow the instructions on the screen as the copy program proceeds.

6. When copying is complete, you will see the message:

DO YOU WISH TO MAKE ANOTHER COPY? type "N" <RETURN>

7. Now we use the Apple DOS MASTER CREATE to copy Apple's DOS to the work diskette. Insert the Apple DOS 3.3 System Master and type BRUN MASTER CREATE <RETURN>.

8. You will be asked to input the greeting program's file name: Type HELLO <RETURN>.

9. Remove the DOS 3.3 System Master and insert the work diskette being converted and press <RETURN>. The program will tell you when conversion is complete. You have now created a A800 five inch DOS initialization diskette.

10. Type BRUN BUILD VDOS. This will create the DOS image in a file called VDOS IMAGE. This file is required by the Vista Format Utility (VFORMAT) in order to place a DOS image on newly-formatted eight inch diskettes.

STEP II - Initializing an eight inch diskette with Apple DOS.

1.   Insert a blank eight inch diskette into drive #1.

2.   Type BRUN VFORMAT   <RETURN>.

NOTE: The questions displayed following this command do not require pressing the <RETURN> key after giving the answer.

3.   The first question (WHICH SLOT) refers to the slot the A800 is plugged into (usually slot #5).

4.   The second question asks which drive: Press "1".

5.   The next question (DOS, CP/M, or PASCAL) must be answered by pressing "D".

6.   The screen clears and displays the first of several DOS options.

The question is "FORMAT or RESTORE a DOS disk".   Answer
by pressing   "F".

Then you will be asked the seek rate, 3, 6, 10, or
15ms.

Your response will format the disk to run at this rate.
6ms and 15ms step rates are available for users with
special requirements (such as Siemens drives which must
use 6ms. Shugart 800/801 take 10ms, while Shugart
850/851 and Qume use 3ms).

7.   The last question is a request for the name of the
HELLO file which will automatically be executed when-
ever the diskette is booted. The name is 30 characters
maximum and one must be entered. No check is made on
the validity of the name but DOS will issue error
messages after booting if the name is invalid. Press
<RETURN>   after entering the name.

8.   If you are satisfied with every answer you have
typed in, press <RETURN>. If you want to change an
answer press <ESC> and the questions will be redis-
played from step 3 above.

The eight inch diskette will now be formatted.   The
program displays a hex number step counter on the
screen to indicate the progress of the format process.
Side one is formatted to track 4C. If the diskette is
double-sided and the disk drive is dual headed, and the
2S signal is enabled (see section 3.0 Theory of Oper-
ation) then side two is formatted. Progress is
displayed on the next line on the screen. Side two is
formatted to track 4C. If there is an error, a message
will be displayed along with the controller status (in
hex).   Refer to the status register summary in the back
of Appendix A.

9.   The program will say:
BUILDING DIRECTORY
FORMAT COMPLETE
FORMAT ANOTHER DISK?   Answer "Y" or "N"

10. If you answer "N", VFORMAT returns you to Apple-
soft or Integer Basic (depending on where you started
from) ready to boot the diskette you just formatted.

11.   Boot the eight inch diskette by typing PR#5
<RETURN>. Your controller may be in another slot, but
we recommend #5.

The display answers with a FILE NOT FOUND. This is
normal because the drive is looking for a HELLO file
with a name you qualified earlier. The VFORMAT program,
unlike the INIT command, does not place the HELLO
program on the diskette. This must be done by you with
the SAVE command following initialization. If this step
is omitted, the message FILE NOT FOUND will be issued
every time the system is booted.

12.   Insert Apple 3.3 DOS MASTER in your five inch
drive. Type BRUN FID, S6, D1 <RETURN>.

13.   Select the COPY FILE function from the menu
displayed by typing "1" <RETURN>.

14.   FID will ask you the source slot. First, remove
Apple's 3.3 DOS and insert the work disk just created
in the five inch drive. Now, type the number of the
slot your five inch controller is plugged into (usually
slot #6) and a <RETURN>.

15.   FID will ask you which drive: Type "1" <RETURN>.

16.   FID will ask you the destination. Answer with the
slot# your eight inch drive controller is plugged into
(usually slot #5) and a <RETURN>.

17.   FID will ask you the drive #. Press "1" <RETURN>.

18.   FID will ask you the filename. Type = <RETURN>.
      = is a wild card which gives you all files.

19.   FID will ask if you want prompts. "N" <RETURN>.

20.   When FID asks, press <RETURN>.

21.   FID will display the filenames as they are copied.
Press <RETURN> and select menu option #9 to get out of
FID.

The process is now complete. The eight inch disk is
initialized and you can boot from it when you use it as
a master diskette.

