

Introduction to the Kingston SLC/Now! Cached Processor Upgrade Card

Congratulations on your purchase of the Kingston SLC/Now! Cached Processor Upgrade Card. This guide will take you through the basic steps of physically installing and configuring the SLC/Now! into your PS/2 system. This installation guide is written to provide a quick and easy process to install the SLC/Now! processor upgrade. If you should require any assistance with this procedure, please feel free to contact Kingston Technical Support at (800) 435-0640 (U.S. and Canada) or (714) 435-2639.

The SLC/Now! is a daughter-card upgrade that replaces the 80286 microprocessor in your IBM PS/2 Models 25-286, 30-286, 50, 50z, and 60 with a 386SLC or 486SLC2 processor. There are three models of upgrades to meet every computing need: 386SLC-20 (20 MHz), 386SLC-25 (25 MHz), and 486SLC2-50 (50 MHz). Designed by IBM for 100% compatibility, the SLC/Now! provides power and performance for today's most demanding software applications and graphics-based operating systems.

Several important features of the SLC/Now! are:

- ❑ Performance enhancement of 4-10 times over 80286 PS/2 processors.
- ❑ **20 MHz** or **25 MHz** 386SLC processor.
- ❑ **50 MHz** 486SLC2 processor running internally at doubled clock rate.
- ❑ Integrated 32-bit-wide **8KB** cache and cache controller for “no-wait” processing for the SLC/Now! 20 and SLC/Now! 25.
- ❑ Integrated 32-bit-wide **16KB** cache and cache controller for the SLC/Now! 50.
- ❑ Easy installation - simply plug the SLC/Now! into the 80286 socket of your IBM PS/2® Models 25-286, 30-286, 50, 50z or 60.
- ❑ Math coprocessor socket supplied on all models (supports 80387SX).
- ❑ Allows you to maintain your investment in your IBM PS/2 at today's performance levels.
- ❑ No need to reinstall or replace your application software, adapter cards or peripherals.
- ❑ Add new applications requiring a more powerful 386 or higher processor.

The cache driver, supplied on the 3.5" diskette included with your upgrade package, allow you to enable the onboard memory cache for superior system performance. Versions for DOS and OS/2 included.

For OS/2 installations, a 386 or higher processor is needed on PS/2 Models 50, 50z, or 60. This is accomplished by adding the SLC/Now! processor upgrade. Be aware that,

OS/2 is NOT supported on the Model 25-286 or 30-286

even with an upgraded processor due to design limitations on those systems.

Package Contents

Your Kingston SLC/Now! processor upgrade package contains the following:

- ❑ SLC/Now! 20, SLC/Now! 25, or SLC/Now! 50 Processor Upgrade Card.
- ❑ Installation Guide.
- ❑ Extraction tool for removing the 80286 processor.
- ❑ 3.5" Kingston Utility Diskette.
- ❑ SLC/Now! sticker for exterior of system.

If any items are missing or damaged, contact your Kingston dealer for a replacement.

Packaging Materials

The SLC/Now! has been carefully packed in a special anti-static envelope to protect it from static electricity and shock prior to being shipped to you. Check for damage while unpacking the cached processor upgrade card. If you notice any damage, notify your place of purchase.

Save all shipping and packaging materials in the event you need to ship these components.

Note: If your SLC/Now! arrives in cold weather, allow it to reach room temperature before installation in your PS/2.

Important Static Electricity Precautions

Many of the components in your personal computer are sensitive to electrostatic discharge. The following precautions can help you reduce the possibility of damaging the components in your personal computer.

- ❑ Touch a grounded surface before handling any components both inside and outside your system unit. If the system unit is connected to a grounded outlet, this can be done by touching the outside chassis of the system unit.
- ❑ Do not remove your SLC/Now! from the anti-static bag until you are ready to install it in your PS/2.
- ❑ Hold the card by the edges. Avoid touching the components on the card.
- ❑ Do not slide the card or any ICs over any surface.
- ❑ Avoid plastic, vinyl and styrofoam in your work area.

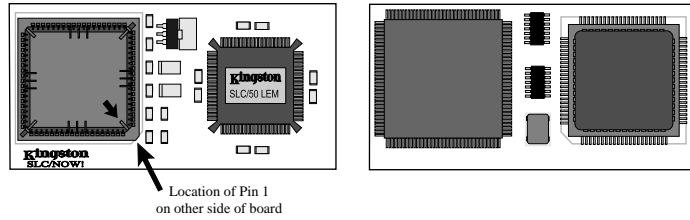


Figure 1 Top View - SLC/50LEM for the IBM PS/2 Models 25 & 30, and New LCM version for PS/2 50z

Bottom View - SLC/50LEM for IBM PS/2 Models 25 & 30, and New LCM version for PS/2 50z

