

MicroDrive IDE Card

Low Cost Hard Disk Controller and Filecard
for MS-DOS Type IDE Hard drives

For Apple IIe and Apple IIGS Computers

User's Manual

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MICDR US 1/2000

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Help and support:

We will do our best to help you and we want you to be a satisfied customer. We want to hear from you. Please report any problems to us. We appreciate your comments and questions.

We will continue supporting the *MicroDrive Card* as long as the Apple II is alive and we can find a way to reach the Apple II community. Feel free to send e-mail for getting support for your purchase.

Apple II forever!

MicroDrive Card User's Manual

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About the *MicroDrive* Card

Congratulations! You have purchased the probably most inexpensive hard disk controller for the Apple II family!

MicroDrive is a very inexpensive solution to let all Apple II users take advantage of the simple and inexpensive interface design of IDE hard drives. Any known IDE hard disk controller for the Apple II family only supports a limited number of hard drives, whereas the *MicroDrive* supports virtually any drive available!

Features:

- Fully ProDOS and GS/OS compatible. Use all your Apple II applications with your *MicroDrive* Card.
- Compatible with Apple IIGS and Apple IIe enhanced.
- Compatible with all known hardware used today with Apple II computers.
- MicroDrive* is a non-DMA device, so it cannot have DMA problems with certain memory cards.
- Compatible with the full range of Apple memory, up to 8 MB on the Apple IIGS.
- Fully compatible with all hardware such as: ZIP GSX, Transwarp GS, PC Transporter, RAM Cards from Apple, Applied Engineering, CV-Tech, Harris, Q-Labs, Sequential Systems etc.
- GS/OS driver with GS/OS caching support included.
- Can boot a minimum GS/OS System in twelve seconds, with accelerator in nine seconds.
- Low power design (all CMOS circuits) assures reliable operation.
- Wastes no time for self-initialization compared to standard SCSI interfaces! Gives a very short warm-up time.
- Allows to boot any partition.
- Up to 8 partitions on one drive, 16 partitions at a time on two drives.
- Universal controller replacement for the Vulcan & Vulcan Gold Controller Card, even for InnerDrive systems.
- The only IDE hard disk controller (except Turbo IDE Card) for the Apple II that supports two hard disks.
- The only IDE hard disk controller for the Apple II that allows to use virtually any IDE hard drive. Other controllers only support a very limited number of drives.

MicroDrive Card Design:

Hardware, firmware, installation software and GS/OS device driver

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Getting Started with the *MicroDrive* Card

What you should have received:

- The *MicroDrive* Manual you're just reading.
- The green *MicroDrive* interface card with golden fingers.
- The *MicroDrive* utilities disk which is a standard Apple 800K disk.

In addition, depending on your order, you may have received:

- A mounting kit for putting the *MicroDrive* Card and a 2.5" notebook hard drive together. This kit also includes a short flat ribbon cable to connect your mounted 2.5" drive with your *MicroDrive* Card.
- A flat ribbon cable (3 ft.) for connecting an external 3.5" IDE hard disk..

What you should do first before doing anything else:

- Make a copy of the *MicroDrive* utilities disk and keep the original disk in a safe place!
- Delete the file PRODOS which can be found on this non-modified copy of the utilities disk.
- Use the Finder or an other GS/OS utility to copy ProDOS 8 (=P8, the 8-bit disk operating system found in the /SYSTEM folder on every bootable GS/OS System Disk) and the INSTALLER (located on the /INSTALL disk of GS/OS System 6) on your copy of the *MicroDrive* utilities disk.
- Rename the file P8 on your utilities disk to PRODOS (to make the disk bootable). Note: the disk is bootable "as is" (even if you don't copy ProDOS 8 to the disk), but you can only launch the installation program in this way.
- If you want to be perfect, you can do a printout of the README files that perhaps could be found on the disk (containing late news and additional program descriptions which could not be included with this document).
- Please be sure to read the whole manual carefully. Many hints can be found all over in this document, and there is no way to include all information on a single sheet of paper.

