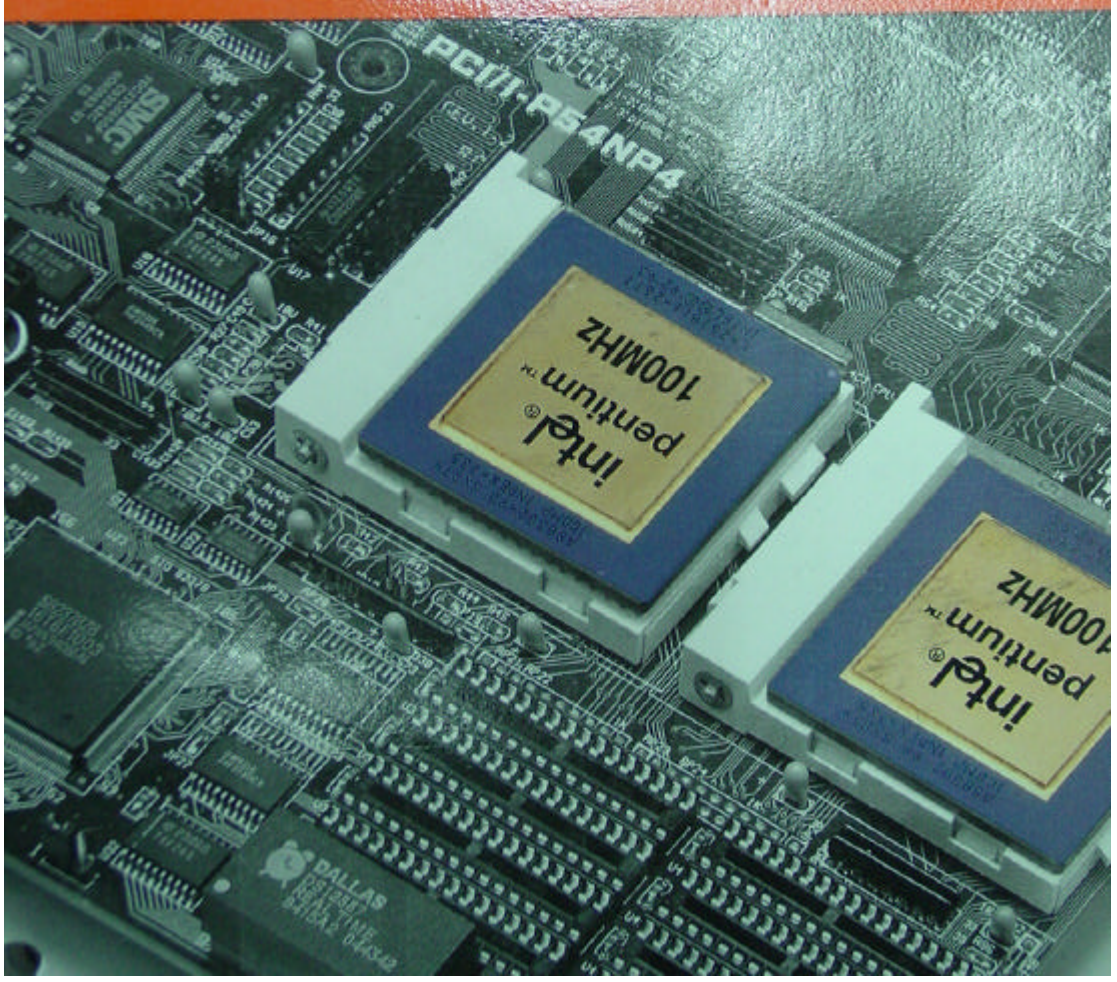
PCI/I-P54NP4

PCI Bus, 90/100MHz Dual Pentium™ Mainboard
With Super Multi-I/O



Technical Summary

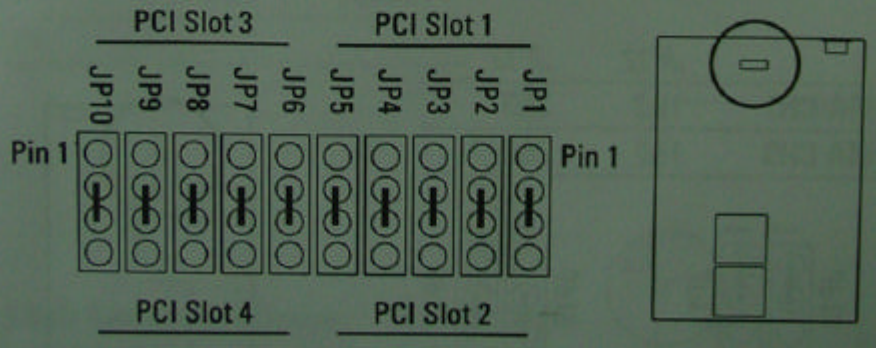
The first part of this section summarizes the mainboard's specifications and explains L2 external cache. The second part explains how to set up the optional PCI-SC200 SCSI Interface card.