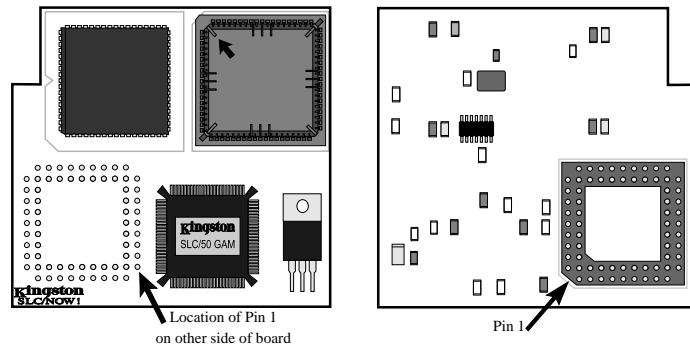


Figure 2 Top View of the SLC/50GAM for the IBM PS/2 Model 50/60

Bottom View of the SLC/50GAM for the IBM PS/2 Model 50/60

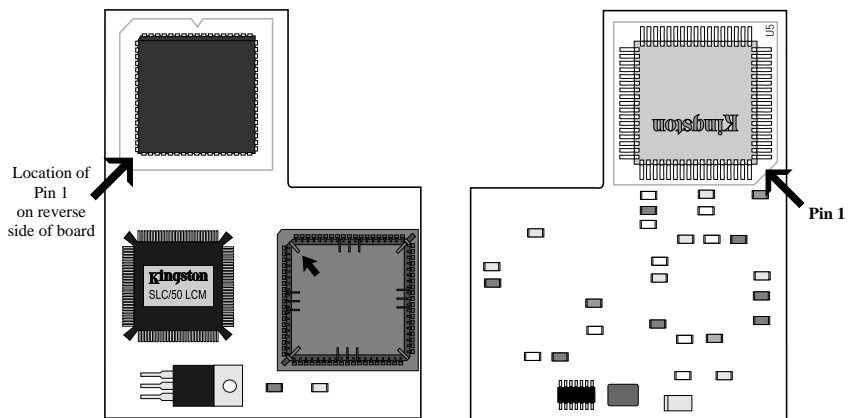


Figure 3 Top View - SLC/50LCM (Older Version) for the PS/2 Model 50z

Bottom View - SLC/50LCM (Older Version) for the PS/2 Model 50z

Tool Requirements

- Medium-size flat-blade screwdriver
- Optional:
 - medium screwstarter
 - 3/16 inch nutdriver
 - 1/4 inch nutdriver

Math Coprocessor

If your system has an 80287 math coprocessor installed, it must be removed prior to installation of the SLC/Now!. The SLC/Now! **supports an Intel 80387SX math coprocessor** or any other fully compatible equivalent, and fits directly into the SLC/Now!'s 80387SX math coprocessor socket. **The clock speed of the coprocessor should match the clock speed of the 386SLC (20MHz or 25MHz) or the 486SLC2 (use 25 MHz).** (Details on installation can be found in the Installation section)

Utility Diskette

Be sure to read the README.TXT file on the utility diskette. It describes the installation procedure and additional features/options of the Cache Enable programs. This program will enable the SLC/Now!'s processor cache.

Software Compatibility

With your SLC/Now! installed you should be able to run your previously installed applications without any changes. In addition, you can now add new applications such as IBM's OS/2™ (for models 50,50z, and 60 only), Microsoft Windows™, and many other 386 based applications. If you already have Windows on your system, you will need to reinstall Windows to enable the 386 enhanced mode features, such as multitasking. Refer to Appendix C, "*Reinstalling Windows*" after you have completed the installation.

80286 Sockets

The 80286 microprocessor in the IBM PS/2 Models 50 and 60 is plugged into a Pin Grid Array socket (PGA) which plugs into corresponding holes on the system board. Kingston provides a chip removal tool for removing this type of cpu chip (PGA version).

The IBM PS/2 Models 25-286, 30-286, and 50z uses a Plastic Leaded Chip Carrier (PLCC) featuring an arrangement of metal leads surrounding the perimeter of the processor chip. Kingston includes a PLCC Extractor for removal of the 80286 microprocessor (PLCC version).

Installing the SLC/Now! Processor Upgrade Card in your IBM PS/2 Models 25 286 and 30 286.

1. Set the power switch on the system unit to OFF.
2. Set all external power switches off, (i.e. display, printer, etc.).
3. Unplug the system unit's power cord from the power outlet.
4. Disconnect all power cords from the rear of your machine.
5. Move your keyboard and all external options away from the work area.
6. Position the unit to allow access to the rear.
7. Using a flat-blade screwdriver or the finger grips, remove the cover mounting screws.
8. Unlock the system cover and carefully slide the system unit's cover away from the rear and to the front. When the cover will go no further, tilt it up, remove it from the base and set it aside.
9. Unscrew and remove any adapter cards, being careful to note their position.
10. Before removing the 80286 and the 80287 coprocessor, (if a coprocessor is installed), note the location of Pin 1 on each processor, (identified by either a notch, beveled edge, dot; or a half-circle on the 80287 coprocessor).
Note: The position of Pin 1 on the 80286 processor socket must match Pin 1 on the SLC/Now!.
11. Using the PLCC Extractor insert the steel tongs into the two notches on the 80286 chip socket, (on the system board). Squeeze the grips of the PLCC extractor tool together and carefully remove the 80286 from the socket while gently rocking side to side. (Save the 80286 microprocessor in the event you need to temporarily return to the old configuration.)
12. If you have an 80287 coprocessor installed, this must also be removed. Locate the 80287 coprocessor as shown in figure 4 and insert the IC removal tool under the corner of the chip. Gently pry upwards, repeat for all four corners. Once the pins have been sufficiently exposed remove with your fingers. (Save the 80287 coprocessor in the event you need to temporarily return to the old configuration.)
13. If you are adding an 80387SX math coprocessor, identify pin 1 of the math coprocessor chip, (designated by either a beveled edge, dot, notch or half-circle). Match this corner to the bevelled edge for the math coprocessor on the 386SLC or the 486SLC2 Cached Processor Upgrade Card. Note the arrow in the coprocessor socket pointing to Pin 1. Carefully place the coprocessor into the socket located on the upgrade card being sure to align the pins and the connector. Firmly press the module into place. (The pins of the module are easily damaged and must be aligned with the connector before pressing the module into place.)
14. Align the beveled edge of the 80286 outline on the SLC/Now! with pin 1 on the 80286 socket. Press gently into place, applying an even pressure. **(If the SLC/Now! is not positioned correctly, damage to both your IBM PS/2 and the upgrade card may result.)**

