



Hard Drives

SCSI Drives
IDE Drives





Basics

Hard Drive





IDE Drives

Intelligent drive electronics, IDE, incorporates controller hardware into the drive. IDE is offered in 8- and 16-bit interface types. Eight-bit drives are sometimes referred to as XT interface drives, and 16-bit drives are sometimes referred to as AT interface drives.

IDE drives do **not** use a SCSI bus. Apple computers continue to use an external SCSI chain, which is supported by a SCSI chip on the logic board.

Also, Apple's HD SC Setup works with IDE drives.





WIDE and FAST SCSI Protocols

SCSI chains that use SCSI-2 protocols are faster than SCSI chains using the original SCSI protocols. Two terms used in the SCSI-2 protocol are “WIDE” and “FAST.”

The term “WIDE” defines the 2-byte or 4-byte wide data interface where each data byte uses its corresponding parity bit. The traditional SCSI-1 interface protocol is 1 byte wide. “FAST” SCSI is defined as data transfer rates between 5 MHz and 10 MHz.

Check these protocols against individual drives for comparative data.

Devices using the SCSI-2 WIDE and FAST protocols are compatible with existing SCSI-1 devices.





Troubleshooting

Hard Drive





General

The Symptom Charts included in this chapter will help you diagnose specific symptoms related to your product. Because cures are listed on the charts in the order of most likely solution, try the first cure first. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure. (Note: If you have replaced a module, reinstall the original module before you proceed to the next cure.)

If you are not sure what the problem is, or if the Symptom Charts do not resolve the problem, refer to the Flowchart for the product family.

For additional assistance, contact Apple Technical Support.





HD SC Setup

Before you replace any drive hardware, run HD SC Setup to update the driver on the drive.

HD SC Setup works with SCSI and IDE drives.





Upgrades

Hard Drives

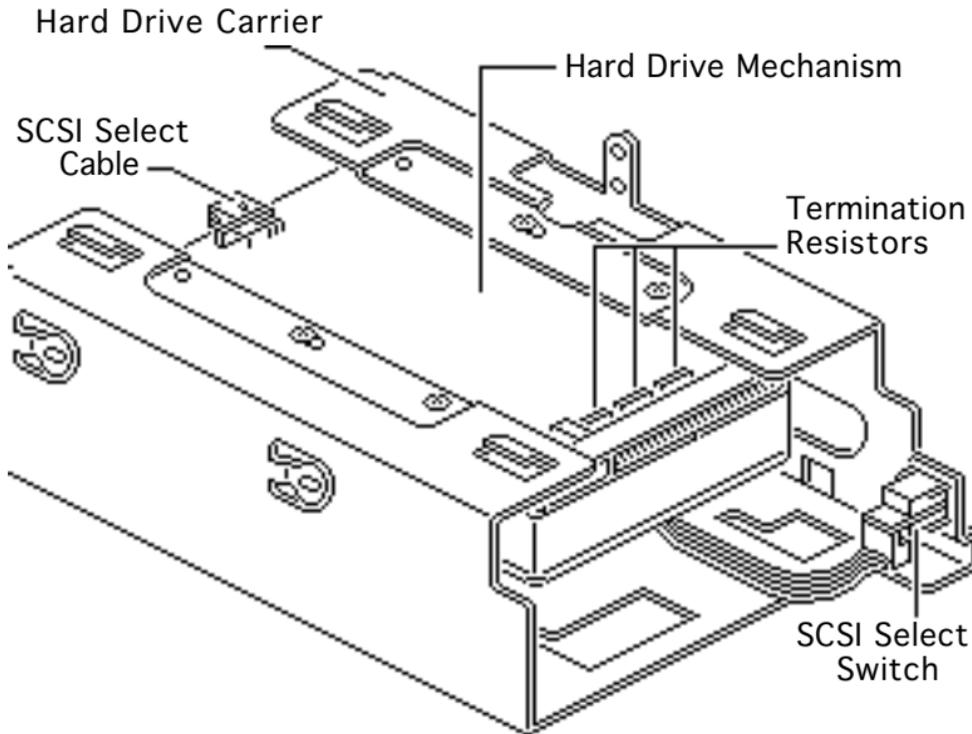




Drives in Quadra 900/950

There are three general procedures for preparing hard drives for Quadra 900/950 computers:

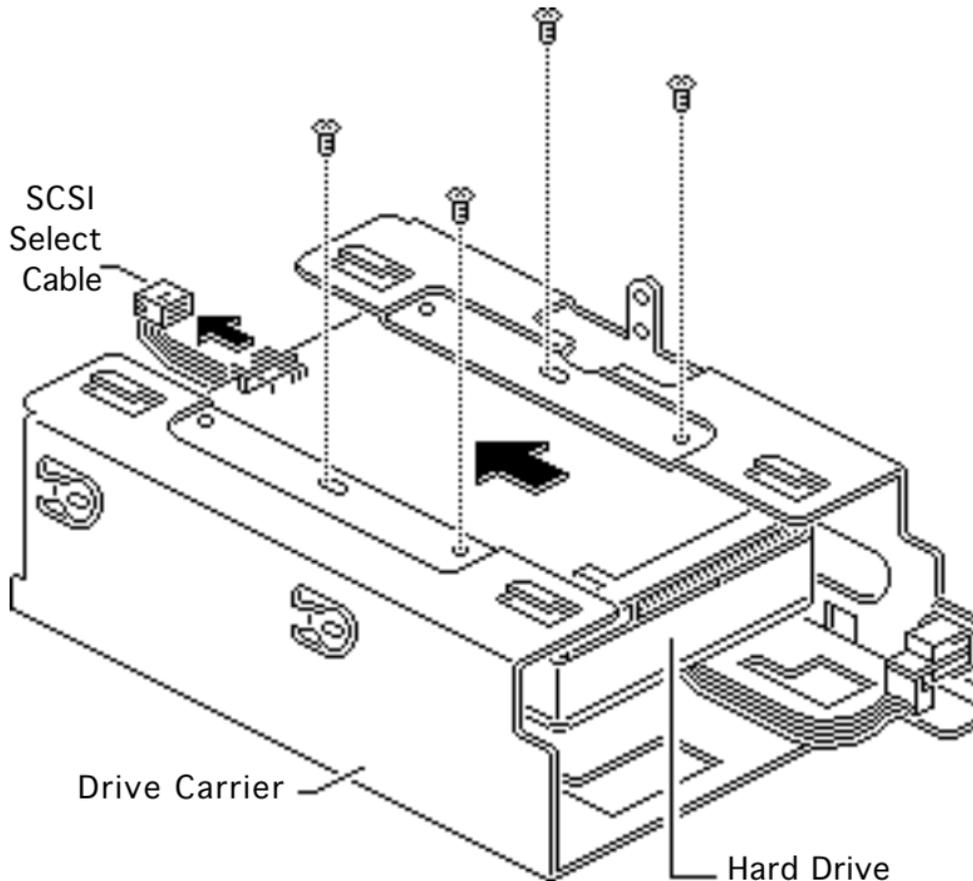
- Removing the hard drive mechanism from the carrier.
- Removing resistors from the replacement drives.
- Connecting the SCSI select cable.