Jumper Setting Summary

ISA/PCI IRQ Assignments: JP1 – 10

These assign IRQs to either the ISA slots (default) or to PCI slots with edge-triggered cards installed. Don't use these for level-triggered cards. Use the PCI Slot Configuration section in the BIOS Setup program for level-triggered cards.

	PCI Slot 1	*PCI Slot 2*	*PCI Slot 3*	*PCI Slot 4*
IRQ5	JP2, 1&2	JP2, 3&4	JP9, 1&2	JP9, 3&4
IRQ9	JP1, 1&2	JP1, 3&4	JP10, 1&2	JP10, 3&4
IRQ11	JP3, 1&2	JP3, 3&4	JP8, 1&2	JP8, 3&4
IRQ14	JP4, 1&2	JP4, 3&4	JP7, 1&2	JP7, 3&4
IRQ15	JP5, 1&2	JP5, 3&4	JP6, 1&2	JP6, 3&4



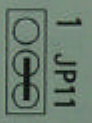
The default settings, all jumpers in the block Pins 2&3 shorted, leave the IRQs listed available for level-triggered or EISA bus expansion cards.

PS/2 Mouse Port Selector: JP11

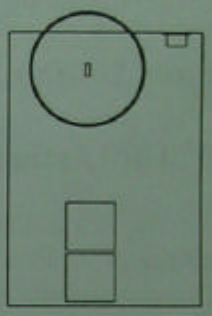
This jumper controls the on-board PS/2 Mouse lead connector. When set to Enable, the port is active and uses IRQ12.

	JP11	
Enable	1&2	Default
Disable	2&3	

Enable



Disable

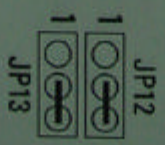


DMA Channel Selection for ECP: JP12 – JP13

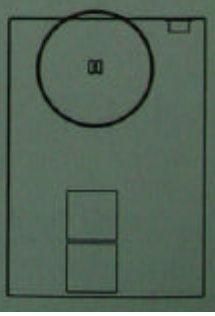
These set the DMA channel for use with the Parallel port's ECP capability. Refer to the manual for the ECP-capable device you want to connect for instructions on which DMA channel to use.

	JP12	*JP13*
DMA CH1	1&2	2&3
DMA CH3	1&2	2&3

DMA CH1



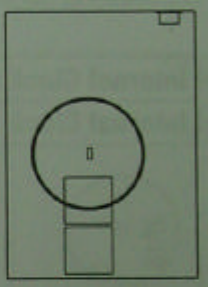
DMA CH3



On-board I/O Selector: JP16

This jumper controls the on-board Super Multi I/O chip. When set to Enable, the I/O ports on the board are active.

	JP16	
Enable	1&2	Default
Disable	2&3	



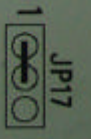
Enable On-board I/O

Disable On-board I/O

BIOS Flash Memory Voltage Selector: JP17

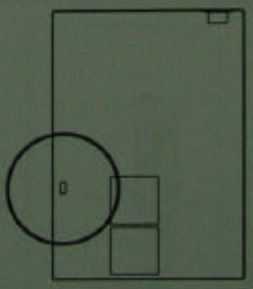
This is factory-set to the 5V setting. See the FMW section in Chapter 3 for more information on this.

	JP17	
5V	1&2	Default
12V	2&3	



5 Volt flash programming & 12 Volt write-protection (default setting)

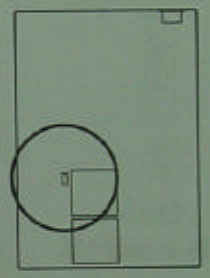
12 Volt flash programming

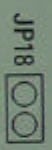


Host Bus Frequency Selector: JP18

This jumper sets what fraction of the CPU's internal clock the external clock speed will be. The default setting for the 90MHz Pentium CPUs is for a 60MHz external clock. Later Pentium CPUs will support the 1/2 feature, which will allow a 100MHz Pentium to run with an external clock speed of either 50 or 66MHz.

