

# HDA-506

## *INSTRUCTION MANUAL*

August 15, 1989

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## INTRODUCTION

Congratulations Amiga User, we are excited that you have chosen our external HDA-506 (IBM-ST506 to Amiga hard drive adaptor) for the A500 or A1000 computer system. We have spent many hours in refining our product to deliver the best performance possible with your Amiga computer system.

The Spirit Technology HDA-506 is a unique product in that it provides a cost efficient bridge to use inexpensive ST506 hard drives. The HDA-506 serves as a host for a 62 pin edge ST506 controller (normally used with an IBM). With the controller card installed you may utilize any of a large selection of ST506 hard drives. Depending on what hardware you choose to configure your system, you can achieve extremely fast transfer rates. We have by far exceeded 300KB per second using the AmigaDOS 1.3 Fast File System, OMTI-5520, and a high speed hard drive.

We feel the HDA-506 is the most cost efficient way to add a hard drive to your Amiga system. Because the IBM market is so saturated with ST506 controllers and drives the price for these items is noticeably cheaper. SCSI (Small Computer System Interface) hard drives are also widely available but more expensive, making the overall cost of your hard drive system much more.

This manual will explain the necessary steps for assembling and operating the HDA-506, including instructions for the various utility programs.

Thank You for choosing Spirit Technology for your expansion needs. Watch for many NEW and exciting products.

## WHAT YOU RECEIVED

You should have received in your HDA-506 package the following items.

- \* HDA-506 metal chassis with pass-thru board installed.
- \* HDA-506 to IBM ST506 host adaptor main card and spacers.
- \* HDA-506 to hard drive power cable (industry standard connectors).
- \* Software support disk containing the device driver and utilities.

If you did not receive any of the items described above, then please immediately contact the place of purchase.

It is important that you make a "WORKING" copy of the HDA software support disk. You can copy the disk by following the standard "DiskCopy" instructions found in your A500 or A1000 instruction manual.

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## COMPONENTS NEEDED FOR ASSEMBLY

Before you can assemble and use the HDA-506 you must first obtain the following items.

1. One 62 pin edge (short card), 8 bit, ST506 controller.

The ST506 controller card is the most important item needed for operation and mounts directly to the HDA-506 adaptor.

We are currently compatible with the following list of controllers.

- \* Scientific Micro Systems OMTI-5527 (RLL).
- \* Scientific Micro Systems OMTI-5520 (MFM).
- \* Data Technology Corp. DTC-5150 X (MFM).
- \* Data Technology Corp. DTC-5160 CRH (RLL).

The controllers listed above are all short cards for the IBM XT and are available at most electronics distributors and retail PC stores. You may look in magazines such as "Computer Shopper" for great prices on both hard drives and controllers.

Both OMTI controller cards listed above deliver the best performance in speed and are highly recommended for use with the HDA-506 adaptor.

See Appendix A for a more detailed list of controllers including known problems and solutions.

2. One set of ST506 controller to hard drive flat ribbon cables.

If you did not receive a set of ribbon cables with the purchase of your ST506 controller card then you must obtain them.

The set of cables should contain one 20 pin and one 34 pin flat ribbon cable used for connecting the ST506 controller card to the hard drive.

If you are planning to use two hard drives then you need an additional 20 pin flat ribbon cable and substitute the 20 pin flat ribbon cable with a 34 pin flat ribbon cable that has a pass-thru (two flat edge connectors on the same cable that attach to each drive in the chain).

3. One or two ST506 compatible hard drives.

The only limitation to the size of hard drive you may purchase is the controller. You should have no problem using one or two 150 megabyte hard drives, as long as you do not exceed the capability of your controller and power supply.

Remember that if you select an RLL controller, then you will be restricted to using RLL certified hard drives. If you select an MFM controller, then you will be restricted to using MFM hard drives.

RLL and MFM cannot be mixed in a dual hard drive system. Both drives must be the same encoding type.

4. One hard drive chassis with built in power supply.

The hard drive external chassis with built in power supply is needed for powering and housing the hard drive(s), this is also where the HDA-506 and controller card will get its power.

When selecting a chassis make sure it has the following approximate specifications.

- \* At least a 60 Watt switching power supply.
- \* Room for one or two half height hard drives.
- \* Two or three AMP power connectors.
- \* Cooling fan or appropriate venting.

If the hard drive chassis you select only has one AMP power connector, then it will be necessary to obtain an AMP Y-adaptor to distribute power.

