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Owner's Manual
ProDOS SCSI
Hard Disk Subsystems

and SCSI II Interface Card

Apple IIe
and Apple IIgs



Models: SC20/A2S, SC40/A2S, SD20/A2S,
SD43/A2S, SD60/A2S, SD30/A2S

Revised 5/19/88

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Owner's Manual
ProDOS SCSI
Hard Disk Subsystems
and SCSI II Interface Card

Apple IIe
and Apple IIgs

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CMS Enhancements, Inc.
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Tustin, California 92680

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Revised
1/11/88

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UNPACKING YOUR HARD DISK

Carefully remove your hard disk from its shipping container and save it in a safe and dry place. This container should be used whenever you ship the CMS hard disk. This is very important! Your warranty will be void if it is shipped without using the original shipping material or packed with material of equal shock resistance. Use soft foam rubber type packing material only.

Your package should include these items:

Package Includes

1. Hard Disk subsystem complete.
2. CMS/SCSI II Interface.
3. A floppy diskette called CMS SCSI II Hard Disk Utilities.
4. A packet with 8 extra jumpers and 4 hex screws and nuts.
5. A warranty registration card.
6. A shielded RS232 cable for connecting the hard disk to the computer.
7. The CMS Instruction manual, what you are now reading.

Warranty Card

Registration

Please fill out the warranty card. The purpose of the card is to register your system for warranty repair should it be needed. Mail it as soon as possible to CMS Enhancements, Inc., and to the address on the reply card.

RMA And Technical Support Policy

RMA Policy

If you should have a problem getting your system up and running please contact the Dealer who sold the system. If for some reason the Dealer cannot help you then call CMS for technical support. Please have the model number, serial number, date of purchase and the dealer's name before calling. If possible please call from a telephone near the system so we can be of maximum help.

If a CMS Technical Support person deems it necessary they will issue you a RMA Number (Return Merchandise Approval). This number should be placed on the outside of the carton in large letters near the address label. Please return the complete system including cables. The system should be packed in the original packing materials and shipped prepaid. CMS will repair it within 48 hours and ship it prepaid by similar common carrier service as shipped to CMS. The limited warranty covers defects encountered in normal use of the product and does not apply when damage due to improper use, abuse, mishandling, accidents, sand, dirt, excessive dust, water damage, unauthorized service or inadequate packaging when shipping.

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FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE STATEMENT

Warning

Warning: The equipment described in this manual has been certified to comply with the limits for Class B computer devices, pursuant to subpart J of Part 15 of FCC rules. Only computers and other peripherals (disk, tape drives, etc.) may be attached to this equipment. Operation with non-certified equipment is likely to result in interference to radio and television reception. It is suggested that other equipment be used with shielded and grounded cables and with in-line filters if necessary.

Instructions

Instructions to Users in Case of Interference: This equipment generates and uses radio frequency energy and if not installed and used properly, i.e. in accordance with the operating instructions and service manual, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in residential installations.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Re-orient the receiving antenna.
2. Relocate the equipment with respect to the receiver.
3. Move the equipment away from the receiver.
4. Plug the equipment into a different outlet so that the equipment and the receiver are on different branch circuits.
5. Ensure that the shielded SCSI cables are properly secured.

If necessary, consult your dealer or CMS for additional suggestions. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of your hard disk. It is the responsibility of the user to correct such interference.

Caution

Caution: This product is equipped with a line cord and plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock and reduce RF emission.

Limitations on Warranty and Liability

Limitations

Although CMS Enhancements, Inc., has tested the software and hardware described in this manual and reviewed its contents, neither CMS nor its dealers make any warranty or representation, either expressed or implied, with respect to this manual or the software described in this manual. In no event will CMS or its dealers be liable for direct, indirect, incidental or consequential damage resulting from any defect in the software, hardware or manual, even if they been advised of the possibility of such damages. In particular, they shall have no liability for any program or data stored in or used with CMS products, including the costs of recovering or reproducing these programs or data. Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This manual and the sotware described in it are copyrighted by CMS Enhancements, Inc. All rights are reserved. This documentation and the software described within may not, in whole or part, be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine readable form without prior consent in writing from CMS Enhancements, Inc. CMS cannot guarantee that you will receive notice of a revision to the software described in this manual, even if you have returned a registration card received with the product. You should periodically check with your dealer for any updates.

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WELCOME FROM CMS

Welcome

We are pleased that you have chosen a CMS/SCSI hard disk subsystem. This system was designed for reliability and performance. We think you will find getting your new hard disk up and running to be easy and that it will make your system more productive from the very start.

If you are a new Apple IIe/IIgs user, please begin by reading the Owner's Manual which was supplied with the computer by Apple. Become familiar with its operation first. Your hard disk behaves much like a very large and fast floppy disk, thus, every operation that can be executed with a floppy can also be executed with your CMS/SCSI hard disk. A general understanding of how a hard disk works with your computer will make getting your new disk in operation a lot easier. Your dealer can help you with questions concerning the basic operations.

This manual presumes that you have a working knowledge in the operation of your Apple IIe or IIgs. This includes the general methods for copying files, how to open documents, clicking with the mouse, and (last, but not least) how to organize files or folders within other folders. If you're not certain about how to do these things, please consult your Macintosh Owner's Manual, Apple dealership or a Local User Group. After you are comfortable with the operation of your computer we then suggest you read this manual which describes installation procedures in detail. Should you need assistance please contact your dealer.

Thanks

Thanks again for choosing a CMS Product, we trust you will enjoy its use.

Before You Begin

Fill out the enclosed registration card and mail it to CMS Enhancements, Inc. Mailing the registration card will protect your warranty and make you a registered owner for needed repairs should they occur.

Feedback To CMS

Your comments assist us in improving our products. CMS welcomes any comments that you may wish to share about its products.

Please submit comments to:

CMS Enhancements, Inc.
Apple Marketing Department
1372 Valencia Avenue
Tustin, CA 92680

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SETTING UP YOUR HARD DISK

Models: SC20/A2S, SC40/A2S, SD20/A2S, SD43/A2S and SD60/A2S.
(The "A2S" designates a ProDOS system)

Setup Procedure

This ProDOS hard disk system was shipped factory formatted, with ProDOS installed, and was designed for quick and easy installation. All that must be done is to install the "A2S", SCSI II Interface Card, connect the hard disk with the drive cable, plug in the hard disk and boot the system.

If for some reason you received a hard disk that was shipped formatted for a Macintosh and a stock "A2S" SCSI II Interface Card, then you must set the interface card to operate with this particular SCSI hard disk. Instructions for this setting can be found in the back of the manual. Before you boot the hard disk, please continue to read this manual.

MINIMUM SYSTEM CONFIGURATION

Minimum System

Apple IIe Standard IIe with Monitor, 80 Column/Extended Memory Card, 5-1/4" Floppy Drive, CMS SCSI II Interface Card, CMS SCSI Hard Disk.

Optional Apple IIe Mouse and Enhanced ROMS to run Desk Top II Selector or other programs requiring a mouse.

Apple IIgs Standard Apple IIgs with Monitor and Mouse, 5-1/4" Floppy Drive, CMS SCSI II Interface Card, CMS SCSI Hard Disk.

Software ProDOS 8 version 1.4 or later.

Note: Desk Top II was installed on the hard disk as a final test. A backup copy has not been furnished. This manual does not cover its use. If you think you might want to use Desk Top II, please make a backup copy from the hard disk.

CONNECTING YOUR HARD DISK

Connecting Hard Disk

1. Place the hard disk cabinet next to your computer or nearby in a place that is sturdy, cool, dry and free of excessive dust. The drive should be located so that the cable that is furnished can safely reach the SCSI connector on the backside of your computer. You must use a shielded cable to comply with the FCC rules on possible interference.

2. Check to see that your computer is turned off. Verify that the SCSI II Interface Card is set properly for the CMS Hard Disk system that you intend to run. See information starting on page 7 of this manual for help in configuring the card. After you are comfortable that the card is set properly, insert it into a empty slot. In order to auto-boot from the hard disk, you must install the SCSI II Interface Card in the highest slot available, having no other boot devices ahead of it. Slot 7 is the last one on the right side while facing the front of the computer and the one that CMS recommends you use. For those running an Apple IIgs you can go into the Control Panel and then select "Slots". You can then specify a specific slot to boot.

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Connecting Cables

3. The short flat ribbon cable, shipped attached to the SCSI II Interface Card, must be carefully routed to the nearest knockout on the back of the computer and installed using the two DB 25 female connectors with the hardware found attached to them.

   Make sure the cable is properly connected to the SCSI II Interface Card or your computer will not boot. No damage will take place if the cable is installed upside down. If the cable is not properly attached you might get a screen of odd characters or just the Basic "] " sign. When properly connected the colored stripe on the flat ribbon cable will be down or attached to pin 1 as marked on the SCSI II Interface Card.

