

Chapter 3
Introduction to SCSI

3-1 Introducing the SCSI Bus

SCSI, which is the acronym for Small Computer System Interface, is a specification for a peripheral bus and command set. The SCSI specification defines a high performance interface that distributes data among peripherals independently of the host, thereby freeing the host computer for more user-oriented activities.

SCSI offers the advantage of letting you connect up to seven internal and/or external SCSI devices to one host adapter card. This enables you to use the other available expansion bus slots for other add-on cards such as internal modem or network cards.

Another SCSI advantage over other peripheral interfaces is that SCSI is designed to keep computers in step with advancing technologies. SCSI enables host computers to connect with virtually any SCSI peripheral device without always having to overhaul system hardware and/or software. The host computer does not have to "learn" a new way to communicate every time a peripheral device is added – the conflicting issues of interrupts and COM/LPT port assignments are eliminated by the independent scheme of assigning a unique SCSI ID number (0–7) to each device on the SCSI bus.

However, one important requirement (defined by the SCSI specification) is the rule of device termination:

> **When adding SCSI devices, you must ensure that the devices on both ends of the SCSI bus are terminated and that all devices in-between are *not* terminated.**

3-1.1 Overview of Basic SCSI Specifications

- A maximum of seven SCSI devices can be attached to the SCSI bus (via daisy-chained cables)
- Each SCSI device on the SCSI bus must have a different ID address (0–7) assigned to it
- The SCSI signals must be terminated at both ends of the SCSI bus
- When two SCSI devices communicate on the SCSI bus, one acts as an initiator and the other acts as a target
- Fast SCSI-2 specifications limit the total length of both internal and external cables to up to 3 meters (9.84 feet)
- ASPI Manager (software) must be installed to provide communication between the SCSI bus and your computer

3-2 SCSI ID

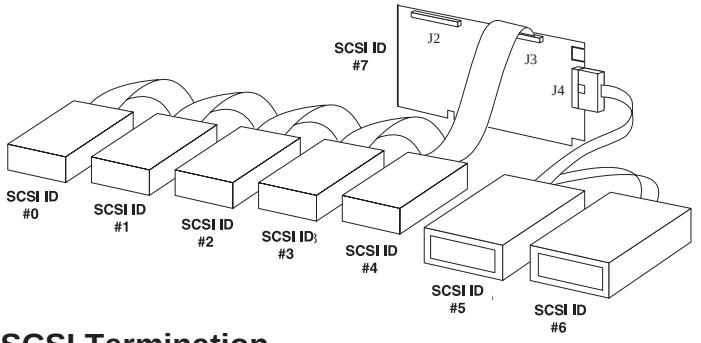
A single SCSI interface board can support up to seven SCSI peripherals in a daisy chain configuration. When connecting multiple SCSI peripherals, each device must be assigned a unique SCSI ID number on the SCSI bus. ID settings range from "0" to "6" for the seven SCSI devices. The SCSI controller itself takes the last position "7" on the chain.

Check each SCSI device you are planning to connect for its factory set ID number. The device ID is typically set via jumpers or switches on most SCSI peripherals.

The following defines the basic rules for SCSI ID numbers:

- The range for assigning 8-bit SCSI devices is 0 to 7; SCSI ID 7 has the highest priority, SCSI ID 0 the lowest.
- SCSI ID 7 is typically used for the SCSI controller, since it has the highest priority. Other devices use SCSI ID numbers from 0 to 6.
- If you have two or more SCSI hard drives installed, the drive with the lower SCSI ID will be your boot drive. Typically the setting for the boot drive is ID 0 or ID 1.

The figure below illustrates a combination of seven SCSI peripheral devices attached to the SCSI board. Note that each device on the SCSI bus has a unique SCSI ID. The SCSI IDs can be randomly assigned, as long as there is no conflict.



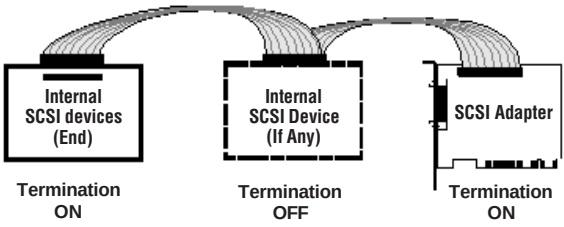
3-3 SCSI Termination

The SCSI bus must be properly terminated in order for its connected devices to function correctly. Only the devices on both ends of the daisy-chained SCSI bus must be terminated – all devices in-between should *not* terminated.

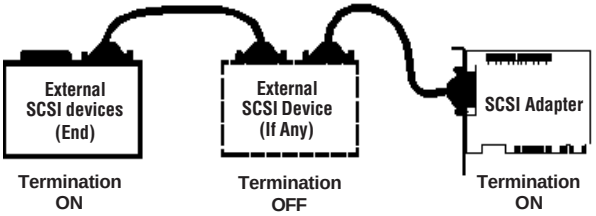
Your *SpeedMaster* includes an "Active Termination" feature that will configure its correct termination automatically. Termination on external devices usually require simply plugging a "terminator" into the open connector which would otherwise receive the cable from the next device in the daisy-chain. Refer to the manufacturer's documentation for any device you plan to add to your system for its method of termination. *Always use "Active Terminators" for your external devices, if needed.*

The following illustrates the correct terminations for the three possible combinations of SCSI devices on the SCSI bus.

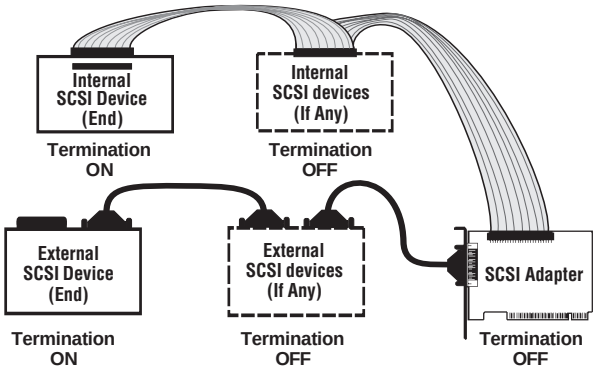
1. Internal SCSI Devices Only with the SCSI Adapter



2. External SCSI Devices Only with the SCSI Adapter



3. Both Internal & External SCSI Devices with the SCSI Adapter



Note that the termination on the *SpeedMaster* will be OFF, if both the internal and external connectors are used.

3-4 SCSI Cables

When connecting peripheral SCSI devices to your system, it is important that you always use quality cables to shield from noise interference. Do not buy cheap cable. External device cables should be constructed of double-shielded twisted pair cable (50 wires in 25 twisted pair).

Do not use cables shorter than 30 cm (11.8 inches) between any two external SCSI devices.

Fast SCSI-2 specification limits the total length of all cables to up to *3 meters (9.84 feet).*