When you turn the system on, the disk controller in the
highest slot # inside the Apple is booted. For example,
if your five inch controller is in slot #4 and the
eight inch controller is in slot #5, the Apple will
automatically boot the eight inch drive on power-up.

NOTE: Always remove eight inch diskettes from the disk
drive before turning the power off or on to avoid
damage to the disk and loss of data.

1.2.3 CP/M Software Installation

1.   Boot CP/M Master (CP/M 2.20B version must be used)

2.   Type FORMAT.
     Q. WHICH DRIVE?
     A. Type A: <RETURN>.
     Take out master, insert working disk <RETURN>.
     After Format press <RETURN>.

3.   Replace Master <RETURN>.
     Type COPY A:=A: <RETURN>.
     Follow the messages on the screen until copying is
     complete.
     Q. DO YOU WISH TO MAKE ANOTHER COPY?
     A. "N".

4.   Insert Master disk <RETURN>.

5.   Insert work disk and cold boot (system OFF/ON).
     Type ERA GBASIC.COM <RETURN>
     (to make room for the Vista files to follow).

1.2.3.1 Single Five-Inch Drive

(The steps above are the same for users with single and
dual drive systems. The procedure for dual drive
follows later)

     Type DDT <RETURN>.

6.   Insert Vista CP/M Patch Disk.
     Type IPATCH.COM <RETURN>.
     Type R <RETURN>.

7.   Insert work disk.
     Press <CONTROL C>.
     Type SAVE 5 PATCH.COM <RETURN>.
     Type DDT <RETURN>.

8.   Insert Vista CP/M Patch Disk.
     Type IPATCH.DAT <RETURN>.
     Type R <RETURN>.

9.   Insert work disk.
     Press <CTRL C>.
     Type SAVE 10 PATCH.DAT <RETURN>.
     Type DDT   <RETURN>.

10. Insert Vista CP/M Patch Disk.
     Type ICONFIG.COM   <RETURN>.
     Type R   <RETURN>.

11. Insert work disk.
     Press <CTRL C>.
     Type SAVE 3 CONFIG.COM   <RETURN>.
     Type DDT.

12. Insert Vista Patch disk.
     Type 1PATCH.BOT <RETURN>.
     Type R <RETURN>.

13. Insert Work disk.
     Press <CTRL C>.
     Type SAVE 12 PATCH.BOT <RETURN>.

The operation is now complete

1.2.3.2 Dual Five Inch Drive

Follow steps 1-5 above then:

6. Your work disk should be in A: and the   Patch disk
in B:

7.   Type PIP A:=B:*.*[V] <RETURN>.
This moves all the Vista Patch files onto the Work
disk.

1.2.3.3 Installing CP/M Patches

1.   Format an eight inch disk with the VFORMAT utility
on your Vista Apple DOS Patch Disk. (Be sure to select
the CP/M and double density Format options). This disk
will be needed once you have created the patched
versions of CP/M.

2.   Run the Vista Patch program by typing PATCH
<RETURN>. PATCH will ask which type of disk the system
is to reside on: Apple five inch or Vista eight inch.

To make a bootable eight inch, select the Vista disk
option (2), to make a bootable five inch, select the
Apple disk option (1).

1.2.3.4 Making a Bootable Five Inch

The following procedure will make your five inch Work
disk bootable with eight inch drive support. Follow
steps 1 and 2 above.

3. Type 1 (Do NOT press <RETURN>)
    The system will load several files.

4. The next question is WRITE TO DISK?
    Press Y (to update your Work disk)

5. Respond to the message: "Replace the system disk
and press <RETURN>," by pressing the <RETURN> key.
Your work disk will now be bootable.

6. Cold boot your new five inch Work disk (system
OFF/ON) and Vista CP/M will sign on. Drives A: and B:
will be five inch and drives C: D: E: and F: will be
eight inch.

1.2.3.5 Making a Bootable Eight Inch

Follow steps 1 and 2 above.

3. PATCH asks where the system will reside. For the
eight inch option, Press 2 (Do NOT press <RETURN>).

4. On the question WRITE TO DISK? place a prefor-
matted double density eight inch disk into your C:
drive (If you booted from five inch) and type Y.

5. Press <RETURN> to answer message "REPLACE SYSTEM
DISKETTE....."

To boot eight inch, you must cold boot (system OFF/ON)
from slot #5 (with the 5 inch drive doors open). Your
Apple will try to boot from slot #6 (five inch).

6. Press <RESET> and type PR#5 <RETURN>.
When you have booted CP/M from your eight inch disk,
place the disk in the A: (now 8 in) drive for updating.

Remember to use the lowest number eight inch drive. The same rule applies for updating five inch drives. Always use the lowest number drive.