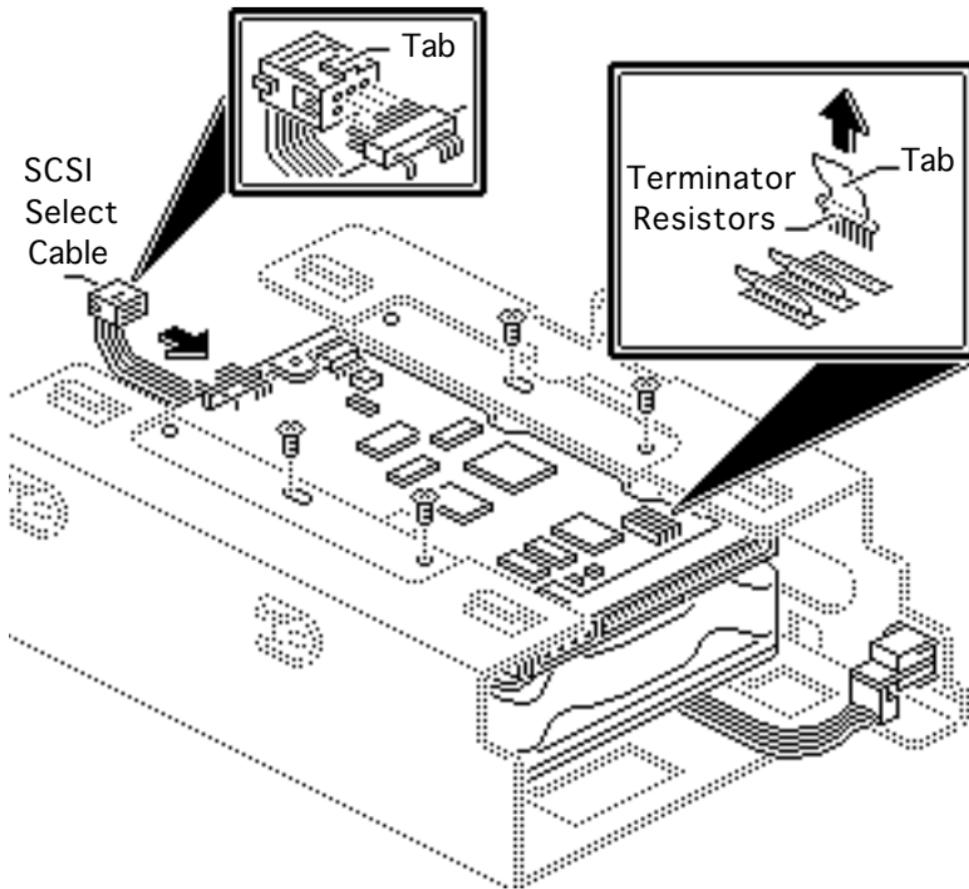




Removing the Hard Drive

- 1 Disconnect the SCSI select cable from the hard drive.
- 2 Remove the four Phillips screws.
- 3 Slide the drive out of the carrier.



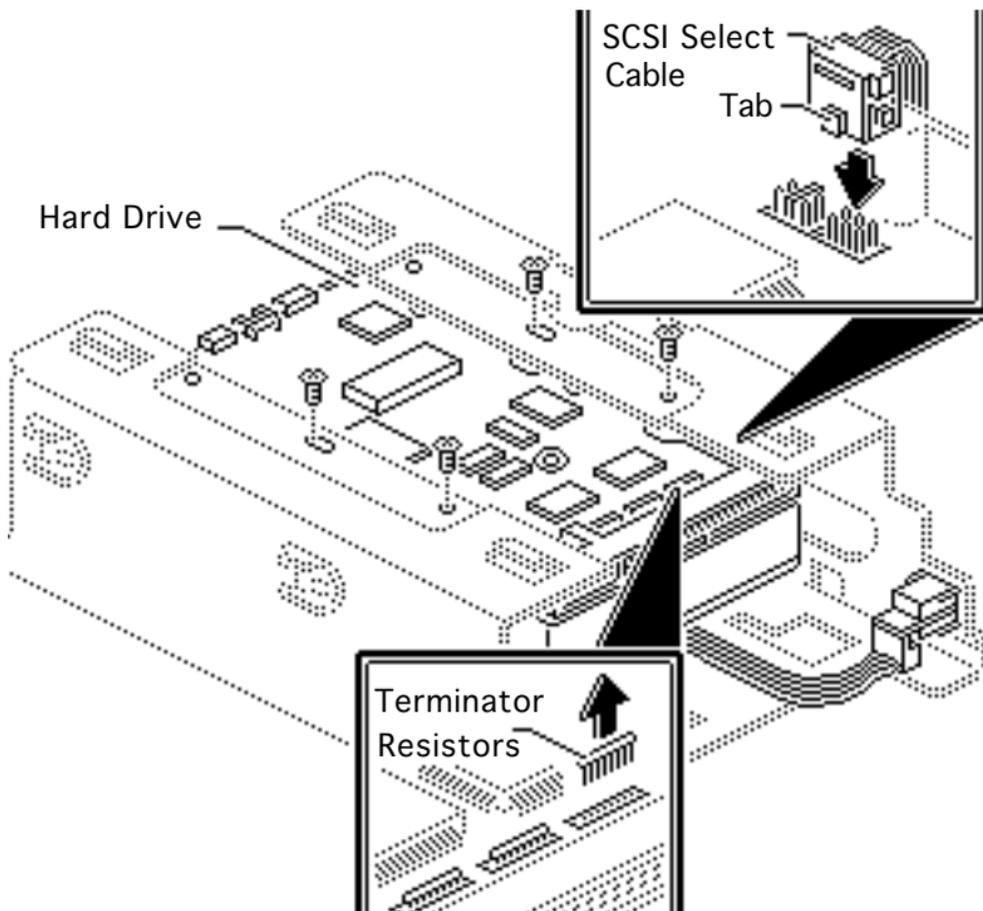


Removing Resistors from the 160 MB Hard Drive

Caution: Failure to remove the terminator resistors can damage the logic board.

- 1 Pull up on the tab and remove the resistors from a replacement 160 MB hard drive.
- 2 Insert the drive in the customer's carrier and install four screws.
- 3 Attach the SCSI select cable tab-up as shown.