When you have obtained all of the items mentioned above then you are ready to assemble your HDA-506 system.

## ASSEMBLING AND INSTALLING THE HDA-506

The following 14 steps will provide the necessary instructions for assembling the HDA-506 and proper connection to your Amiga.

1. Plug the ST506 controller card into the 62 pin edge slot located on the solder side of the HDA-506 main circuit board. Make sure the component side of the ST506 controller is facing towards you, away from the solder side of the HDA-506 main circuit board.

NOTE: The ST506 controller card may come with a metal plate attached to one side. The metal plate must be removed before installation to the HDA-506 main circuit board.

2. Locate each mounting hole in both bottom corners of the HDA-506 if these holes match up to any mounting holes on your ST506 controller card then you must install the spacers that were included with your HDA-506. This will prevent the solder side of your ST506 controller from touching the solder side of the HDA-506. If you have no place for mounting the spacers to the ST506 controller then you must devise your own method for spacing the ST506 controller away from the HDA-506 host.

3. Open your hard drive chassis.

4. Mount your hard drive into the chassis. You should have received mounting hardware with your chassis (screws etc.), if you did not then you must obtain them in order to mount your hard drive into the chassis.

NOTE: You must decide on a way of routing cables into your hard drive chassis before you install them to your hard drive.

5. Connect both flat ribbon cables to their appropriate locations on the hard drive you selected. Make sure the red stripe on one edge of each flat ribbon cable matches up to the notch in the card edge, this verifies pin 1.

6. Connect power to your hard drive.

7. Connect the power cable included with the HDA-506 to the hard drive power supply. If there is only one AMP power connector attached to the power supply then you will need to utilize a Y-adaptor to connect both the HDA-506 and hard drive to the power supply.

NOTE: You may want to wait until you have tested your system to close the hard drive chassis.

8. Attach the wide flat ribbon cable from the hard drive to the wide row of pins (location J1) located on the ST506 controller which is mounted to the back side of the HDA-506 adaptor card. Pin 1 is labeled on the J1 connector located on the ST506 controller board. Pin 1 on the flat ribbon cable is indicated by a red stripe down one edge. Make sure that they match up!

9. There are two narrow pin connector locations (J2 and J3) on the ST506 controller card which is mounted to the back of the HDA-506 host adaptor. These locations are used for connecting drive 0 (J2) and drive 1 (J3). For single drive usage (drive 0) connect the narrow flat ribbon cable to the J2 connector on the ST506 controller board. Pin 1 is labeled on the J2 connector on the controller board. Pin 1 on the flat ribbon cable is indicated by a red stripe down one edge. Make sure that they match up!

10. Attach the power cable from the hard drive chassis power supply to one of the AMP power receptacles located on either side edge of the HDA-506 host card. Make sure that the power cable is plugged into the receptacle that will be closest (when installed) to the back slot in the HDA-506 metal chassis.

11. Disassemble the HDA-506 metal chassis. Simply remove four screws around the base of the chassis to access the pass-thru board.

12. Install the HDA-506 host card mounted with the ST506 controller and cables, into the HDA-506 pass-thru board (which is mounted to the bottom section of HDA-506 metal chassis). When plugging the HDA-506 main board into the pass-thru board, make sure the component side of the HDA-506 is always facing away from the Amiga which means the IBM controller mounted to the solder side of the HDA-506 will always be facing towards the Amiga.

13. Re-assemble the HDA-506 metal chassis now containing the HDA-506 host card mounted with the ST506 controller. Make sure to route all cables thru the back slot of the chassis.

14. Now position the 86 pin socket of the HDA-506 parallel with your Amiga 86 pin expansion port. Make sure power to your Amiga is OFF, now connect the HDA-506 to your Amiga by simply plugging into the 86 pin expansion port edge located on the right side of your A1000 or on the left side of your A500.

NOTE: If you have any memory expansion on the external 86 pin BUS, then it is important to make sure that the HDA-506 is plugged into the pass-thru of the last memory expansion device in the chain of expansion. You always want to make sure that your memory expansion is as close to your Amiga as possible. If your memory expansion has no pass-thru then you may use the pass-thru on the HDA-506 for attaching the device.

This completes the assembly and installation of your hardware.

## TESTING YOUR SYSTEM

Making sure the hard drive chassis is plugged into a power outlet, power up your Amiga system.