1.2.3.6 Changing Eight Inch Drive Speed Under CP/M

To change from the default seek speed assigned for your eight inch drives at patch time, run the Vista utility SETSPEED.COM. Select the desired speed and press the corresponding number (0-3).

If you want to make the change temporary, type "N" to the last question: "MAKE PERMANENT?". If you want to change the system tracks on your A: drive, type "Y" and SETSPEED will rewrite your disk so it will boot with the default speed you have specified.

1.2.3.7 Automatic Density Selection

The VISTA patched CP/M system will read and write single density (single sided, interchange format) and VISTA double density (30 sectors of 256 bytes each) single or double sided discs. The software will identify the type of disc in each 8 inch drive automatically upon logging in a new disc. Remember- when changing discs, always type <CONTROL-C> to cancel all your logged in disc parameter information.

NOTE: Only 56K CP/M and a language card will provide the correct environment for your Vista eight inch controller and software.

1.2.4   Pascal 1.1 Software Installation

1.2.4.1 Single Drive

Tne Apple PASCAL distribution package contains four diskettes labeled Apple0: through Apple 4:

1. Boot the system using the disk labelled APPLE1:
    Type X , for execute

2. Insert APPLE3:
    Type #4:FORMATTER   <RETURN>.

3. Insert your work disk (a blank diskette)
    Q. FORMAT WHICH DISK?
    A. Type #4: <RETURN>.
    Q. DESTROY DIRECTORY?
    A> Type "Y" <RETURN>.

4. Insert APPLE1: <RETURN>.
    Type F, for Filer.
    Type T, for Transfer.

    Q. TRANSFER?
    A. Type #4: <RETURN>.
    Q. TO WHERE?
    A. Type #4: <RETURN>.
    Q. 280 BLOCKS?
    A. Type "Y" <RETURN>.

5. Insert work disk. Press <SPACE>.
    Q. DESTROY BLANK?
    A. Type "Y" <RETURN>.

Insert Master and slave diskettes back and forth as prompted. At the end, type "C" <RETURN> for Change.

    Q. CHANGE.
    A. Type #4: <RETURN>.
    Q. CHANGE TO WHAT?
    A. Type VISTA1: <RETURN>.

Message reads APPLE1: --> VISTA1:   The working diskette is now called VISTA1:

6. Insert Vista's Pascal Attach Diskette (VISTA0:)

    Type T <RETURN> for Transfer.
    Q. TRANSFER?
    A. Type VISTA0:SYSTEM.ATTACH <RETURN>.
    Q. WHERE?
    A. Type VISTA1:SYSTEM.ATTACH <RETURN>.

Follow the messages on the screen.

7. Insert work diskette (VISTA1:) <SPACE>.

8. Insert Pascal Attach Diskette.
    Type T <RETURN> for transfer.
    Q. TRANSFER?
    A. Type VISTA0:ATTACH.DRIVERS <RETURN>.
    Q. WHERE?
    A. VISTA1:ATTACH.DRIVERS <RETURN>.

Follow the messages on the screen.

9. Insert work disk (VISTA1:) <SPACE>.

10. Insert Pascal Attach Disk (Vista0:)
     Type T <RETURN> for Transfer.
     Q. TRANSFER?
     A. Type VISTA0:ATTACH.DATA <RETURN>.
     Q. WHERE?
     A. Type VISTA:ATTACH.DATA <RETURN>.

Follow the messages on the screen.

11. Insert work disk (VISTA1:) <SPACE>.

12. Insert Pascal Attach Disk (VISTA0:)
     Type T <RETURN> for Transfer.
     Q. TRANSFER?
     A. Type VISTA0:PBOOT.CODE <RETURN>.
     Q. WHERE?
     A. Type VISTA1:PBOOT.CODE <RETURN>.

Follow the messages on the screen.

13. Insert work disk (VISTA1:) <SPACE>.

14.   Insert Pascal Attach Disk (VISTA0:).
      Type T <RETURN> for Transfer.
      Q. TRANSFER?
      A. Type VISTA0:MAKETURN.CODE <RETURN>.
      Q. WHERE?
      A. Type VISTA1:MAKETURN.CODE <RETURN>.

Follow the messages on the screen.

15.   Insert work disk (VISTA1:) <SPACE>.

16.   Insert Pascal Attach Disk (VISTA0).
      Type T <RETURN> for Transfer.
      Q. TRANSFER?
      A. Type VISTA0:PBOOT.LIB <RETURN>.
      Q. WHERE?
      A. Type VISTA1:PBOOT.LIB <RETURN>.

Follow the messages on the screen.

17.   Insert work disk (VISTA1:) <SPACE>.

18.   Insert Pascal Attach Disk (VISTA0:).
      Type T <RETURN> for Transfer.
      Q. TRANSFER?
      A. Type VISTA0:READ.ME.TEXT <RETURN>.
      Q. WHERE?
      A. Type VISTA1:READ.ME.TEXT <RETURN>.

