USER'S REFERENCE

SCSI CARD 3950U2

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User's Reference

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Understanding SCSI

SCSI (pronounced “scuzzy”) stands for Small Computer Systems Interface. SCSI is an industry standard computer interface for connecting SCSI devices (such as a hard disk drive, CD-ROM drive, or scanner) to a common SCSI bus.

A SCSI bus is an electrical pathway that consists of a SCSI adapter card (such as the SCSI Card 3950U2) installed in a computer and one or more SCSI devices. SCSI cables are used to connect the devices to the SCSI adapter card.

For the SCSI bus to function properly, SCSI IDs must be assigned to SCSI devices (SCSI devices and SCSI card), and the SCSI bus must be properly terminated.

SCSI IDs

Each device attached to the SCSI Card 3950U2, as well as the SCSI Card 3950U2 itself, must be assigned a unique SCSI ID number from 0 to 15. A SCSI ID uniquely identifies each SCSI device on the SCSI bus and determines priority when two or more devices are trying to use the SCSI bus at the same time.

Refer to the device’s documentation to set the SCSI ID. Here are some general guidelines for SCSI IDs:

- For internal SCSI devices, the SCSI ID usually is set by configuring a jumper on the device.
- For external SCSI devices, the SCSI ID usually is set with a switch on the back of the device.
- SCSI ID numbers don’t have to be sequential, as long as the SCSI Card 3950U2 and each device has a different number. For example, you can have an internal SCSI device with ID 0, and an external SCSI device with ID 6. Gaps in the sequence of numbers don’t matter.
- SCSI ID 7 has the highest priority on the SCSI bus. The priority of the remaining IDs, in descending order, is 6 to 0, 15 to 8.
- The SCSI Card 3950U2 is preset to SCSI ID 7 and should not be changed. This gives it the highest priority on the SCSI bus.

- Most internal SCSI hard disk drives come from the factory preset to SCSI ID 0.
- If you have 8-bit SCSI devices, they must use SCSI IDs 0, 1, 2, 3, 4, 5, or 6. SCSI ID 0 is recommended for the first SCSI hard disk drive.
- If you are booting your computer from a SCSI hard disk drive connected to the SCSI Card 3950U2, the Boot Target ID setting in the SCSI*Select*® utility must correspond to the SCSI ID of the device from which you are booting. By default, the Boot Target ID is set to *0*. See *Boot Device Options* on page 19 to change the Boot Target ID.
- In Windows® 95, you can use the Device Manager to view the SCSI ID (and other details) assigned to each SCSI device installed.
- If you installed Adaptec® EZ-SCSI® software, you can use the SCSI Explorer utility to view the SCSI ID (and other details) assigned to each SCSI device installed.

SCAM Protocol

The SCSI Card 3950U2 supports the SCSI Configured AutoMatically (SCAM) protocol, which assigns SCSI IDs dynamically and resolves SCSI ID conflicts automatically when you start the computer. If your computer includes SCSI disk drives or other devices that support SCAM, you do not need to manually assign SCSI IDs to these devices. To enable SCAM support, see *Configuring the SCSI Card 3950U2 with SCSISelect* on page 15.

Terminating the SCSI Bus

To ensure reliable communication on the SCSI bus, the ends of the SCSI bus must be properly terminated. This is accomplished when the device at the end of each cable, or the end of the cable itself, has a terminator installed (or enabled). The devices between the ends of each cable must have its terminator removed (or disabled).

Since the method for terminating a SCSI device can vary widely, refer to the device's documentation for instructions on how to enable or disable termination. Here are some general guidelines for termination:

- Termination on internal SCSI devices usually is controlled by manually setting a jumper or a switch on the device, or by physically removing or installing one or more resistor modules on the device.
- Termination on external SCSI devices usually is controlled by installing or removing a SCSI terminator. On some external devices, termination is controlled by setting a switch on the back of the drive.
- By default, termination on the SCSI Card 3950U2 itself is *Automatic* (the preferred method). To manually set termination on the SCSI Card 3950U2, see *Configuring the SCSI Card 3950U2 with SCSISelect* on page 15.
- Internal Ultra2 devices are set at the factory with termination disabled and cannot be changed. Proper termination for internal Ultra2 devices is provided by the built-in terminator at the end of the Ultra2 internal SCSI cable.
- Most non-Ultra2 SCSI devices come from the factory with termination enabled.

Troubleshooting

Most problems can be resolved by following the recommendations in *Troubleshooting Checklist* below. If you still experience problems after following the recommendations, continue with the remainder of this section.

Troubleshooting Checklist

Most problems with using the SCSI Card 3950U2 result from errors in preparing and connecting devices on the SCSI bus. If you have problems, check these items first.

Note: If you have problems with a specific SCSI device when other connected SCSI devices are working correctly, please contact the manufacturer of the problem device for trouble-shooting information.

- Are all SCSI devices turned on?
- Are all SCSI cables and power cables properly connected?
- Is the SCSI Card 3950U2 firmly seated and secured in the PCI expansion slot?
- Is the PCI expansion slot PCI Rev. 2.1 or higher compliant and does it support Bus Mastering?
- Are all SCSI devices and the SCSI Card 3950U2 assigned unique SCSI IDs?
- Are all SCSI devices terminated properly?
- If your computer allows you to set up configuration options when the computer first boots up (that is, through CMOS setup), are the following options set up as specified?
  - If there is an Interrupt Type or Interrupt Line option in the Setup program, select **Int-A** or **Interrupt Type = A** (you may also be required to change a motherboard jumper setting).
  - If there is a Triggering Interrupt option, select **Level**.