Warning

4. You will find two DB 25 female connectors on the backside of the hard disk cabinet. Connect the shielded cable and tighten the thumb screws securely. The other end should be attached to one of the SCSI hard disk connectors on the back side your computer. AVOID DAMAGE. BE CERTAIN TO CONNECT ONLY SCSI DEVICES TO THESE CONNECTORS AND NOT A SERIAL PRINTER OR MODEM! Using the furnished power cords, plug in your computer and hard disk into a 110 Volt AC outlet. We recommend the use of surge protectors or power filters for protection of your hard disk.

Ready to Boot

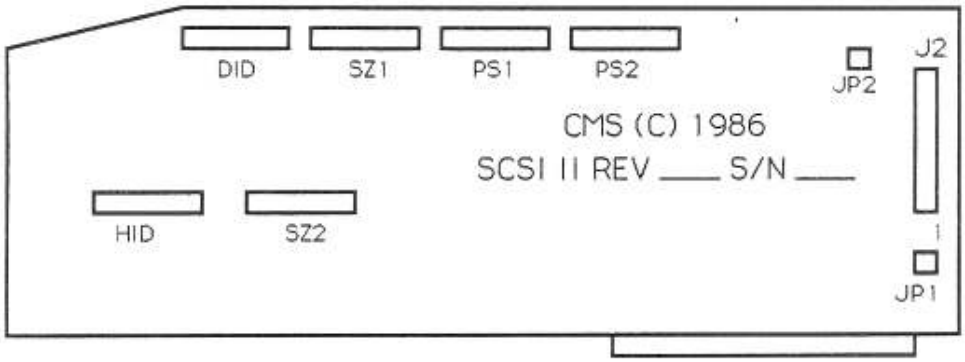
5. Now that everything is properly connected you can switch on the the hard disk and when it is ready then turn on your computer. The hard disk will come up to operational speed very quickly (about 15 seconds) and then turn on the computer. You will note that the activity light on the drive will blink slightly. A "CONTROL-RESET" should also cause the drive light to blink . If the light does not blink, the card may not be set with the proper "DID". See page 8.

   If ProDOS is properly installed on the hard disk a title screen will appear informing you that ProDOS is being loaded. If ProDOS along with a system file are not installed on the hard disk the computer will hang and not boot. If an " * " appears in the upper left corner of your monitor you will need to boot the "Filer" from a floppy drive and copy "ProDOS" and "Basic.System" to the hard disk. These files can be found on the CMS SCSI II Utility disk. To boot from your floppy disk, reset the computer by pressing the "CONTROL-RESET" keys together. Then at the Basic System prompt, "] ", type "PR#n" ("n" is the slot number of the floppy drive).The system will boot from drive one or the partition set as drive one. Drive one's ID is determined with jumpers 1,2 and 3 of DID jumper block.

6. The procedure you have just followed to start your system is called "booting". If all went well you are now ready to begin using your hard disk. Please make a backup copy of the hard disk and your CMS SCSI Utility disk. See back of this manual for trouble shooting tips.

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CMS/SCSI II INTERFACE CARD



SCSI Interface Card

The CMS/SCSI II Interface Card is compatible with an Apple IIe under ProDOS or a Apple IIgs running ProDOS 8 or ProDOS 16. It will auto boot direct from a CMS/SCSI Hard Disk System from any slot except 3. The card is best installed in an upper slot, such as slot 7. The SCSI II Interface Card will support two CMS/SCSI Hard disks or two partitions on the same drive and each can be a different size. In addition the card can be setup to allow either drive to be a "read only" volume. The settings for various size drives or partitions will be explained later.

SOME FACTS ABOUT SCSI

Facts About SCSI

The Small Computer Standard Interface (SCSI) allows 8 devices to be on the bus at once. The cable length (bus) maximum from end to end is about 20 feet. Each SCSI device must be set to a different "ID" from "0" to "7". The SCSI port on the Macintosh Plus is fixed at "7" therefore only one Macintosh can be on the bus at a time. Multiple IIe/IIgs's can be on the bus along with multiple hard disks or tape backup systems since their SCSI "ID" can be changed. ProDOS supports two drives or volumes from one slot with a maximum of 32 MB each. Each SCSI device must have its own separate "ID". The boot device will always be drive 1 (or S7,D1 if the interface is in slot #7). Each drive or volume must have its own unique name such as /CMS1 and /CMS2, etc.

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CMS/SCSI II INTERFACE CARD INSTALLATION

Looking at the SCSI II card with the component side up, you will notice 6 sets of jumper blocks each with 8 positions, and labeled as follows:

SCSI II Card Settings

DID Drive "ID". Sets the Drive "ID" to the target drive(s) from host card with read or read/write options for drive 1 and drive 2.

SZ1 Size of Drive 1 (in Megabytes) Example: 20 MB, 40mb, etc.

PS1 Starting Point of Drive 1. Example: 15 MB point on a 20mb drive.

PS2 Starting Point of Drive 2. Example: 20 MB point on a 40 MB drive.

HID Host "ID". Example: "0" to "7". Must be different on each Host Card. Pin 4 of HID with ROM version 9.24.87 determines whether the drive will be used as single or double volume.

SZ2 Size of Drive 2 (in Megabytes) Example: 20 MB, 40 MB, etc.

JP1 Reset. Jumper should be in place for single drive use.

OTHER CONNECTORS ON THE CARD

Other Connectors

J2 (26 pin header to the far right) This header is used to attach the short ribbon cable, with the two DB-25 connectors, which then attaches to the rear panel of your Apple Computer. You will note that pin "one" is marked at the bottom of the header which should be matched with the stripe in the cable when attached and the cable should flow away from the card.

JP2 Reserved for future use.

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JUMPER SETTINGS FOR SCSI II INTERFACE CARD

"DID" OR "DRIVE ID" SETTINGS FOR TARGET HARD DISK

DID Settings

	DRIVE 1			DRIVE 2		
ID	Jumpers = 1,2,3*			ID	Jumpers = 6,7,8*	
0	=	none		0	=	none
1	=	1		1	=	6
2	=	2		2	=	7
3	=	1-2		3	=	6-7
4	=	3		4	=	8
5	=	1-3		5	=	6-8
6	=	2-3		6	=	7-8
7	=	1-2-3		7	=	6-7-8

Drive 1 - Read/Write = 4
Drive 1 - Read Only = none

Drive 2 - Read/Write = 5
Drive 2 - Read only = none

***A number indicates a jumper should be in place**

"HID" OR "HOST ID" SETTINGS FOR THE INTERFACE CARD

HID Settings

ID	Jumpers 1-2-3 Only*		Jumper 4 Only **
0	=	none	(Rom v 11.09.87)
1	=	1	**ON** = Supports 2 Drives
2	=	2	**OFF** = Supports 1 Drive
3	=	1-2	
4	=	3	
5	=	1-3	
6	=	2-3	
7	=	1-2-3	

***A number indicates a jumper should be in place**

****NOTE:** HID position 4 determines single or double volumes. If Drive 1 and Drive 2 have the same SCSI ID, then HID '4' determines whether the drive will be used as a single volume or double volume. If Drive 1 and Drive 2 have different ID's, then HID '4' has no effect and the two drives ID's will always be active. This feature used on 20 MB hard disks with one partition to eliminate two identical volumes apprearing on DeskTop II and when listing volumes with the Filer.

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"PS1" AND "PS2" - STARTING POINTS IN MEGABYTES

(The starting point or points of volumes or partitions on the hard disk)

PS1 and PS2 Starting Points

Starting Point		Jumpers*	Starting Point		Jumpers*
0 MB	=	none	85 MB	=	1-2-5
5 MB	=	1	90 MB	=	3-5
10 MB	=	2	95 MB	=	1-3-5
15 MB	=	1-2	100 MB	=	2-3-5
19 MB	=	3	105 MB	=	1-2-3-5
20 MB	=	1-3	110 MB	=	4-5
21 MB	=	2-3	115 MB	=	1-4-5
25 MB	=	1-2-3	120 MB	=	2-4-5
30 MB	=	4	125 MB	=	1-2-4-5
35 MB	=	1-4	130 MB	=	3-4-5
40 MB	=	2-4	135 MB	=	1-3-4-5
45 MB	=	1-3-4	140 MB	=	2-3-4-5
50 MB	=	3-4	145 MB	=	1-2-3-4-5
55 MB	=	1-2-4	150 MB	=	6
60 MB	=	2-3-4	155 MB	=	1-6
65 MB	=	1-2-3-4	160 MB	=	2-6
70 MB	=	5	200 MB	=	1-2-6
75 MB	=	1-5			
80 MB	=	2-5			

***A number indicates a jumper should be in place.**

"SZ1" and "SZ2" - SIZE OF HARD DISK OR VOLUME IN MEGABYTES

(Sets size of multiple volumes on hard disk)