	JP18
2/3 of Internal Clock (Default)	Open
1/2 of Internal Clock	Short





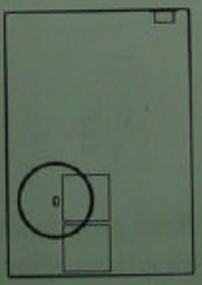
2/3 Internal Clock

1/2 Internal Clock

Single/Dual Pentium Selector: JP19

Set this according to the number of Pentium chips installed on the mainboard.

	JP19
Dual	1&2
Single	2&3



Dual

Single

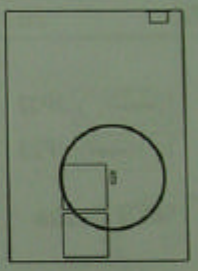
Level 1 Cache Type Selector: JP20

This sets the cache type for the CPU's internal cache.

	JP20	
Write-Back	Open	Default
Write-Through	Short	

Write-Back

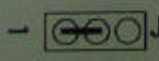
Write-Through



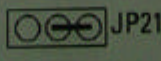
CPU to PCI Bus Clock Ratio Control Selector: JP21

This sets the ratio between the CPU's external clock speed and the speed of the PCI Bus.

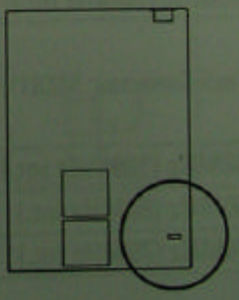
	JP21	
2:1 (CPU=60 or 66MHZ, PCI=30 or 33MHZ)	1&2	Default
3:2 (CPU=50MHZ, PCI=33MHZ)	2&3	



2:1 Ratio



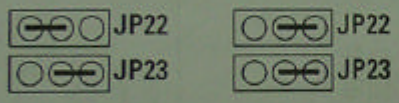
3:2 Ratio



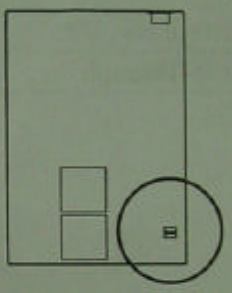
Level 2 Cache Size: JP22 – JP23

These are set based on the size of the installed cache.

	JP22	*JP23*
256K	1&2	2&3
512K	2&3	2&3



256KB Cache **512KB Cache**



External Clock Frequency Selector: JP24 – JP26

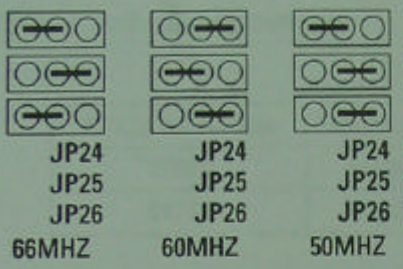
The three jumpers set the Bus Clock speed. There are two groups of settings, one each for the two clock generator chip options. If you need to change these from the current setting, check the existing setting to see which chip your board has.

Clock Generator: AV9154A-27

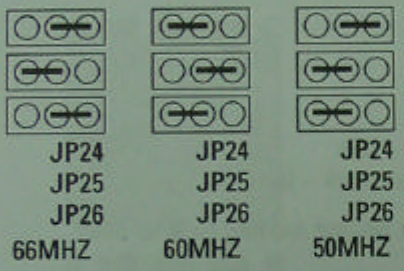
	JP24	*JP25*	*JP26*	
66MHz (100MHz int.)	1&2	2&3	1&2	
60MHz (90MHz int.)	2&3	1&2	2&3	Default
50MHz (75MHz int.)	1&2	2&3	2&3	

Clock Generator: MX8315

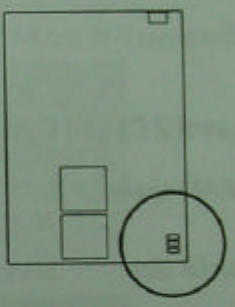
	JP24	*JP25*	*JP26*	
66MHz (100MHz int.)	2&3	1&2	2&3	
60MHz (90MHz int.)	1&2	2&3	1&2	Default
50MHz (75MHz int.)	2&3	1&2	1&2	



AV9154A-27



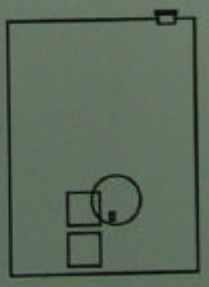
MX8315

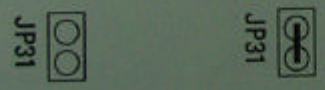


Address Pipeline: JP31

This controls the address pipeline feature. The default is to turn the feature off. Use the default for dual-CPU operation. For single CPU operation, turn this on to enhance performance.