15. Return cards to their original positions as noted previously. Be certain to retighten the screws to secure the adapters in place.
16. Replace the cover and reattach all cables and power cords.
17. If you are changing the system configuration by either adding a math coprocessor or eliminating a math coprocessor do the following steps, (otherwise skip to step 18).
 - a). Boot the system from your backup copy of the IBM Starter diskette, containing the configuration settings in your PS/2 Model 25-286 or 30-286.
 - b). While the system is booting, a 162 error will appear on the screen indicating a change in your PS/2 configuration.
 - c). After the IBM logo appears, press the **Enter** key.
 - d). A description of the 162 error code will appear, followed by a prompt asking if you want "auto configuration." Answer "Y" (yes), to the reconfigure question.
 - e). After the system has been reconfigured, remove the back-up reference diskette and reboot the computer.
18. Turn on power to your PS/2, check that it boots successfully. If it does not, check that the SLC/Now! is correctly inserted into the 80286 socket with Pin 1 lined up. Check for bent or damaged pins.
19. Once the machine boots correctly, install the setup utility to enable the SLC/Now!'s onboard cache. Continue with the *Software Installation*" section.

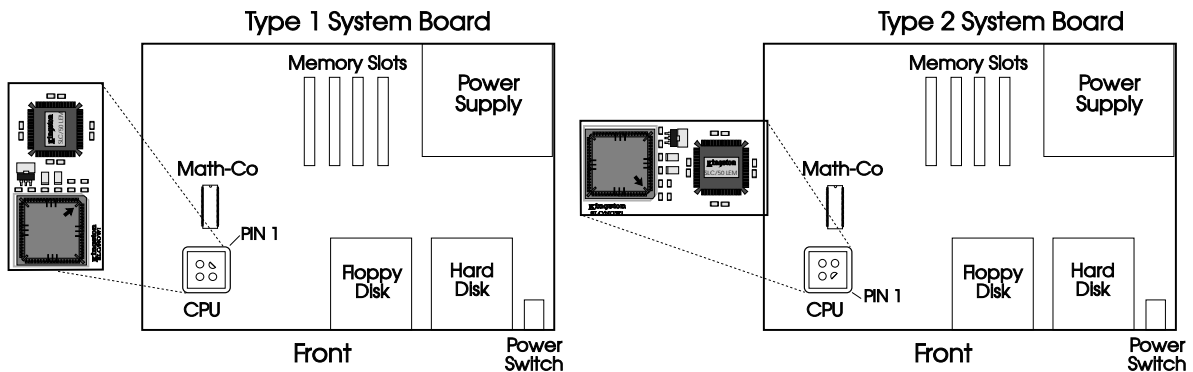


Figure 4. IBM PS/2 Models 25-286 & 30-286 Systems

Installing the SLC/Now! Processor Upgrade Card in your IBM PS/2 Model 50.

1. Set the power switch on the system unit to OFF.
2. Set all external power switches off, (i.e. display, printer, etc.).
3. Unplug the system unit's power cord from the power outlet.
4. Disconnect all power cords from the rear of your machine.
5. Move your keyboard and all external options away from the work area.
6. Position the unit to allow access to the rear.
7. Using a flat-blade screwdriver or the finger grips, remove the cover mounting screws.
8. Unlock the system cover and carefully slide the system unit's cover away from the rear and to the front. When the cover will go no further, tilt it up, remove it from the base and set it aside.
9. Unscrew and remove any micro-channel adapter cards, being careful to note their position.
10. Before removing the 80286 and the 80287 coprocessor, (if a coprocessor is installed), note the location of Pin 1 on each processor, (identified by either a notch, beveled edge, dot; or a half-circle on the 80287 coprocessor).
Note: The position of Pin 1 on the 80286 processor socket must match Pin 1 on the SLC/Now!.
11. Using the IC chip removal tool provided, gently but firmly insert the edge of the tool under a corner of the coprocessor between the chip and the socket and pry upward to loosen it from the socket. Repeat this action for all four corners until you are able to remove the microprocessor by hand. Carefully remove the chip. (Save the 80286 microprocessor in the event you need to temporarily return to the old configuration.)
12. If you have an 80287 coprocessor installed, this must also be removed. Locate the 80287 coprocessor as shown in figure 5 and insert the IC removal tool under the corner of the chip. Gently pry upwards, repeat for all 4 corners. Once the pins have been sufficiently exposed remove with your fingers. (Save the 80287 coprocessor in the event you need to temporarily return to the old configuration.)
13. If you are adding an 80387SX math coprocessor, identify pin 1 of the math coprocessor chip, (designated by either a beveled edge, dot, notch or half-circle). Match this corner to the bevelled edge for the math coprocessor on the 386SLC or the 486SLC2 Cached Processor Upgrade Card. Note the arrow in the coprocessor socket pointing to Pin 1. Carefully place the coprocessor into the socket located on the upgrade card being sure to align the pins and the connector. Firmly press the module into place. (The pins of the module are easily damaged and must be aligned with the connector before pressing the module into place.)