Follow the messages on the screen.

19.   Insert work diskette (VISTA1:) <SPACE>.
      READ.ME.TEXT should be read by user for a fuller
understanding of the Vista Pascal Diskette.

Turn the system OFF/ON to cold boot the new disk and
bring on the new operating system.

1.2.4.2 Dual Drives

In your Pascal package, from Apple, you have received
four diskettes labelled APPLE0: through APPLE3:.

1.   Boot the system using the disk labelled APPLE1: in
drive 1 and APPLE3: in drive 2.

2. Type X, for execute.
    Type #5:FORMATTER <RETURN>.

3. Insert your work disk (a blank diskette) into your
second drive (#5:).
    Q. FORMAT WHICH DISK?
    A. Type 5 <RETURN>.
    Q. DESTROY DIRECTORY? (An optional question)
    A. Type Y <RETURN>.
Type <RETURN> to exit FORMATTER.

4. Type F, for Filer.
    Type T, for Transfer.
    Q. TRANSFER?
    A. Type #4: <RETURN>.
    Q. TO WHERE?
    A. Type #5: <RETURN>.
    Q. 280 BLOCKS?
    Q. DESTROY BLANK?
    A. Type Y

5. Type C <RETURN> for CHANGE
    Q. CHANGE?
    A. Type #5: <RETURN>.
    Q. CHANGE TO WHAT?
    A. Type VISTA1: <RETURN>.

The message reads APPLE1: --> VISTA1:. The working
diskette is now called VISTA1:

6. Type "T" (for Transfer).
Remove APPLE1: and insert Vista Patch disk in drive #4.

7. Type #4:=,#5:$ <RETURN>.
This moves all the files from the Vista Patch disk onto
your work disk. ·

1.2.4.3 Installing Pascal Patches

1. Use the FILER to copy all the files from your Apple
Pascal Distribution Disk Version 1.1 (APPLE1:), onto
your work disk. (See sections 1.2.4.1 and 1.2.4.2
above). These files include:

SYSTEM.ATTACH   PBOOT.CODE   READ.ME.TEXT
ATTACH.DRIVERS   MAKETURN   PBOOT LIB
ATTACH.DATA
More files may be included with later releases.

2. Place your work disk into drive one (for a two drive
system, put APPLE2: into drive two).

3. Cold boot the system. Devices 9, 10, 11 and 12 are
the eight inch drives.

4.   Use the Filer to zero the directory on a prefor-
matted, double density, eight inch disk.   Refer to your
Apple reference manual for the procedure, but specify
the correct block size as indicated above.   Eight inch
disks must be formatted with Vista's VFORMAT Program
under Apple DOS.

**NOTE: Double sided disks have 2310 blocks. Single sided
disks have 1155. This must be remembered when zeroing a
directory.**

2.0 OPERATION

2.1 Disk Drive Configuration

Vista's A800 controller board contains no jumper
options and is complete as received. All that is
required to operate with a disk drive is a 50 pin flat
cable (optional item). Your disk drives may, however,
require jumper configuration.

**NOTE: If you have purchased a complete floppy sub-
system, the disk drives may already be configured to
operate with the controller board and no changes should
be necessary.**

If you have purchased disk drives separately, however,
these drives are shipped with a factory configuration
different from that required by Vista's controller
board. The Shugart SA850 and Qume DataTrack 8 disk
drives both require the same jumper changes as follows:

Remove	Add
HL	DS
X	C
Z	Y
	2S

The table below provides a summary of jumper configura-
tions required for use with Vista's controller board.

For more information on jumper configurations, refer to
the individual drive manuals (OEM SA800/801 manual,
Qume DataTrack 8 manual).

2.2 DETERMINING COMPATIBILITY OF NON-VISTA DRIVES

Please note that the recommended hardware configuration
for operation of Apple DOS includes 8", double density,
single- or double-sided drives from Vista. If you have
non-Vista drives you may be able to jumper them for use
with the A800. Since exact board layout varies widely,
it is impossible for Vista to supply exact jumpering
instructions for non-Vista drives. We recommend that
only trained technicians attempt to use these drives.
If you are not a trained technician and you have non-
Vista drives, you should contact your dealer for help
in determining compatibility.

Below is a list of jumpering guidelines for users of non-Vista drives:

* When Drive Select (DSn) is asserted, drive n is selected, its activity light is illuminated, its head is loaded, its head positioner is energized, and its   door is locked.

* Two headed drives respond to the side select signal for head selection.

* The drive should reduce its write current in response to TK>43.

* The drive should return only one index pulse per diskette revolution.