	JP31
Off (Default)	Open
On	Short





Pipeline Off **Pipeline On**

Memory Subsystem

Memory Specifications:

See pages 2-9.

Memory Configurations

See pages 2-10 and 2-12 for chart.

Level 2 Cache Options

SRAM speed: 66MHz external clock – 12ns
50 or 60MHz external clock – 15ns

Cache Size: See jumper section for settings and next page for other specifications.

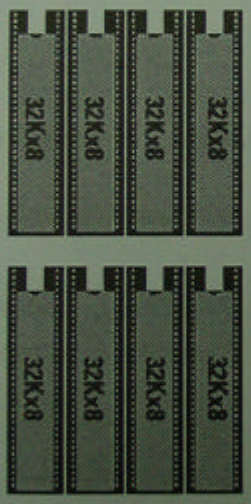
CPU Options

Types: Install in ZIF Socket 5 – Pentium P54C, CT or CM

Internal/External Clock Speeds: 90MHz/60Mhz or 100MHz/66MHz

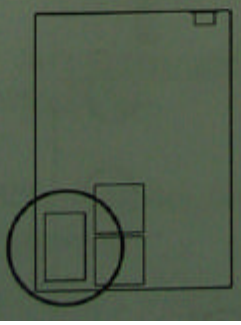
Level 2 Cache Configurations

SRAM Cache Size	Number & Size	Pin Congifuration
256KB	Eight 32Kx8	28 pins/chip
512KB	Eight 64Kx8	32 pins/chip



256KB cache

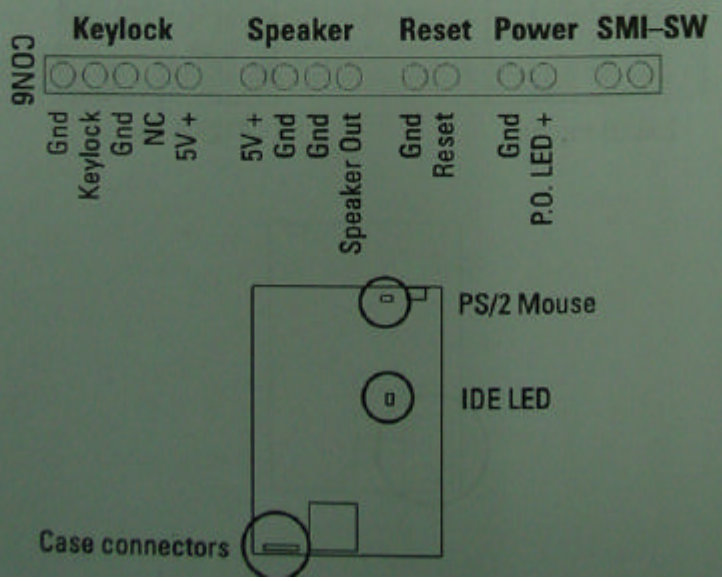
512KB cache



Connectors

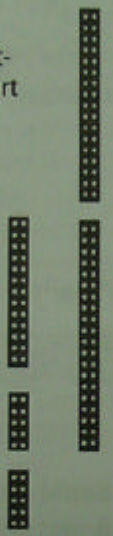
There are several connectors on the board for switches and indicator lights from the system case. The connectors are made of the same components as the jumper switches. There are also connectors for the on-board I/O ports and the leads from a 5-volt system power supply.

KeyLock	Connector for both a case-mounted keyboard lock. Pin 1 is live, pins 3 & 5 are grounds.
Speaker	Connector for the lead from a speaker mounted inside the system case.
Reset Switch	Connector for the lead from a Reset switch mounted on the system case.
Power LED	Connector for the lead from a case-mounted Power-On LED indicator light.
SMI Switch	Connector for the lead from a Case-mounted Suspend switch.
PS/2 Mouse	Connector for a lead from a case-mounted PS/2 mouse port.



I/O Port Connectors

Pin1 is the upper left-hand pin on each port connector



Floppy Disk Drive cable connector

Parallel Port cable connector

IDE Hard Disk Drive cable connector

Serial Ports cable connectors

When you connect a ribbon cable to any of these I/O connectors, you must orient the cable connector so that the Pin 1 edge of the cable is at the Pin 1 end of the on-board connector. The Pin 1 edge of the ribbon cable is colored to show where it is.