SZ1 and SZ2 Volume Size

Size of Volume		Jumpers*	Size of Volume		Jumpers*
1 MB	=	none	17 MB	=	5
2 MB	=	1	18 MB	=	1-5
3 MB	=	2	19 MB	=	2-5
4 MB	=	1-2	20 MB	=	1-2-5
5 MB	=	3	21 MB	=	3-5
6 MB	=	1-3	22 MB	=	1-3-5
7 MB	=	2-3	23 MB	=	2-3-5
8 MB	=	1-2-3	24 MB	=	1-2-3-5
9 MB	=	4	25 MB	=	4-5
10 MB	=	1-4	26 MB	=	1-4-5
11 MB	=	2-4	27 MB	=	2-4-5
12 MB	=	1-2-4	28 MB	=	1-2-4-5
13 MB	=	3-4	29 MB	=	3-4-5
14 MB	=	1-3-4	30 MB	=	1-3-4-5
15 MB	=	2-3-4	31 MB	=	2-3-4-5
16 MB	=	1-2-3-4	32 MB	=	1-2-3-4-5

***A number indicates a jumper should be in place.**

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EXAMPLES OF JUMPER SETTINGS

Jumpers settings to operate a SC20/A2S - (18.96 MB formatted capacity)

SC20/A2S SCSI Setting

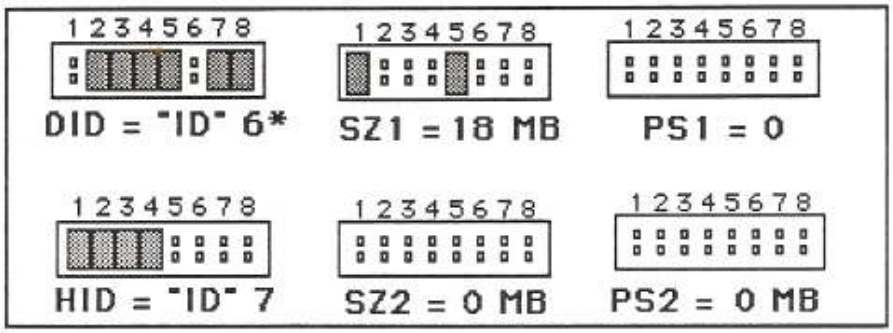
All ProDOS hard disk subsystems for the Apple IIe/IIgs were shipped formatted and with ProDOS installed. The SCSI II Interface Card was set to work with the specific hard disk system as ordered. Please test the drive before you attempt to change any of the jumper settings.

The settings below are for "One" 18 MB Hard disk with SCSI "ID" of "6" with the read/write options set active. The starting point of Drive 1 set to "0 MB". The SCSI Host "ID" was set to "7". The drive or volume must be initialized for ProDOS using the "Filer" Version 1.1 or later. Under "Volume" commands go to the "Format" option and then "Format" the Slot both for Drive 1. Do not confuse this function with the "Hard Format" found on the CMS SCSI Utility Diskette. The "Hard Format" does not write a directory thus you must use the "Filer " after a "Hard Format" and only when the jumpers have been set to proper size and starting points. After successful formatting (or initializing) each volume (with a different name) it is advisable to go to the "File" commands and "Copy" the files named "ProDOS" and "Basic.System" to drive 1.

Make sure that the "DID" of Drive 1 matches the "ID" of the target hard disk. See pages 10 and 11 of the Installation Manual for additional settings.

Jumper Settings for the SCSI II Interface Card

SCSI II Interface Setting



NOTE: HID position '4' determines single or double volumes. This feature used on 20 MB hard disks with one partition to eliminate two identical volumes appearing on DeskTop II or when listing volumes with the Filer.

SCSI HARD DISK "ID" SELECTION CHART

DIP Switch Settings on back of the cabinet

SC20/A2S ID Setting

ID	1	2	3	4	5	6	7	8
0	DOWN	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
1	DOWN	DOWN	UP	N/A	N/A	N/A	N/A	UP
2	DOWN	UP	DOWN	N/A	N/A	N/A	N/A	UP
3	DOWN	UP	UP	N/A	N/A	N/A	N/A	UP
4	UP	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
5	UP	DOWN	UP	N/A	N/A	N/A	N/A	UP
6*	UP	UP	DOWN	N/A	N/A	N/A	N/A	UP
7	UP	UP	UP	N/A	N/A	N/A	N/A	UP

***As shipped from the factory UP = ON**

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Jumper settings to operate a SC40/A2S (With two 19 MB partitions)

SC40/A2S SCSI Setting

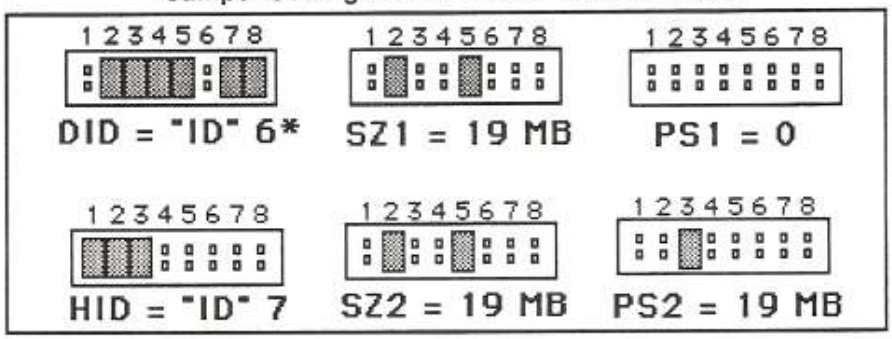
All ProDOS hard disk subsystems for the Apple IIe/IIgs were shipped formatted and with ProDOS installed. The SCSI II Interface Card was set to work with the specific hard disk system as ordered. Please test the drive before you attempt to change any of the jumper settings.

The settings below are for "One" 38.45 MB hard disk (with two 19 MB Partitions) with SCSI "ID" of "6" with the read/write options set active. The starting point of Drive 1 (partition) set to "0 MB". The starting point of Drive 2 (partition) set to 19 MB. The SCSI Host "ID" was set to "7". The size of each volume set to 19 MB. Each drive or volume must be initialized for ProDOS using the "Filer" Version 1.1 or later. Under "Volume" commands go to the "Format" option and then "Format" the Slot both for Drive 1 and Drive 2 (or Partition 1 and Partition 2). Do not confuse this function with the "Hard Format" found on the CMS SCSI Utility Diskette. The "Hard Format" does not write a directory thus you must use the "Filer " after a "Hard Format" and only when the jumpers have been set to proper size and starting points. After successful formatting (or initializing) each volume (with a different name) it is advisable to go to the "File" commands and "Copy" the files named "ProDOS" and "Basic.System" to drive 1.

Make sure that the "DID" of Drive 1 and Drive 2 matches the "ID" of the target hard disk. See pages 10 and 11 of the Installation Manual for additional settings.

Jumper Settings for the SCSI II Interface Card

SCSI II Interface Setting



NOTE: HID position '4' determines single or double volumes. This feature used on 20 MB hard disks with one partition to eliminate two identical volumes appearing on DeskTop II or when listing volumes with the Filer.

SCSI HARD DISK "ID" SELECTION CHART

DIP Switch Settings on back of the cabinet

SC40/A2S ID Setting

ID	1	2	3	4	5	6	7	8
0	UP	UP	UP	N/A	N/A	N/A	N/A	UP
1	DOWN	UP	UP	N/A	N/A	N/A	N/A	UP
2	UP	DOWN	UP	N/A	N/A	N/A	N/A	UP
3	DOWN	DOWN	UP	N/A	N/A	N/A	N/A	UP
4	UP	UP	DOWN	N/A	N/A	N/A	N/A	UP
5	DOWN	UP	DOWN	N/A	N/A	N/A	N/A	UP
6*	UP	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
7	DOWN	DOWN	DOWN	N/A	N/A	N/A	N/A	UP

***As shipped from factory UP = ON**

The SC40/A2S Auto Parks

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Jumpers Settings for a SD20/A2S - (20 MB) with one 20 MB volume.

SD20/A2S SCSI Setting

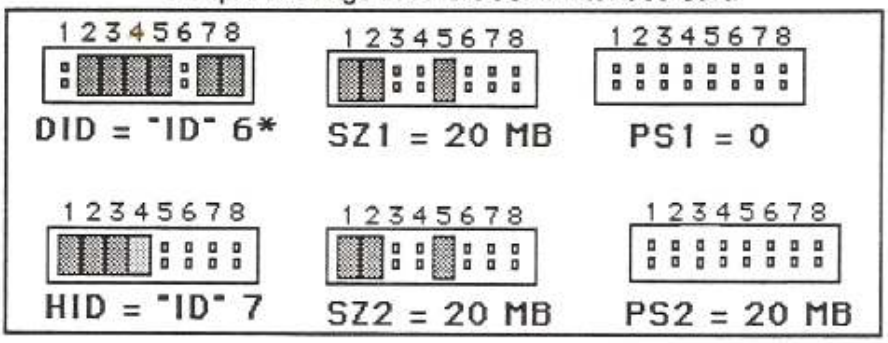
All ProDOS hard disk subsystems for the Apple IIe/IIgs were shipped formatted and with ProDOS installed. The SCSI II Interface Card was set to work with the specific hard disk system as ordered. Please test the drive before you attempt to change any of the jumper settings.