* The drive returns two-sided status when a two-sided diskette is inserted.

* The -5 -15 jumper should be set to match the power supply.

SHUGART SA800 CUSTOMER CUT/ADD TRACE OPTIONS

TRACE DESIGNATOR	DESCRIPTION	OPEN	SHORT
T3,T4, T5,T6	Terminations for Multiplexed Inputs		x
T1	Terminations for Drive Select		x
T2	Spare terminator (Radial H'd Load)	x	
DS1,DS2 DS3,DS4	Drive Select Input Pins	x	DS1
RR	Radial Ready		x
RI	Radial Index and Sector		x
R,I,S	Ready,Index Sectr Alt'n't Output Pads		x
HL	Stepper Power Form Head Load	x	
DS	Stepper Power Form Drive Select		x
WP	Inhibit Write (Write Protected)		x
NP	Allow Write (Write Protected)	x	
8,16,32	8,16,32 Sectors(SA801 only)	8 & 16	32
D	Alternate Input In Use	x	
2,4,6,8, 10,12,14, 16,18	Nine Alternate I/O pins	x	
D1,D2, D4,DDS	Installable Decode Drv Sel Opt	x	
A,B	Radial Head Load		x
X	Radial Head Load	x	
C	Alternate Input Head Load		x
Z	In Use From Drive Select	x	
Y	In Use from HD LD	x	
DC	Alternate Output Disk Change	x	

QUME AND SHUGART 850/851 OPTION TRACE CONFIGURATION

DESIGNATOR	DESCRIPTION	OPEN	SHORT
DS1-DS4	Drive Address Select Pins	DS2,DS3	DS1
	(Up to 4 Drives)	DS4	
A,B	Radial Head Load		x
X	Radial Head Load	x	
Z	In Use From Drive Select	x	
HL	Stepper Power From Head Load	x	
R	Ready Alt'n't Output Pad		x
I	Index Alt'n't Output Pad		x
C	Alternate Input Head Load		x
D	Alternate Input In Use	x	
DC	Alternate Output Disk Change	x	
2S	Alternate Output Disk 2 Sense		x
DS	Stepper Power from Drive Select		x
Y	In Use from Head Load		x
DL	Door Lock Latch	x	
RR	Radial Ready		x
RI	Radial Index		x
WP	Inhibit Write (Write Protected)		x
NP	Allow Write (Write Protected)	x	
D1,D2,	Drive Address Select Pins	x	
D4,DDS	(Up to 8 Drives)		
B1-B4	Two, Double Sided Drive Select	x	
S1-S3	Head Select Option	S1,S3	
6,8,10,	Alternate I/O Pins	x	
12,16,			
18,24			

2.3 DISKETTES

2.3.1 Vista Approved Suppliers

Recording disks are made of a mylar film to which
particles of iron oxide are bonded. After bonding, the
disks are burnished to ensure smoothness, and lubri-
cated to reduce abrasion from the drive head. Makers of
superior recording media use techniques to ensure a
uniformly smooth disk for better transfer of data and
less head abrasion.

The thickness of the oxide coating and the quality of
lubricant used are important factors for optimizing
signal resolution.

Greater surface durability is obtained by the use of
efficient liners between the jacket and the disk.

When the diskette is properly inserted, the head is
loaded onto the media on the recording side and a felt
loading pad is applied to the non-recorded side. If the
diskette is reversed, that is loaded upside down, the
scouring action of the oxide-impregnated pad is trans-
ferred to the recorded side thus reducing performance
and increasing the possibility of drop-outs and errors.
For this reason, major manufacturers do not recommend
"flipping" or the use of two-sided disks for single-
head drive operation.

Standard diskettes are not certified for operation in
two-headed drives. There are, however, manufacturers of
two-sided diskettes for operation in two-headed disk
drives. For this reason, and others stated above, Vista
recommends the use of the following soft sectored
recording media for prolonged life and higher data
integrity:

MANUFACTURER	SINGLE-SIDE PART#	DOUBLE-SIDE PART#
IBM	Diskette 1	Diskette 2D
Dysan	800605	800837
Maxell	FDI	FD2XD
Verbatim	FD34-8000	FD34-40xx

2.3.2   Diskette Loading and Handling

Diskette Loading

To load the diskette, remove it from its protective
envelope and proceed as follows:

* Press latch on front of the disk drive to open the
  door.
* Insert diskette with label facing up. Push until you
  hear a click.
* Close the disk drive door.
* To remove the diskette, depress the door latch and
  the diskette will be ejected.

