CubeFloppy 2.9
External Floppy Drive
User's Manual

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1.0 Introduction

CubeFloppy 2.9^{TM} is a floppy disk drive designed to interface with the NeXT^{TM} computer. The drive and DIT's FloppyWorks software allow you to format, read, and write 3-1/2" MS-DOS, NeXT, and Macintosh disks. CubeFloppy 2.9 also provides you with an inexpensive medium for storing, updating, and exchanging NeXT files.

CubeFloppy 2.9 is fully compatible with the original NeXT computers as well as the new NeXT computers based on the Motorola 68040 processor.

CubeFloppy 2.9 is compatible with the NeXT system software 2.0 and will read and write NeXT and MS-DOS disks without any additional software. If you are using the NeXT System Software 1.0 or 1.0a, then you must use DIT's CubeFloppy software in order to read and write floppy disks.

The drive connects to the external SCSI interface connector on the NeXT, so the installation is fast and easy.

Introduction

The CubeFloppy 2.9 comes with all the necessary hardware you need to get up and running. The disk drive, interface cable, and power supply are all provided in one package.

Please fill out and return the enclosed warranty registration card.

2.0 REQUIREMENTS

Before you begin the installation, you should make sure that you have all the necessary items. The CubeFloppy 2.9 package should include:

1. The CubeFloppy 2.9 disk drive
2. An external power supply module
3. A SCSI interface cable. Note: A SCSI-I cable is required to connect the drive to the original NeXT 68030 computers. A SCSI-II cable is required to connect the drive to the 68040 NeXT computers. Your CubeFloppy 2.9 drive comes with a SCSI-I cable. A SCSI-II cable is available at extra cost.
4. NeXT system 2.0 or higher, or NeXT system 1.0 using optional CubeFloppy software.
5. A warranty registration card

Please retain all packing materials in case you need to return the drive for service.

IMPORTANT: Before hooking up *any* new SCSI device to your computer (including CubeFloppy 2.9) we recommend that you make a backup of all the files on your hard disk! In the event of a hardware or software problem that causes loss of data on your hard disk, you will then be able to recover the data.

3.0 INSTALLATION

The installation procedure is quite simple, and it should take less than 10 minutes. If you have any problems after installing the drive, please read the Troubleshooting section *BEFORE* turning off the Power switch on your computer or doing anything else.

Note: The NeXT computer boots off the hard disk device with the lowest numbered SCSI address installed on the SCSI bus. The CubeFloppy 2.9 is seen as an external hard disk device by the NeXT system, therefore, the hard disk which you boot from MUST have a SCSI address setting lower than the floppy drive, or your system will try to boot off of the floppy drive. If you installed your own hard disk drive, make sure the hard disk SCSI address is set for 0 or 1 *before* connecting CubeFloppy 2.9 to your system.

3.1 Unpacking and Configuring Switch Settings

Remove the CubeFloppy 2.9, the power supply transformer and the SCSI cable from the shipping container. Remove the protective plastic wrap.

The drive is shipped from the factory with the SCSI address set for 3. The default setting for the termination-resistor switch is ON. Verify that your drive is properly set to these defaults by looking at the switches on the back of the CubeFloppy 2.9 disk drive.

If the CubeFloppy 2.9 is the only external SCSI device you will have connected to your NeXT computer, then the default switch settings will be correct. Skip to step 3.2.

Configure the drive termination and address switches. The following configuration settings may need to be changed:

1. The SCSI address setting for the drive if another external SCSI device is already using CubeFloppy's default address.
2. The SCSI termination switch if the CubeFloppy 2.9 is to be daisy chained with other external SCSI devices.

See Appendix A for the details of reconfiguring the SCSI address and termination setting.

3.2 Connecting CubeFloppy 2.9 to Your NeXT Computer

If your NeXT computer is on, press the power switch and perform an orderly system shutdown.   Make sure that the NeXT computer and all other devices connected to the SCSI port are turned off before starting the installation.   *NEVER* connect or disconnect any SCSI device to the SCSI bus when the power is turned on. The hard disk drive on the NeXT computer is connected to the SCSI bus, and it could be electrically damaged by connecting the cable with the power on.

3.2.1   Connect the CubeFloppy 2.9 to the SCSI bu using the SCSI cable provided.

Connect one end of the SCSI cable to the SCSI connector on the rear of the NeXTcube^{TM}. Connect the other end of the SCSI cable to the top SCSI connector on the rear of the CubeFloppy 2.9. There are two SCSI connectors provided on the back of the CubeFloppy 2.9. The bottom connector is used to daisy chain other SCSI devices on the SCSI bus.

3.2.2   Connect the CubeFloppy 2.9's power supply to the drive's power port at the rear of the drive.

First plug the connector into the CubeFloppy 2.9 drive, THEN plug the power supply transformer into an electrical outlet.

IMPORTANT: Insure that when you have your CubeFloppy 2.9 disk drive connected to your NeXT with the SCSI cable that the power to the CubeFloppy drive is always on when your computer is on. If you try to operate your NeXT without power to the CubeFloppy disk drive, SCSI Bus errors may result, with the possibility of damaging the file system on your hard disk drive.