NOTE: If you are NOT using a multiple outlet power strip to control power to your computer components, then power to the hard drive must be switched ON first before Amiga, or your Amiga system will not boot-up.

Now that you have turned ON power to all components, you should hear the sound of your hard drive as it comes up to speed and you should also see either the KickStart prompt (for owners of an A1000) or the WorkBench prompt (for owners of an A500). Boot your system using a copy of the Spirit HDA-506 support disk that you received with your HDA-506 adaptor.

NOTE: Owners of the A1000 must first boot their KickStart disk, at the appropriate prompt, before booting the HDA-506 software support disk.

If everything is functioning properly you should see the WorkBench icon screen waiting for your use.

If your Amiga did not function at all, then go back to the "ASSEMBLING AND INSTALLING THE HDA-506" section of this manual and carefully retrace your steps to make sure you have correctly connected the cables. Also make sure that the hard drive was receiving power or was turned ON.

If you have checked your installation and found no errors, and your Amiga continues not to function, then contact Spirit Technology Tech Support at (801) 485-4275.

If your Amiga system is functioning as it normally does, then you are ready to format your drive.

## LOW LEVEL FORMATTING

There are two basic format procedures required to prepare your hard drive system for use.

- \* ST506 controller low level format.
- \* AmigaDOS high level format.

This section will explain the procedures necessary for performing a low level format.

The reason for needing to do a low level format is so the controller can understand the layout of the hard drive. Once the drive has been formatted, the Amiga can then use the "STDisk.Driver" as a software interface to talk to the controller, which in turn performs reads and writes to the hard drive.

Make sure that everything has been properly connected to your Amiga as described in the "ASSEMBLING AND INSTALLING THE HDA" section of this manual.

If not previously booted, boot your Amiga system with a copy of the HDA support disk.

The low level format program is located in the Spirit drawer and is called HDFormat.

Double click on the HDFormat icon, the program will then load.

Once the program is loaded you will see the HDFormat main screen, this is where YOU MUST enter all the information needed to perform the low level format.

The following is a description of each data entry box and the appropriate data that MUST be entered.

### \* UNIT # \*

The ST506 controller can support two hard drives. the "UNIT #" gadget can be toggled between "Drive 0" or "Drive 1" by a single click. If you have only one drive then your selection would be "Drive 0". If you have two drives then toggle select which drive (0 or 1) you want to format.

### \* CONTROLLER TYPE \*

The "CONTROLLER TYPE" depends on what type of controller you are using. There are two options available, "MFM" or "RLL". The "CONTROLLER TYPE" gadget can be toggled between "MFM" or "RLL" by a single click. Note that you cannot mix MFM and RLL drives from one controller.

### \* NUMBER OF CYLINDERS \*

You must enter (into the string gadget) the total number of data cylinders your drive has. You may obtain this information by consulting the technical reference manual received with your drive.

**\* NUMBER OF HEADS \***

You must enter (into the string gadget) the number of heads your drive has. You may obtain this information by consulting the technical reference manual received with your drive.

**\* CYL FOR REDUCE WRITE CURRENT \***

You must enter (into the string gadget) the cylinder for reduce write current. You may obtain this information by consulting the technical reference manual received with your drive. Here is an example of how to determine the correct entry. If your drive manual shows that the cylinder for reduce write current is 300 then enter 300, if your drive manual shows no value or "N/A" then enter the total number of cylinders as entered for "NUMBER OF CYLINDERS".

**\* CYL FOR WRITE PRECOMP \***

You must enter (into the string gadget) the starting cylinder for write precompensation. You may obtain this information by consulting the technical reference manual received with your drive. Here is an example of how to determine the correct entry. If your drive manual shows that the cylinder range for write precompensation is 300-614 then enter 300, if your drive manual shows no value ("N/A") then enter the total number of cylinders as entered for "NUMBER OF CYLINDERS".

**\* STEPRATE CODE \***

You must enter (into the string gadget) the controller steprate code. In most cases you can use a steprate code of 5 which will work fine for most controllers and drives. If you want to fine tune your drive for optimal performance then you may try different steprate codes. To determine a good steprate code you will first need to reference your drive manual to find what the step pulse range is. The step pulse range value listed in your drive manual might be for example... 3-200 usec (micro seconds), 3-200 usec is a range of possible step rates. Now see the appropriate steprate table for your controller make in Appendix B (located in the back of this manual) and find the steprate code with the fastest response (10 usec = fastest and 200 usec = slowest).