MicroDrive DIP Switch Setting

Read this manual carefully before attempting to install your *MicroDrive* Card. Please be very careful when working with your computer and the *MicroDrive* Card. Do not touch the gold fingers and do not bend the gold pins of the header connectors. Note that we cannot be responsible for malfunctions due to careless handling on any kind of connectors.

There are different kinds of DIP switches, depending on the manufacturer. Some DIP switches are marked **on/off**, others **open/closed**. Here is the "official" translation table:

open has the same meaning as **off**
closed has the same meaning as **on**

□ **DIP switches 1, 2 and 3** determine the slot number for the *MicroDrive* Card (representing the inverse bits 0, 1, 2 of the slot number) The *MicroDrive* Card must be located in the slot that you choose by the DIP switch setting. Your system will crash during boot time if the setting is not correct! If you ever want to use a different slot, never forget to adjust the DIP switch setting accordingly.

Slot	DIP switch			
	1	2	3	
n/a	on	on	on	(card disabled)
1	off	on	on	
2	on	off	on	
3				slot 3 not allowed!
4	on	on	off	
5	off	on	off	
6	on	off	off	
7	off	off	off	

□ **DIP switch 4**: No configuration required if present. Some cards only have three DIP switches.

On the Apple IIGS, be sure to set the *MicroDrive* slot to "Your Card" in the Control Panel.

Once again, please keep in mind: If you ever want to use a different slot, never forget to adjust the DIP switch setting accordingly.

Installing Your *MicroDrive* Card

- Set the DIP switches and jumpers correctly as described before.
- If you have an external hard disk, connect the hard drive cable to the *MicroDrive* Card. Do not bend the connector pins!! Be very careful especially when removing the cable from a connector!
- Turn off the Apple's power switch. Never insert or remove a card while your computer is turned on. You should, however, leave it plugged in to allow the power supply to absorb any static electricity from your body. Also, be sure that any other power supply involved (e.g. the hard drive's) is turned off!
- Remove the cover from your Apple.
- Touch the power supply case in the Apple to discharge any static electricity from your body. Make sure you do this because static can cause a great deal of damage to the computer chips on interface cards and in your computer.
- Select the slot into which you are going to install the *MicroDrive* Card. Align the card edge with the slot and use the heel of one hand to slowly push the card down into the slot.

Setting up the Hard Disk

(for external hard drive usage)

Important Note: Configuring a hard drive requires a user's manual. If you don't have purchased your hard disk with the *MicroDrive* Card, we cannot be responsible for the lack of a manual for your hard disk. If you have purchased a hard disk without manual and you don't know how to set it up correctly, please don't expect that we can help you! We won't. There may be a ten thousands of hard drives and you really can be sure that we don't know anything about your specific drive.

Don't buy a hard disk drive shipped without manual!!

You can use two IDE style hard drives with your *MicroDrive* Card. Both drives must be connected in the same way with only one cable which has two plugs on the hard drive's cable end. The total cable length should be no more than about 3 ft.

- If something doesn't work as expected: first try to find out whether your hard drive works on a MS-DOS machine.
- Power supply for the hard disk drives

External hard drives attached to the *MicroDrive* Card must be supplied by an external power supply. You must not supply those drives via the card's power connector. The *MicroDrive* Card was intentionally designed to not supplying power for the disk drives. Due to excessive current flow, the data integrity and proper functioning of the *MicroDrive* Card would suffer if power would be drawn via the slot connector. This is a matter of precaution, nevertheless you can use your Apple's power supply (using the lines coming out of the case directly) to supply one single hard disk. The Apple's power supply is not powerful enough to supply two hard drives!

If you are using an external power supply, be sure to use the same wall outlet as your Apple computer does (to avoid ground loop problems).

