
Chapter Two. The PC/KPR Co-Processor Board.

Overview of Chapter Two.

This chapter provides a physical description of the PC/KPR co-processor board and its parts. This chapter also explains how to unpack and install the co-processor board.

This chapter is divided into five sections as follows:

- Section One. What is the PC/KPR Co-Processor Board?
- Section Two. Unpacking the Co-Processor Board.
- Section Three. Physical Description of the Co-Processor Board.
- Section Four. Installing the Co-Processor Board.
- Section Five. Maintenance and Safety Tips.

End of Overview of Chapter Two.

Chapter Two. Section One.

What is the PC/KPR Co-Processor Board?

The PC/KPR co-processor board is specifically designed to provide the dedicated processing capabilities required for fast, accurate scanning and intelligent character recognition.

The co-processor board is driven by a thirty-two-bit, Motorola Sixty-Eight-Zero-Twenty processor chip, operating at clock speeds of up to sixteen megahertz. In addition, the co-processor board provides an extra two megabytes of dynamic RAM and a built-in DMA controller for direct processing of scanner images.

Mounted on the PC/KPR co-processor board is a piggy-back interface card, which provides communication between the co-processor and scanner, and is custom-fitted with the particular Xerox interface port that is compatible with your system.

The co-processor board comes standard with two megabytes of DRAM. You can add another two megabytes of memory with the optional piggy-back memory upgrade card, for a total of four megabytes. Please note that scanning documents in landscape mode is only possible with this memory upgrade.

The PC/KPR co-processor board, with both the interface and memory upgrade piggy-back boards mounted on it, occupies just one full length, full height, eight or sixteen bit expansion slot in your computer.

The PC/KPR co-processor board has a single bank of eight DIP-switches, which allow you to configure the board for use in conjunction with a wide range of peripheral hardware. Additionally, there is a bank of twelve jumper pins for even more customization possibilities.

End of Chapter Two, Section One.

Chapter Two. Section Two.
Unpacking the PC/KPR Co-Processor Board.

The instructions in this section are written under the assumption that you have unpacked your particular scanner system according to the unpacking instructions shipped with the system. Therefore, the co-processor board should still be in its flat cardboard box. Please recall that this box is seventeen inches long, by six-and-one-half inches wide, by two-and-one-half inches high. There is no tape on the box, and the box hinges open by its top back edge.

Hold the box by the short sides so that you can feel the narrow two-inch slot in the center of each of the two bottom side edges. This assures you that you are holding the box right side up. Locate the open bottom edge on one of the long sides. This open bottom edge should be facing towards you.

Pull the forward portion of the box by the open bottom edge until the flaps on either side of the box cover release. Open the box cover like a hinged lid.

The PC/KPR co-processor board is contained within the box in an anti-static plastic envelope. This anti-static envelope is not sealed, and it opens along one of its short sides.

Keep the co-processor board in its anti-static plastic envelope and in its box until you are actually ready to insert it in your computer.

End of Chapter Two, Section Two.

Chapter Two. Section Three. Physical Description of the PC/KPR Co-Processor Board.

Dimensions.

With both the interface and memory-upgrade piggy-back cards mounted, the overall dimensions of the PC/KPR co-processor board are thirteen-and-one-half inches long, by three-and-seven-eighths inches wide, by three-quarters of an inch thick. Additionally, the bus connector is three-and-one-eighth inches long, and extends one-quarter inch from the main body of the board. The board requires one full length, full height, eight or sixteen bit slot in your computer.

Location of Parts and Switches.

What is Front and What is Back?

All of the chips and switches are located on the front side of the board. The back side of the board has hundreds of soldered connections with sharp wire ends sticking through the mounting holes.

With the front side facing you, orient the board "right side up" by holding it so that the interface port receptacle is on the right edge, and the bus connector tab is on the bottom right edge. As a further reference, you should feel a roughly square, smooth plastic panel, three-and-one-half inches wide by four inches high, on the right side of the board. This panel is the piggy-back interface card, and is located directly above the bus connector tab. The piggy-back interface card holds the interface port receptacle, and also has a small rectangular cut-out section in the lower left corner. Beneath this cut-out section, you will feel twelve vertical jumper pins sticking up. Hold the board so that this piggy-back card is on the right.