14. Align the beveled edge of the 80286 outline on the SLC/Now! with pin 1 on the 80286 socket. Press gently into place, applying an even pressure. **(If the SLC/Now! is not positioned correctly, damage to both your IBM PS/2 and the upgrade card may result.)**
15. Return micro-channel adapter cards to their original positions as noted previously. Be certain to retighten the screws to secure the adapters in place.
16. Replace the cover and reattach all cables and power cords.
17. If you are changing the system configuration by either adding a math coprocessor or eliminating a math coprocessor do the following steps, (otherwise skip to step 18).
 - a). Boot the system from your backup copy of the IBM Reference diskette, containing the configuration files for any micro-channel adapters installed in your PS/2 Model 50.
 - b). While the system is booting, a 162 error will appear on the screen indicating a change in your PS/2 configuration.
 - c). After the IBM logo appears, press the **Enter** key.
 - d). A description of the 162 error code will appear, followed by a prompt asking if you want "auto configuration." Answer "Y" (yes), to the reconfigure question.
 - e). After the system has been reconfigured, remove the back-up reference diskette and reboot the computer.

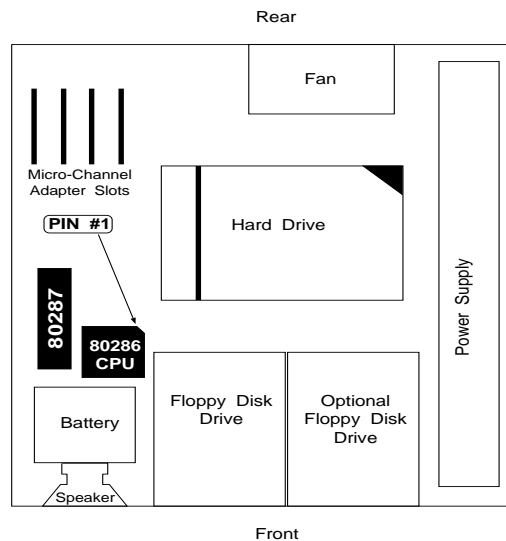


Figure 5. IBM PS/2 Model 50

18. Turn on power to your PS/2, check that it boots successfully. If it does not, check that the SLC/Now! is correctly inserted into the 80286 socket with Pin 1 lined up. Check for bent or damaged pins.
19. Once the machine boots correctly, install the setup utility to enable the SLC/Now!'s onboard cache. Refer to the section "*Software Installation.*"

Installing the SLC/Now! Processor Upgrade Card in your IBM PS/2 Model 50Z

1. Set the power switch on the system unit to OFF.
2. Set all external power switches off, (i.e. display, printer, etc.).
3. Unplug the system unit's power cord from the power outlet.
4. Disconnect all power cords from the rear of your machine.
5. Move your keyboard and all external options away from the work area.
6. Position the unit to allow access to the rear.
7. Using a flat-blade screwdriver or the finger grips, remove the cover mounting screws.
8. Unlock the system cover and carefully slide the system unit's cover away from the rear and to the front. When the cover will go no further, tilt it up, remove it from the base and set it aside.
9. Unscrew and remove any micro channel adapter cards, being careful to note their position.
10. Before removing the 80286 and the 80287 math coprocessor, (if a coprocessor is installed), note the location of pin 1 on each processor, (identified by either a notch, beveled edge, dot; or a half-circle on the 80287 coprocessor).
Note: The position of Pin 1 on the 80286 processor socket must match Pin 1 on the SLC/Now!.
11. Using the PLCC Extractor insert the steel tongs into the two notches on the 80286 chip socket, (on the system board). Squeeze the grips of the PLCC extractor tool together and carefully remove the 80286 from the socket while gently rocking side to side. (Save the 80286 microprocessor in the event you need to temporarily return to the old configuration.)
12. If you have an 80287 coprocessor installed, this must also be removed. Locate the 80287 coprocessor as shown in figure 6 and insert the IC removal tool under the corner of the chip. Gently pry upwards, repeat for all 4 corners. Once the pins have been sufficiently exposed remove with your fingers. (Save the 80287 coprocessor in the event you need to temporarily return to the old configuration.)
13. If you are adding an 80387SX math coprocessor, identify pin 1 of the math coprocessor chip, (designated by either a beveled edge, dot, notch or half-circle). Match this corner to the bevelled edge for the math coprocessor on the 386SLC or the 486SLC2 Cached Processor Upgrade Card. Note the arrow in the coprocessor socket pointing to Pin 1. Carefully place the coprocessor into the socket

located on the upgrade card being sure to align the pins and the connector. Firmly press the module into place. (The pins of the module are easily damaged and must be aligned with the connector before pressing the module into place.)