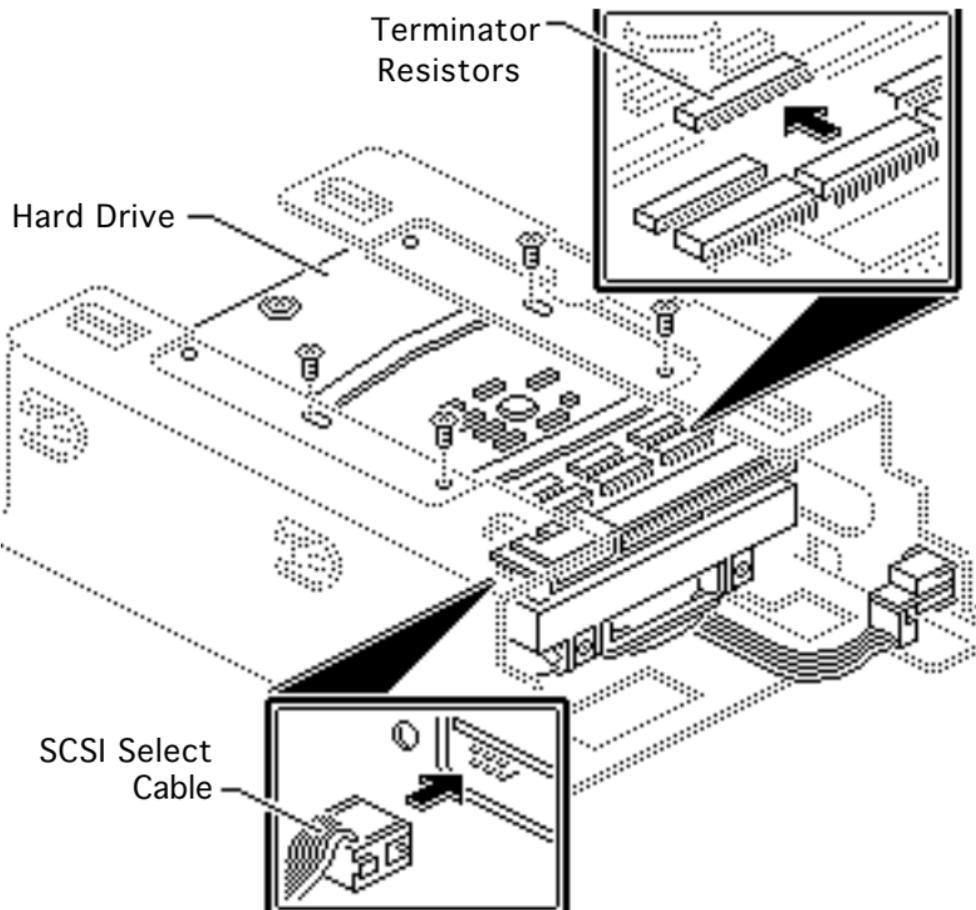


Removing Resistors from the 230 MB Hard Drive

Caution: Failure to remove the terminator resistors can damage the logic board.

- 1 Using needlenose pliers, remove the resistors from a replacement 230 MB drive.
- 2 Insert the drive in the customer's carrier and install four screws.
- 3 Attach the SCSI select cable as shown.





Removing Resistors from the 400 MB Hard Drive

Caution: Failure to remove the terminator resistors can damage the logic board.

- 1 Remove the resistors from a replacement 400 MB drive.
- 2 Insert the drive in the customer's carrier and install four screws.
- 3 Attach the SCSI select cable with the tab of its connector facing down.





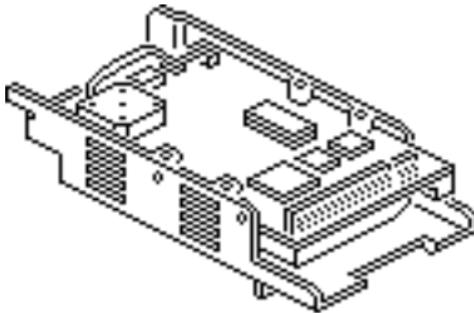
Identifying 20SC Rev A & B

No preliminary steps are required before you begin this procedure.

Note: The Hard Drive 20SC 3.5-inch Revision A and Revision B drives must be replaced like-for-like.

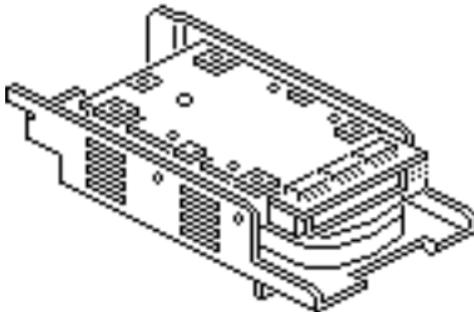
Identify the revision you need by matching the customer's defective drive with the replacement drive.





Revision A (661-0373)

- Revision A replacement drives ship in an internal carrier, component side up.
- Revision B replacement drives ship in an internal carrier, component side down.



Revision B (661-0612)





Additional Procedures

Hard Drives



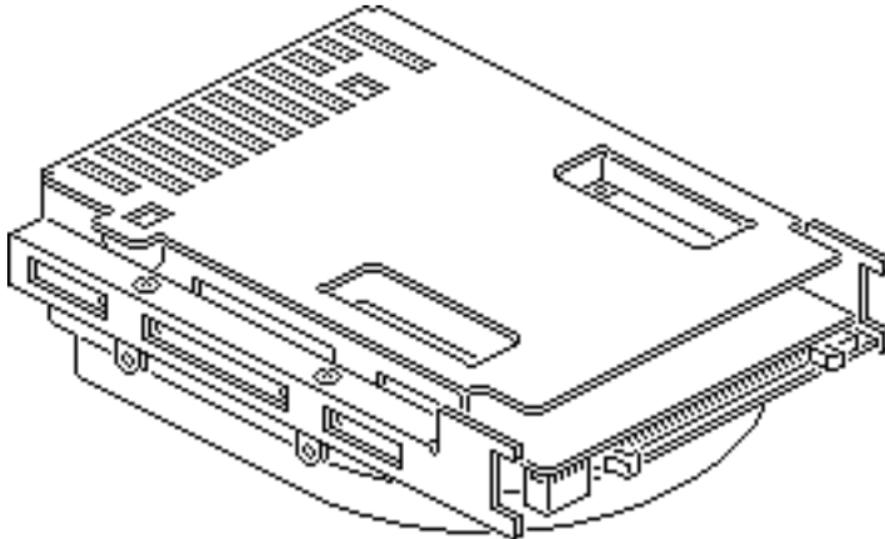


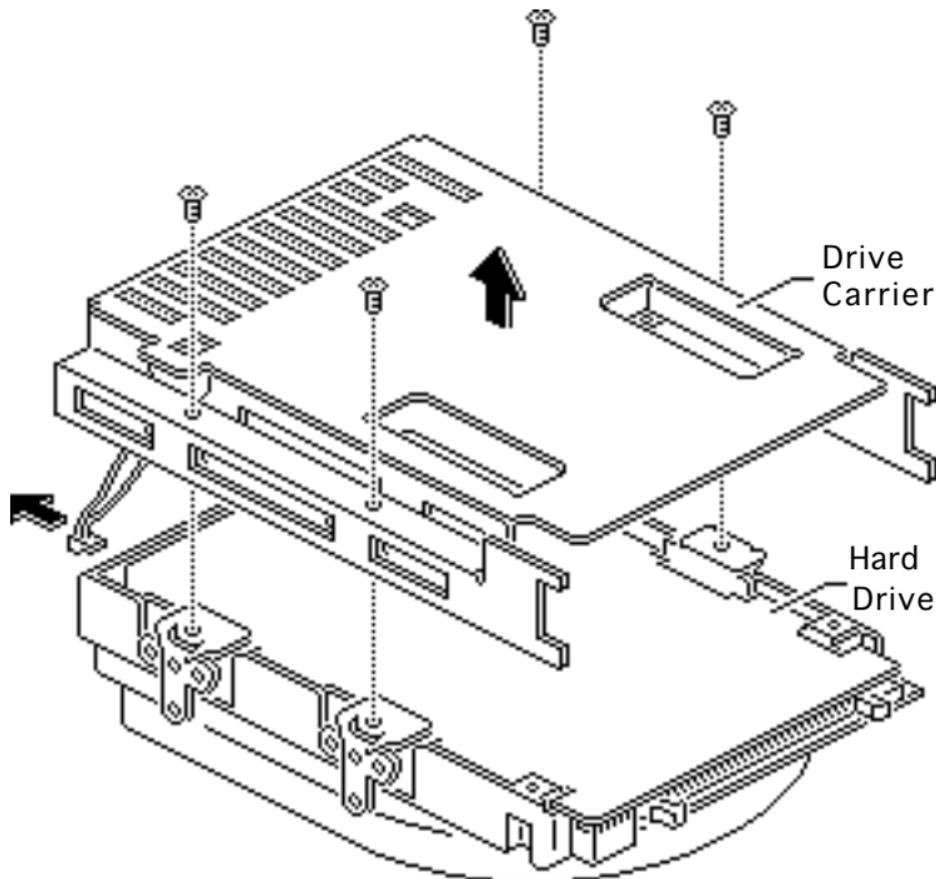
Carrier Removal

No preliminary steps are required.