The optional two-megabyte piggy-back memory upgrade card, if your system has one, is roughly the same size as the piggy-back interface card, but is mounted on the left side of the co-processor board. Note also that the memory upgrade card, unlike the interface card, has no cut-out sections in it.

Note that all parts and switches are described here referring to the above orientation.

Bus Connector Tab.

The bus connector tab provides electrical contact between the co-processor board and your computer's bus. The bus connector tab extends one-quarter of an inch off the bottom right edge of the board, starting three-quarters of an inch off the lower right corner. The tab is three-and-one-eighth inches long.

DIP-Switches.

The PC/KPR co-processor board is equipped with a single bank of eight DIP-switches, which allow you to configure the board to work in conjunction with a wide range of peripheral hardware devices. Specifically, if you need to change the Input/Output port address because of hardware compatibility problems, you will need to change the settings on this bank of DIP-switches. Refer to Chapter Nine for complete details on Input/Output port addresses.

The bank of eight DIP-switches is three-eighths of an inch wide, by seven-eighths of an inch high. It is located near the bottom right edge of the co-processor board, approximately one-and-one-quarter inches to the left of the cut-out section in the lower left corner of the piggy-back interface card. Just to left of the bank of DIP-switches is the square gate-array, which is one-and-one-quarter inches square.

The switches are arranged in a single vertical row, starting with the number eight switch nearest the bottom edge of the co-processor board, and ending with the number one switch nearest to the top edge of the board.

The DIP-switches are rocker-type switches, with the axes oriented vertically from top to bottom on the board. When the rocker for a given switch is depressed nearest to the square gate array and the left side of the board, the switch is off. When the rocker is depressed nearest to the interface port receptacle and the right side of the board, the switch is on.

Piggy-Back Interface Card.

The piggy-back interface card provides the necessary circuitry for communication between your scanner and the co-processor board. It is fitted with the Xerox interface port receptacle that is compatible with your system.

The appropriate piggy-back interface card for your system is installed at the factory. Note that if you change the scanner on your system, there is a good chance that you will have to change the piggy-back interface card as well.

The interface card is mounted flat on the right side of the co-processor board. The front surface of the interface card is a flat, smooth, rectangular plastic panel, three-and-one-half inches wide by four inches high. There is a seven-eighths inch by one-half inch rectangular cut-out section in the lower left corner of the card. There are two nylon screws located near the upper and lower right corners respectively. The interface port receptacle is attached at the right edge of the card.

The card is secured to the co-processor board by two nylon screws, which are mounted through the back face of the board at the upper and lower corners and attached to the interface port receptacle.

Piggy-Back Memory Upgrade Card.

The optional piggy-back memory upgrade card provides two megabytes of memory in addition to the two megabytes of memory on the co-processor board, bringing the total system memory up to four megabytes.

Note: Scanning documents in landscape mode is only possible with this memory upgrade.

The memory upgrade card is mounted flat on the left side of the co-processor board. The front surface of the memory upgrade card is a flat, smooth, rectangular plastic panel, three-and-one-half inches wide by four inches high. Unlike the piggy-back interface card, the memory upgrade card has no cut-out sections of any kind in it.

The card has two nylon screws on its front face, located in the upper left corner and near the lower right corner respectively. Note that the memory upgrade card simply plugs into the co-processor board, and that the nylon screws should not be removed at any time.

End of Chapter Two, Section Three.

Chapter Two. Section Four. Installing the PC/KPR Co-Processor Board.

Overview of this Section.

This section explains how to install the PC/KPR co-processor board in your computer.

Please note that because of the proliferation of IBM-style computers produced by a wide range of computer companies, it is impossible to describe all of the different computer chassis and cabinet designs. The location of power supplies, fans, disk drives, add-on boards, circuitry and cabling within different computers can vary significantly. Even the way to simply open the computer cabinet differs from machine to machine. Therefore, the instructions given here refer specifically to the standard IBM/XT and AT computer design.