- If there is an option to enable or disable bus mastering for the PCI slots, select **Enabled**.
- If there is an option to enable or disable individual PCI slots, be sure the slot in which you install the SCSI Card 3950U2 is Enabled.
- If your computer has a combination of ISA (or EISA) boards and PCI boards, you may need to mark the IRQs used by ISA / EISA boards as *Used* so the computer BIOS will not try to assign these IRQs to other PCI boards.
- In some computers the BIOS reserves a set of available IRQs for PCI boards, and you have to assign these IRQs manually.

Note: Some configuration options apply to a specific PCI bus slot, so if you change any option be sure you are applying the change to the correct slot. Check your computer documentation to determine the correct PCI bus slot.

Troubleshooting in Windows 95/Windows 98

When I start Windows 95/Windows 98, the system locks up when the Windows logo is displayed. How can I get the system to start so that I can verify that the SCSI card is functioning normally?

1. Start or restart your computer. View the messages that appear onscreen.
2. When the message "Starting Windows 95" appears, press and release the **F8** function key while the text is on your screen. (In Windows 98, no message appears. Press and release the **F8** function key at boot.)
3. From the menu that is displayed, select **Safe Mode.** (It may take several minutes for Windows 95 / Windows 98 to load.)
4. If the system completes the boot to the desktop, the core software is functional; resources, software conflicts, and / or hardware needs to be checked.

5. If the system still fails to boot, and the boot drive is on an existing IDE or SCSI controller, shut down the system, remove the SCSI Card 3950U2, and restart the computer.
6. Verify that an IRQ is available by viewing resources in System Properties.
7. Verify the Operating System is set to **Optimal Performance** by checking the Performance tab under System Properties.

How can I tell if the SCSI Card 3950U2 software driver is loading properly?

1. Click the **Start** button, point to **Settings**, then click **Control Panel**.
2. Double-click the **System** icon.
3. Click the **Device Manager** tab.
4. Double-click the **SCSI Controller** icon. The software driver for the SCSI Card 3950U2 is listed as "Adaptec AHA®-3950U2 PCI Ultra2 SCSI Controller."
   - If the driver is listed, the SCSI Card 3950U2 driver is loading properly.
   - If the driver is listed but has an exclamation mark inside a yellow circle, the software driver may be in conflict with other hardware using the same resources. Double-click the icon to see the device status and possible solutions.
   - If the driver is listed but has an "X" inside a red circle, the SCSI Card 3950U2 software driver is disabled and isn't loading (see below).
   - If the SCSI Controller icon or the SCSI Card 3950U2 software driver is not listed, reinstall the driver (see below).

Note: Software upgrades (including downloadable drivers) for Adaptec products are available on the Adaptec Web Site at *http://www.adaptec.com*.

An "X" inside a red circle appears with the SCSI Card 3950U2 software driver in Device Manager. What does this mean?

The SCSI Card 3950U2 software driver is disabled and isn't loading. To enable the driver

1. Double-click the SCSI Card 3950U2 software driver in Device Manager.
2. Under the **General** tab, check the Original Configuration (current) box.

What if there is no SCSI controller icon under Device Manager, or the software driver for the SCSI Card 3950U2 does not appear under Device Manager?

If the SCSI Controllers icon or the software driver do not appear

1. Double-click the **Add New Hardware** icon in Control Panel.
2. Select **Yes** on the second screen of the Add New Hardware Wizard to have Windows search for the SCSI Card 3950U2.
3. Follow the onscreen instructions.

If Windows 95/Windows 98 does not detect the SCSI Card 3950U2, run the Add New Hardware Wizard again:

1. Double-click the **Add New Hardware** icon in Control Panel.
2. Select **No** on the second screen of the wizard.
3. Select **SCSI controllers** on the next screen.
4. Select "**Adaptec AHA-3950U2 PCI Ultra2 SCSI Controller**."

If "Adaptec AHA-3950U2 PCI Ultra2 SCSI Controller" is not on the list, you may be able to install the driver from the Adaptec EZ-SCSI Setup Diskette. Follow these steps:

1. Place the Adaptec EZ-SCSI Setup Diskette in the floppy disk drive.
2. Double-click the **Add New Hardware** icon in Control Panel.
3. Select **No** on the second screen of the wizard.
4. Select **SCSI controllers** on the next screen.
5. Click the **Have Disk** button, then click the **Browse** button.

6. Look in the *drivers**storage* directory of the Windows 95/ Windows 98 CD-ROM (or the root directory of the EZ-SCSI Setup Diskette) and select the model of your SCSI card.

How can I check the status of a resource (for example, IRQ, Memory, I/O)?