EXAMPLE: Using an OMTI controller and a drive with a step pulse range of 3-200 usec, you will want to use 1 as your steprate code (see the steprate code table for OMTI in Appendix B). A step rate code of 1 = 10 usec which is between 3-200 usec for the drive and is the fastest steprate code.

**\* SECTOR INTERLEAVE \***

You must enter (into the string gadget) the sector interleave value. If you are using an OMTI 5520 (MFM) controller then use 0 as the sector interleave value. If you are using an OMTI 5527 (RLL) controller then use 2 as the sector interleave value. For DTC controllers use 3 as the sector interleave value. If you want to fine tune your drive for maximum performance then experiment by formatting with different interleave values in range from 0 to 9, then after performing a high level format run the DiskPerf benchmark program (located in the Public Domain directory on the Spirit support disk) to see what your read/write speeds are.

**\* FORMAT START CYLINDER \***

You must enter (into the string gadget) what cylinder you want to start the format from. This is usually 0 but can be set to any number between 0 and the "NUMBER OF CYLINDERS" value.

After you have entered the appropriate values into the data box gadgets you will first want to re-check each value to make sure it is what you want, Then double check the "UNIT #" setting (if you have two hard drives) to make sure that you are not formatting a drive that already contains Amiga programs and data!

To start the low level format click once on the green button gadget labeled "FORMAT HD" located in the gadget cluster with "SCREEN", "VERIFY HD", and "EXIT", After prompted by the "ARE YOU SURE?" requester your drive will then start formatting. While formatting, your mouse pointer will change into a busy cloud until the format is complete.

NOTE: Once the format has started you cannot abort, you must wait until the format is complete.

If you received an error of any kind during the format procedure, then a value may have been entered wrong or your cables may not have been connected properly. Re-check everything and then try again.

If you have checked everything and found no problems, and your drive continues not to format, then contact Spirit Technology Technical Support at (801) 485-4275.

If your drive formatted with no errors, then you are ready to verify.

Now that you have finished a low level format of your drive, you must execute the verify option. Verify will read your drive and report to the screen or printer any bad locations it finds.

Before you start the verify, there is one option, this option is for toggling the output to the screen or printer (default is screen). The gadget for output selection is blue and is located in the gadget cluster with "FORMAT HD", "VERIFY HD", and "EXIT", this gadget can be toggled by a single click.

Once you have selected the output of verify, you may click on the gadget labeled "VERIFY HD" this will start the verify process. Notice the "VERIFY HD" gadget has now changed to "END VERIFY", the verify process will run in a loop from start to end cylinder until you click on the "END VERIFY" gadget, at which point the verify process will immediately stop.

It would be a good idea to let verify complete at least two passes, and If you have a printer, then select "PRINTER" for the verify output, This will produce a printed report of any existing errors.

NOTE: You may find that your drive contains some factory media flaws, these flaws may show up during the verify process as errors. Usually the media flaws are specified by a label on your drive. There is a program on the HDA support disk called MapBAD that can be run after formatting your drive with the AmigaDOS format command. The MapBAD program will allocate any bad tracks so that they cannot be used by AmigaDOS, see the "USING MAPBAD" section of this manual after you have completed an AmigaDOS high level format.

When finished with the low level format and verification of your drive(s) you are now ready for a high level AmigaDOS format.

## HIGH LEVEL FORMATTING

The next step in installing your system (after low level formatting) is to complete a high level format of your drive using the AmigaDOS format command.

There are a couple of things you must do to ready the drive for an AmigaDOS format.

- Create a MountList entry for your particular drive.
- Mount the device from the "MountList"

The reason for needing to first edit the MountList is so that AmigaDOS knows what kind of a drive it is going to be talking to. The mount list contains blocks of device information headed by the device name i.e. DH0:. Each device block contains information like ... the total number of cylinders, what file system to use, the unit number, and much more. The MountList file is located on the HDA support disk in the DEVS: directory. To edit the MountList You must first enter the AmigaDOS Shell (CLI). Now type (at the shell prompt) the following command (exclude the quotation marks).

```
"Ed Devs:MountList" (hit return)
```

Now you should see the edit screen with some text. Notice the heading DH0:. This is the block of information you will be modifying.

The following is a list of the DH0: entry in the MountList file and indicates the fields you must change in order to match your hard drive and controller specifications.