PS/2 Mouse lead connector

IDE hard disk activity LED connector

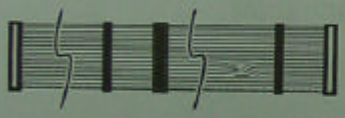
Port & Controller Cables

The mainboard comes with the following cables:

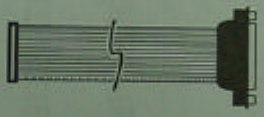
- 2 serial port ribbon cables attached to one mounting bracket
- 1 parallel port ribbon cable with mounting bracket
- 1 IDE ribbon connector cable
- 1 floppy disk drive ribbon connector cable

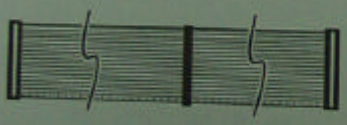
Connector and Port Cables

IDE ribbon cable

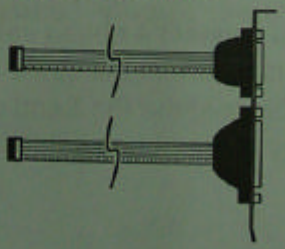


Parallel ribbon cable





Serial ribbon cables & port bracket



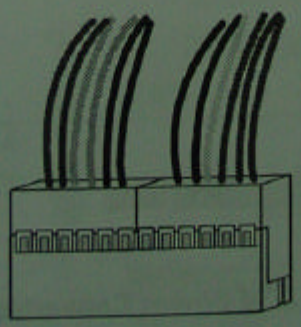
Connecting The Power Supply

There are two system power supply connectors on the mainboard. One is for a 5–volt power supply, the other for a 3.3–volt power supply. If the power supply is a 3.3–volt mode, you can connect the leads to the 3.3–volt connector. If the supply provides 5 volts, you must connect the leads to the 5–volt connector AND install the supplied Power Converter card in any available PCI slot. The card installs like any other expansion card and does not require any setup.

To connect the leads from either voltage power supply, you should first make sure the the power supply is unplugged. Most power supplies have two leads. Each lead has six wires, two of which are black. Orient the connectors so the black wires are in the middle.

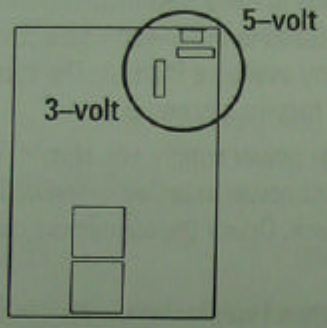
Align the plastic guide pins on lead to their receptacles on the connector. You may need to hold the lead at an angle to line it up. Once you have the guide pins aligned, press the lead onto the connector so that the plastic clips on the lead snap into place and secure the lead to the connector.

Connecting Power Supply Leads



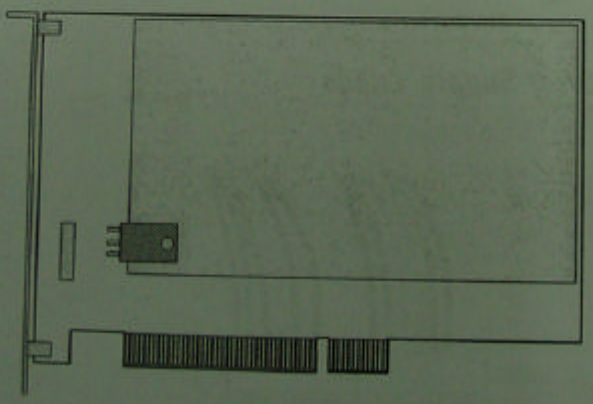
The black wires should be in the middle.