1. Click the **Start** button, point to **Settings**, then click **Control Panel**.
2. Double-click the **System** icon.
3. Click the **Device Manager** tab.
4. Double-click the **Computer** icon.
5. On the View Resources tab, click the option button for the type of resource you want to check.
6. The setting and the hardware using the setting are displayed.
   - If a specific resource is not listed, the resource is not used by a device.
   - If a resource is listed more than once, the resource is used by more than one device.
   - If a resource is used by an unknown device, the resource is used but the device using the resource cannot be detected.

How do I use the Hardware Conflict Troubleshooter in Windows 95/ Windows 98?

1. Click the **Start** button, then click **Help**.
2. From the Contents tab, double-click **Troubleshooting**.
3. Double-click **If you have a hardware conflict**.
4. Follow the step-by-step instructions in the Windows Help window.

Common Error Messages

The following messages may appear at bootup:

"Device connected, but not ready"
The host received no answer when it requested data from an installed SCSI device.

- Run SCSI*Select* and set the Send Start Unit Command to **Yes** for the particular SCSI device.
- Make sure the drive is set to spin up when the power is switched on. (See the documentation for the device.)

"Start unit request failed"
The SCSI Card BIOS was unable to send a Start Unit Command to the device.

- Run SCSI*Select* and disable the Send Start Unit Command for the device.

"Time-out failure during..."
An unexpected time-out occurred.

- Verify the SCSI bus is properly terminated.
- Verify all cables are properly connected.
- Try disconnecting the SCSI device cables from the SCSI card and then starting the computer. If the computer successfully restarts, one of the SCSI devices may be defective.
- Ensure that power is turned on because the external devices may be turned off.

Using the SCSI Card 3950U2 and SCSI Devices

This section provides useful information on using the SCSI Card 3950U2 and your SCSI devices. For specific information, refer to the documentation that came with your SCSI device.

Using SCSI Devices

Hard Disk Drives

- Every SCSI hard disk drive must be physically low-level formatted, partitioned, and logically formatted before it can be used to store data. SCSI hard disks are physically low-level formatted at the factory and do not usually need to be formatted again.

  If you connect a new SCSI hard disk drive to your SCSI card, you must partition and logically format the drive. For DOS and Windows (3.x and 95/98) use the DOS Fdisk and Format commands (see your computer, DOS, and Windows documentation). For other operating systems, see your operating system documentation.

- If you are booting from a SCSI hard disk drive, make sure the Hard Disk (or Drives) setting in your computer's CMOS setup program is set to **None** or **No Drives Installed**, as is required for SCSI hard disk drives. See your computer documentation for details.

- If both SCSI and non-SCSI (for example, IDE) disk drives are installed, then the non-SCSI disk drive is typically the boot drive. If your computer supports BBS (BIOS Boot Specification), both SCSI and non-SCSI disk drives can coexist and you can specify which drive to boot from. Refer to your computer documentation for more information.

Ultra2 Hard Disk Drives

- We recommend keeping your Ultra2 hard disk drives separate from your non-Ultra2 devices. Connecting a non-Ultra2 hard disk drive to one of the Ultra2 connectors on the SCSI Card 3950U2 causes the Ultra2 SCSI segment of the SCSI bus to drop down to Ultra SCSI performance levels (40 MBytes / sec).

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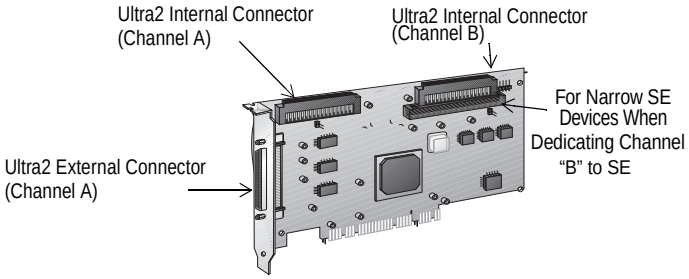

Figure 1. Ultra2 Internal and External Connectors

- Internal Ultra2 SCSI devices come from the factory with termination disabled and cannot be changed. Proper termination is provided by the built-in terminator at the end of the Ultra2 internal SCSI cable provided in the kit.

Scanners

- You will need to install the scanner manufacturer's proprietary software drivers. See your scanner's documentation for details.

SCSI Device Display at Bootup

At bootup, each device attached to the SCSI Card 3950U2 is identified by SCSI ID and the name. For example, a message similar to the following appears on the screen at bootup:

```
SCSI ID:0  Seagate ST39173LC  Ultra2  LVD
```

In this example, the device is assigned SCSI ID 0; "Seagate ST39173LC" refers to the name of the device; "Ultra2" indicates that the device is attached to the Ultra2 SCSI segment; "LVD" means that the device is running in LVD-Ultra2 mode.

LVD (Low Voltage Differential) is the enabling technology for Ultra2. If the device is running in LVD-Ultra2 mode, this indicates that the device's maximum transfer rate is set at the Ultra2 SCSI performance level (80 MBytes / sec). SE (Single-Ended) is the enabling technology for Fast SCSI and Ultra SCSI. If the device is running in SE-Ultra mode, this indicates that the device's maximum transfer rate is set at the Ultra SCSI performance level (40 MBytes / sec).

Note: If any SE device is attached to the Ultra2 SCSI segment, the Ultra2 SCSI segment will run at speeds up to 40 MBytes / sec instead of 80 MBytes / sec.