3.2.3 Turn on your NeXT computer and the other SCSI devices on the SCSI bus.

The CubeFloppy 2.9 SCSI floppy disk drive is compatible with the NeXT 2.0 operating system and will read and write UNIX and MS-DOS disks without any additional software.

If you need to read and write Macintosh disks, or need extended capabilities for file filters when using DOS and UNIX floppy disks, then DIT's FloppyWorks software must be used.

3.2.4 If your NeXT computer has system 1.0 installed.

In order to use an external floppy drive with NeXT system 1.0, you must install DIT's CubeFloppy Version 1.5b software. Install the CubeFloppy software as explained in the CubeFloppy User's manual.

3.2.5 If your NeXT computer has system 2.0 or greater installed.

After your computer boots up normally, insert a NeXT or DOS formatted floppy disk in the CubeFloppy 2.9 drive and if everything is working correctly, the NeXT system 2.0 will automatically mount the floppy disk in the NeXT file system. The disk is ejected by dragging the floppy disk icon into the NeXT recycler or selecting the disk and pressing the eject command. The eject command is located in the workspace Disk menu.

If the floppy disk is not automatically mounted by the NeXT system, then go to the troubleshooting section.

3.2.6 If you purchased DIT's FloppyWorks software.

After your computer boots up normally, install the FloppyWorks software as explained in the FloppyWorks User's manual.

Note: FloppyWorks software requires NeXT operating system 2.0 or greater.

4.0   Troubleshooting Guide

4.1   Initial Checks

If you are having trouble getting the CubeFloppy 2.9 to work, then the first thing to do is review the hardware procedure described in section three. Also, review the configuration information in Appendix A.

4.2   Unrecognized Floppy Drive Problem

The NeXT does not recognize your floppy drive: When the NeXT computer boots up, it scans the SCSI bus to determine which devices are connected. Sometimes, during the boot up procedure, the NeXT will not recognize the CubeFloppy 2.9 drive. If this occurs, when the user inserts a floppy disk into the drive, nothing will happen. Do NOT power your system down at this time. Seek the assistance of your system administrator if you are unsure about executing UNIX commands from a shell. Perform the following steps to reboot your system properly:

1. Perform the following steps only if your system has booted up.
2. Save any files you have open and quit all running applications.
3. Start a "shell" window. Become super user by typing in su <RETURN> then typing in the root password. NOTE: If you logged in as root you will already be super user.
4. Type $sync$ <RETURN>, then type $halt$ <RETURN>. Type the $halt$ command immediately after typing in the $sync$ command. If in doubt, type the $sync$ command again before typing in the $halt$ command.
5. After the NeXT computer halts, it will display the NeXT ROM Monitor window with a NeXT> prompt. If you get the mini-monitor window with the nmi> prompt instead, type mon <RETURN> to get the NeXT ROM Monitor.
6. While the system is halted with the ROM monitor displayed, check that the SCSI address and termination switches are set properly. See Appendix A for configuration information.

7. While the system is halted with the ROM monitor displayed, power cycle the CubeFloppy 2.9 drive by unplugging the power supply to the drive, then plugging it back in. This will reset the internal logic of the floppy drive.

8. Type b <RETURN>. This will boot your computer.

9. Observe the ROM monitor screen as the computer boots.When the computer checks for SCSI devices you should see a message such as "SCSI 53C90A controller, Target 7, as sc0 at 0X2014000".

10. In the next line or two after the above message, if the NeXT system recognizes the floppy drive you should see a message displayed such as "PLI SUPER FLOPPY as sd1 at sc0 target 3 lun 0". The acutal numbers displayed will depend on your system configuration.

11. If your system recognized the floppy drive by displaying the above message, then after the computer boots up, the floppy drive should respond normally.

12. If your system did not recognize the drive during boot up, then call DIT technical support.

4.3 Detailed Checks

4.3.1 Check for SCSI address and termination conflicts.

1. Shut down the NeXT computer system and turn off the power to the NeXT and all SCSI equipment connected to your system. Temporarily remove all other external SCSI devices from the SCSI bus. Set the CubeFloppy 2.9 address-selector switch to position 3, which is the default address setting for CubeFloppy 2.9. Review Appendix A for a description of the SCSI addresses used by the NeXT system.

2. Set the termination switch on the CubeFloppy 2.9 to the ON position. Turn on the power to the NeXT computer and the CubeFloppy 2.9 drive and boot up your NeXT.

3. After the computer has booted up, log in and insert a NeXT or MS-DOS floppy disk into the floppy drive

4. If the hardware configuration is correct, the NeXT operating system 2.0 will automatically mount the floppy disk in the file system and a disk icon will appear in your browser. If this does not happen then skip to the Hardware checks in section 4.3.2.

5. If the floppy drive worked after performing the above steps, then there is a problem with termination in your original setup of SCSI devices (i.e., too many or too few SCSI devices are terminated), or there are two SCSI devices set to the same address.

4.3.2 Hardware checks

Check Cabling

1. The second most common problem is cabling. Check to make sure that there are no loose or defective cables. Make sure that there are no broken pins on the connectors and no breaks in the cables.