Note: This procedure applies to hard drive mechanisms that have been removed from a computer or an external hard drive, or to replacement drive mechanisms that have not yet been installed in the computer.

Caution: Review the ESD precautions in Bulletins/ Safety.



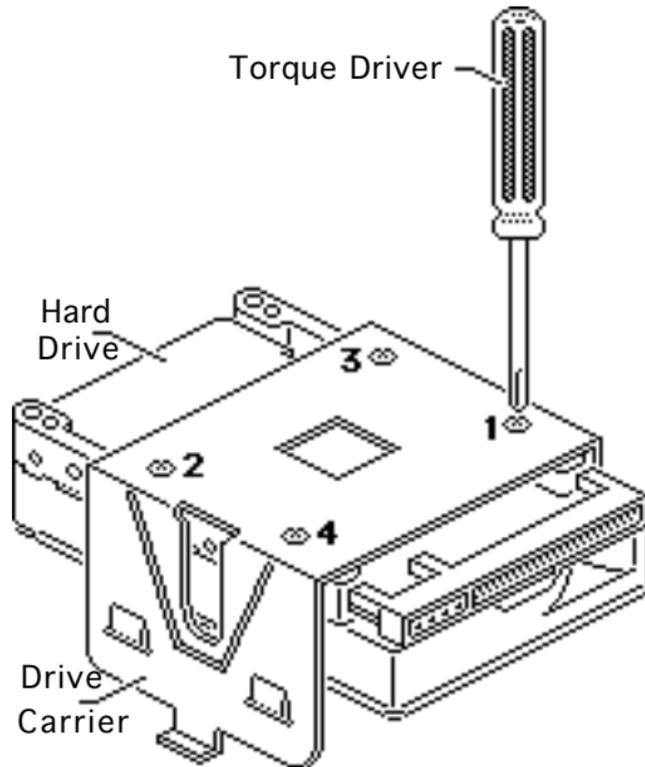


Remove the four screws and lift the carrier from the hard drive.

Replacement Caution: Be sure to properly torque the replacement drive to its carrier. Failure to do so could damage the drive. See “Torque Sequence” in this chapter.

Note: For information on returning defective drives, see “General Return Info” and refer to the Parts chapter in this manual.





Torque Sequence

No preliminary steps are required before you begin this procedure.

Note: This procedure applies to hard drive mechanisms that have been removed from a computer or an external hard drive, or to replacement drive mechanisms that have not yet been installed in the computer.

Using a torque driver,

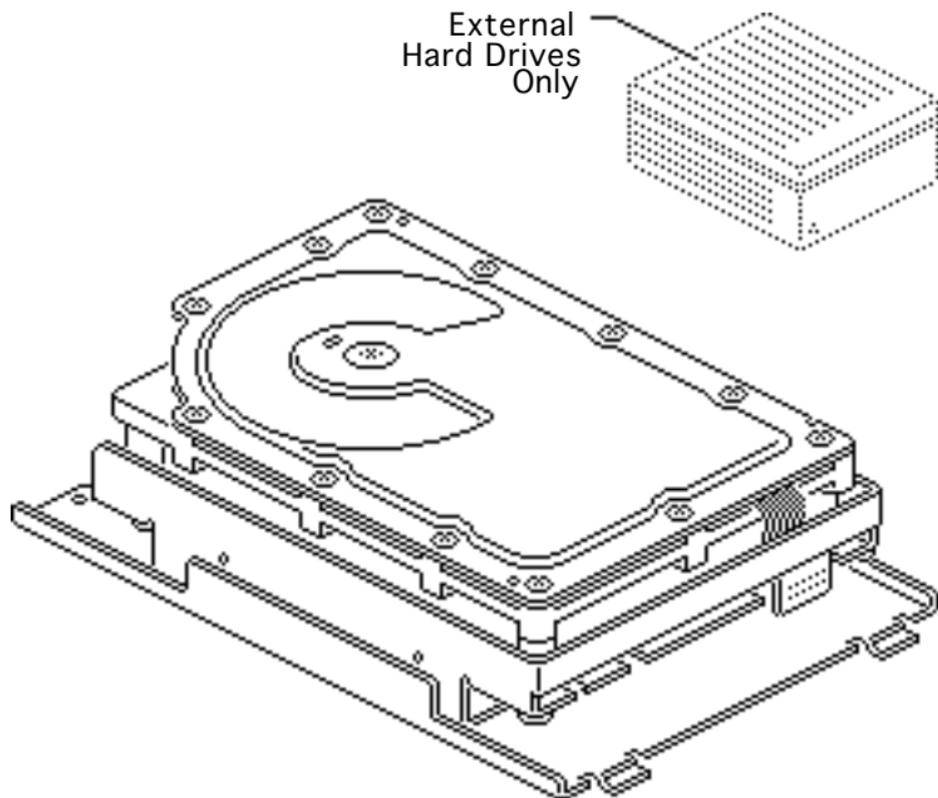




tighten the screws in the order shown. Torque the screws with driver to 8.0-inch pounds.

Note: The torque sequence is the same for all types of drives and carriers. The Apple torque driver is preset to 8 in/lbs.





External
Hard Drives
Only

Modifying 5.25-Inch Drives

No preliminary steps are required before you begin this procedure.

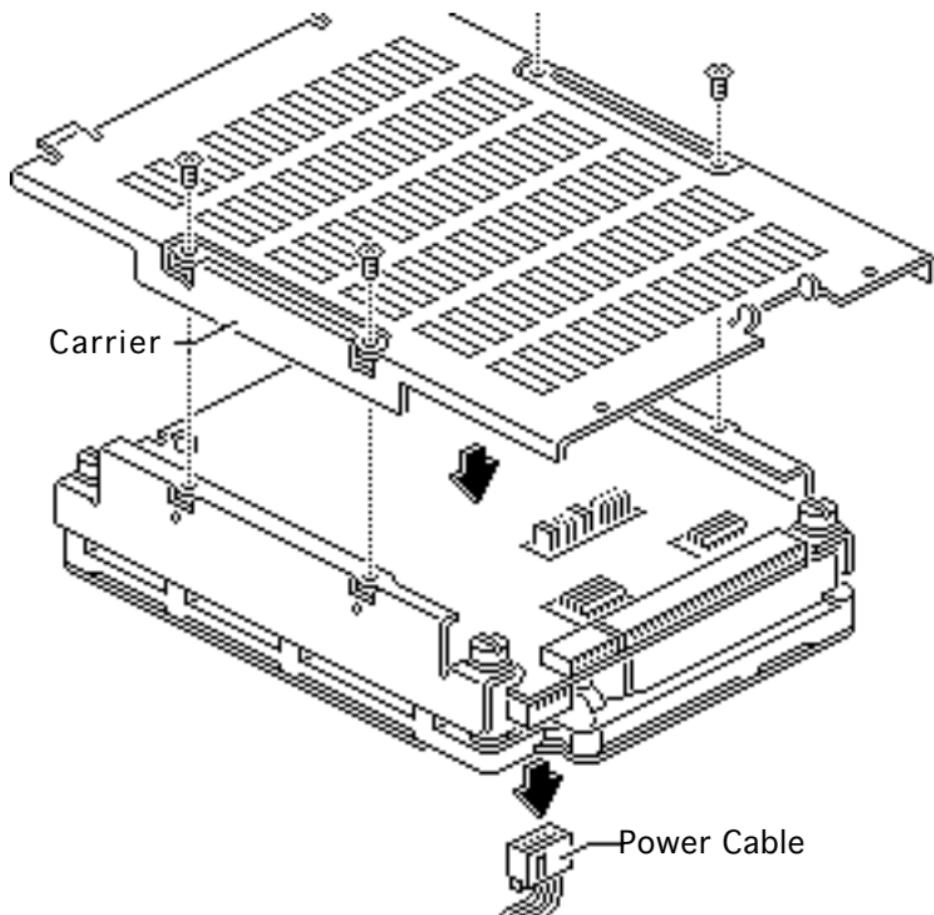
This section describes procedures for modifying 5.25-inch replacement hard drives that are qualified for external hard drives. To learn whether a replacement drive is a qualified external drive, refer to compatibility information in the Service Source parts database.