Installing Multiple SCSI Cards

- You can install multiple SCSI cards in your computer; you are limited only by the available system resources (for example, IRQ settings, I / O port addresses, BIOS addresses, and so forth) not used by other cards installed in your computer.
- Each SCSI card you install forms a separate SCSI bus with a different set of SCSI devices. SCSI IDs can be reused as long as the ID is assigned to a device on a different SCSI card (for example, each SCSI card can have a device with SCSI ID 2).
- If you have two or more SCSI cards, enable the BIOS on the boot SCSI card only; disable the BIOS on the remaining SCSI cards.

Connecting the LED Connector

(*Optional feature*) Most computers have an LED disk activity light on the front panel. If you choose to disconnect the cable from the LED connector on the motherboard and connect it to the LED connector on the SCSI card, the LED on the front panel of the computer will light whenever there is activity on the SCSI bus (see Figure 2).

Note: If you are using non-SCSI disk drives (for example, IDE), you may not want to connect your computer's LED to the SCSI card, since the LED will no longer indicate non-SCSI disk activity.

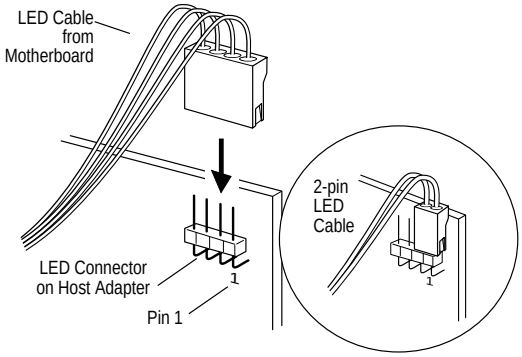

Figure 2. Connecting the LED Cable to the LED Connector

Using SCSI and IDE (or EIDE) Devices

- All Adaptec SCSI cards can coexist with another controller (IDE, EIDE, RLL, etc.) installed in the computer.
- If you have both an IDE hard disk drive and a SCSI hard disk drive, the IDE drive is typically the boot drive. In this case, disable the BIOS on the SCSI card (see *Advanced Configuration Options* on page 22). If your computer supports BBS, both SCSI and non-SCSI disk drives can coexist and you can specify which drive to boot from. Refer to your computer documentation for more information.
- You cannot connect an IDE device to a SCSI card, or a SCSI device to an IDE card (controller).
- Disable the BIOS on the SCSI card if no SCSI hard disk drives are installed (see *Advanced Configuration Options* on page 22).

Replacing a Non-Adaptec SCSI Card with an Adaptec SCSI Card

- SCSI is standard, but how data is translated on to a hard disk drive is not. Each SCSI card manufacturer uses its own translation schemes for writing data to a disk. To use a hard disk drive previously connected to a non-Adaptec SCSI card, low-level format the drive after connecting to the Adaptec SCSI card. (See *Using SCSI Disk Utilities* on page 24.)

Caution: A low-level format destroys all data on the drive. Be sure to back up your data before performing a low-level format.

Configuring the SCSI Card 3950U2 with SCSI*Select*

The SCSI Card 3950U2 includes the SCSI*Select* configuration utility, which allows users to change host adapter settings without opening the computer. SCSI*Select* also lets users list the SCSI IDs of devices on the host adapter, format SCSI disk drives, and check drives for defects. The following sections describe SCSI*Select* and its allowable and default settings. See the *SCSI Card 3950U2 Installation Guide* for instructions on running SCSI*Select*.

SCSI*Select* Settings

SCSI*Select* has the options shown in Table 1. The same settings apply to the second channel.

Table 1. SCSI*Select* Settings

Options	Allowable Values	Default Setting
SCSI Bus Interface Options		
Host Adapter SCSI ID	0-15 (ID must be 7-0 if 8-bit devices are attached to internal or external connectors)	7
SCSI Parity Checking	Enabled, Disabled	Enabled
Host Adapter SCSI Termination		
Ultra2-LVD / SE Connector (Only for channel A)	Automatic, Enabled, Disabled	Automatic
Fast / Ultra-SE Connector (Only for channel B)	Automatic, Low ON / High ON, Low OFF / High OFF, Low OFF / High ON[1]	Automatic
Boot Device Options		
Boot Channel	A First, B First	A First
Boot SCSI ID	0-15	0
Boot LUN Number[2]	0-7	0

Options	Allowable Values	Default Setting
SCSI Device Configuration Options		
Initiate Sync Negotiation	Yes, No	Yes (Enabled)
Maximum Sync Transfer Rate (MBytes / sec)	80.0, 53.4, 40.0, 32.0, 26.8, 20.0, 16.0, 13.4, 10.0, ASYN[3]	80.0
Enable Disconnection	Yes, No	Yes (Enabled)
Initiate Wide Negotiation	Yes, No	Yes (Enabled)
Send Start Unit Command	Yes, No	Yes (Enabled)
Enable Write Back Cache	Yes, No, N / C[4]	N / C
BIOS Multiple LUN Support	Yes, No	No (Disabled)
Include in BIOS Scan	Yes, No	Yes (Enabled)
Advanced Configuration Options		
Reset SCSI Bus at IC Initialization	Enabled or Disabled	Enabled
Extended BIOS Translation for DOS Drives > 1 GByte[2]	Enabled or Disabled	Enabled
Plug and Play SCAM Support	Enabled or Disabled	Disabled
Host Adapter BIOS	Enabled or Disabled	Enabled
Support Removable Disks Under BIOS as Fixed Disks[5]	Boot Only, All Disks, Disabled	Boot only
Display <Ctrl> <A> Messages during BIOS Initialization[2]	Enabled or Disabled	Enabled
BIOS Support for Bootable CD-ROM[2]	Enabled or Disabled	Enabled
BIOS Support for Int 13h Extensions[2]	Enabled or Disabled	Enabled