DH0:		(Anything you like. i.e. DH1:, DH2:, etc..)
Device	= stdisk.device	(Do not change this line.)
FileSystem	= 1:FastFileSystem	(Do not change this line.)
DosType	= 0x444F5301	(Do not change this line.)
GlobVec	= 1	(Do not change this line.)
Priority	= 10	(Do not change this line.)
Unit	= 0	(First drive = 0, second drive = 1.)
Flags	= 0	(Do not change this line.)
Surfaces	= 4	(# of heads your drive has.)
BlocksPerTrack	= 17	(Use 17 for MFM or 26 for RLL.)
Reserved	= 2	(Do not change this line.)
Interleave	= 0	(Do not change this line.)
LowCyl	= 6	(For AutoBoot leave the start cylinder at 6.)
HighCyl	= 613	(Total # of drive cylinders less 3.)
Buffers	= 30	(May be adjusted to greater values.)
BufMemType	= 0	(Do not change this line.)
Mount	= 1	(Do not change this line.)
StackSize	= 4000	(Do not change this line.)
#		(Indicates the end of an information block)

Here is a detailed description of necessary changes.

The default device name is DH0:, you may change this to anything you want. If you are setting up for two drives it is recommended to name unit 0 as DH0: and unit 1 as DH1:.

If using only one drive the "UNIT = 0" should be left as is. If you have two drives and you are editing an entry for your second drive then change "UNIT = 0" to "UNIT = 1".

The "SURFACES =" should equal the number of heads your hard drive has.

The "LOWCYL =" should be set to 6 in the first partition, this allows room for installation of the AutoBoot process if you have or plan to obtain the AutoBoot feature.

The "HIGHCYL =" should be the total number of cylinders your drive has minus 3 cylinders. This guarantees that no data will ever be stored on those cylinders used for parking the drive heads. i.e. If your drive has 615 cylinders then you should use 612 for the "HIGHCYL =" MountList entry.

If you are planning to break down your drive into partitions then you must duplicate the DH0: data block (located in the MountList) for as many partitions as you are going to have. These partitions must be named differently from each other. The only thing that needs to change from one partition to the next is the "LowCyl =" value and the "HighCyl =" value. For example, lets say that you have a 40 Megabyte Drive with 818 cylinders (after subtracting 3 cylinders from the total number of cylinders) and you want to break it down into three partitions, one partition for AutoBoot and two 20 Megabyte partitions for data storage, you will first want to make one duplication of the DH0: data block located in the MountList and rename it to DH1:, the ABoot: data block already exists in the mountlist file ready for use. Next you will want to edit the high and low cylinder values in each partition (except ABoot:) as shown below.

For partition 1 (i.e. ABoot:) low cylinder = 0 and the high cylinder = 5.

For partition 2 (i.e. DH0:) low cylinder = 6 and high cylinder = 403.

For partition 3 (i.e. DH1:) low cylinder = 404 and high cylinder = 818.

As you can see the only difference between partitions is the low and high cylinder values. You may break your drive into 10 partitions if you desire, DH0:, DH1:, DH2:, DH3:, DH4:, etc.... just as long as the high and low cylinders are set correctly.

If do not wish to use the FastFileSystem in a specific partition (and lose all that high performance speed?) then you may delete the following lines from your MountList entry.

```
FileSystem = l:FastFileSystem
DosType = 0x444F5301
GlobVec = 1
```

NOTE: The AutoBoot partition (ABoot:) cannot use the FastFileSystem, therefore its default is the SlowFileSystem.

If you are technically familiar with the MountList file, you may then modify some of the other values to your preference.

Double check what you have typed into the MountList, if everything is correct you may save the MountList file back to disk by first pressing the ESC key (you will see an asterisk at the bottom of the screen) then press X and hit return. once the MountList has been saved you may continue.

Now you are ready to mount and format your drive.

You must still be in the AmigaDOS SHELL (CLI) window.

Mount the drive or partition(s) you are going to format, use the following syntax for the AmigaDOS Mount command (do not include the quotes). "MOUNT <DeviceName:>", i.e. "MOUNT DH0:"

You should see the hard drive indicator light flash briefly, then you will see the AmigaDOS prompt in your Shell window waiting for input.

NOTE: Do not mount or format the ABoot: entry, it is automatically mounted and formatted by the ABootInstall utility program (see "AUTOBOOTING THE HDA-506").