Getting Started.

Step One.

Tools You Will Need.

The only tool you need to install the PC/KPR co-processor board is a screwdriver. Depending on the kind of computer you are using, you may need a flat-head screwdriver or a Phillips-head screwdriver. Specifically, IBM computers require a flat head screwdriver, while most others require a Phillips-head. Compaq computers usually require a five millimeter hex-wrench.

Step Two.

Preparing Your Computer.

Make sure the power switch on your computer is turned off and the power cable is unplugged. You do not need to unplug any of the other cables from the back of your computer. The computer should be sitting flat on your desktop, with the top side facing up and the front side facing you. If your monitor is on top of the computer, move the monitor aside for now.

Caution:

You **MUST** turn the power to your computer OFF and **UNPLUG** the power cable before opening your computer or attempting to install the co-processor board. Failure to do so could result in serious electrical shock to yourself and irreparable damage to the co-processor board or computer.

Opening the Computer.

Step One.

Locate the Cover Screws on Your Computer.

On IBM computers, there are five flat-slot screws that secure the computer cover to the computer chassis. All five of these screws are located on the back of the computer.

Four of the screws are located outermost in the four corners on the back face of the computer. The fifth screw is located highest on the center of the back face, near the top edge. There are two other potentially confusing smaller screws in the vicinity of this fifth screw. The screw you want is larger and located topmost center. Use your screwdriver to remove the five cover screws from the back of your computer. Keep these screws near at hand.

Step Two.

Slide the Cover Off Your Computer.

Slowly slide the computer cover off by pulling the cover towards you. You may have to press up on the bottom side edges near the back of the cover before it will release. Be careful not to disconnect the ribbon cables over which the cover may slide. Make sure that the top rear edge of the cover clears these cables. Disconnecting or damaging the ribbon cables could cause your computer to function improperly or not at all. Remove the cover completely and set it aside for now.

Step Three.

Locate an Open Slot for the Co-Processor Board.

The PC/KPR co-processor board can fit in any full-width slot in your computer. The bus connector can be either full-length or half-length. This means that just about any slot in your computer can accept the PC/KPR co-processor board.

To locate the area in your computer that can hold the co-processor board, start by searching for a large rectangular cut-out section on the back face of the computer. This cut-out section contains all of the port connections, such as your parallel printer and serial ports, as well as smooth cover plates that cover the openings to any empty slots inside the computer.

Inside your computer, behind the port connectors and empty slot cover plates, there is a series of screws mounted vertically in the top of a metal frame along the top edge. These screws secure the add-in boards, the port connectors, and the empty slot cover plates to the computer chassis. Each screw holds one cover plate or add-on board with its port connector.

Locate an open slot by searching for an empty vertical area behind one of the empty slot cover plates. Depending on what other add-on boards you have installed in your computer, there may be a lot of room in there or it may be crowded with other vertically standing circuit boards. You are looking for an empty vertical slot at least three-quarters of an inch wide, by four-and-one-quarter inches deep, by fourteen inches long. The slot spans from the back to the front of the computer.

Step Four.

Remove the Slot Cover Plate.

Remove the empty slot cover plate for the slot in which you want to install the co-processor board by unscrewing the single screw holding the cover plate inside your computer. Looking at the computer from the front, the screw is offset just to the right side of the cover plate. Lift the empty slot cover plate vertically to remove it. Be sure to keep the screw for the cover plate handy, because you will use this screw later to secure the co-processor board inside the computer.

Inserting the Co-Processor Board.

Step One.

Ground Yourself Before Handling the Co-Processor Board.

Make sure that your hands are clean and dry. Ground yourself before handling the co-processor board by touching any bare metal part on the computer chassis.

Once you have grounded yourself, try not to move around too much until the co-processor board is installed. Things like shuffling your feet on the carpet or rubbing your hands on the desk can generate new static electric charges that can damage the co-processor board.

Step Two.

How to Hold the Co-Processor Board for Insertion.

Remove the co-processor board from its anti-static envelope. Make sure to save the envelope and the box in case you need to remove the board later for any reason.