The SCSI II Host Card set for "One" 20 MB Drive with a SCSI "ID" of "6". The read/write option is set active (DID Jumpers 4 and 5). "SZ1" is the size of the volume and is set to 20 MB. "SZ2" is not needed since there is only one volume on this drive. "PS1" is the starting point for the first volume and is set to "0 MB". "PS2" is not needed since there is only one volume on this drive. The Host "ID" is set to "7". If needed go to the Filer's "Volume" commands and "Format" D1. Do not confuse this function with the "Hard Format" found on the CMS SCSI Utility Diskette. The "Hard Format" does not write a directory thus you must use the "Filer " after a "Hard Format". The "Hard Format" only needs to be used when you have verified that the hard disk has developed bad blocks. The jumpers must be set to the proper size and starting points first. After successful formatting (or initializing) the volume it is then advisable to go to the "File" commands and "Copy" the files "ProDOS" and "Basic.System" to Drive 1 or first volume on the hard disk. If this is successful then you can boot from the hard disk into Basic and begin to move applications and data to the hard disk.

Make sure that the "DID" of Drive 1 and Drive 2 matches the "ID" of the target Hard disk. See pages 10 and 11 of the Installation Manual for additional settings.

Jumper Settings for the SCSI II Interface Card

SCSI II Interface Setting



NOTE: HID position '4' determines single or double volumes. This feature can be used with 20 MB hard disks with one partition to eliminate two identical icons showing on DeskTop II or identical volume names of drive 1 and drive 2 when listing volumes with the Filer.

SCSI HARD DISK "ID" SELECTION CHART

DIP Switch Settings on back of the cabinet

SD20 ID Setting

ID	1	2	3	4	5	6	7	8
0	DOWN	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
1	DOWN	DOWN	UP	N/A	N/A	N/A	N/A	UP
2	DOWN	UP	DOWN	N/A	N/A	N/A	N/A	UP
3	DOWN	UP	UP	N/A	N/A	N/A	N/A	UP
4	UP	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
5	UP	DOWN	UP	N/A	N/A	N/A	N/A	UP
6*	UP	UP	DOWN	N/A	N/A	N/A	N/A	UP
7	UP	UP	UP	N/A	N/A	N/A	N/A	UP

*As shipped from the factory UP = ON

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Jumper Settings for a SD43/A2S - (43 MB) with two 20 MB volumes.

SD43/A2S SCSI Setting

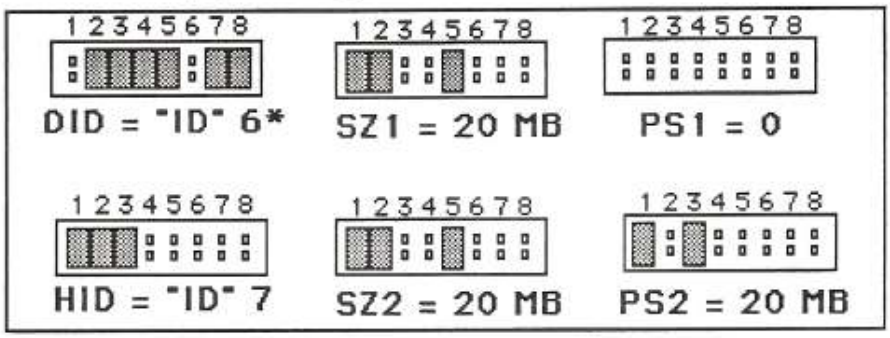
All ProDOS hard disk subsystems for the Apple IIe/IIgs were shipped formatted and with ProDOS installed. The SCSI II Interface Card was set to work with the specific hard disk system as ordered. Please test the drive before you attempt to change any of the jumper settings.

The SCSI II Host Card settings below are for "One" 43 MB Drive with a SCSI "ID" of "6". The read/write option is set active for both volumes (DID Jumpers 4 and 5). "SZ1 and SZ2" is the size of the volume and both are set to 20 MB each. "PS1" is the starting point for the first volume and is set to "0 MB". "PS2" is the starting point of the second volume and is set to "20 MB". The Host "ID" is set to "7". The drive was shipped initialized for ProDOS using Apple's ProDOS Utility "Filer" Version 1.1. If needed go to the Filer's "Volume" commands and "Format" the Slot both D1 and D2. Do not confuse this function with the "Hard Format" found on the CMS SCSI Utility Diskette. The "Hard Format" does not write a directory thus you must use the "Filer " after a "Hard Format". The "Hard Format" should be used when you have verified the hard disk and bad blocks found. The jumpers must be set to the proper size and starting points first. After successful formatting (or initializing) the volumes it is then advisable to go to the "File" commands and "Copy" the files "ProDOS" and "Basic.System" to Drive1 or first volume on the hard disk. If this is successful then you can boot from the hard disk into Basic and then you can begin to move applications and data to the hard disk.

Make sure that the "DID" of Drive 1 and Drive 2 matches the "ID" of the target hard disk. See pages 10 and 11 of the Installation Manual for additional settings.

Jumper Settings for the SCSI II Interface Card

SCSI II Interface Setting



SCSI HARD DISK "ID" SELECTION CHART
DIP Switch Settings on back of the cabinet

SD43A2S IDSetting

ID	1	2	3	4	5	6	7	8
0	DOWN	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
1	DOWN	DOWN	UP	N/A	N/A	N/A	N/A	UP
2	DOWN	UP	DOWN	N/A	N/A	N/A	N/A	UP
3	DOWN	UP	UP	N/A	N/A	N/A	N/A	UP
4	UP	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
5	UP	DOWN	UP	N/A	N/A	N/A	N/A	UP
6*	UP	UP	DOWN	N/A	N/A	N/A	N/A	UP
7	UP	UP	UP	N/A	N/A	N/A	N/A	UP

***As shipped from the factory UP = ON**
The SD43/A2S Auto Parks at Power Down.

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Jumper Settings for a SD60/A2S (62.4 MB) with two 30 MB volumes.

SD60/A2S SCSI Setting

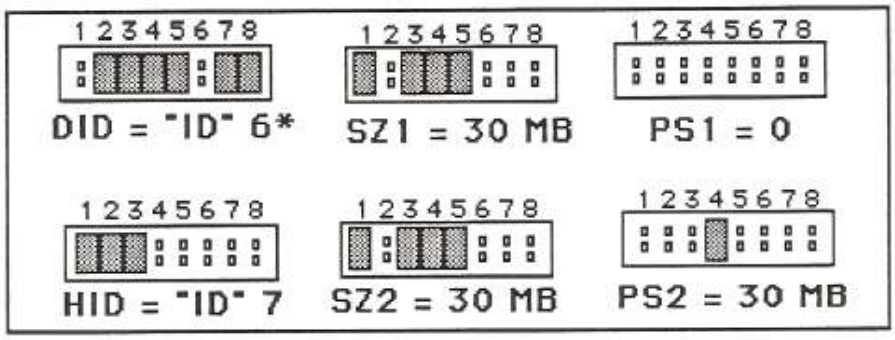
All ProDOS hard disk subsystems for the Apple IIe/IIgs were shipped formatted and with ProDOS installed. The SCSI II Interface Card was set to work with the specific hard disk system as ordered. Please test the drive before you attempt to change any of the jumper settings.

The SCSI II Host Card settings below are for "One" 60 MB Drive with a SCSI "ID" of "6". The read/write option is set active for both volumes (DID Jumpers 4 and 5). "SZ1 and SZ2" is the size of the volume and both are set to 30 MB each. "PS1" is the starting point for the first volume and is set to "0 MB". "PS2" is the starting point of the second volume and is set to "30 MB". The Host "ID" is set to "7". The drive was shipped initialized for ProDOS using Apple's ProDOS Utility "Filer" Version 1.1. If needed go to the Filer's "Volume" commands and "Format" the Slot both D1 and D2. Do not confuse this function with the "Hard Format" found on the CMS SCSI Utility Diskette. The "Hard Format" does not write a directory thus you must use the "Filer " after a "Hard Format". The "Hard Format" should be used when you have verified the hard disk and bad blocks found. The jumpers must be set to the proper size and starting points first. After successful formatting (or initializing) the volumes it is then advisable to go to the "File" commands and "Copy" the files "ProDOS" and "Basic.System" to Drive 1 or first volume on the hard disk. If this is successful then you can boot from the hard disk into Basic and then you can begin to move applications and data to the hard disk.