Preparing Your Hard drive

In this section, you will find a description how to install a hard disk "from scratch", i.e. if you have a new or used hard disk that isn't yet known to your Apple II system. If you have received the *MicroDrive* Card complete with hard disk, you will only have to install your System software on your hard disk. *MicroDrive* hard drive systems always come fully prepared for work, i.e. the hard disk is partitioned and every partition is pre-formatted. Here is how to start "from scratch":

- Make a copy of the *MicroDrive* Card Utilities disk as described in the introduction of this manual. Use this copy now (we call it installation disk).
- Copy the GS/OS driver from the installation disk to your GS/OS boot volume (disk or hard disk or what else). Use any copy program to copy the driver to the `/your.disk/SYSTEM/DRIVERS` folder (`your.disk` is the name of your GS/OS boot disk, for example `/INSTALL` if the System 6 installer disk will be used) The driver is not required now, but later it will speed up the installation process of GS/OS on the IDE drive (everything works fine even without a GS/OS driver, but somewhat slower).

- Boot the installation disk to run the configuration program MICRO.INSTALLER. Do not use a GS/OS program launcher.
- After you have launched the program, the screen gets blanked. If your hard disk is "virgin", you will notice a short time of hard disk activity while the screen says "one moment please....". At this time, the installation program scans your hard disk to find the operating parameters (number of cylinders, number of heads and number of sectors per track)
- After this primary and automatic setup process, you will find the parameters of your hard disk displayed on the top of the screen, right below the screen title. The only work that is left for you is to setup the number of partitions and their sizes. Press the <E> key to enter the partition editor. Now you can press <A> to add a partition or <D> to delete the current partition highlighted. Note that you cannot add a new partition as long as the last partition created is still zero blocks large. If the number of blocks is greater than zero, the partition is considered as valid, and a new one can be added. Use the left and right arrow keys with or without the Open-Apple and Closed-Apple Keys to adjust the sizes of the partitions. The up and down keys let you choose the partition to be modified. While you are setting up the partition sizes, you will find the total free number of blocks for your hard disk being growing or shrinking. You can add as many blocks as you like until the total free number of blocks is zero. You can hear a small beep if something is out of range. When you have finished creating your partition set, press <ENTER> or <ESC> to leave the partition editor. The light bar goes back to the menu list.
- Now it's time to save the information you just created. Use menu item <Write Configuration> to write your partition map and operating parameters to hard disk. The program should report success.
- Leave the Installer program by pressing ESC or using the menu item <QUIT> and confirm quitting. This is the only way you should shutdown this program.
- Reboot your Apple (this is required before the IDE drive(s) can be recognized by your card). At this time, trying to boot from the *MicroDrive* Card ends in the message "Volume not formatted" or "Unable to load ProDOS". This is OK. So you will still have to boot from an other System volume such as a System Disk or an other hard disk.
- Use any formatting utility to format your partitions. You can use GS/OS and the FINDER, the Advanced Disk Utilities or PROSEL-16 for formatting the your volumes. The default boot volume is volume (partition) number one. Holding down the OA key or the Option key while booting lets you choose an alternate boot volume by pressing the corresponding key for the volume number.
- After a complete GS/OS system has been installed on the first partition, the *MicroDrive* Card is ready for booting. To install GS/OS correctly you must use the GS/OS Installer, the Finder or another 16-bit program (such as ProSel-16) which is able to copy resource forked files. Please do not forget to copy the GS/OS driver from the installation disk to the */System/Drivers folder on any of your boot volumes (* stands for the name you choose when formatting the volume). Only with the GS/OS driver installed you will get optimum performance out of your *MicroDrive* Card.
- If you want to use two drives with your *MicroDrive* Card, you must repeat those steps listed before for your second drive. Just boot the *MicroDrive* Installer program and press <ENTER> after highlighting menu item DRIVE CHANGE. After this, continue setting up the partition map and repeat the other steps.