Orient the board vertically so that the front is facing you and the port connector is in your right hand. The bus connector tab should be in the lower right corner.

Step Three.

Insert the Co-Processor Board in Your Computer.

On the bottom of the slot, there is a flat rectangular block, one-half inch wide, and depending on which slot you have chosen, either three-and-one-quarter inches or five-and-one half inches long, spanning from back to front in the computer. This block is the bus connector. The most important thing in installing the co-processor board is to get the bus connector tab on the board inserted in the bus connector block on the computer.

Start by locating the screw hole for the slot that you just removed the slot cover plate from. At the other end of the slot, towards the front of the computer, locate the quarter-inch deep vertical groove that guides the unsecured end of the co-processor board into the slot.

With your right hand, hold one end of the board by the flat metal screw-plate on top of the port connector on the right edge. With your left hand, hold the other end of the board by the upper left corner.

Partially insert the lower left corner of the board into the vertical guide groove nearest you. Gently lower the entire board evenly and vertically into the slot until it comes to rest. Do not force it if it does not easily slide in.

Gently press the board down until the bus connector tab is firmly seated in the bus connector. The bus connector tab should fit snugly, but without too much difficulty.

If the board does not feel snugly seated, or if you find yourself pressing hard to get the board in, you probably missed getting the bus connector tab in the bus connector. In such case, lift the board out and try again. When the board is correctly seated in the slot, you should not be able to wiggle the bus connector tab from side to side in the bus connector.

Step Four.

Secure the Board with the Slot Cover Plate Screw.

When the board is inserted properly, the flat metal screw-plate above the port connector will line up over the hole that originally held the slot cover plate.

Reinsert the screw through the flat metal screw plate on the co-processor board and into your computer. Tighten the screw down.

Finishing the Installation Procedure.

Step One.

Put the Cover Back on Your Computer.

Grasp the computer cover by the sides and slide it back over the chassis. There are bent edges on the bottom of either side of the computer cover. These bent edges correspond to two bent edges on the bottom sides of the computer chassis.

When you slide the cover back on the computer, make sure that the bent edges on the cover are beneath the bent edges on the computer chassis. The cover should envelop the computer chassis as much as possible, so that when you lift the computer by the cover, even without the five cover screws inserted, the whole computer will lift up, not just the cover.

Slide the cover all the way back onto the computer, taking care to not disconnect any of the flat ribbon cables. Secure the cover by reinserting the five cover screws.

End of Chapter Two, Section Four.

Chapter Two. Section Five.
Maintenance and Safety Tips for the Co-Processor Board.

Listed below are some tips that can help extend the trouble-free life of your co-processor board.

One. Less is Better.

In general, try to physically handle the co-processor board as little as possible. Keep the board in its anti-static envelope until you are ready to install it. Try to avoid touching the bus connector tab, as the oils from your fingers can disrupt electrical contact and reduce performance.

Two. Ground Yourself.

Before handling the co-processor board, you should dissipate static electric charges from your body by touching something metal, such as the cabinet of your computer, a filing cabinet, or the metal leg of a chair. This is especially important in cold weather, when the buildup of static charges from walking across a carpet can cause significant damage to electronic components.

Three. Keep it Dry.

Avoid placing any liquids near the co-processor board. If the co-processor board does get wet, let it dry thoroughly before you attempt to install it. If it is a sticky liquid such as soda, gently blot the board with a damp cloth and then let it dry. If the board is already installed in your computer, turn the power to your computer off immediately and allow it to dry.

Four. Fatal Attractions.

Magnetic charges can destroy the components on the co-processor board, so keep the board away from things that can generate magnetic fields. Tape recorders, stereo speakers, telephone receivers, CRT displays, and many other electronic equipment can generate damaging magnetic charges. Note that if you have a Kurzweil Personal Reader, the magnetic tracking aids shipped with that system can also damage the co-processor board.

Five. Save it for Later.

Save the box and anti-static envelope in which the co-processor board was shipped, in case you need to send the board back or transport it for any reason.

End of Chapter Two, Section Five.
End of Chapter Two.