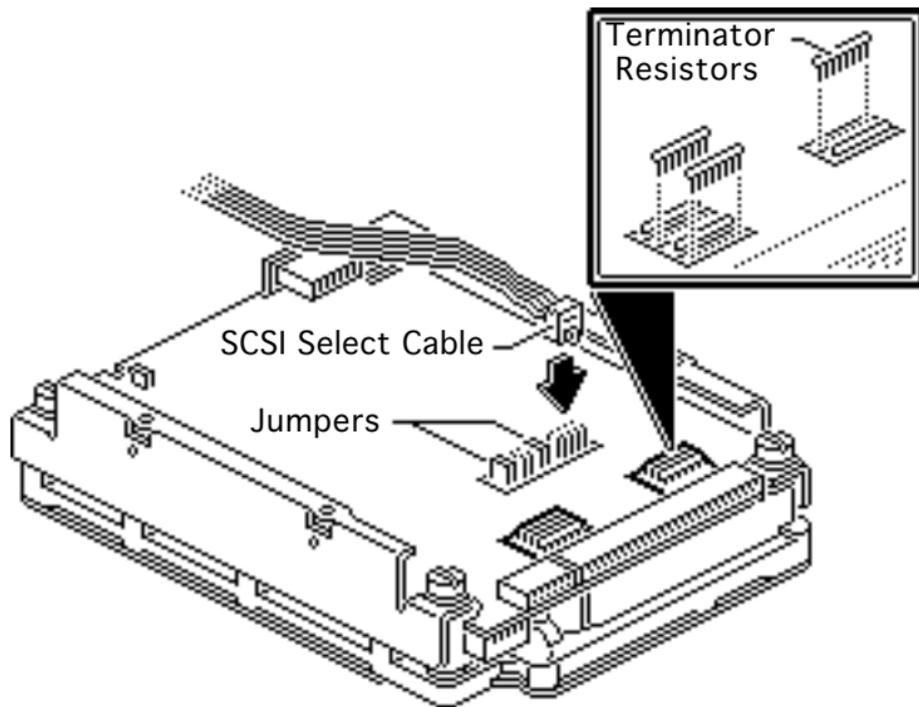
Note: The 20 MB and 160 MB external 5.25-inch replacement hard drives ship prepared for external drives. You must modify other replacement hard drives for use in external hard drives.





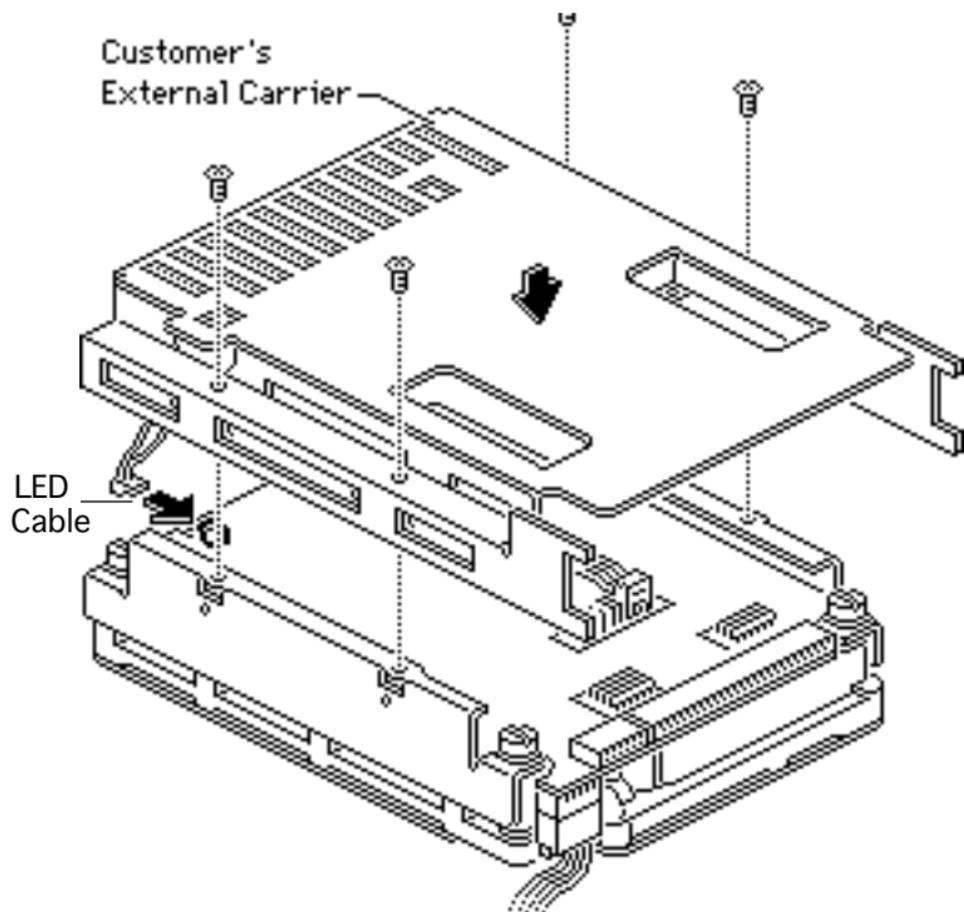
- 1 Remove the four mounting screws and carrier from the 5.25-inch service replacement hard drive.
- 2 Disconnect the power cable (if attached) from the replacement drive.





- 3 Disconnect the resistors from the component side of the replacement drive. Use needlenose pliers and pull the resistors straight up.
- 4 **Replacement Note:** Be sure that the tab on the SCSI select cable connector points toward the hard drive data cable. Connect the SCSI select cable to the three pairs of pins on the component side of the drive. Leave the black jumpers on the other pins.