[1] Refer to *Cabling Examples* on page 27.
[2] Setting is valid only if BIOS Multiple LUN Support is enabled; otherwise, only LUN 0 is used.
[3] Asynchronous
[4] No change
[5] Settings are valid only if host adapter BIOS is enabled.

Starting SCSI*Select*

Follow these steps to start SCSI*Select*:

1. Turn on or restart your system.

   During the startup process, pay careful attention to the messages that appear on your screen.

2. When the following message appears on your screen, press the **Ctrl-A** keys simultaneously (this message appears for only a few seconds):

   Press <Ctrl><A> for SCSISelect (TM) Utility!

Note: This message only appears if the above setting is enabled. If this setting is disabled, look for the BIOS banner of the Adaptec host adapter.

3. From the menu that appears, use the ↑ and ↓ keys to move the cursor to the option you want to select, then press **Enter**.

Note: If you have difficulty viewing the display, press **F5** to toggle between color and monochrome modes. (This feature may not work on all monitors.)

Exiting SCSI*Select*

Follow these steps to exit SCSI*Select*:

1. Press **Esc** until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).

2. At the prompt, select **Yes** to exit, then press any key to reboot the computer. Any changes you made in SCSI*Select* take effect after the computer boots.

Using SCSI*Select* Settings

To select an option, use the ↑, ↓, ←, and → keys to move the cursor to the option, then press **Enter**.

In some cases, selecting an option displays another menu. You can return to the previous menu at any time by pressing **Esc**.

To restore the original SCSI*Select* default values, press **F6** from the main SCSI*Select* screen.

SCSI Bus Interface Options

The SCSI bus has the default settings described here for Host Adapter SCSI ID, SCSI Parity Checking, and Host Adapter Termination. Users can use SCSI*Select* to choose a different setting if needed. Users should not change any SCSI*Select* settings unless they thoroughly understand the consequences of the change.

Host Adapter SCSI ID—(Default: *7*) Each device on the SCSI bus, including the adapter, must have a unique SCSI ID. Allowable IDs are 0 though 7 on 8-bit devices, and 0 through 15 on 16-bit devices. The ID serves two purposes:

- It uniquely defines each SCSI device on the bus.
- It determines which device controls the bus when two or more devices try to use the bus at the same time. For 8-bit devices, ID 7 has the highest priority and ID 0 has the lowest priority. For 16-bit devices, the priority of IDs is 7-0, then 15-8; in this case, ID 7 has the highest priority and ID 8 has the lowest priority.

  Each host adapter has the default SCSI ID of 7, which gives it the highest priority on the SCSI bus.

Caution: *Do not* set the Host Adapter SCSI ID from 8 to 15 if you have an 8-bit device connected to the SCSI bus. This applies to both channel A and B.

- **SCSI Parity Checking**—(Default: *Enabled*) Each adapter uses SCSI Parity Checking to verify the accuracy of data transfer on the SCSI bus. By default, parity checking is enabled on the SCSI bus. If a device on the SCSI bus does not support SCSI parity, disable parity checking through SCSI*Select*. Most currently available SCSI devices support SCSI parity.
- **Host Adapter SCSI Termination**—When this option is selected, the user will be prompted to choose between Fast / Ultra-SE Connectors and Ultra2-LVD / SE connector.

  If the user chooses the SCSI channel with the 50-pin connector, the following options are displayed[1]:

  Automatic
  Low ON / High ON
  Low OFF / High OFF
  Low OFF / High ON

  If the user chooses Channel A, the following options are displayed:

  Automatic
  Enabled
  Disabled

  The default value is *Automatic* for both kinds of connector.

Boot Device Options

- **Boot Channel**—(Default: *A*) The Boot Channel option lets you choose which SCSI channel to boot from: Channel A or Channel B.
- **Boot SCSI ID and Boot LUN Number**—The Boot Device options let you specify the device from which you want the system to boot. The default boot device is the device at SCSI ID 0 and LUN 0 to Channel A. To specify a different boot device, choose a different SCSI ID from ID 0 through 15. If the boot device has multiple logical units, you must also specify the boot LUN, which can be 0 through 7.

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[1] Refer to *Cabling Examples* on page 27.

SCSI Device Configuration Options

Each SCSI device on the SCSI bus has the default settings described in this section. OEMs or end users can change the device settings through SCSI*Select*.