Make sure that the "DID" of Drive 1 and Drive 2 matches the "ID" of the target hard disk. See pages 10 and 11 of the Installation Manual for additional settings.

Jumper Settings for the SCSI II Interface Card

SCSI II Interface Setting



SCSI HARD DISK "ID" SELECTION CHART
DIP Switch Settings on back of the cabinet

SD60/A2S ID Setting

ID	1	2	3	4	5	6	7	8
0	DOWN	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
1	DOWN	DOWN	UP	N/A	N/A	N/A	N/A	UP
2	DOWN	UP	DOWN	N/A	N/A	N/A	N/A	UP
3	DOWN	UP	UP	N/A	N/A	N/A	N/A	UP
4	UP	DOWN	DOWN	N/A	N/A	N/A	N/A	UP
5	UP	DOWN	UP	N/A	N/A	N/A	N/A	UP
6*	UP	UP	DOWN	N/A	N/A	N/A	N/A	UP
7	UP	UP	UP	N/A	N/A	N/A	N/A	UP

***As shipped from the factory UP = ON**
The SD60/A2S Auto Parks at Power Down.

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HOW TO CONNECT MORE THAN ONE COMPUTER

Connecting More than One Computer

It is possible to connect 8 total SCSI devices to the same bus (cable). All devices must have an "ID" number different than the others. The total bus length of about 20 feet is all the system can tolerate and transfer data properly. Use the work sheet found on page 20 to plan a multi-device system. Below is an example of a 3 computer and 1 hard disk system in which files can be shared safely without directory crash. The 10 MB volume can contain the application programs shared by all three computers and for data for computer 1. The first 5 MB volume would be the data volume for computer 2, the 2nd 5 MB volume would be the data volume for computer 3. Files can be shared safely with the read only option.

20 MB Hard disk - "ID" = 6 and partitioned as follows: 10MB, 5 MB, 5 MB.

Computer 1 - Host Card - "HID" = 7
Drive 1 "DID" = 6 with read/write active, Drive 2 "DID" = 6 with read only.
Size of Drive 1 - "SZ1" = 10 MB, Size of Drive 2 - "SZ2" = 5 BM
Starting Point of Drive 1 - "PS1" =0 MB", Starting Point of Drive 2 - "PS2" = 10 MB.
This computer can read and write to the 10 MB volume and read only from the first 5 MB volume.

Computer 2 - Host Card - "HID" = 5
Drive 1 "DID" = 6 with read only, Drive 2 "DID" = 6 with read/write active.
Size of Drive 1 - "SZ1" = 10 MB, Size of Drive 2 - "SZ2" = 5 BM
Starting Point of Drive 1 - "PS1" =0 MB", Starting Point of Drive 2 - "PS2" = 10 MB.
This computer can read only from the first 10 MB volume and read/write to the first 5 MB volume

Computer 3 - Host Card - "HID" = 4
Drive 1 "DID" = 6 with read only, Drive 2 "DID" = 6 with read/write active.
Size of Drive 1 - "SZ1" = 10 MB, Size of Drive 2 - "SZ2" = 5 BM
Starting Point of Drive 1 - "PS1" =0 MB", Starting Point of Drive 2 - "PS2" = 15 MB.
This computer can read only from the first 10 MB volume and read/write to the second 5 MB volume

A WORD ABOUT TERMINATION

Termination

Your CMS SCSI Hard Disk and the SCSI II Interface card both are properly terminated. There is no need to remove or add termination when connecting other CMS SCSI Hard Disk Subsystems.

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INITIALIZING A MACINTOSH DRIVE FOR ProDOS

Initializing a Macintosh Drive

All ProDOS hard disk subsystems for the Apple IIe/IIgs are shipped formatted and with ProDOS installed. The SCSI II Interface Cards was set to work with the specific hard disk system as ordered. First test the system before you attempt to change any of the jumper settings.

If you are converting a Macintosh formated hard disk into a ProDOS system then you must check to see that the SCSI II Interface Card is properly set before booting. See example settings of the SCSI II Interface Card for each specific hard disk. To convert a Macintosh formatted hard disk into a ProDOS system, you must boot the CMS SCSI II Hard Disk Utility and execute the "FILER". Select V(olume Commands and then F(ormat Slot 7, Drive 1. If two volumes then Format Slot 7, Drive 2 as well. This "Format" function actually initializes the drive as ProDOS and is not to be confused with "Hard Format" or a low level format. A ProDOS hard disk can be converted back to Macintosh by attaching it to a Macintosh and Initializing with the CMS Macintosh SCSI Utility. Jumper JP1 on the SCSI II Interface Card must be in place as well as DIP Switch No. 8 on back of the hard disk cabinet should be down or off. With these jumpers in place OPEN APPLE- CONTROL-RESET will properly reset the drive when needed. If the system should ever be converted back to Macintosh then DIP Switch No. 8 must be up so that the hard disk will boot.

FINAL INSTALLATION CHECK

Final Check

Double check to see that all jumpers are set properly. Before installing the card you must attach the short ribbon cable to the 26 pin header labeled J2. Make sure the colored stripe is down and that all pins are connected properly. Now install the card in the slot of your choice except slot 3. We suggest you boot direct from the hard disk, thus in an Apple IIe the SCSI II Card must be installed in an upper slot such as slot 7. In an Apple IIe, if you have a boot device in a slot number higher than the CMS/SCSI II Card, it will boot first. In an Apple IIgs you may use the control panel and set the boot slot, which is recommend since it will find the boot device faster. Use the hardware furnished to attach the two DB-25 connectors to the back panel of your IIe/IIgs. Double check to see which two knock-outs best suit your needs. Two connectors are provided to make it easy to daisy chain other CMS/SCSI Hard disks or other Apple IIe/IIgs computers.

Now that the SCSI card is installed you are ready to connect your hard disk. Attach the furnished shielded cable to one of the SCSI connectors on the hard disk. Then the other end to one of the SCSI connectors on your Apple Computer. Power up your hard disk, allowing it to come up to speed before you boot your Apple Computer. ProDOS, Basic.System along with Desk Top II was installed on the hard disk before it was shipped. If all is well you should boot into the Desk Top II Selector. Type the "Q" to continue to the Desk Top. NOTE: Make a backup of the contents of the hard disk. This was installed as a courtesy and no other backup of this software is furnished.

Upon boot, should the monitor (*) appear then type in the SLOT NUMBER of your floppy drive, such as 7, then hold down CONTROL and type the "P", after which press RETURN which should boot the hard disk. If this does not work, boot the CMS SCSI II Utility Disk. Reset the computer by pressing the CONTROL and RESET keys together. A "] " cursor should appear, then type in "PR#6" and touch RETURN. From the menu select the "FILER" and then select

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VOLUME Commands. Under the VOLUME Commands select LIST. This will LIST all volumes on line by slot number and volume name and will indicate if the computer and the drive are connected. If the slot does not show then check all connections and reboot. The system will not work unless you can LIST the slot.

Detect Bad Blocks

The DETECT BAD BLOCKS found on the "FILER" can be used to verify the disk to see if it contains bad blocks. If it does you might want to use the FORMAT command of the "FILER". If you have "two" Drives or Partitions, FORMAT each drive and give each a unique volume name. It takes only a split second to Format (initialize) each drive. Check to see if any bad blocks remain and if they do then use the Hard Format Option on the CMS SCSI II Utility. This will take a few minutes and when this is finished you must initialize each volume using the "FILER" format option. After formatting the drive go to the option called "BLOCK ALLOCATION" and check to see that each drive has the correct number blocks. If the proper number of blocks do not appear then check to see that the jumpers are correct. If not correct the jumpers and FORMAT with the "FILER" again. Note: 20 MB = 40,000 blocks, etc.

Now that you have initialized your CMS/SCSI Hard disk for ProDOS you must move at least the files ProDOS and BASIC.SYSTEM to the root level in order to auto boot the hard disk. You will find these two files on the CMS SCSI II Utility diskette. ProDOS 8 and ProDOS 16 can reside on the drive at the same time by placing ProDOS-16 under a sub-directory along with a sub-directory called "System" under which you copy all the System files needed to run the Launcher. Remember that ProDOS volumes can have only 51 files on the root level. Thus making sub-directories helps to organize your drive. For example a sub-directory called /CMS1/PROGS would be a good place to keep programs. It would even be better to extend this to include sub-directories for each program. For example: /CMS1/PROGS/AW could be for the program AppleWorks, etc.

USING YOUR HARD DISK EFFICIENTLY

Using Hard Disk

File operations are performed with your hard disk just as they are with floppy disks. Applications and files are moved to hard disk using similar utilities that you copy files to floppy disk. Remember that under ProDOS you can only have 51 files on the Root or first level of your directory. Since a 20 MB Hard disk allows you to store up to 144 floppy disks worth of information, some care should be taken when you are organizing the contents of your disk. We would like to propose a few suggestions that we hope will simplify the business of organizing and maintaining the contents of your hard disk directory.