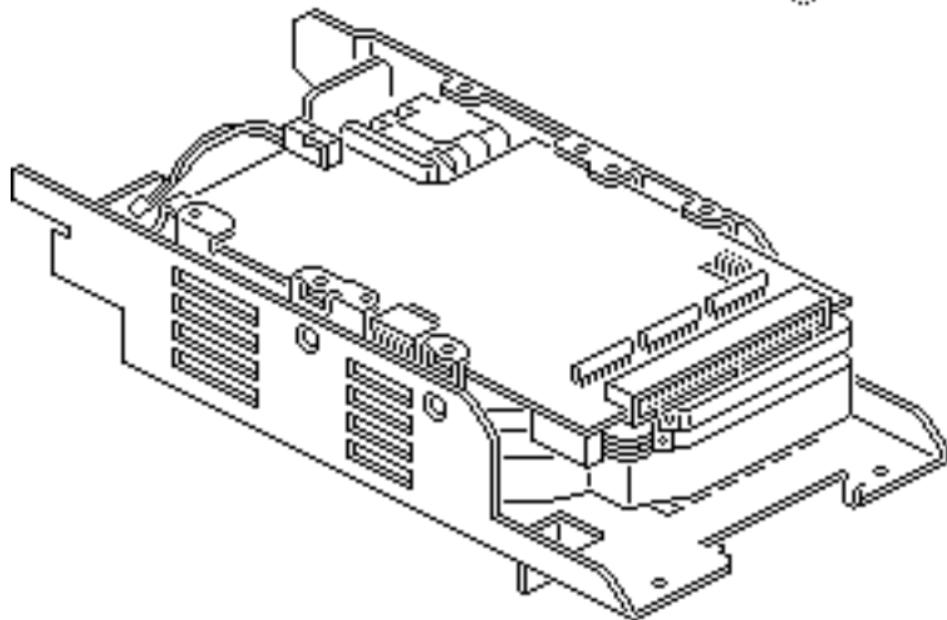
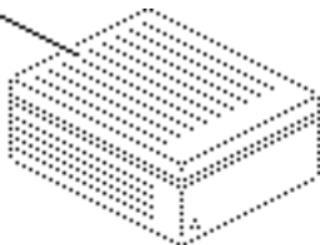
- 5 Connect the LED cable connector from the customer's external carrier to the component side of the replacement drive.
- 6 Attach the reconfigured replacement hard drive to the customer's external carrier with the four screws.

Note: For information on returning defective drives, see "General Return Info" and refer to the Service Source parts database.





External Drives Only



Modifying 3.5-Inch Drives

No preliminary steps are required before you begin this procedure.

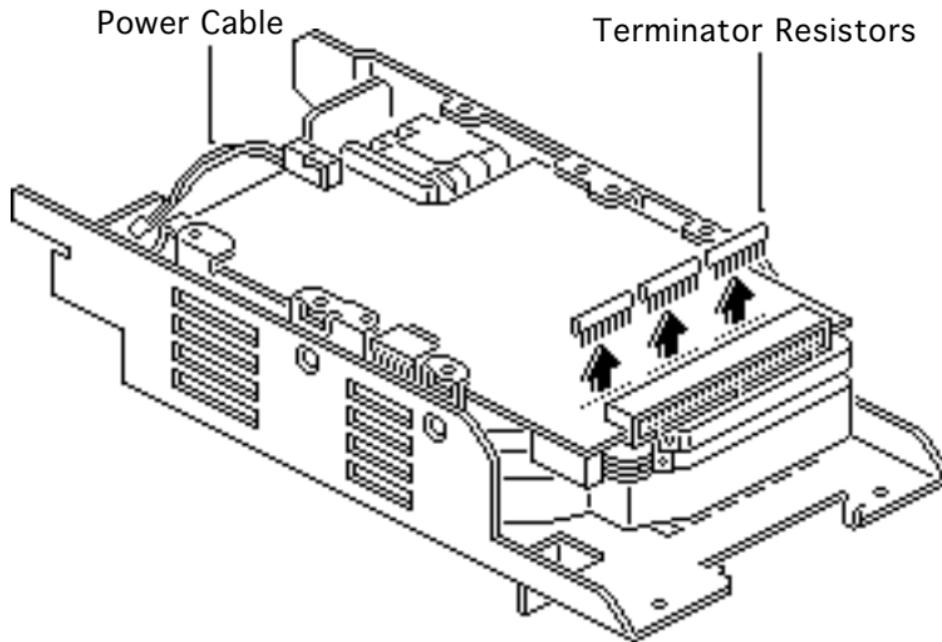
This section describes procedures for modifying 3.5-inch replacement hard drives that are qualified for external hard drives. To learn whether a replacement drive is a qualified external drive, refer to compatibility information in the Service Source parts database.





Note: The External 20 MB SCSI Rev A replacement hard drive ships prepared for use in external hard drives. You must modify other replacement hard drives for use in external hard drives.

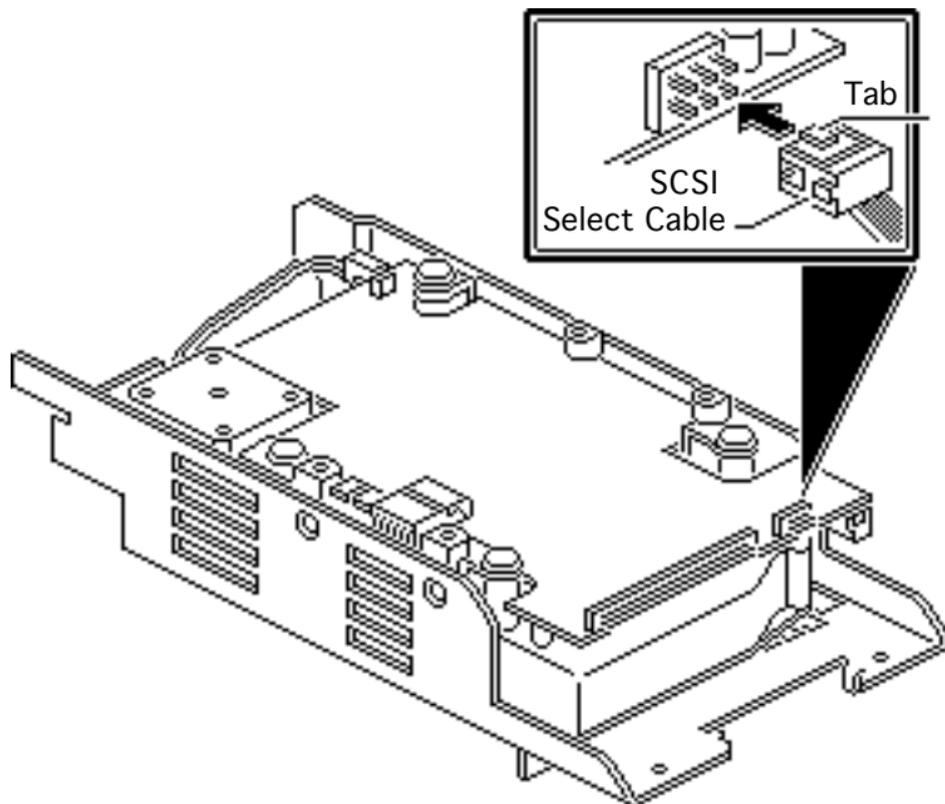




- 1 Remove the 3.5-inch replacement hard drive from its carrier.
- 2 Disconnect the power cable (if attached) from the replacement drive.
- 3 **Note:** The location of the terminator resistors may differ among drives.

Disconnect the three terminator resistors from the component side of the replacement drive. Use needlenose pliers, if necessary.