Power supply connectors



Gnd
Gnd
Gnd
+ 3.3V
+ 3.3V
+ 3.3V
+ 3.3V
+ 3.3V
+ 3.3V
Gnd
Gnd
Gnd

3–volt power connector pinout



PCi slot 5V to 3.3V Power Converter card

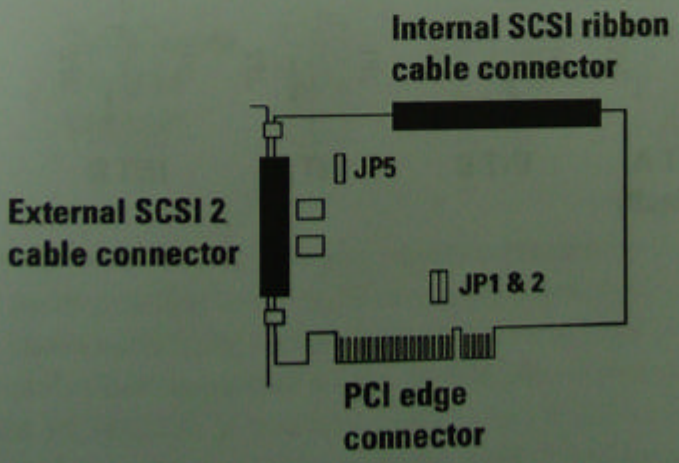
Technical Summary 4

The PCI-SC200 SCSI Interface Card

Your mainboard may have come with an optional SCSI (Small Computer System Interface) controller card, the PCI-SC200. The card is also available separately. This card works with the SCSI BIOS on the mainboard. Together, they provide a complete PCI Fast SCSI-2 interface. With the card installed in your system you can connect SCSI devices installed in your system case to the internal connector on the card. You also have the additional option of connecting external SCSI devices to the external SCSI-2 connector on the card.

If you get the PCI-SC200 later on as an option, you will need to install it yourself. The setup procedure is explained here. The basic card installation procedure is explained at the end of Chapter 2.

The PCI-SC200 SCSI Interface Card



Setting Up the PCI-SC200

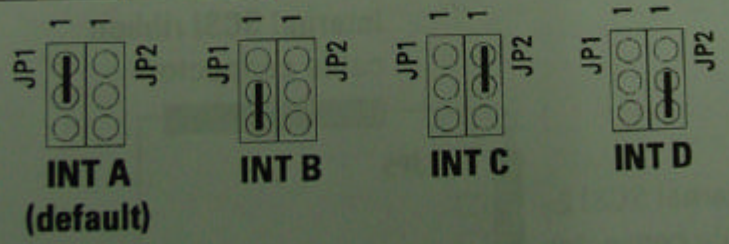
There are two jumper settings you may need to make on the card to set it up. One setting assigns the PCI INT interrupt, the other sets the card's termination.

Setting the INT Assignment

As explained in Chapter 2, any PCI card you install must use PCI INT A. On the PCI-SC200, you assign the INT by setting jumper JP1 or JP2. The default setting for the card already is INT A, so you do not need to change the setting to use the SC-200 with this mainboard.

The INT assignment jumper settings are illustrated below. The settings are printed on the card for your convenience.

JP1 & 2: Interrupt settings



Technical Summary 4

Terminator Settings

SCSI devices are connected together in a "chain" by cables. Internal devices connect to the PCI-SC200 with a fifty-pin flat ribbon cable. External devices connect to the external port with a SCSI-2 cable. If there is more than one internal or external device, additional devices are connected with cables to form a "daisy chain". The SCSI chain must be "terminated" at both ends, or the devices in the chain will not work properly.

Many SCSI devices use a set of terminating resistors to terminate the device. The PCI-SC200 has "active" termination that you set using jumper JP5. If you need to terminate the PCI-SC200, you do it by setting the jumper. The are two settings, terminated and unterminated, as shown below.

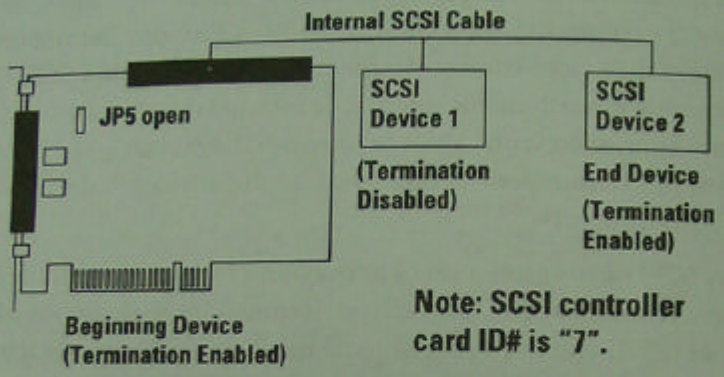
JP5: Terminator setting

Termination Enabled (default)