For Programs, for instance, you might create a sub-directory called "PROGS" (keep names short). Then under "PROGS" you will want a different Sub-sub-directory for each program moved to the hard disk. For information on how to create sub-directories refer to the ProDOS Users manual. See example later on about moving programs and creating directories on hard disk.

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FORMATTING AND INITIALIZING

Your CMS/SCSI Hard disk comes factory pre-formatted. Consequently, there is no need to run the format routine found on the CMS Hard Disk Utility program included with the software for your hard disk, also included is "Apples System Utility or FILER". The "Filer" is used to initialize the hard disk after you have done a hard format. But use only if you have experienced a disk failure or wish to erase your disk.

Running the CMS Hard Disk Utility - "Format" program will completely erase the contents of your hard disk. Make sure that all of your valuable software has been backed up on floppies before you run the program. THERE IS NO NEED TO USE THE HARD DISK UTILITY UNLESS A PROBLEM ARISES!.

1. Be certain that your CMS/SCSI Host Card is properly installed!

2. Installed the CMS Hard Disk Utility diskette is in floppy Drive 1.

3. Turn on your Hard Disk first and then power up your computer.

4. Your hard disk might attempt to boot with this arrangement, so do what is needed to boot the floppy. (Break to the Cursor by pressing Control and Reset together, then typing in PR#n and then RETURN. Or if the computer shows an " * " hold down CONTROL and then "n" and RETURN. ("n" is the slot number of your floppy drive) The floppy drive should start to spin and a menu should appear shortly.

5. To hard format select the first item, [F] HARD FORMAT. The LED indicating disk activity should light up and you might hear the hard disk clicking, etc. This will take a few minutes. After a "hard format" you will need to use the"Filer" to complete the format procedure.

6. To initialize a volume boot the "Filer" found on the CMS/SCSI Utility. Select "V" for VOLUME COMMANDS and a second menu will appear. Now select "F" for Format. Answer the next prompt for a Slot Number with "7" (or the slot number of the hard disk you want to format) and the Drive Number with a "1" (if a two drive system then select 1 or 2 depending on which drive you want to format). Next a prompt will appear with a random name which you can change or accept. If you desire a new name then change it and press RETURN. You will then be prompted DESTROY "/" Y/N?. Answer this with a "Y" and quickly the "Filer" gives the drive the Volume Name selected and states that "Format Complete".

7. You may press ESCAPE and go back to the Volume Commands menu and verify the volume by selecting "LIST VOLUMES" which should give you a complete listing of all Volumes on line. You might also want to run the "DE-TECT BAD BLOCKS" to verify that the volume is good and has no bad blocks on it. This will take a few minutes but is well worth the satisfaction to know your disk is perfect before adding programs and data to it. During this BAD BLOCK SCAN you will notice that the LED responding to disk activity came on and stays on and should flicker slightly as it reads the complete disk.

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8. If the system hangs up and the light never goes out it would be best to reformat the drive and try the Detect Bad Blocks again. If this fails we suggest you call your dealer for help.

   Note: If at anytime during any of the above operations, the LED Disk Activity Light comes ON and stays ON you might need to reset the controller by powering the drive down, for only a second or two, and then turning it right back ON. Sometimes after pressing CONTROL AND RESET the system gets confused thus a power OFF and ON will reset it and allow normal operation.

9. If no bad blocks appear then install applications programs or data

BACKING UP YOUR HARD DISK

Backup

Hard disks are mechanical devices, and inherent in any mechanical system is the possibility of failure from abuse, mishandling, or other anomalous operating conditions. If your disk ever suffers a catastrophic failure, uncommon though it may be, all the information it contains could be lost or irreparably damaged. For this reason, we highly recommend that you back up your data files on a regular basis. There is only one hard and fast rule governing backup: If you can't afford to lose it, keep it backed up. In general, there is no need to back up your application programs onto floppy disks. In most cases this would be a waste of time and floppy disk storage, because you already have a master disk of the programs. It is far more important to back up the documents and data you create.

File backup is achieved by copying your valuable ProDOS files from the Hard Disk to a floppy. The process for backing up your files is very simple, use the CMS version of Apple's Backup II. Instructions for using Backup II will be covered later on in this manual.

The next question is usually "How often should data be backed up?" A good guideline is to back up a file whenever major revisions have been made. (Incidentally, backing up data stored only on floppy disks is a good idea since floppy disks do occasionally "go bad" as well.)

HANDLING YOUR HARD DISK SYSTEM

Handling Your Hard Disk

Your CMS Hard Disk is a high-precision hard disk and unlike floppy disks most people are used to, hard disks require gentle treatment, especially when they are in use.

An operating hard disk is constantly spinning at a very high speed. Information stored on the disk's hard magnetic surface is read by disk heads that float on a cushion of air above the disk. The heads are generally close to the disk surface because this arrangement allows the maximum density of information to be placed on the disk. Unfortunately, having the heads at such close proximity to the disk increases the chance that a shock may cause the heads to hit the disk surface. Contact between the heads and the disk often causes no damage to either. However, if the shock is great enough, a condition known as a "head crash" may result. A head crash can destroy the disk and data on it.

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The following guidelines for the handling of your hard disk will help insure a long and reliable life:

1. Never move or jar your hard disk cabinet while its operating.
2. Before transporting your drive, use the "Park Heads to Ship" program.
3. When transporting your hard disk system, use a padded container. When shipping, use the original packing materials or similar amount of soft foam.

If you are moving the hard disk around your office or home, just "QUIT", and turn off the drive and the Apple, disconnect them, and then move them one at a time. Remember that executing the "Park to Ship" routine, found on the CMS Utility Disk, parks the drive heads properly, giving an added margin of safety during transportation. In addition to using added padding (such as the original packaging), try to transport it in a relatively protected location. For example, when traveling by car, place the drive in the passenger compartment, not the trunk.

COMMENTS CONCERNING PERFORMANCE

Performance

Your CMS/SCSI Hard disk uses a high-speed controller and therefore transfers data much faster than the other hard disks that use older controllers. However, since much of the delay (waiting time) in transferring data to and from the disk is caused by processor overhead in the computer, you will notice a tremendous variance in performance depending on the task. So that you can understand what is going on and get the most out of your new drive, this section briefly explains certain factors that affect disk speed. What has become evident with the arrival of very fast peripherals is that much of the blame for slow speed has been misplaced. The rate-limited factor is often the CPU.

For example, AppleWorks, about a 194k program (V1.3 selected from Desk Top II), loads in approximately 7 seconds to the Main Menu (about 27 Kbytes per second). This is faster than most other drives can load it. However, your CMS/SCSI Hard disk will load a 100K AppleWorks document in less than 20 seconds (about 5 Kbytes per second). What the vast difference in data transfer rates indicates is that your hard disk subsystem is spending much of its time waiting for the processor to arrange the program in the computer. In contrast, when loading the document, the processor is moving data more of the time.

Another factor is that the drive often spends more time searching the disk for data, than while it is loading an application. This is due in part to the fact that data frequently gets scattered on the hard disk, whereas program files tend to be contiguous blocks of information.

We suggest to those who own a Twin CMS/SCSI Hard Disk Subsystem, that an occasional back-up to and from the second drive will greatly speed up your disk access time since files will be copied in contiguous order and the hard disk then does not have to gather data from scattered areas on the hard disk.

Backup II is furnished on the CMS SCSI II Utility diskette. See the section on Backup II on how to use the program.

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HOW TO INSTALL ProDOS PROGRAMS

Installing programs like AppleWorks on your CMS/SCSI Hard Disk System is very easy. First point to remember is that ProDOS only allows 51 files on the root level. The "root level" is the very first level of file names below the volume name. If you exceed this level of file names you will get a "Disk Full" error, when you try to save a file, even though the hard disk is not full. Its best to make a sub-directory with any needed sub-sub-directories, then move new programs and data to the hard disk accordingly. The number of files possible under a sub-directory is far greater than one will ever use. Just remember the "/" slashes are like rungs in a ladder. You must touch each rung going up. In other words you cannot get to 3rd level without using the 1st and 2nd level in the path name.

EXAMPLE OF PATHNAMES AND SUBDIRECTORY LEVELS

(1) (2) (3)	
/CMS1/PROGS/AW	**"AW"** the sub-directory to place Apple Works program.
/CMS1/PROGS/GW	**"GW"** the sub-directory for Graph Works program.
/CMS1/PROGS/DD	**"DD"** the sub-directory for Dazzle Draw, etc.

(1) = Volume Name of Hard Disk.
(2) = Sub-directory for installing all your programs. Maximum number of file names at this level is 51.
(3) = Sub-Sub-directory for the actual Programs. No limit of file names here.