After the drive or partitions have been mounted you may perform a format, the syntax is as follows (do not include the quotes).

```
"FORMAT DRIVE <DeviceName:> NAME <AnyName> NOICONS FFS"
i.e. "FORMAT DRIVE DH0: NAME AmigaHD NOICONS FFS" (hit return)
```

You should see the hard drive indicator light flash as the drive formats. When the format operation is complete you will see the AmigaDOS prompt in your Shell window waiting for input.

If while formatting you encounter a hard error that causes the format to abort, you will want to use the "QUICK" option with the format command. Follow the instructions above for formatting but add the "QUICK" option following the "FFS" option for that device.

If you are planning to format a partition that does not use the FastFileSystem then you must omit the "FFS" syntax option.

For more information on FORMAT and MOUNT commands see the AmigaDOS 1.3 reference manual.

After you have successfully completed a high level format, you will then want to run the MapBAD utility.

---

## USING MAPBAD

The MapBAD program is used for mapping out any bad sectors on your hard drive. What this means is that if MapBAD finds an error on your drive, it will be allocated, thus "locking out" the appropriate sector so that AmigaDOS cannot see it. This will eliminate the chance of loading any valuable files on to "unreadable" sectors of the drive. The MapBAD program is located in the Spirit directory on the HDA support disk.

you must be in SHELL (CLI) to use MapBAD.

The syntax for MapBAD is as follows (do not include quotes).

"MapBAD <DeviceName:>" i.e. "MapBAD DH0:" (hit return)

When the MapBAD program is started it will scan the drive that you specified for any bad sectors, if bad sectors are found it will lock them out so that AmigaDOS cannot use them. A report showing the total amount of errors encountered (if any) will be displayed when MapBAD has completed its scan.

NOTE: It is highly recommended that MapBAD be run immediately after you have formatted your drive using the AmigaDOS format command. If MapBAD was not run before loading your drive with programs and data, you may find that you have some files that when run give you Read/Write errors. If necessary MapBAD can be run on a drive with programs and data and no damage to your files will result. If any programs show Read/Write errors when run, they must be deleted before using MapBAD. After you have deleted the files indicating Read/Write errors, you may then run MapBAD. After running MapBAD the programs that were deleted may then be copied back onto your drive.

After you have run MapBAD, you are ready to copy programs to your drive.

## LOADING YOUR DRIVE WITH PROGRAMS

You are now ready to load your drive with programs and data.

The following is a list of steps to follow in order to load your drive with needed information.

1. Copy the HDA support disk or a standard WorkBench 1.3 to the hard drive.

To perform the copy you must be in the SHELL (CLI). Once in the SHELL you must first mount your drive partition that you wish to use as your main system, i.e. "MOUNT DH0:". Now you are ready to copy.

The following line assumes that your HDA support disk or WorkBench 1.3 disk is in DF0: and your destination device name is DH0:.

From the SHELL prompt type the following (do not include quotes).

"Copy DF0: To DH0: ALL" (hit return)

All the files from the disk in DF0: will be copied to DH0:.

NOTE: If you copied a standard WorkBench 1.3 disk to your hard drive instead of the HDA support disk, then you will need to copy the DefSYS program from the C: directory of the HDA support disk to the C: directory of your hard drive.

2. Modify a copy of the HDA support disk so that you may easily boot your drive from a Startup-Sequence file.

A sample Startup-Sequence file is provided in the S: directory of the HDA support disk and is named HDA-SS. The HDA-SS file can be renamed to Startup-Sequence which will automate the mounting of your drive partition(s) when the HDA support disk is booted. The HDA-SS file has been set-up to mount DH0:, assign the system over to DH0:, and then execute the Startup-Sequence located in the S: directory on DH0:. If you want to use a drive partition that is not named DH0:, then you must edit the HDA-SS file changing all occurrences DH0: to whatever your device name is i.e. DH0: to HD0:.

Now rename the old Startup-Sequence to SS-OLD and rename HDA-SS to Startup-Sequence, to do this type the following from the Shell (CLI) prompt (do not include quotes).

```
"Rename S:Startup-Sequence To S:SS-OLD" (hit return)
```

```
"Rename S:HDA-SS To S:Startup-Sequence" (hit return)
```

The next time you boot with the HDA support disk it will automatically mount and assign the system to your selected drive partition, and the Startup-Sequence will be executed from the newly assigned system's S: directory on your drive.

3. Copy your personal files to your drive and or partitions.

You may use WorkBench or the Shell (CLI) to copy personal files and programs to your drive. See your Amiga instruction manual for further information on copying files.