14. Align the beveled edge of the 80286 outline on the 386SLC or 486SLC2 Processor Upgrade with pin 1 on the 80286 socket. For reference, see Figure 1 on page 3 for New LCM board version Rev.A4 or higher, or Figure 3 for older version. Press gently into place, applying an even pressure. **(If it is not positioned correctly, damage to both your IBM PS/2 and the upgrade card may result.)**
15. Return micro-channel adapter cards to their original positions as noted previously. Be certain to retighten the screws to secure the adapters in place.
16. Replace the cover and reattach all cables and power cords.
17. If you are changing the system configuration by either adding a math coprocessor or eliminating a math coprocessor do the following steps, (otherwise skip to step 18).
 - a). Boot the system from your backup copy of the IBM Reference diskette, containing the configuration files for any micro-channel adapters installed in your PS/2 Model 50Z.
 - b). While the system is booting, a 162 error will appear on the screen indicating a change in your PS/2 configuration.
 - c). After the IBM logo appears, press the **Enter** key.
 - d). A description of the 162 error code will appear, followed by a prompt asking if you want "auto configuration." Answer "Y" (yes), to the reconfigure question.

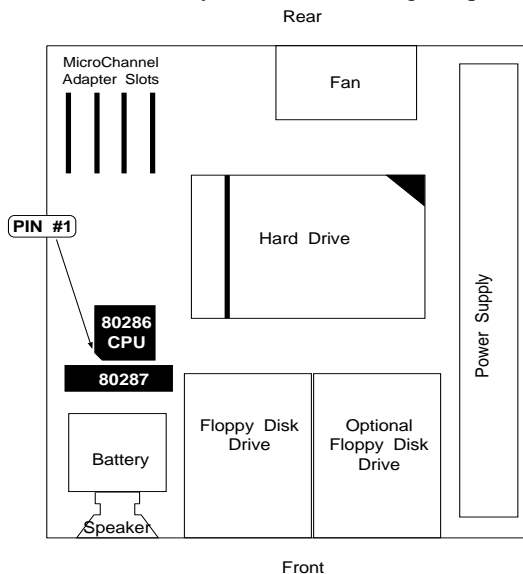


Figure 6. IBM PS/2 Model 50Z

- e). After the system has been reconfigured, remove the back-up reference diskette and reboot the computer.
18. Turn on power to your PS/2, check that it boots successfully. If it does not, check that the SLC/Now! is correctly inserted into the 80286 socket. Check for bent or damaged pins.
19. Once the machine boots correctly, install the setup utility for Enabling/Disabling the Memory Cache. Continue with the *"Software Installation"* section on page 13.

Installing the SLC/Now! Processor Upgrade Card in your IBM PS/2 Model 60

1. Set the power switch on the system unit to OFF.
2. Set all external power switches off, (i.e. display, printer, etc.).
3. Unplug the system unit's power cord from the power outlet.
4. Disconnect all power cords from the rear of your machine.
5. Move your keyboard and all external options away from the work area.
6. Place the PS/2 Model 60 on its side and unlock the side panel.
7. Tilt the side panel and remove from the base. Set the side panel aside.
8. Unscrew and remove any micro channel adapter cards, being careful to note their position.
9. Before removing the 80286 and the 80287 math coprocessor, (if a coprocessor is installed), note the location of pin 1 on each processor, (identified by either a notch, beveled edge, dot; or a half-circle on the 80287 coprocessor).
Note: The position of Pin 1 on the 80286 processor socket must match Pin 1 on the SLC/Now!.
10. Using the IC chip removal tool, gently but firmly insert the edge of the tool under a corner of the processor between the chip and the socket and pry upward to loosen it from the socket. Repeat this action for all four corners until you are able to remove the microprocessor by hand. Carefully remove the chip. (Save the 80286 microprocessor in the event you need to temporarily return to the old configuration.)
11. If you have an 80287 coprocessor installed, this must also be removed. Locate the 80287 coprocessor as shown in figure 7 and insert the IC removal tool under the corner of the chip. Gently pry upwards, repeat for all 4 corners. Once the pins have been sufficiently exposed remove with your fingers. (Save the 80287 microprocessor in the event you need to temporarily return to the old configuration.)
12. If you are adding an 80387SX math coprocessor, identify pin 1 of the math coprocessor chip, (designated by either a beveled edge, dot, notch or half-circle). Match this corner to the bevelled edge for the math coprocessor on the 386SLC or the 486SLC2 Cached Processor Upgrade Card. Note the

arrow in the coprocessor socket pointing to Pin 1. Carefully place the coprocessor into the socket located on the upgrade card being sure to align the pins and the connector. Firmly press the module into place. (The pins of the module are easily damaged and must be aligned with the connector before pressing the module into place.)