Changing Your Hard Disk Configuration

If you want to change anything, first boot the *MicroDrive* Card installation disk and run the MICRO.INSTALLER

The installer automatically reads the configuration block from your hard disk. Now you can make changes on your partitions or on the boot volume for example.

We recommend making hard disk backups for reason of data security. In the case something went wrong, it is also useful to have written down the complete setup parameters of your configuration.

You may change any item without the risk of loosing data, **except the parameters listed here:**

- The number of cylinders, heads and sectors
- The number of blocks assigned to each volume
- The number of volumes for your hard disk

When you have finished modifying your configuration, save the configuration block by writing it back to your hard disk (menu item Write Configuration).

Every time you want to do that, you will get a warning message to remind you that you may loose your data on the hard disk. The message appears whether or not you made changes to the cylinders, heads and sectors and the volume parameters. As mentioned before, there is no danger for your hard disk data **as long as you have not touched** these parameters.

Modifying Partitions

If you want to change a partition in size, the data on this partition will be lost. In addition, the contents of any partition with a number greater than the one you may want to change will be lost. So be **very** careful when doing changes and

!! make a backup first !!

If you reduce the number of partitions, the data on any partition greater than the new number will be lost.

After changing any partition size it is absolutely necessary to (high-level) format the modified partition and all the partitions with the higher numbers! (use the Finder, the Advanced Disk Utilities or another disk utility).

Do not forget this step, it is required even if you can still read the old contents of this partition! Only after re-formatting the volume directory reflects the actual size of the new partition.

A Different Look at the *MicroDrive* Installer

The MICRO.INSTALLER is a PRODOS 8 system file which is designed to run under any circumstances (i.e. it can be launched under ProDOS 8 or GS/OS without the need of any further accessories. The MICRO.INSTALLER can be launched from any environment without the need of BASIC.SYSTEM. It even can be launched directly by booting the *MicroDrive* installation disk.

The MICRO.INSTALLER also can be run from any program launcher that supports launching SYS files (for example the built-in PRODOS 8 launcher or the GS/OS Finder).

After the program's startup, it tries to read the configuration data from the first hard drive and displays it on the 80-column screen. Now you can change any parameters as you like. The program should be self-explanatory. After you have changed any parameters, please don't forget to save your new configuration using <W>RITE CONFIGURATION TO HARD DISK. However, you have the option leaving the program without saving anything.

New Hard Disk Setup

When there is no valid configuration data found at start-up, the program assumes that a new hard disk was connected and needs to be configured. In this case, the program automatically does all the necessary things to set up a valid configuration including default operating parameters (It is basically the same thing as pressing CTRL-R, re-read configuration parameters from hard disk). The only thing you have to do is to set up one or more partitions by entering the partition editor and to save your configuration data on the hard disk. As the last step, use a formatting utility like the FINDER, the Advanced Disk Utilities or PROSEL-16 to format your partitions.

The MICRO.INSTALLER does not check your second drive (slave) if it is present. If you need a second drive to be configured, choose menu item CHANGE drive and the program will behave just like it has when dealing with the first drive.

The MICRO.INSTALLER saves itself on hard disk

(not yet implemented, please ask for program upgrades)

Once you have run the MICRO.INSTALLER to create a new hard disk configuration, there is no need to launch it again from the installation disk. The program writes itself on your hard disk into a safe area which cannot be accessed from any PRODOS or GS/OS program. At any time when you boot from your hard disk, you can choose launching the utility program first. When you reboot your computer, just hold down the Apple key or the Option Key and press <I> to run the MICRO.INSTALLER.

If you prefer to run the MICRO.INSTALLER from a program launcher, you can keep a copy on your hard disk.

Several additional options for setting up operating parameters can be found in this program. The functions are not implemented yet and won't be of any use for correct hard disk operation. These options will be added in a later revision of the card's software.