You are now ready to start using your drive!

If you have any questions about your system please feel free to call Spirit Technology Technical Support at (801) 485-4275.

## ADDING A SECOND DRIVE

To add a second ST506 Hard drive to your system you must do the following steps.

1. Make sure your chassis is capable of supporting two drives (physically and electrically), if not then you will need to obtain a new chassis or devise your own way of installing the new drive and supplying power.

2. You need one additional 20 pin flat ribbon cable and substitute the 34 pin flat ribbon cable you are currently using with a 34 pin flat ribbon cable that has pass-thru (two edge connectors on the same cable that attach to each drive in the chain).

3. You must now remove the resistor terminator pack located on the first drive in your chain (Drive 0), consult your drive manual on the location of the resistor terminator pack or the proper method for adding an additional drive to the chain.

4. Connect the new 34 pin pass-thru cable to both of your drives and then appropriately connect the other end of the cable to the ST506 controller card mounted to the HDA-506 host adaptor

NOTE: Save any removed parts as you may need them in the future.

5. Connect the additional 20 pin cable's appropriate end to the back of your new drive (unit 1) then connect the other end of the 20 pin cable to location J3 on the ST506 controller mounted to the HDA-506 host card.

You must remember that unit 0 will be the drive connected to location J2 on the controller card and that unit 1 (your new drive) will be connected to J3. Be very careful to keep this in mind when formatting your new drive.

The next thing to do after re-assembling both the hard drive and your HDA-506 chassis, will be to low and high level format your new drive.

## AUTOBOOTING THE HDA-506

The HDA-506 was designed to optionally support the AutoBoot feature of KickStart 1.3. To take advantage of the AutoBoot capabilities you must first obtain KickStart 1.3 ROM (or DISK for A1000 owners), then you need the optional HDA-506 AutoBoot EPROM and PAL kit available from Spirit Technology, call for details (800) 433-7572.

If AutoBoot was installed at the factory or you have purchased the AutoBoot/PAL kit then continue reading this section.

### **\* INSTALLING AUTOBOOT \***

If AutoBoot was installed onto your HDA-506 at the factory then you may skip the following instructions.

With your AutoBoot kit you should have received the following items.

- \* EPROM (AutoBoot) chip
- \* Replacement PAL chip
- \* Black or blue shorting plug

Here is a step by step list of instructions for installing the AutoBoot components to your HDA-506.

Before you begin the installation make sure that you are in a static free environment. To make sure there will be no static discharge it is best to work on NON carpeted floors (cement or linoleum) and before you touch any static sensitive devices make sure you touch something connected to ground.

When you have found an appropriate place to do the installation then you are ready to start.

1. Remove the main HDA-506 main circuit board from the HDA-506 chassis.
2. Make sure that you are looking at the component side of the HDA-506 circuit board. you will notice the empty ROM socket in the middle of the board, and the Spirit logo positioned close to the top of the board.
3. Using a small flat-head screw driver carefully remove the PAL (501) chip in location U1, this location can easily be found directly to the left of the ROM socket. Once you have removed the old PAL chip from the board you must insert the new PAL (5501) chip into the same (U1) location. Make sure that when plugging the PAL chip into the U1 socket the notch in one end of the PAL chip matches the notch in the socket, the notch points towards the bottom of the circuit board.
4. Now you must insert the Spirit AutoBoot EPROM chip into location U10, you will see U10 as the only bare socket in the middle of the circuit board. Make sure that when plugging the EPROM chip into the U10 socket the notch in one end of the EPROM chip matches the notch in the socket, the notch points towards the bottom of the circuit board.

NOTE: Do not remove the sticker from the EPROM. Exposure of the EPROM window to ultraviolet light will erase the AutoBoot data contained.

5. Next you must install the small blue shorting plug. The blue shorting plug connects to the two left-most pins (of three) on JP1, located directly below the EPROM chip.

Step 5 completes the installation of AutoBoot.

#### **\* SOFTWARE SETUP FOR AUTOBOOT \***

There is a file called "ABootInstall" that automatically sets up the AutoBoot partition. To use this program you must leave cylinders 0 thru 5 unused by anything in your "MountList" except for the "ABoot:" partition. You must also edit the "BlocksPerTrack" entry in the "ABoot:" partition to 17 if you are using MFM, or 26 if you are using RLL.