13. Align the beveled edge of the 80286 outline on the SLC/Now! with pin 1 on the 80286 socket. Press gently into place, applying an even pressure. **(If the SLC/Now! is not positioned correctly damage to both your IBM PS/2 and the upgrade card may result.)**
14. Return micro-channel adapter cards to their original positions as noted previously. Be certain to retighten the screws to secure the adapter cards in place.
15. Replace the cover and reattach all cables and power cords.
16. If you are changing the system configuration by either adding a math coprocessor or eliminating the math coprocessor do the following steps, (otherwise skip to step 17).
 - a). Boot the system from your backup copy of the IBM Reference diskette, containing the configuration files for any micro-channel adapters installed in your PS/2 Model 60.
 - b). While the system is booting, a 162 error will appear on the screen indicating a change in your PS/2 configuration.
 - c). After the IBM logo appears, press the **Enter** key.
 - d). A description of the 162 error code will appear, followed by a prompt asking if you want "auto configuration." Answer "Y" (yes), to the reconfigure question.

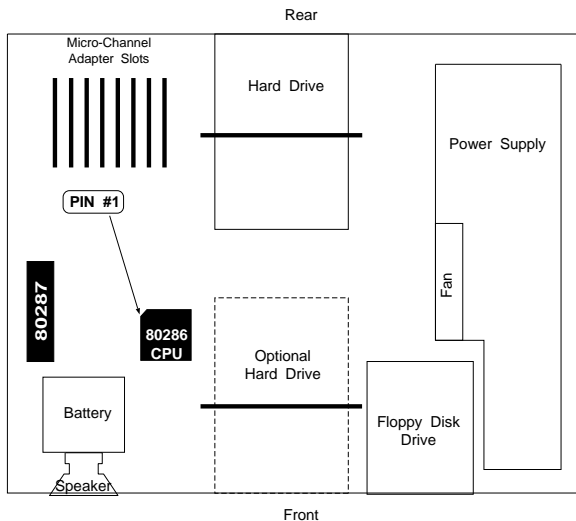


Figure 7. IBM PS/2 Model 60

- e). After the system has been reconfigured, remove the back-up reference diskette and reboot the computer.
17. Turn on power to your PS/2, check that it boots successfully. If it does not, check that the SLC/Now! is correctly inserted into the 80286 socket. Check for bent or damaged pins.
18. Once the machine boots correctly, install the setup utility for Enabling/Disabling the Memory Cache as outlined below.

Software Installation

The SLC/Now! requires a cache enabling device driver, **SLCCARD.SYS** to run at optimum performance. This device driver comes in two versions, DOS or OS/2, depending on which operating system you are using. If you are running an earlier version OS/2 1.2 or 1.3, you will need to upgrade to version 2.0 or higher. OS/2 is NOT supported on PS/2 Models 25 286 or 30 286 due to design limitations within those systems. Only install OS/2 in models 50, 50z, and 60 with SLC/Now! processor upgrades installed.

The DOS driver, **SLCCARD.SYS**, or the OS/2 driver, **SLCOS220.SYS**, must be added to your **CONFIG.SYS** file to enable the SLC/Now!'s 8K or 16K onboard cache. Follow the appropriate instructions below depending on your operating system.

Enabling the Cache (DOS version)

The DOS cache control program, **SLCCARD.SYS**, should be loaded as a device driver in your **CONFIG.SYS** file. To add the device driver to your **CONFIG.SYS** file, do the following:

- Step 1. Copy **SLCCARD.SYS** to the root directory on the hard drive, or to a bootable floppy if you are booting from a floppy.
- Step 2. Using your favorite text editor, add the following line as the first "DEVICE=" line in your **CONFIG.SYS** file:

```
DEVICE=C:\SLCCARD.SYS
```

To verify the cache has been enabled, run **SPEED200.EXE** from the Kingston Utility Diskette. This is the Landmark System Speed Test version 2.0. This program will test the clock speed of the SLC/Now! and report a dramatic difference when the cache is enabled. Refer to *Appendix A Running Landmark System Speed Test* in the back of this manual.

If the processor cache is not enabled, the performance will be considerably less than it was with the 286 microprocessor. Review the steps listed above to verify proper installation of the device driver.

Enabling the Cache (OS/2 version)

The OS/2 2.0 or higher cache control program, SLCOS220.SYS, should be loaded as a device driver in your CONFIG.SYS file. To add the device driver to your CONFIG.SYS file, do the following:

- Step 1. Copy **SLCOS220.SYS** to the OS/2 root directory on the hard drive, or to a bootable floppy if you are booting from a floppy.
- Step 2. Using your favorite text editor, add the following line as the **last** "DEVICE=" line in your CONFIG.SYS file:

```
DEVICE = C:\OS2\SLCOS220.SYS
```

This will enable the SLC/Now! to operate at optimum performance. Please note, you cannot open a DOS window within OS/2 to run the speed test from the Kingston diskette. To test the SLC/Now!'s performance you must boot from a DOS floppy to run the Landmark 2.0 speed test.

Troubleshooting

This troubleshooting section and Appendix C "Common Problems" listed in the back of this manual are designed to assist you in correcting problems with your system. If you do not find your problem listed, or the suggestions described do not solve your problem, call Kingston Technical Support at (714) 435-2639. Please have available the following information before you call:

- Speed rating of the math coprocessor if installed.
- Exact wording of any error messages associated with the problem.
- Listing of your CONFIG.SYS.
- Listing of your AUTOEXEC.BAT.
- Version number of your application/operating system.