**NOTE: Always insert a shipping disk or a blank disk
inside double headed drives when the power is off,
after you have powered down. Then remove the disk
before you power up.**

Diskette Handling

To protect the diskette, take the following steps:

1. Return the diskette to its envelope after removal
from the drive.
2. Keep the diskette away from strong magnetic fields
which may distort recorded data.
3. Do not write on the diskette jacket with a lead
pencil or ball point pen. Use a felt tip. If adding
your own label, write on the label BEFORE sticking it
onto the diskette.
4. Do not expose the diskette to heat or sunlight.
5. Heat or ash from a cigarette can cause damage.
6. Do not touch the diskette surface.

**NOTE: Always remove eight inch diskettes from the disk
drive before turning the power OFF or ON to avoid
damage to the disk and loss of data.**

2.3.3 Write Protect

The write protect feature is available on diskettes
with a protect slot. When this is open, the disk is
protected. When covered, writing is allowed. To use the
write protect feature, follow these directions:

*   To write enable the diskette: close the slot by
placing a tab over the front and fold it to cover the
rear.

*   To write protect the diskette: remove the tab.

**NOTE: The above write protect procedure is the opposite
for five-inch minifloppies. To write protect a mini-
diskette, the hole must be covered.**

3.0 THEORY OF OPERATION

3.1 Introduction

This section of the manual was written for the advanced programmer, the repairman and those wishing to integrate the controller into future software products.

The A800 is a large circuit board which plugs into one of the slots in the Apple II motherboard. The board contains an LSI controller chip, a PLL data separator, DMA logic, several command and status registers and a 2K byte EPROM used for boot loading the computer.

The controller is built around a Western Digital floppy disk controller chip. For technical information on this component, refer to the Appendix of this manual.

3.2 Address Registers

3.2.1 Address Locations

Apple I/O cards have 16 address locations designed for various uses. The Western Digital controller chip WD1797's COMMAND/STATUS, TRACK, SECTOR and DATA registers may be read or written at the first four of these locations, 0 through 3. The next four addresses are a duplication of the first four and are not recommended for programming. The actual address is determined by the slot used in the Apple.

3.2.2 Data Transfer

The Vista controller transfers data directly from the WD1797 chip into memory without help from the microprocessor. Logic is included to seize the data and address bus in the Apple and to make the transfer whenever required, (with each positive pulse on the 1797 DRQ line). To set the memory address to which the controller will load or store disk data, registers 8 and 9 are provided. Register 8 is the low byte of the DMA address while 9 is the high byte. After each byte is transferred, the DMA address is automatically incremented. Attempting to read these registers will destroy their contents.

3.2.3 Drive Select

A Drive-Side-Mode select register is located at address
13 ($0D). The lower four bits are used to select one of
four disk drives. These bits are intended to be set
high, one at a time. In the event that more than one
bit is "on", the respective drives will be selected
simultaneously. This is an illegal condition which will
prevent the controller from communicating with the
drives.

3.2.4 Single Density Mode

The high two bits of register 13 may be set to select
single density mode and the second side of the disk (if
using double-headed drives and two sided disks). One
common use of the single density mode is reading and
writing disks in the standard CP/M interchange format.
Setting each bit high selects the corresponding
function. Reading this register is not allowed and will
destroy its contents.

3.2.5 DMA Logic Status

Register 15 ($0F) is read only. It contains the status
of the DMA logic and whether the current disk is one or
two sided. The high bit (7) is "on" to indicate that
the DMA logic is still active and that it is not wise
to read the WD1797's registers (lest you cause a
pending status to be cleared before the controller
board can respond). Bit 6 "on" indicates that the disk
in the drive is useable on side one only. If single
head drives are being used, this bit will always be on.
Writing to this register has no effect on the data
content.

3.2.6 Disk Read, Disk Write

Registers 10 ($0A) DMA ON DISK READ, 11 ($0B) DMA ON
DISK WRITE, and 12 ($0C) DMA OFF, are activated simply
when addressed. No data is transferred when these
registers are read or written. The DISK READ register
turns on the green light and DISK WRITE illuminates the
red one. When the programmer is ready to unlock the DMA
logic and allow a transfer of data, one of the DMA ON
locations is referenced (depending on the direction of
data movement desired). This must be followed by
corresponding commands to the WD1797.

When the controller chip has finished the request
operation, it turns off the DMA logic (via the 1797's
IRQ line). A computer program which has been looking at
the DMA ON bit in register 15 will observe the change
from one to zero when the 1797 is done. In the event
the program needs to turn off the DMA logic, a read or
write to register 12 ($0C) will accomplish this.

3.2.7 Boot Rom

To provide enough storage to support DOS, CP/M and
Pascal, the boot rom is designed to use the common
addressing space from $C800 to $CFFF. (In this
instance, we will assume the controller is in slot #5).
During booting, the Apple will access the standard boot
rom address area of $C500 to $C5FF. When this happens,
the entire contents of the 2716 Prom will be mapped
into the Common Rom area. Although the space from $C800
to $C8FF will be the same data as found at $C500, the
remaining 1784 bytes are available for extended disk
drivers etc. When the last byte of Rom is read, it is
deactivated and disappears from the common memory
space.