2. If the CubeFloppy 2.9 appears to be dead then it is probably not getting any power. Check the power supply module's cables at the CubeFloppy 2.9's rear panel and at the electrical outlet. Disconnect then reconnect the power plug at the drive end to insure the connector is making good contact.

3. If all of the above steps have been performed and the drive still does not operate properly, then the disk drive may be bad. Contact DIT, Inc. technical assistance for additional help and a return authorization number if the drive needs repair.

Check Drive

If the CubeFloppy 2.9 is getting power, then perform the checks outlined below.

1. If floppy disks are properly mounted in the NeXT file system, but there are read/write errors, then there are several possible causes of the problem. The first thing to do is to verify that the CubeFloppy 2.9 can format a blank diskette.The NeXT operating system 2.0 will ask you if you wish to format a blank floppy disk when it is inserted into the floppy drive. If the drive cannot format a disk, then the CubeFloppy 2.9 is defective. REMEMBER: use high-density diskettes (labeled MF-2HD) to format to 1.44MB and low-density diskettes to format to 720K. The 1.44 MB high-density diskettes have a square hole opposite the write protect tab. Contact DIT technical assistance for additional help and a return authorization number if the drive needs repair.

2. If the CubeFloppy 2.9 can format a blank diskette but cannot read a diskette from another machine, then the problem is either a compatibility or an alignment problem. The CubeFloppy 2.9 is not compatible with the older Macintosh 400K and 800K disks. It may not be compatible with all of the various UNIX systems, be-

cause no official standard exists for floppy formats and directory structures.

3. The other problem, alignment, occurs when a diskette that is written on one machine cannot be read by another because the disk drive on one machine is mechanically misaligned so that its data tracks are off-set from the standard track location. But which drive is out of alignment? You may need to use a third disk drive to determine which of the two drives is misaligned.

A computer repair facility can realign the defective drive, and most drive manufacturers recommend that the alignment be checked once a year. However, this figure depends on the amount of use that the drive receives. If the CubeFloppy 2.9 drive is still under warranty, contact DIT technical assistance for additional help and a return authorization number if the drive needs repair.

Formatting Problems

A problem can arise when a 720K diskette is formatted to 1.44MB. Besides being unreliable for storing data, the diskette may not be able to be reformatted to 720K without using a bulk eraser on it. This is because the 1.44MB diskettes have higher coercivity and require more energy from the drive's read/write head. The lower energy output of the 720K drive may not be able to override the 1.44MB signal on the diskette.

CubeFloppy 2.9 does not support formatting a 1.44MB diskette as a 720K diskette, nor will it read diskettes formatted in this manner.

CubeFloppy 2.9 does not support formatting a 2.88MB diskette as a lower density diskette nor will it read diskettes formatted in this manner.

5.0 Appendix A. Configuration Information

5.1 Setting CubeFloppy 2.9 Switches

There are only two switches which must be set prior to using the CubeFloppy 2.9:

1. The SCSI device address-selector switch

2. The SCSI termination switch

5.2 Address Selection

There are eight possible addresses for devices on the SCSI bus: 0 through 7. The NeXT CPU uses #7, the NeXT 40MB hard disk uses #6, and the 330 and 660MB hard disks use #1 or #0 depending on the date they were shipped. All other devices on the bus must use one of the remaining addresses. Each device must have a unique address; no two devices can have the same address. If you have any other devices connected to the SCSI bus, you must determine their addresses and set the CubeFloppy 2.9 address-selector switch to an unused address.If there are no other external SCSI devices on your system, we recommend that you use the CubeFloppy 2.9 default address selection of 3. If assigning address #3 to the CubeFloppy 2.9 drive creates a conflict with your system, then we recommend you use either 2, 4, or 5.

5.3 SCSI Termination Resistors

Only one external SCSI device on the SCSI bus should be terminated -- the one furthest from the computer. If the CubeFloppy 2.9 is the only device plugged into the external SCSI bus connector or if it is the last device daisy-chained to the bus, then it, and ONLY it, should be terminated. This is accomplished by simply moving the termination switch located at the rear of CubeFloppy 2.9 to the 'ON' position. If CubeFloppy 2.9 is NOT the last SCSI device on the bus, then move the termination switch to the 'OFF' position.

6.0 Appendix B. Technical Specifications

Disk Specifications

Media 3.5", double-sided diskettes, double density (720K), high density (1.44MB), or extended density(2.88MB).

Drive Specifications

Dimensions

Height (in/cm)	2.5/6.35
Width (in/cm)	5/12.7
Depth (in/cm)	7/17.78
Weight (lb/kg)	3/1.38
Color	Black

Sectors per track	18
Block size (bytes)	512
Heads	2

Access time (msec) including settling time

Track-to-track	3
Average	94
Data transfer rate	300K/sec max

Interface

Two 50-pin SCSI ports	
Buffer size (K)	8

Reliability

MTBF (hr)	10,000+

Electrical

Current (amps)	0.75 max
Complies with UL, CSA	

Shock and Vibration

Operating	5g
Nonoperating	60g