Machine Does Not Boot

1. Check that all power and cables are plugged into the right locations. The system unit power indicator and Display indicators should show light indicating power.
2. Turn off the computer and unplug the unit from the power outlet. Remove the cover from the system unit and check that all adapter boards are firmly seated in their sockets. Replace the cover and turn the power on again.
3. Turn off the computer and unplug the unit from the power outlet. Check the orientation of Pin 1. Make sure Pin 1 on the 80286 socket matches Pin 1 on the SLC/Now! and insure that it is firmly seated in the 80286 socket.

4. Remove the SLC/Now!, replace with the 80286 and 80287 (if previously installed) and turn the power on. If system boots, the SLC/Now! may be defective. Contact your dealer.

System Boots from Floppy Disk, does not boot from Hard Disk

Check the connections to the hard disk and controller card. Connection may have been dislodged.

System does not read floppy drive

Check the connections to the floppy disk controller card. Connection may have been dislodged.

System seems to run slow

Check to see if the cache control program (SLCCARD.SYS or SLCOS220.SYS) has been added to your CONFIG.SYS file. If so, run the Landmark 2.0 speed test from the Kingston diskette.

Using DOS's EMM386.EXE

The SLCCARD.SYS driver must load before EMM386.EXE in your CONFIG.SYS file. If you are using MemMaker, please verify the order of device drivers when finished. If SLCCARD is not the first device loaded, move it to the top line in CONFIG.SYS.

Using DOS 6.0's MemMaker

This utility will change the order of devices in CONFIG.SYS. The SLCCARD.SYS file must remain the first driver loaded. Comment out the SLCCARD driver (add REM to beginning of line) and reboot by turning power off and then on. Run MemMaker as usual. When MemMaker has finished, edit your CONFIG.SYS, uncomment the SLCCARD device line (remove REM statement) and move it to the top of the file.

You can also program MemMaker to do this procedure for you by adding the driver to MemMaker's information (INF) file. This approach will prevent any future conflicts when running the MemMaker utility. Follow the steps below:

1. Edit the MEMMAKER.INF file located in your DOS directory.

```
C:\> cd\dos [Enter]
```

```
C:\DOS> edit memmaker.inf [Enter]
```

2. Scroll down to the bottom of the file and insert the following line:

```
^slccard
```

3. Save your changes and exit the file.

Adding the program name with a carat (^) in front will tell MemMaker to load the driver in memory before HIMEM and EMM386. It will not be loaded into upper memory. You can now run MemMaker to calculate the optimum memory configuration for your system without interfering with the SLCCARD.SYS driver. For more information, read the beginning of the MEMMAKER.INF file.

Replacing the SLC/Now! Processor Upgrade Card

To remove your SLC/Now! from your IBM PS/2 and restore the system with your original 80286 microprocessor, simply follow these steps:

1. If the **CONFIG.SYS** has been modified to enable the cache (for either DOS or OS/2 2.0 version), remove the line or make it a REM statement.
1. Set the power switch on the system unit to OFF.
2. Set all external power switches off, (i.e. display, printer, etc.).
3. Unplug the system unit's power cord from the power outlet.
4. Disconnect all power cords from the rear of your machine.
5. Move your keyboard and all external options away from the work area.
6. Position the unit to allow access to the rear.
7. Using a flat-blade screwdriver, remove the cover mounting screws.
8. **For Models 25, 30, 50, 50Z:** Unlock the system cover and carefully slide the system unit's cover away from the rear and to the front. When the cover will go no further, tilt it up, remove it from the base and set it aside.
For Model 60: Lay the tower system unit on its side and remove the side panel
9. Unscrew and remove any micro-channel adapter boards, being careful to note their position.
10. Hold the SLC/Now! gently on the edges and pull upwards, while rocking side to side, being careful not to bend any pins. Be sure to note the position of pin 1, (pin 1 of the 80286 must be inserted into pin 1 of the socket).

Place the SLC/Now! in the original packaging material and contact your dealer or IBM for repair or replacement.
11. If you are restoring the 80287, align pin 1 on the 80287 with pin 1 of the socket and press into place, being careful not to bend the pins.
12. Replace the 80286 microprocessor, be careful to align pin 1 of the chip with pin 1 of the socket.
13. Return adapter boards to their original positions as noted previously, being certain to tighten the screws.
14. Replace the cover and reattach all cables and power cords.
15. Turn on power to your PS/2, check that it boots successfully. (If you are changing the system's configuration, reconfigure the system using the backup copy of your IBM Reference diskette containing the configuration files for any microchannel adapters installed in the system).
16. If your PS/2 does not boot, check that the 286 is firmly inserted into the 80286 socket.

Appendices

Appendix A Running Landmark System Speed Test

To verify that the onboard cache is enabled as well as proper operation of the SLC/Now!, you can run the Landmark System Speed Test, provided on the Kingston Utility diskette. To run Landmark, follow these steps:

NOTE: Due to the multi-tasking nature of both Windows and OS/2, running Landmark in these environments yields inconsistent results. In order to obtain consistent results, you must start Landmark directly from DOS.