Once you have checked your "MountList" (as per the above instructions) then you may issue the "ABootInstall" command from the Shell (CLI) of your HDA-support disk.

NOTE: To use the "ABootInstall" command you must have booted with an HDA support disk that does not automatically mount your drive(s).

Type the following command at the Shell (CLI) prompt (excluding the quotes).

"ABootInstall" (hit return)

In a few moments (with some interaction) the ABootInstall program will report back that it has finished the installation.

To AutoBoot you must have the KickStart 1.3 ROM installed in your A500 (for A1000 owners KickStart 1.3 must be loaded from disk).

NOTE: see the instructions included with your Amiga KickStart 1.3 ROM for installation into your A500.

Once your machine has initialized KickStart 1.3, it will then check drive DF0: to see if there is a bootable disk present, if no bootable disk is present, the Amiga will then AutoBoot directly from your hard drive.

NOTE: You may need to modify the "Startup-Sequence" (ABoot:S directory) and the "MountList" (ABoot:Devs directory), especially if you have more than one drive partition. You must edit the "Startup-Sequence" to mount your additional partitions and make sure the "MountList" contains the proper partition information.

If you have any questions or problems with AutoBoot please contact Spirit Technology Technical Support at (801) 485-4275

### **USING THE PARK COMMAND**

The "Park" command is used to secure your hard drive for shipping or any other kind of physical movement.

To "Park" your drive simply double click on its icon located in the Spirit directory of the HDA-506 Software Support Disk. You will hear the drive activate briefly, then stop, at this point power down your system.

NOTE: You may copy this file to your hard drive for easy access.

## Appendix A

### *HDA-506 Compatible Controllers*

The following list of controllers have been carefully tested with the HDA-506 to insure compatibility.

Controller: Scientific Micro Systems OMTI-5520 (MFM)  
Dimensions: 4" x 5"  
Power: +5v @ .5a, +12v @ .1a  
Bus: XT 8 bit 32 pin  
Sectors Per Track: 17  
Maximum Cylinders: 2048  
Maximum Heads: 16  
Jumpers: Factory Default

Notes: Excellent performance, much faster than DTC.

Controller: Scientific Micro Systems OMTI-5527 (RLL)  
Dimensions: 4" x 5"  
Power: +5v @ .5a, +12v @ .1a  
Bus: XT 8 bit 32 pin  
Sectors Per Track: 26  
Maximum Cylinders: 2048  
Maximum Heads: 16  
Jumpers: Factory Default

Notes: Excellent performance, much faster than DTC.

Controller: Data Technology Corp. DTC-5150 X (MFM)  
Dimensions: 3.9" x 4.9"  
Power: +5v @ 1.25a, +12v @ 0a  
Bus: XT 8 bit 32 pin  
Sectors Per Track: 17  
Maximum Cylinders: 2048  
Maximum Heads: 16  
Jumpers: Factory Default

Notes: No known problems.

Controller: Data Technology Corp. DTC-5160 CRH (RLL)  
 Dimensions: 3.9" x 4.9"  
 Power: +5v @ 1.25a, +12v @ 0a  
 Bus: XT 8 bit 32 pin  
 Sector per Track: 26  
 Maximum Cylinders: 2048  
 Maximum Heads: 16  
 Jumpers: Factory Default

Notes: There is a known problem regarding firmware version "DTC-350 A". When operating under this version you may encounter meaningless read/write errors which are cancelable. Before you purchase the controller be sure that the firmware version you get is "DTC-378 A", if you get a controller that has the incompatible firmware then contact place of purchase or DTC for an upgrade.

## Appendix B

### Step Rate Code Tables

#### Steprate code table for OMTI controllers

\* Code 0 .....03 msec, unbuffered step.  
 Code 1 .....10 usec, buffered step.  
 Code 2 .....25 usec, buffered step.  
 Code 3 .....50 usec, buffered step.  
 Code 4 .....200 usec, buffered step.  
 Code 5 .....70 usec, buffered step.

#### Steprate code table for DTC controllers

\* Code 0 .....03 msec, unbuffered step.  
 Code 1 .....45 usec, buffered step.  
 Code 2 .....60 usec, buffered step.  
 Code 3 .....18 usec, buffered step.  
 Code 4 .....210 usec, buffered step.  
 Code 5 .....75 usec, buffered step.  
 Code 6 .....30 usec, buffered step.  
 Code 7 .....18 usec, buffered step.

\* = Code for drives that run in the milliseconds only.