- **Initiate Sync Negotiation**—(Default: *Yes*) The Initiate Sync Negotiation option determines whether the adapter initiates synchronous negotiation with the specific SCSI device. At the default setting, *Yes*, the adapter initiates synchronous negotiation with the SCSI device. If you change the setting to *No,* the adapter does not initiate synchronous negotiation; however, the adapter always responds to synchronous negotiation if the SCSI device initiates it. If neither the adapter nor the SCSI device negotiates for synchronous data transfers, data is transferred in asynchronous mode. Do not change the default setting. Synchronous data transfer is faster than asynchronous data transfer. If a device does not support synchronous negotiation, the adapter automatically transfers the data in asynchronous mode.
- **Maximum Sync Transfer Rate**—Determines the maximum synchronous data transfer rate that the adapter will negotiate with the device. The adapter automatically negotiates for the rate requested by the device. If the adapter is set *not* to negotiate for synchronous data transfer (that is, if Initiate Sync Negotiation is set to *No*), then the value selected here is the maximum rate at which the adapter accepts data from the device during negotiation. This is standard SCSI protocol. If Wide negotiation is set to *No*, the rates for 16-bit devices are half those shown in the Table 1.
- **Enable Disconnection**—(Default: *Yes*) When Enable Disconnection is set to *Yes*, the default setting, the SCSI device may disconnect from the SCSI bus. The SCSI device may choose not to disconnect, however, even if permitted by the adapter (this can usually be configured on the SCSI device). When Enable Disconnection is set to *No,* the SCSI device cannot disconnect from the SCSI bus. Leave Enable Disconnection set to *Yes* if the adapter connects to two or more SCSI devices. This optimizes SCSI bus performance. If the adapter connects to only one SCSI device, set Enable Disconnection to *No* to achieve slightly better performance.

- **Initiate Wide Negotiation**—(Default: *Yes*) This option, which appears for only 16-bit buses, lets the adapter initiate Wide negotiation with attached 16-bit SCSI devices. The adapter will not attempt Wide negotiation with 8-bit devices, so you can leave this option enabled (that is, set to *Yes*) even if the bus includes 8-bit devices.
- **Send Start Unit Command**—(Default: *Yes*) Determines whether the adapter sends the Start Unit command (SCSI command 1B) to the SCSI device. The default setting (*Yes*) reduces the load on a computer's power supply by allowing the adapter to turn on SCSI devices one-by-one when the computer boots. Before you enable this option for a device, be sure that the AHA-3950U2 BIOS is enabled. Also, check the device documentation to make sure the device supports the command. On most devices, you must also change a switch or jumper setting on the device to enable the device to respond to the command.

  If you enable Send Start Unit Command for more than one SCSI device, the adapter first sends the Start Unit command to the boot device specified in SCSI*Select* (see *Boot Device Options* on page 19*)*. When this device responds, Start Unit commands are sent to the remaining devices, beginning with the device with lowest SCSI ID. The boot time varies.
- **Enable Write Back Cache**—(Default: *Automatic*) Can be used to enable or disable the write-back cache on SCSI disk drives connected to the host adapter. Leave this option at its default setting.
- **BIOS Multiple Lun Support**—(Default: *Disabled*) When enabled, allows the BIOS to support multiple logical units. Enable this option if any devices have multiple logical units.
- **Include in BIOS Scan**—(Default: *Yes*) Determines whether the adapter includes the device with the specified SCSI ID in the BIOS Int 13 drive hooking.

Advanced Configuration Options

- **Reset SCSI Bus at IC Initialization**—(Default: *Yes*) Allows you to enable or disable SCSI bus resets generated by the single-chip host adapter during power-on initialization and after a hard reset. We recommend that you leave this option at the default setting.
- **Extended BIOS Translation for DOS Drives > 1 GByte**—(Default: *Enabled*) All current versions of MS-DOS are limited to 1024 cylinders per drive. The standard translation scheme for SCSI host adapters, using 64 heads and 32 sectors, provides a maximum accessible capacity of 1 GByte. To support disk drives larger than 1 GByte, the AHA-3950U2 includes an extended translation scheme that supports disk drives as large as 8 GBytes under MS-DOS. This option must be set correctly even if the host adapter BIOS is disabled, because the operating system needs the information in order to support drives larger than 1 GByte.

  When extended translation is enabled, drives handled by the AHA-3950U2 use extended translation if their formatted capacity is greater than 1 GByte, and drives smaller than 1 GByte use standard translation.

Caution: If you decide to change the translation scheme, back up the disk drives first! All data is erased when you change from one translation scheme to another.

  When you partition a disk larger than 1 GByte, use the MS-DOS *fdisk* utility as you normally would. Because the cylinder size increases to 8 MBytes under extended translation, the partition size you choose must be a multiple of 8 MBytes. If you request a size that is not a multiple of 8 MBytes, *fdisk* rounds up to the nearest whole multiple of 8 MBytes.

- **Plug and Play SCAM Support**—This option allows the host adapter to automatically assign SCSI IDs to SCSI devices that support the SCAM protocol.

  The fault is disabled. Most non-SCAM devices tolerate the SCAM protocol, so you can enable this option even if you have a non-SCAM device.