3.2.8   Register Assignments

Addr	Write	Read
COn0	1797 cmd reg	1797 status reg
COn1	1797 track reg	1797 track reg
COn2	1797 sector reg	1797 sector reg
COn3	1797 data reg	1797 data reg
COn4	--same as 0--	
COn5	--same as 1--	
COn6	--same as 2--	
COn7	--same as 3--	
COn8	low DMA addr	not allowed
COn9	high DMA addr	not allowed
COnA	DMA ON:Disk read	(same as write)
COnB	DMA ON:Disk write	(same as write)
COnC	DMA OFF	(same as write)
COnD	sngl side xx fd fd fd fd dens sel xx 3 2 1 0	not allowed
COnE	--spare--	
COnF	not allowed	DMA one xxxxxx on side

3.3   PROGRAMMER USE OF PROM

3.3.1   Scope

DOS, Pascal and CP/M each provide low-level drivers
which allow the caller to read or write an individual
sector. Use of these drivers will provide a reasonable
degree of protection against hardware and software
changes. For this reason, the following information is
provided for system implementers of operating
environments which Vista does not currently support.

3.3.2   Stability of Entry Points

Only the three major entry points discussed below are
supported to the effect that their addresses will
remain constant in future versions of the Prom.

3.3.3 Addressing

The first 256 bytes of the Prom, which contain the
entry points, can be addressed, either in the slot Rom
area, or the Common Rom area. The supported entry
points turn off the common Rom to ensure that no other
devices are contending for that area. Therefore, entry
must be made through the slot address.

3.3.4 Boot

1.   Entry - The boot routine is entered at offset 0
($C500 for slot 5)

2.   Function - Track 0 and sector 0 of drive 1 (the
first drive) is loaded at $800.

3.   Parameters - None

4.   Memory usage -

        A. Monitor usage
          $FF58   IORTS   to determine slot
          $FF2D   ERRMSG   writes "ERR" on screen
          $FDDA   PRBYTE   writes err code to screen

        B. Ram
          $2C   SLTPTR   slot address in form Cs
          $2d   BSLOT   slot address in form s0
          #3C   SEEKR   seek rate

3.3.5 Flow

        SET SLOWEST SEEK RATE
        Turn off common Rom
        Turn on monitor Rom
        Get slot #
        RESTORE DISK
   yes   ERROR? no
        READ SECTOR 0
        ERROR? JUMP TO $800
   yes   PRINT "ERR" on screen
        PRINT ERR code on screen
        Enter monitor

3.3.6 VRWTS

1. Entry - Offset $FD ($C5FD for slot 5) s0 in reg X

2. Function - Read or write a specific sector as specified by the parameter list

3. Parameters -

```
$48 (2 bytes) Address of IOB
 #3C          Seek rate - the two least significant
              bits are or'd into the seek command
```

The IOB is the same as that for the DOS RWTS routine, with the following exceptions:

If the sector number is <128, the access will be made to that sector in double-density. If the sector number is >=128, then sector (#-128) will be accessed in single-density.

The DCT, Volume, Actual Volume, previous slot and previous drive fields are not referenced or updated.

4. Memory usage -

        A. Scratch locations used during call only

```
$2D    sector
$2E    track
$35    drive # converted to bit mask
$578   retry count
```

        B. Locations preserved between calls

```
$478 + S
$4F8 + S   current track position
$578 + S   for each drive
$5F8 + S
```

5. Flow -

    Set RETRY COUNT = 10
    Move parameters form IOB to temp variables
    SEEK to requested track
    If Permanent err, return with err code set
    If command is NULL, return
    If cmnd is FORMAT, set write protect err A return
    Send track, sector + buffer addrs values to ctrllr
    If permanent err, rtn with err code set
    Turn off common Rom
    Return to caller

3.3.7 CRWTS

1. Entry - Offset $FA ($C5FA for slot 5)

2. Function - Same as VRWTS, but with a different
parameter list structure to be compatible with CP/M

3. Parameters -

    $3C   Seek rate
    $3E0   Track
    $3E1   Sector (+128 for single-density)
    $3E4   Drive (1-4)
    $3E6   Slot 6
    $3E8   Buffer address (2 bytes)
    $3EA   Error code
    $3EB   Command code

4. Memory usage - same as VRWTS

5. Flow - same as VRWTS, except no reference to IOB

3.4 SPACE ALLOCATION ON DISKETTE

3.4.1 Apple DOS

Allocated Space

The standard method of keeping track of allocated space
is by specifying a one byte track number and a one byte
sector number. This method provides for up to 256
tracks of up to 256 sectors each. Since this is more
than adequate for a double-sided, double-density eight
inch diskette, no changes are necessary.