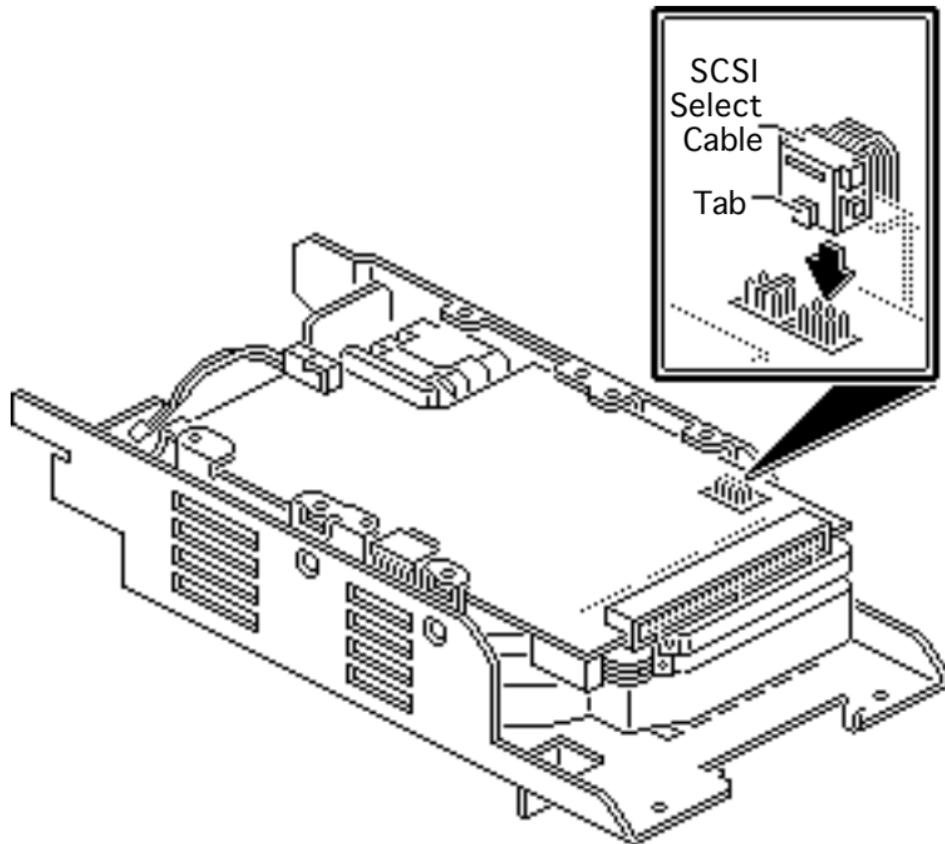


- 4 **Important:** You must connect the customer's SCSI select cable to six unkeyed pins on the controller board. Be aware that SCSI select cable connectors differ among drives in both design and location.

For SCSI select cable connectors located on the edge of the drive controller board:

- Remove any black jumpers that may be installed on the outside pins.





- Face the tab up and attach the SCSI cable connector.

For SCSI select cable connectors located on the surface of the controller board:

- Face the SCSI cable connector tab toward the center of the drive.
- Attach the connector to the six pins closest to the 50-pin SCSI connector.

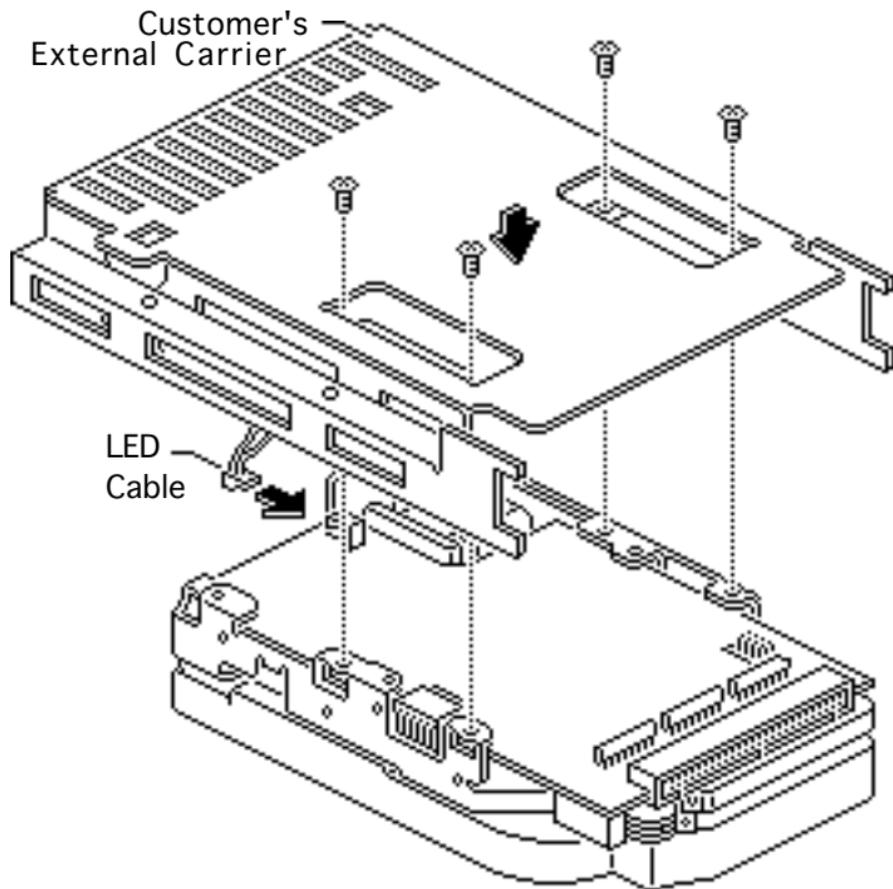
Important: Combinations of SCSI select connectors and cables vary. To verify the proper position of the





SCSI select cable connector, connect the drive to a known-good Macintosh and choose **Get Info** from the Finder's File menu. If **Get Info** displays the wrong SCSI ID or drive name, reverse the tab of the SCSI select cable connector.





- 5 Connect the LED cable connector from the customer's external carrier to the component side of the replacement drive.
- 6 Install the reconfigured replacement hard drive in the customer's external carrier.

Note: For information on returning defective drives, see “General Return Info” and refer to the Service Source parts database.