- **Host Adapter BIOS**—(Default: *Enabled*) Enables or disables the AHA-3950U2 BIOS. The BIOS must be enabled if you want the computer to boot from a SCSI hard disk drive connected to the adapter. In addition, the BIOS must be enabled if you want to enable any of the following options:
  - Support Removable Disks Under BIOS as Fixed Disks
  - Display <Ctrl><A> Message During BIOS Initialization
  - BIOS Support for Bootable CD-ROM
  - BIOS Support for Int 13h Extensions

  If the devices on the SCSI bus are controlled by device drivers (and therefore do not need a BIOS), you can disable the AHA-3950U2 BIOS to free memory. This also shortens the boot time.
- **Support Removable Disks Under BIOS as Fixed Disks**—(Default: *Boot Only*) Controls which removable-media drives are supported by the AHA-3950U2 . The following choices are available (the first two choices are valid only if the AHA-3950U2 BIOS is enabled):
  - Boot Only (the default setting): Only the removable-media drive designated as the boot device is treated as a hard disk drive.
  - All Disks: All removable-media drives supported by the AHA-3950U2 are treated as hard drives. This setting has no effect on drives under NetWare, because NetWare automatically supports removable-media drives as fixed disks.
  - Disabled: No removable-media drives running under DOS are treated as hard disk drives. In this situation, driver software is needed, because the drives are not controlled by the BIOS.
- **Display <Ctrl><A> Message During BIOS Initialization**—(Default: *Enabled*) When this option is enabled, the following prompt appears onscreen when the computer boots:

  Press *<Ctrl A>* for SCSISelect (TM) Utility!
- **BIOS Support for Bootable CD-ROM**—(Default: *Enabled*) If booting from a hard disk or other device, make sure no bootable CD-ROM is installed, or disable this option.

- **BIOS Support for Int 13h Extensions**—(Default: *Enabled*) This option appears only if the BIOS is configured to include bootable CD-ROM support. When this option is enabled, the host adapter BIOS supports El Torito Int 13h extensions, which are required for bootable CD-ROMs. You can disable this option if the boot device is not a CD-ROM; however, leaving it enabled causes no harm.

Using SCSI Disk Utilities

To access the SCSI disk utilities, follow these steps:

1. Select the **SCSI Disk Utilities** option from the menu that appears after starting SCSI*Select*. SCSI*Select* scans the SCSI bus (to determine the devices installed) and displays a list of all SCSI IDs and the devices assigned to each ID. (See *SCSI Device Display at Bootup* on page 12 for a definition of the messages displayed.)
2. Use the ↑ and ↓ keys to move the cursor to a specific ID and device, then press **Enter**.
3. A small menu appears, displaying the options Format Disk and Verify Disk Media.

   - **Format Disk**—Allows you to perform a low-level format on a hard disk drive. *Most SCSI disk devices are preformatted at the factory and do not need to be formatted again*. Each hard disk drive must be low-level formatted before you can use your operating system's partitioning and file preparation utilities, such as MS-DOS *fdisk* and *format*.

Caution: A low-level format destroys all data on the drive. Be sure to back up your data before performing this operation. You *cannot* abort a low-level format once it is started.

   - **Verify Disk Media**—Allows you to scan the media of a hard disk drive for defects. If the utility finds bad blocks on the media, it prompts you to reassign them; if you select *Yes*, those blocks are no longer used. You can press **Esc** at any time to abort the utility.

Obtaining SCSI Cables and Adapters

High-quality cables are required in high-performance SCSI systems to ensure data integrity. Adaptec provides the highest quality SCSI cables and adapters designed specifically for use with Adaptec SCSI cards. For purchasing information, contact Adaptec at 1-800-442- 7274, Monday to Friday, from 6 a.m. to 5 p.m. (Pacific Time).

External Cables

Table 2. External Cables

Description	Part Number
High-density 50-pin to High-density 50-pin Cable (1 m)	ACK-H2H
High-density 50-pin to Centronics 50-pin Cable (1 m)	ACK-H2L
High-density 68-pin to High-density 68-pin Cable (1 m)	ACK-W2W-E
High-density 68-pin Wide Ultra2 (1 m)	ACK-WU2-1M
High-density 68-pin Wide Ultra2 (3 m)	ACK-WU2-3M
Standard 50-pin Internal-to-High-density 50-pin External Ultra SCSI Cable With Two Internal Connectors (1.5 m)	ACK-50I-50E

External Connector Diagrams

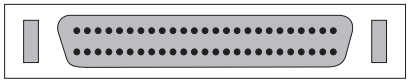


Figure 3. High-density 50-pin

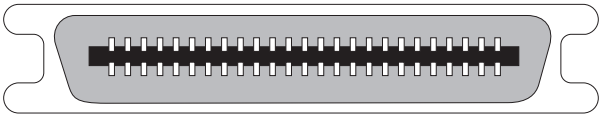


Figure 4. Centronics 50-pin

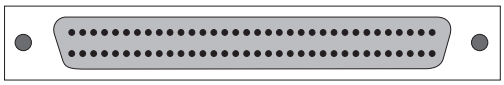


Figure 5. Ultra2 and High-density 68-pin

Internal Cables

Table 3. Internal Cables

Description	Part Number
3 position (2 devices + adapter card), standard 50-pin Internal Ultra SCSI (1 m)	ACK-INT3-PNP
5 position (4 devices + adapter card), standard 50-pin Internal Ultra SCSI (1.5 m)	ACK-INT5-PNP
5 position (4 devices + adapter card), High-density 68-pin Internal Ultra2 SCSI (1.5 m)	ACK-68I-WU2
5 position (4 devices + adapter card), High-density 68-pin connectors (1.1 m)	ACK-W2W-5I