Add as many sub-directories as needed to properly place all the programs you will add to disk. This is good for keeping programs separated, which makes it easy to maintain. Data Files for these programs could be kept under /CMS1/DATA/AW or GW for example.

BENEFITS

1. Sub-directories are like file cabinets and file drawers and file folders. Sub-directories help organize a hard disk for ease of finding files and to help one to know what files belong together.

2. Data files by necessity must be backed up often. If all data files are kept under a sub-directory, such as "/CMS/DATA", then backing up will be easy.

HOW TO CREATE A SUBDIRECTORY

Creating Sub-directories

Use the ProDOS Users Disk or System Utilities or Desk Top II or most any other program that allows creation of a directory. Remember you cannot create the third sub-directory (3) without creating the first two levels (1) and (2) beforehand. You must think of it like climbing a ladder. You must create a rung at a time to get to the last level. Each rung is represented by a "/" in ProDOS. So one would create /CMS1/PROGS and then create /CMS1/PROGS/AW next and so on as needed.

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COPYING APPLEWORKS TO HARD DISK

Copying Software to the Hard Disk

1. First CREATE the sub-directory as described above " /CMS1/PROGS/AW".

2. Using the Filer or System Utilities or Desk Top II, etc., copy the contents of both disks into this sub-directory. No need of copying ProDOS again since it should reside once on the disk at the root level only.

3. Some utilities, such as the "ProDOS Filer", do not copy files found under sub-directories thus its best to use Desk Top II or System Utilities from Apple Computer for this purpose. These programs will copy all files including those found under sub-directories.

HOW TO USE THE CMS HARD DISK UTILITY

Using the CMS SCSI Utility

This CMS SCSI Utility Disk is to be used with great care! It can and will destroy all the data on your Hard Disk if not used with care and understanding. Don't boot this disk to take a joy ride! If your curious about what is on this disk then turn your hard disk off and then boot it. By doing this you will eliminate the chance of erasing everything on your hard disk. Again this is a special tool to be used only if something happens to the drive.

CMS/SCSI II HARD DISK UTILITY PROGRAM

[T] TEST HARD DISK **(Prompts for Slot Number)**

[F] HARD FORMAT

[P] PARK HEADS TO SHIP

[R] ProDOS UTILITY "FILER" - V 1.1

[Q] TO QUIT

—> USE ARROW KEYS TO SELECT MODEL <—

HOW TO USE THE ABOVE FUNCTIONS

Note: Press RETURN after selecting a letter.

[T] Use this routine to verify drive over night. This program will fill the drive with files, one after the other. It is best if old files are deleted before testing the drive. Use the Filer to format the drive which will erase files.

[F] Use this function to start the Format function. It will prompt you to make sure you want to perform this operation. Takes about 1/2 minute per MB. Afterwards, use the Filer to Format (Initialize) each volume.

[P] Use this function to Park the Heads to Ship the drive. There is no need to perform a head park unless you are going to move or ship the drive.

[R] Use this routine to boot the ProDOS Utility Filer V 1.1.1

[Q] Use this to Quit

—> USE ARROW KEYS TO SELECT MODEL <—

Select the proper model number prior to performing Format, Test or Park.

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HARD DISK BACKUP WITH AN APPLE II

Introduction

Introduction

This chapter describes how to use the Backup II program. It is written for both new and experienced computer users and provides a brief overview of the program with step by step instructions for backing up, listing, and restoring files. Backup II will only read ProDOS files. It will not work for DOS 3.3 or with Pascal.

The Backup II program allows you to back up a file from your CMS hard disk—that is, save it on 3.5-inch disks or on 5.25-inch disks so that you can recover its information if the original file is lost or damaged. The backed up files are unreadable by programs other than Backup II. Backup II then allows you to restore the file to a CMS hard disk—that is, recover information from backup disks and restore it to its original state.

The instructions that follow presume that hard disk has been named, "CMS". If you have renamed it, you will need to substitute the volume name you chose whenever the volume name "CMS" appears.

When to Use Backup II

When to Use Backup II

To use Backup II, you must carefully consider your needs and choose an appropriate backup strategy. It is possible to keep a precise backup of all your files by doing weekly full-volume backups and daily incremental backups (that is, backups of files modified since the last full backup). However, keep in mind that backing up the entire contents of a 20-Megabyte hard disk requires "144" 5.25-inch disks (or approximately "25" 3.5-inch disks) and a lot of your time. You should consider doing infrequent full-volume backups and concentrate on backing up important files and directories only. If the set of incremental backup disks become larger than the original full-volume backups, then you should consider starting over with a new full-volume backup.

Remember, you can also use the "Copy Files" command from the "ProDOS Filer" to make copies of important files and store them on disks.

Volume Vs. Sub-Volume

Volume Vs. Sub-Volume

When making a backup of your files, Backup II transfers data from one volume to another. You can choose to back up either a full volume or a sub-volume. You can also choose to include either all files from the volume or sub-volume, or only the files you've modified since the last backup.

A full-volume backup preserves all the files of the source volume, that is of the CMS, unless you specify that you want to back up only the modified files. To indicate a full-volume backup you specify "/CMS" or "/CMS/=" as the source pathname. You type the wild card '=' to indicate all files in a volume or sub-volume. A sub-volume backup preserves a selected group of files. For example, to back up only the files in the "ACCOUNTS" sub-directory, you would specify "/CMS/ACCOUNTS/=" as the pathname. Backup II automatically prompts you for the pathname during operation.

Note: Backup II supports 15 levels of sub-directories. If you want to back up a volume that has more than 15 directory levels, you must first rearrange your directory structure.

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GETTING STARTED WITH BACKUP II

You can start the Backup II program in this way:

1 Boot the CMS SCSI Utility diskette from floppy drive.

2. Quit the program and and Press RETURN to accept /CMS.SCSI.UTIL prefix. When "ENTERN PATHNAME OF NEXT APPLICATION" appears type in BACKUP.SYSTEM and hit RETURN.

   When the main menu appears, you can remove the Backup II disk from the drive. The main menu offers three options:

   B - BACKUP FILES
   R - RESTORE FILES
   Q - QUIT

   To get the "Backup Files Menu" or the "Restore Files Menu", or to exit from the program, type B, R, or Q respectively.

Backing Up Files

To perform a full-volume, sub-volume, or incremental (only modified files) backup, follow these steps. For example, these instructions will use the volume "/CMS".

1. Insert a formatted blank diskette into the floppy drive. Note: Backup II will format the disks for you if they are un-formatted, but we recommend that you format all disks before using them.

2. From the main menu type B.

3. From the "Backup Files Menu", type 'P' if you want to back up all the files in a volume or sub-volume, or type M if you want to back up only files modified since the last backup.

4. Backup II prompts you for a pathname. Type "/CMS" and press Return to back up all files on the CMS (or all modified files, if you selected the M option in the previous step). To back up files in a sub-directory, type a directory name and press Return.

   For example, type "/CMS/ACCOUNTS/=" to back up all the files in the "Accounts" sub-directory. Note: At any point in this procedure you can press Escape key to move to the previous prompt or menu.

5. Backup II prompts you for the name of the destination device. Type '6', then type '1', and press Return to specify slot 6, drive 1 (or type the appropriate slot and drive numbers if you are not using drive 1 in slot 6).

   Backup II constructs a table of contents for this backup and stores it on the first backup volume. Then it begins to transfer the information from the CMS to the backup volume. Messages on the screen inform you that the program is verifying and updating directories, and tell you when to replace the disk in the backup drive.

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As you remove disks from the drive, label them with the proper volume number and date. Backup II automatically gives each backup volume in sequence the name "BACKUP.VOLUMEn", where 'n' is the volume number.

When Backup II finishes, the following message appears on the screen:

OPERATION COMPLETE
PRESS SPACE TO CONTINUE

6. Remove the final backup volume from the drive.

7. Press the Space bar to return to the "Backup Files Menu".

8. Press Escape to return to the main menu.

Listing Files

Listing Files

Files transferred by Backup II cannot be read by other programs such as the "ProDOS Filer". You must use the Backup II program to get a directory listing of backup files. To see the directory listing, follow these steps:

1. Insert the disk "/BACKUP.VOLUME1" in the floppy disk drive.

2. After starting the program, type 'R' from the main menu.

3. From the "Restore Files Menu", type 'L'.

4. Backup II prompts you for the slot and drive numbers for the device containing the table of contents, and then asks where to send the listing. Type '6' and then '1' to specify slot 6, drive 1 (or type the appropriate slot and drive numbers if yours are different). Pressing Return sends the listing to the screen only, or type 'P' and press Return if you want a printout as well as a screen display of the listing.

   Backup II displays the listing on the screen (and prints it out also if you chose the 'P' option in instruction #4). Below the header, on the far left side of the screen, Backup II displays the message "VOLUME BACKUP" if a full-volume backup is being listed. This line is blank if a sub-volume backup is being listed.