Step 1. Insert the Kingston Utility diskette into Drive A.

Step 2. At the DOS prompt, enter the following commands:

```
C> a: [Enter]
```

```
A> speed200 [Enter]
```

To bypass the initial screen, skip the video test, and run the test without the beeping sound, type:

```
A> speed200 /b /nv /q [Enter]
```

/b to bypass initial menu.

/nv do not run video test.

/q run in quiet mode (no sound). Note: Pressing [F10] while the test is running turns sound off.

The resulting bar graph indicates the relative speed in MHz of your CPU (Central Processing Unit) and your FPU (Floating Point Unit, aka Math Co-Processor), if installed. We do not use the video bar for this test. For example, if you have an IBM PS/2 Model 60 with an SLC/Now! 20MHz, the Landmark Speed 2.00 Test will show a CPU speed of 45.90.

Use the charts below to find the relative speeds you can expect with cache memory enabled and disabled.

Landmark 2.00	386SLC/20	386SLC/25	486SLC2/50
Cache Enabled	45MHz CPU	57MHz CPU	107MHz CPU
Cache Disabled	6MHz CPU	7MHz CPU	8MHz CPU

Note: When running Landmark System Speed Test on the 486SLC2/50, the "CPU CLOCK" value will be 17Mhz. This is due to the use of clock-doubling technology and does not indicate a problem. To test, verify the CPU bar graph reports over 110MHz as compared to an IBM AT.

Appendix B Re-installing Windows for 386 Enhanced Mode

One of the many benefits of upgrading your 286 computer with the SLC/Now! is the ability to make use of multi-tasking in the 386 Enhanced Mode of Microsoft Windows

To run Windows in 386 Enhanced Mode, a 386SX or higher processor must be present during the installation of Windows. If Windows was installed on your system prior to installing the SLC/Now!, you must re-install Windows. If you do not reinstall Windows, it will still run but it will not be able to use 386 Enhanced mode.

To reinstall Windows, follow these steps:

- Step 1. Remove the HIMEM.SYS statement and any other memory manager statements from CONFIG.SYS.
- Step 2. Remove the SMARTDRV.SYS or SMARTDRV.EXE from both CONFIG.SYS or AUTOEXEC.BAT if present.
- Step 3. Reboot the computer by turning power off then on.

NOTE: It is absolutely necessary that these steps 1, 2, and 3 be done prior to reinstalling Windows, (step 4). If these steps are not followed, Windows will not install the 386 Enhanced Mode files that are required.

- Step 4. When the computer is finished booting, reinstall Windows.

Appendix C Common Problems

Windows 3.0 Won't Go into 386 Enhanced Mode

In order to run Windows in 386 Enhanced mode, you must re-install Windows **after** the SLC/Now! has been installed. If you have not done this, refer to Appendix B for details.

Symptom: When starting Windows, the Microsoft logo is displayed and then the DOS prompt appears in the upper left of the screen.

Solution: Modify the SMARTDRV.SYS statement in your CONFIG.SYS file. Add the "Disable double buffering" parameter **"/b-**" to the end of the statement. For example:

If the SMARTDRV.SYS statement looks like this:

```
device=c:\windows\smartdrv.sys 2048 1024
```

Change it to look like this:

```
device=c:\windows\smartdrv.sys 2048 1024 /b-
```

System Runs Slow

Symptom: The Landmark System Speed Test indicates that the computer is running at a very slow rate.

Solution: The onboard cache memory is not enabled. Refer to the section on "Software Installation" on enabling the cache.

Free Technical Support

If you have problems associated with your SLC/Now! processor upgrade which you are unable to resolve through the use of this manual or have additional questions, comments, or suggestions regarding your new SLC/Now! or any other Kingston product, you can contact Kingston Technical Support at (714) 435-2639.

**Kingston Technology
SLC/Now!
Installation Guide
For PS/2 Models
25-286, 30-286
50, 50z, & 60**

**Models: SLC20/xxM
 SLC25/xxM
 SLC50/xxM**

**Kingston SLC/Now!
Processor Upgrade
Installation Guide**

For IBM PS/2 Models

25 286, 30 286

50, 50z, & 60

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- (1) This device may not cause harmful interference
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This device generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antennas.
- Increase the separation between the device and the receiver.
- Connect the device into an outlet on a circuit different from that to which the receiver is connected.

CAUTION: Changes or modifications to this device not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the device.

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Revision History

<u>Revision Level</u>	<u>Comments</u>
B	Added troubleshooting for Windows to Appendices.
B1	Removed references to SLCCARD DOS prompt commands until new driver is tested. Removed reference to Disabling Cache control program.
B2	Added DOS 6.0 MemMaker and EMM386 comments to troubleshooting section. Now FCC Class B.
B3	Changed cache enable driver from SLCCARD.EXE to SLCCARD.SYS.
C1	Added LCM model drawing and updated GAM drawing.
C2	Added LEM model for PS/2 25 286 and 30 286.
C3	OS/2 not supported on LEM model for PS/2 25 or 30.
C4	Changed program in Appendix A from SPEED to SPEED200.
C5	Added MEMMAKER.INF instructions.
D1	New LCM design Rev. A4, same as LEM model.