Internal Connector Diagrams

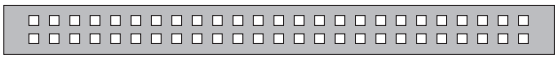


Figure 6. Standard 50-pin

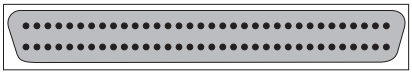
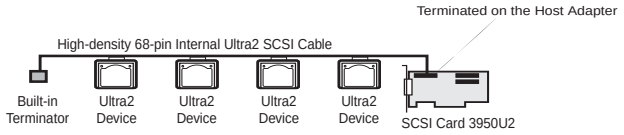


Figure 7. Ultra2 and High-density 68-pin

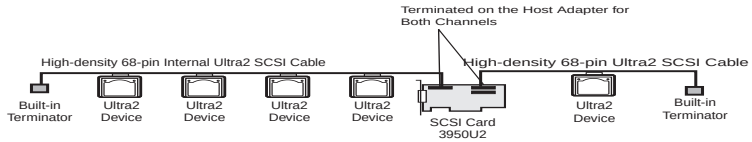
Cabling Examples

The following diagrams show how to terminate the SCSI bus for various combinations of SCSI devices.

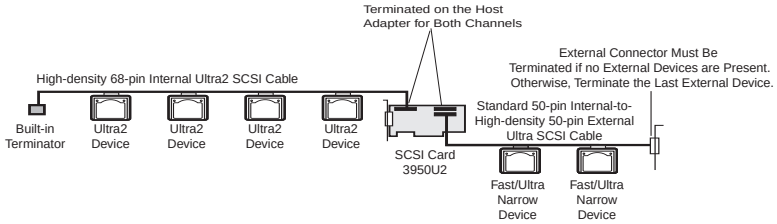
Connecting Ultra2 Internal Devices



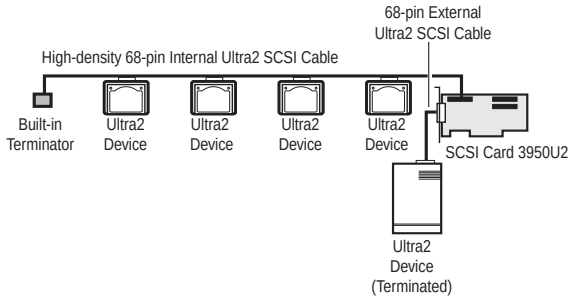
Connecting Ultra2 and Fast/Wide Ultra Internal Devices



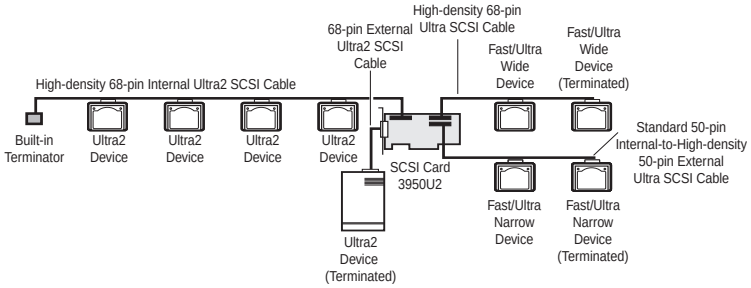
Connecting Ultra2 and Fast/Ultra Narrow Internal Devices



Connecting Ultra2 Internal Devices and External Devices



Connecting Ultra2, Fast/Ultra Wide, and Fast/Ultra Narrow Internal Devices



In this configuration, high byte termination on the host adapter needs to be enabled because devices are connected to both the 50-pin and 68-pin connectors of channel B. SCSI*Select* settings for channel B termination should be set to Automatic or Low OFF / High ON.

Maximum Cable Lengths

The total length of cabling (internal and external) on the SCSI bus may not exceed the maximum lengths listed in Table 4.

Table 4. Maximum Cable Lengths

Maximum Cable Length	Data Transfer Rate	Maximum Devices Supported
25 m (82.0 ft)	Ultra 2 (80 MBytes / sec)	1
12 m (39.4 ft)	Ultra2 (80 MBytes / sec)[1]	15
3 m (9.8 ft)	Fast SCSI (10 MBytes / sec)	7
3 m (9.8 ft)	Wide SCSI (20 MBytes / sec)	15
3 m (9.8 ft)	Ultra SCSI (40 MBytes / sec for 16-bit, 20 MBytes / sec for 8-bit)	4
1.5 m (4.9 ft)	Ultra SCSI (40 MBytes / sec for 16-bit, 20 MBytes / sec for 8-bit)	5-8[2]

[1] Mixing Fast / Ultra devices with Ultra2 devices causes the entire SCSI bus to default to Ultra SCSI speeds and cable requirements.

[2] Ultra SCSI data transfer rates do not currently support more than eight devices.

❒

Federal Communications Commission Radio Frequency Interference Statement

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment 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:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Adaptec, Inc. SCSI Card 3950U2

FC Tested To Comply With FCC Standards

FOR HOME OR OFFICE USE

Canadian Compliance Statement

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Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matérial brouilleur du Canada.

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