5. If the listing is not contained on a single screen, press the Space bar to see additional screens.

6. After viewing the last screen of the listing, press Escape to return to the "Restore Files Menu".

Restoring By Volume Vs. Pathname

Restoring Volume

The files stored on backup disks are in a compressed format. This reduces the number of disks required during a backup. When you restore, you are recovering information from backup disks and restoring it to its original condition. You must use Backup II to restore files, because other programs cannot read files backed up with Backup II.
You can either restore a full volume or restore files by pathname. You use a

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full-volume restore if there has been a catastrophe and you have lost all the data on your CMS. You restore files by pathname if you want to recover specific files, for example files that you have inadvertently deleted.

Restoring a Full Volume

You can restore a full volume only if you have previously performed a full-volume backup. Before restoring an entire volume you should initialize it. Use the "CMS Utilities Disk" to initialize the hard disk. Refer to "Installing an Apple // system".

Warning: Initializing erases all data on the disk. Be certain that you don't need any of the information on the disk before reformatting.

To restore a volume, follow these steps:

1. Insert the disk "/BACKUP.VOLUME1" into the floppy disk drive.

2. After starting the program, type 'R' at the main menu.

3. From the "Restore Files Menu", type 'V'.

4. Backup II issues a warning and asks if you want to continue. When you restore a volume, Backup II deletes any files that were not present at the time of the backup. If there are no files you are afraid of losing, type 'Y' to proceed with the restore operation, and go to instruction #5. Otherwise, type 'N'. Backup II returns you to the "Restore Files Menu". You can select the 'P' option (described in "Restoring by Pathname" below), which does not delete any files during the restore operation.

5. Backup II prompts you for the slot and drive numbers. Type '6' and then '1' to specify slot 6, drive 1 (or type the appropriate slot and drive numbers if yours are different).

   Note: At any time you can press Escape to move to the previous prompt or menu.

6. Backup II prompts you for the name of the destination device. Type "CMS" and press Return.

7. Backup II prompts you for the listing output. Press Return if you want screen output only, or type P and then press Return if you want a printout as well as a screen display of the listing.

   Now Backup II begins transferring data. Messages on the screen keep you informed of the progress of the restoration and tell you when you need to replace the disk in the backup drive. Replace each disk with the next volume in sequence as you are prompted to do so. When the last volume has been restored, the following message appears at the bottom of the screen:

   OPERATION COMPLETE
   PRESS SPACE TO CONTINUE, <ESC> TO EXIT

8. Press the Space bar to return to the "Restore Files Menu".

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Restore in chronological order any incremental backups you have made since the full-volume backup. Use the same steps you have just followed, starting from the "Restore Files Menu" (instruction #3).

9. When you have restored your latest backup, press Escape to return to the main menu.

Restoring by Pathname

Restore files by pathname to recover specific files. You must use this option if you have not done a full-volume backup. **Note:** Backup II does not delete any files when you use this option.

To restore files by pathname, follow these steps:

Restore by Pathname

1. Insert the disk "/BACKUP.VOLUME1" into the floppy disk drive.

2. After starting the program, type 'R' from the main menu.

3. From the "Restore Files Menu", type 'P'.

4. Backup II prompts you for the slot and drive numbers. Type '6' and then '1' to specify slot 6, drive 1 (or type the appropriate slot and drive numbers if yours are different).

5. After you type the slot and drive numbers, Backup II replaces them with the volume's name and pauses to allow you to add sub-volume names, file-names, or both. Type in the sub-volume names and filenames (or use '=' to restore all files in the volume's directory or sub-directory) and press Return.

   Note: At any point in this procedure you can press Escape to move to the previous prompt or menu.

6. Backup II prompts you for the name of the destination device. Type "CMS" and press Return.

   Note: In place of the volume name you can use a slot and drive reference when you want to restore to the volume directory. Type 'S' for slot, then the slot number followed by the drive number.

7. Backup II prompts for the listing output. Press Return if you want screen output only, or type 'P' and then press Return if you want a printout as well as a screen display of the listing.

   Now Backup II begins transferring data. Messages on the screen keep you informed of the progress of the restoration and tell you if you need to replace the disk in the backup drive. If there is more than one backup volume, Backup II prompts you for required subsequent volume(s). If a file to be backed up is on a later volume, Backup II prompts you with the volume number.

If the volume that you specify as the source device is not the first backup volume,

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Backup II displays the error message

NOT THE FIRST BACKUP VOLUME

Either put in the correct disk or specify another source device. If your specified pathname does not match any of the files on the backup volume(s), the screen displays the message:

NO FILE FOUND

When the last volume has been restored, the following message appears at the bottom of the screen:

OPERATION COMPLETE
PRESS SPACE TO CONTINUE, <ESC> TO EXIT

8. Press the Space bar to return to the "Restore Files Menu".

9. Press Escape to return to the main menu.

End Backup II

TROUBLE SHOOTING

1. **THE HARD DISK WILL NOT AUTO BOOT?**
   Check all connections and make sure the hard disk is turned on and ready before attempting to boot the computer. Check the LED disk activity light. If it is on then reset controller by turning the hard disk OFF and ON. Turn on the hard disk and allow it to get up to speed before attempting to boot your computer.

Auto Boot

2. **AT TIME OF BOOT THE SYSTEM CRASHES INTO MONITOR (*).**
   Remove all interface cards in the computer and replace one at a time. This will isolate which interface card that is causing conflict. Cards that are multi-function and "act as ghost slots" must be configured so as not to conflict with the CMS SCSI interface card.

Monitor

3. **WHICH SLOT TO USE FOR HARD DISK TO AUTO BOOT?**
   The Apple II Computer starts looking in Slot 7, then 6, 5, 4, 2, 1 for a boot device that it recognizes by its ROM. Thus you place the hard disk interface card in any slot, but it is best in Slot 7. Just make sure that there is no other boot device ahead of it.

Auto Boot

4. **WHICH WAY DO THE CABLES ATTACH TO THE HOST CARD?**
   The flat ribbon cable attaches to the interface card with the stripe down or to pin 1.

Cable

5. **CAN MORE THAN ONE CMS HARD DISK BE ON LINE AT ONCE?**
   Yes as many as you have slots open. But remember Slot 3 cannot be used as an I/O slot.

More Than Hard Disk

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Other Hard Disks

6. **WILL THE HARD DISK ALLOW OTHER DISKS TO BE ON LINE?**
Yes, any ProDOS device can be on line with a CMS SCSI Drive.

Speed-Up Cards

7. **WILL SPEED-UP CARDS WORK WITH MY CMS SCSI HARD DISK?**
Yes they do work. Some speed-up cards are a bit sensitive and cause problems which seems to be related to its power supply and/or other personalities specific to the computer.

Formatting Hard Disk

8. **WHEN IS IT NECESSARY TO "FORMAT" MY HARD DISK?**
The hard format routine found on the CMS Hard Disk Utility Disk is to be used only when a disk has been damaged from transporting it, power surges, electrical storms, etc. If you use the "FILER" and go into the VOLUME COMMANDS and select DETECT BAD BLOCKS and then specify the slot number of your Hard Disk System and let this routine completely check the drive you will know if you have any bad blocks. The program will tell you how many and where and at that point decide if you need to hard format your disk. First try the soft format using the Filer. This may do the trick and is a lot faster than a hard format.

Head Parking

9. **WHEN SHOULD THE HEADS BE PARKED?**
Park the heads only when moving the system. Parking the heads is not needed, unless the drive is going to be subjected to shock, such as transporting it or from shipping. Some hard disks auto head park on power down thus no need to park the drive by software.

Cable Length

10. **HOW LONG CAN THE SCSI DISK DRIVE CABLES BE?**
About 20 feet total. Each system is slightly different so best way is to find maximum length is to add short lengths until the system fails to operate. It is best not use a star arrangement when attaching cables use a daisy chain type configuration. The use of shielded cables is a must.

Termination

11. **DO I NEED TO TERMINATE MY SYSTEM?**
CMS SCSI Hard Disk Subsystems have termination in place and operate properly with other CMS SCSI Subsystems on the same bus with no changes needed.

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WORK SHEET FOR SYSTEM CONFIGURATION

Use this sheet to record or plan your system

Hard disk 1: Installed in Slot ____ Computer No.____ : Set to "ID" No. ____

Hard disk 2: Installed in Slot ____ Computer No.____ : Set to "ID" No. ____

INTERFACE CARDS JUMPERS SET AS FOLLOWS:

Computer 1:_____**Specifications**

DID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

HID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

Computer 2:_____**Specifications**

DID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

HID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

Computer 3:_____**Specifications**

DID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

HID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

Computer 4:_____**Specifications**

DID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS1:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **PS2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

HID: _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8 **SZ2:** _:_:_:_:_:_:_:_: 1 2 3 4 5 6 7 8

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