Free Space

The standard method of keeping track of free space is
by use of a bit map. Each bit represents one sector.
This map normally resides at track 17, sector 0 and
contains enough room to control up to 50 tracks of up
to 32 sectors each. Since a single-sided diskette has
77 tracks and a double-sided diskette has 154 tracks,
this method must be modified.

The most straightforward method of extending the free
space map is to replicate it as many times as
necessary. This requires one additional map sector, for
a single-sided diskette, or three additional map
sectors for a double-sided diskette.

As far as the diskette format is concerned, this method
is implemented simply by assigning two previously
unused bytes in the map sector. The byte at offset 50
becomes the link pointer. If this byte is zero, then
this map sector is the last (or only) sector on the
volume. If the pointer is non-zero, then it is the
sector number of the next map sector in the chain. By
design restriction, these additional map sectors must
be on the same tracks as the first one (track 17).

NOTE: Some Apple documentation shows bytes 48, 49, 50
and 51 to be a bit mask. This is incorrect. Byte 48 is
the track number from which space was last allocated.
Byte 49 is always either 1 or -1 and is added to byte
48 to determine the next track to be examined for free
space. Bytes 50 and 51 are not used by the standard DOS
routines.

3.4.2 CP/M

CP/M keeps track of both free and allocated space by
allocation units. The mapping between these units and
the physical location on the disk are controlled by
tables which are internal to the CP/M BIOS. Therefore,
no changes are required to the disk format.

3.4.3 PASCAL

PASCAL keeps track of both allocated and free space in
terms of 512 byte blocks. Since this method is not
sensitive to track and sector structure, the only
consideration for eight inch diskettes is to specify
the correct number of blocks at initialization time. A
single-sided, double-density diskette has 1155 blocks.
A double-sided, double-density diskette has 2310
blocks. (Remember these numbers when you zero the
directory).

4.0 SERVICE AND ADJUSTMENTS

4.1 SYSTEM FAILURES

The usual causes of failure in a disk subsystem are the disk, disk drive and/or the interface cable. If your Vista controller appears to malfunction, check all three possibilities. Signs of wear on the disk may indicate a damaged head in the drive.

Oxide build-up on the head may be a sign of a defective head (see 2.2.1 for Vista approved suppliers). A crimped cable may have an internal broken wire.

In the event the controller is diagnosed defective, make sure a qualified technician performs the adjustment procedure below.

4.2 ADJUSTMENT PROCEDURE

The following procedure is performed at the factory to align your controller card before shipment. Damage resulting from performance of the adjustment procedure by non-qualified personnel will not be covered by warranty.

1. Use a frequency counter to measure 2.0mhz at test point 5. This confirms that the 4mhz crystal oscillator is working.
2.   Use an oscilloscope to measure 1.4V (+-.1V) at test point 2. Adjust pot R2 as necessary. This sets the phase detector offset.
3. Connect a frequency counter to test point 3 and measure 4.0mhz (+-0.05) Adjust pot R3 as required.
4. While writing to the disk at track 44 or higher, observe write data on test point 4 to have a "jitter" of about 200ns. This jitter is the write compensation provided by the controller. Adjust pot R1 for the the correct reading. The easiest time to perform this adjustment is while formatting the disk. Set the oscilloscope to 200ns/cm.

ERRATA

Your Apple DOS PATCH disk contains the following files.
Previous releases used different names for similar
programs.

OLD NAME   NEW NAME

BUILD SETDOS   BUILD VDOS
SETDOS   VDOS IMAGE
IPL TEXT   BOOT OVERLAY
DOS MODS TEXT   VDOS MODS OVERLAY
FORMAT 2.2 (OR 2.21)   VFORMAT
RESTORE   (N/A)
(N/A)   VCOPY
HELLO   HELLO

LAST MINUTE ADDITIONAL NOTES....

Some customers have reported success using Siemens Disk
Drives with the A800. While Vista cannot be
responsible for their use, we have included this list
of jumpers for your convenience.

Please note - The Siemens are designed for a step rate
of 6 ms track to track. We have had reports of good
results running them at 3 ms. For some reason the
samples tried would not operate at 10 ms.

SHORTED	OPEN
E	V
D	B
RR	M
RAD STEP 2	RAD STEP 1
RAD SEL 0	RAD SEL 1..3
RI	ALL BINARY SELECT
H	G & F
ACT LED V & H	ACT LED S & R
L	J & K
SE	TE
SECT 0	SECT 8,16,32
SS	HS
12,18,20,22,24,34,36	C
	16