Termination Disabled

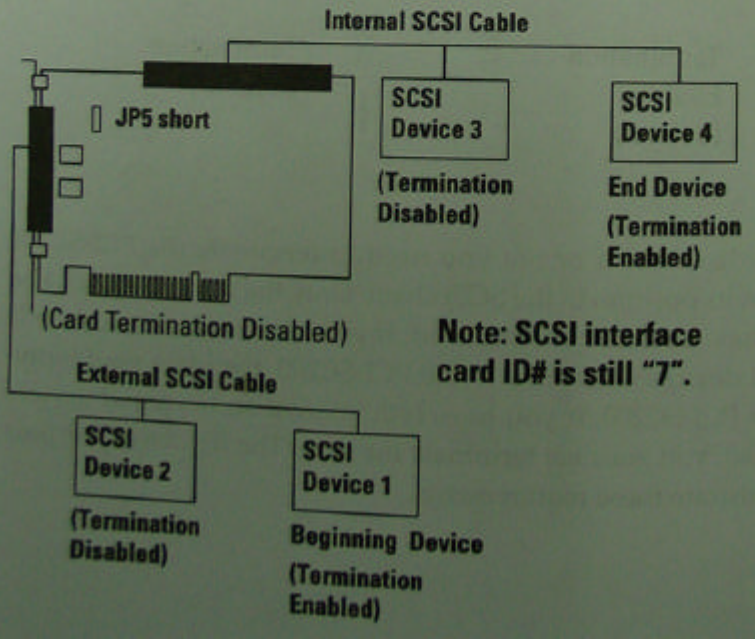
Decide whether or not you need to terminate the PCI-SC200 based on its position in the SCSI chain. Only the devices at each end of the chain need to be terminated. If you have *only* internal or *only* external devices connected to the PCI-SC200, then you *must* terminate the PCI-SC200. If you have *both* internal and external devices connected, you *must not* terminate the card. The figures on the next page illustrate these requirements.

Example 1: Only internal or only external devices connected



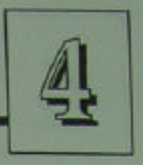
Note: SCSI controller card ID# is "7".

Example 2: Both internal and external devices connected



Note: SCSI interface card ID# is still "7".

Technical Summary



SCSI ID Numbers

All SCSI devices, including the PCI-SC200 interface card must have a SCSI identification number that is not in use by any other SCSI device. There are eight possible ID numbers, 0 through 7. The PCI-SC200 has a fixed SCSI ID of 7.

You can connect up to seven SCSI devices to the interface card. You must set a SCSI ID number for each device. SCSI devices vary in how they set the ID number. Some use jumpers, others have some kind of selector switch. Refer to the manual for any device you install for details on how to set its ID number.

Assigning System IRQs

Both the ISA and PCI buses may need to use IRQs. You must configure any IRQ assignments so that the system can know which bus is using a particular IRQ. You must assign IRQs correctly, or the mainboard will not work properly.

As mentioned in Chapter 1, there are 16 IRQs available. In an ISA design, some of them are already in use by standard parts of the system such as the keyboard or mouse. Drawing from the unused group of System IRQs, you can assign an IRQ to either bus. Since both bus designs use IRQs, we differentiate them by referring to the IRQs assigned to the ISA bus as ISA IRQs and to the PCI bus as PCI IRQs. There is an IRQ reference chart in Chapter 4.

The two bus designs deal with IRQs differently. In the ISA bus, the IRQs are available to every slot and you define which IRQ is in use by configuring the IRQ number on the expansion card you want to install. You can then install the card in any available slot.

In the PCI design you assign an IRQ to a PCI slot rather than doing it on a card. For PCI cards, you only need to set something called the "INT" assignment. Since all the PCI slots on this mainboard use "INTA#", you only need to make sure that any PCI card you install is set to INT A. Of the PCI cards that use an IRQ, the overwhelming majority of them use a level-triggered IRQ design. You can assign IRQs for this type of card by using the BIOS Setup Utility. See the section on PCI SLot Configuration in Chapter 3.

Some PCI cards, many IDE hard disk controller cards for example, use an edge-triggered design. For these you have to assign the PCI Slot IRQ by also setting a jumper in a jumper block. The block sets the assignments for IRQs 5, 9, 11, 14, and 15. The block jumpers only assign IRQs for edge-triggered cards. The default settings leave the IRQs available to either the ISA bus or level-triggered PCI cards.

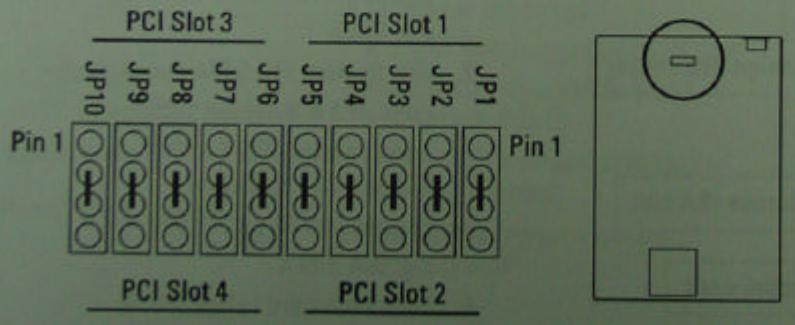
You do not need to assign a System IRQ to a PCI slot unless you install a card in it that needs an IRQ. If you don't assign a System IRQ to a PCI slot in the Setup Utility, the unused IRQS are available to the ISA bus.