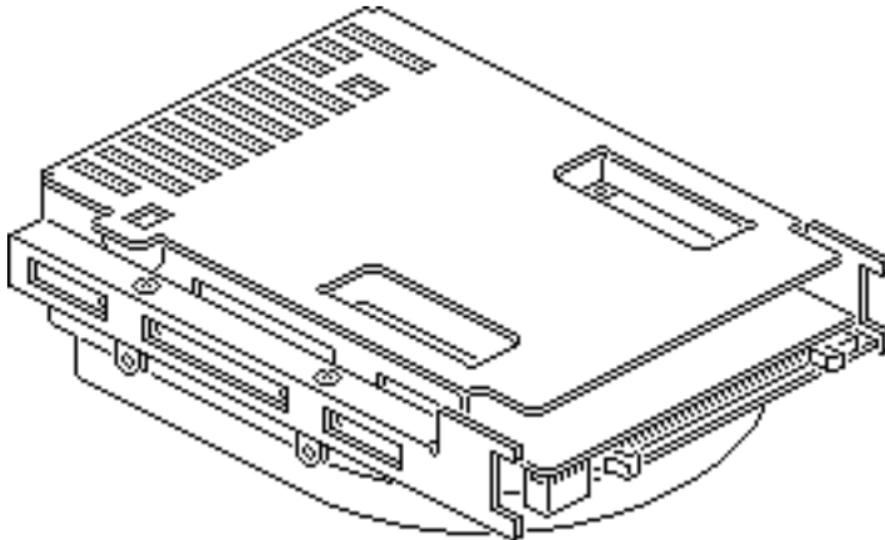


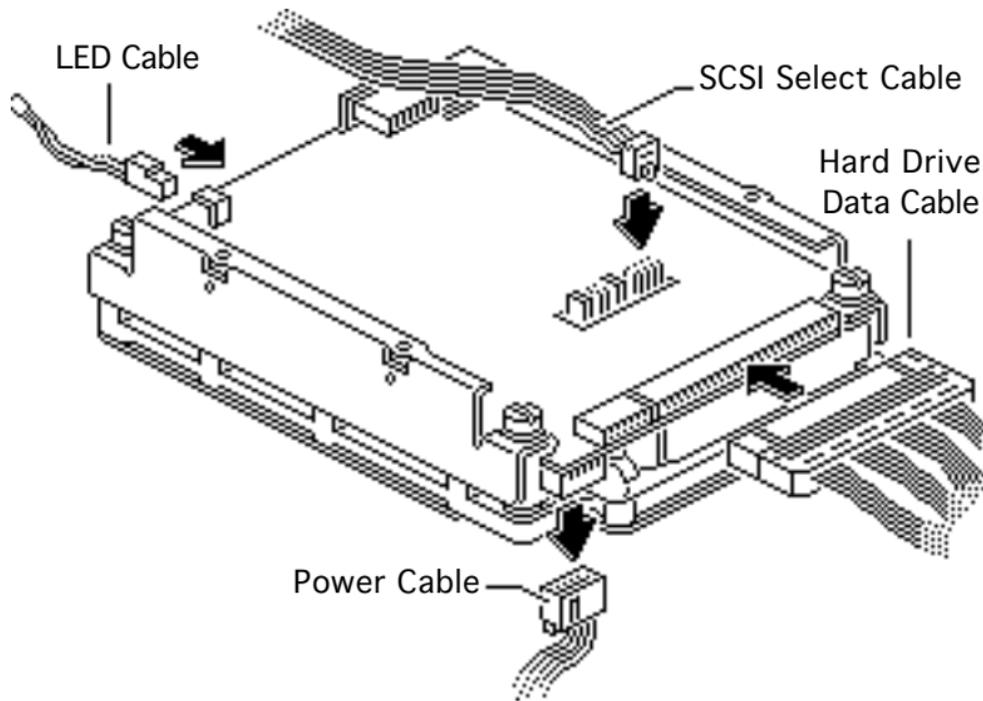
General Return Information

No preliminary steps are required before you begin this procedure.

Note: You must return a defective hard drive to Apple without the carrier and cables.

Note: For specific return requirements, refer to the Service Source parts database.





Each drive has four cables that need to be removed before the hard drive is returned. They are

- Power cable
- Hard drive data cable
- SCSI select switch cable
- LED cable

Note: For specific return requirements, refer to the Service Source parts database.





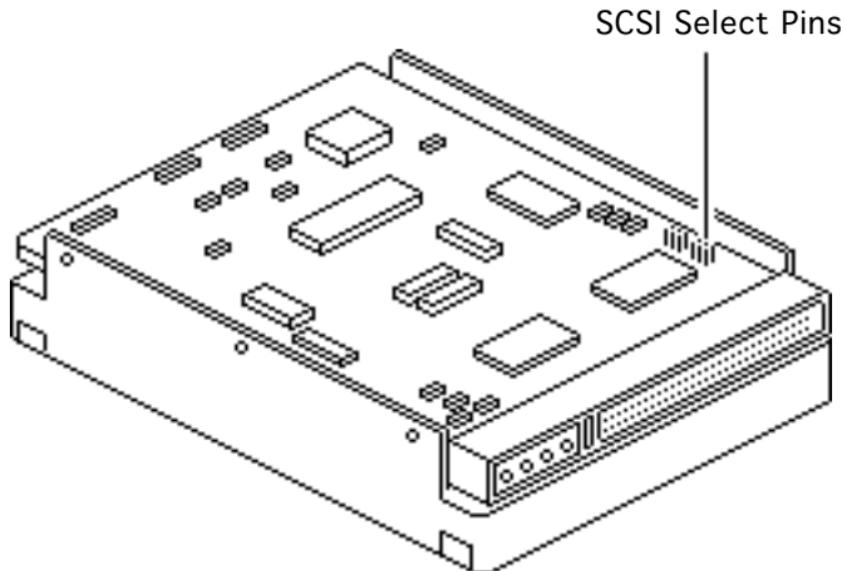
Setting SCSI ID

No preliminary steps are required before you begin this procedure.

- 1 To set the SCSI ID, locate the drive's six SCSI select pins.

Note: The location of the SCSI select pins varies among drives.

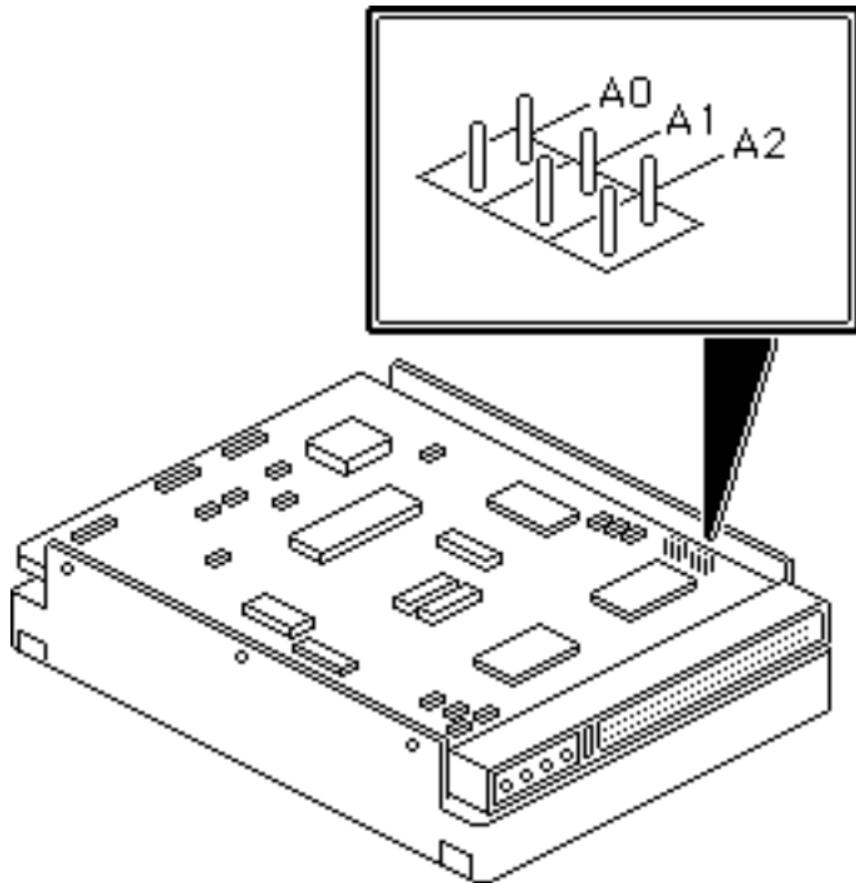
Generally, the group of six (occasionally eight) pins is on the top or side of the printed circuit board.





Note: If you are installing the drive in a docking station, such as the DuoDock, Apple recommends you change the SCSI ID to 1. If you are installing the drive mechanism in an external drive case, Apple recommends you change the SCSI ID to any number from 2 to 6.





- 2 Place jumpers on the pairs of pins as shown in the table below.

Note: In the following table, the SCSI ID numbers are labeled across the top and the pin numbers are labeled on the side. (The pin pairs may be labeled using either the A0-A1-A2 pin number convention or the E1-E2-E3 convention. Some pin pairs may not be labeled.) The letter “J”





indicates a jumper.

	0	1	2	3	4	5	6	7
A0/E1	-	J	-	J	-	J	-	J
A0/E2	-	-	J	J	-	-	J	J
A0/E3	-	-	-	-	J	J	J	J