Selecting IRQ Settings for Edge-Triggered Cards

Set the IRQ for edge-triggered cards both in the Setup Utility and on the board using the IRQ jumper block. The chart below shows the setting options and the figure below it the defaults.

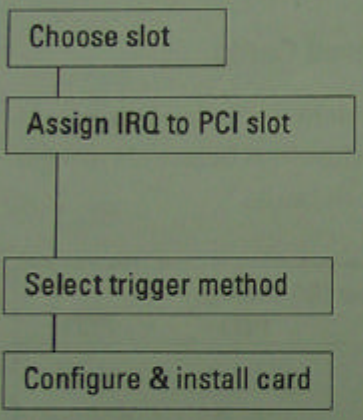
System IRQ	Default settings	PCI Bus edge trigger IRQ settings PCI1	PCI2	PCI3	PCI4
IRQ 5	JP2&9 2-3	JP2 1-2	JP2 3-4	JP9 1-2	JP9 3-4
IRQ 9	JP1&10 2-3	JP1 1-2	JP1 3-4	JP10 1-2	JP10 3-4
IRQ 11	JP3&8 2-3	JP3 1-2	JP3 3-4	JP8 1-2	JP8 3-4
IRQ 14	JP4&7 2-3	JP4 1-2	JP4 3-4	JP7 1-2	JP7 3-4
IRQ 15	JP5&6 2-3	JP5 1-2	JP5 3-4	JP6 1-2	JP6 3-4

Note: You can only select one option for each IRQ.



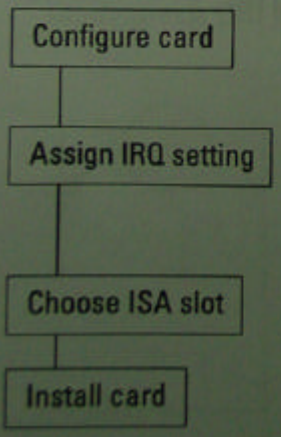
The default settings, all jumpers in the block Pins 2&3 shorted, leave the IRQs listed available for level-triggered or ISA bus expansion cards.

Installing Expansion Cards That Use An IRQ



Example PCI installation procedure:

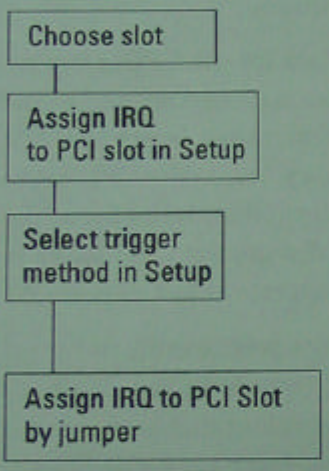
1. Choose a slot to use -
   e.g. PCI Slot 1 - fixed INT A#
2. Assign a System IRQ to Slot 1
3. Select level- or edge-trigger
   (see next page)
4. Configure the card you will install in PCI Slot 1 to use INT A and install it



Example ISA installation procedure:

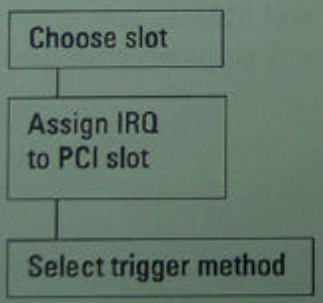
1. Configure the expansion card and select the ISA IRQ it will use
   e.g. IRQ 5
2. Use System IRQ 5 ISA Bus default -
   - use JP2 & 9 default settings
   - don't assign IRQ 5 to PCI slot in Setup PCI Slot Configuration
3. Choose an ISA slot to use -
   e.g. ISA Slot 4
4. Install the card in ISA Slot 4

PCI Edge-Triggered IRQ Assignment



1. Choose a slot to use –
   e.g. PCI Slot 2 - fixed INT A#
2. Assign a System IRQ to Slot 2
   e.g. default IRQ3
3. Select trigger method:
   "Edge(BY Jumper)"
4. Set JP3 to 'IRQ 11' (short pins 3-4)

PCI Level-Triggered IRQ Assignment



1. Choose a slot to use –
   e.g. PCI Slot 1 - uses fixed INT A#
2. Assign a System IRQ to Slot 1
   e.g. default IRQ 10
   – use JP1-10 default settings,
   pins 2&3 shorted
3. Use default trigger method:
   "Level (Auto)"