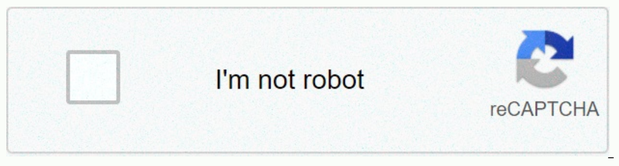

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How motherboard works pdf

Motherboard has been an integral part of most personal computers for more than 20 years. Think of the motherboard as a scale model for a futuristic city with many plug-in buildings in units, each using the power of a common electrical system. Multi-track highways of various symptoms transfer data between buildings. The motherboard is the data and power infrastructure of the entire computer. Motherboards (also called mainboards) are actually a transfer of architecture used for years in central computers. Different circuit cards perform different functions all plug-in in many similar sockets on a shared circuit board. Each circuit card performs a unique function in the computer and gets its power from the socket. Due to improvements in circuitry and packaging, motherboards remained essentially the same size or shrunk while their functions rose. In this edition of HowStuffWorks, you will learn how motherboard works and what many sockets and links do. The original IBM PC background contained the original PC motherboard. In this design, which was first introduced in 1982, the motherboard itself was a large printed circuit card containing the 8088 microprocessor, BIOS, CPU RAM sockets and a set of slots that auxiliary cards could enter. If you want to add a floppy drive, parallel port, or joystick, you bought a separate card and then connected it to one of the slots. This approach was a market leader by Apple II. By facilitating the addition of cards, Apple and IBM have accomplished two huge things: they opened the computer to creative opportunities for third-party sellers. Different motherboards of different vintages usually have different shape factors. The shape factor is basically the size, shape and design of the actual motherboard. There are more than half a dozen memory board shape factors - check out PC Guide's motherboard shape factors to learn more about the various labels. By enabling connected components, the motherboard allows users to customize a computer system according to their applications and needs. On the motherboard motherboard is a multi-layered printed circuit board. Copper circuit paths are called complex road map-like effects that carry signals and voltages across the motherboard. Layer manufacturing techniques are used so that some layers of the plate can carry data for BIOS buses, processor and memory while others carry voltage and ground back without short-circuit paths at intersections. Insulated layers are manufactured in one complete and complex sandwich. Chips and sockets are welded on the motherboard. For example, MSI 694D Pro AR supports pentium dual microprocessors, and has five PCI slots and a communication network riser (CNR). The board supports 133 MHz bus speeds and ultra-direct memory (UDMA). There are four USB ports and audio on board in the ATX form board factor. MSI 694D Pro AR Dual-Face Chip Socket 370 Motherboard Abit KT-7A supports advanced Micro Devices (AMD) processors and has KT-133A slides. Card slots on KT-7A Abit, from bottom to top in the picture below, shows that ISA has one slot, PCI has six slots and AGP has one slot. A special fan cools the slices. Abit KT-7A AMD motherboard processor partial view of TechRam S3ProM shows motherboard slots: from bottom to top, ISA has one slot, PCI has two apertures, sound modem riser (AMR) has one slot, and AGP has one slot. TechRam S3ProM motherboard bios chip is common to many motherboards. BIOS data chip bus display motherboard class Pentium modern has a data conveyor with 64-bit. This is a highway data display that enters and exits the processor. Pentium processors, however, use 32-bit recordings to process 32-bit instructions. Bus speeds and width have increased due to faster processors and multimedia application needs. Typical bus names and displayare: Industrial Standard Architecture (ISA) - 8 or 16-bit Extended Industry Standard Structure (EISA) - 8 or 16-bit Microchannel (MCA) structure - 16 or 32-bit VESA local carrier (VLB) - 32-bit Interconnect Terminal Component (PCI) - 32 or 64-bit graphics port acceleration (AGP) - 32-bit chip chip-chip to provide support for processor chip on the motherboard. 440BX Intel is the dominant chipset in non-Apple pCs. A chipset is the heart of a computer as it controls processor speed, memory, and used slots, and determines how fast it is. Another chip on the main board is called a super I/O controller. Its main function is to control the floppy drive, keyboard, mouse, serial and printer ports. Check pcGuide's Super I/O control functions to learn more. Recent motherboard designs include additional chips to support USB, audio card, video adapter, computer host and network adapter. These chips save the cost of an adapter slot. Speeds have driven fans, temperatures, density, faster chip designs and the number of components needing to cool the circuit through miniature electric fans. These fans mount inside the actual computer state. Heat sinks work like car refrigerants, providing extra space to help cool the element. Fan/heat sink replacement associations are often used to help dissipate a large amount of heat on modern processor chips. The heat assembly takes away the chip by thermal load, using a layer of thermal grease between the two metal mating surfaces. Fans often have a third wire used to monitor fan speed. If you've ever taken the case from a computer, you've seen one piece of equipment that connects everything together - motherboard. Motherboard allows for all parts of Computer to receive power and communicate with each other. Motherboards have come a long way in the past 20 years. The first panels held very few actual components. The first IBM PC motherboard was only processor slots and card. Users have connected components such as flexible drive controllers and memory in slots. Today, motherboards typically boast a wide range of built-in features, directly affecting computer capabilities and upgrades capabilities. In this article, we will look at the general components of the motherboard. Then, we'll study closely five points that greatly affect what your computer can do. For other uses, see motherboard (illustration). The main printed circuit board (PCB) for the motherboard computing device for desktop pc, showing the components and typical interfaces found on the motherboard. This model follows the microATX shape factor, which is used in many desktop computers. The motherboard (also called the main panel, the main circuit board, the system panel, the board, the board, the logic panel,[1] or mobo) is the main printed circuit board (PCB) in general purpose computers and other expandable systems. It maintains and allows communication between many important electronic components of the system, such as CPU and memory, and provides connectors for other peripherals. Unlike the rear plane, the motherboard usually contains important subsystems, such as the central processor, i/o and memory control of the slide set, interface connectors, and other integrated components for public use. Motherboard specifically means PCB with expansion capabilities. As the name suggests, this painting is often referred to as the mother of all associated components, which often include peripherals, interface cards and girls' cards: audio cards, video cards, video cards, host bus adapters, IEEE 1394 cards; video cards, network cards, host bus adapters, IEEE 1394 cards; video cards, IEEE 1394 cards; video cards, network cards, host bus adapters, IEEE 1394 cards. And a variety of other customized components. Dell Precision T3600 motherboard, used in cad professional workstations. As manufactured in 2012, the mainboard describes a single-panel device with no expansionors or additional capability, such as control panels for laser printers, TVs, washing machines, mobile phones and other built-in systems with limited expansion capabilities. Range Logic Board is a specific brand, coined by Apple in the early 1980's for motherboards in Macintosh computers. [2] History before the invention of the microprocessor, the digital computer consists of multiple printed circuit boards in a cage card tray with components connected by the rear plane, and a set of threaded sockets. In very old designs, copper wires had separate connections between card connector pins, but printed circuit boards quickly became standard practice. Cpu, memory and peripherals were on individually printed circuit boards, which are connected to the rear plane. The Ubiah S-100 bus in the 1970s is an example of this type of rear plane system. The most popular computers of the 1980s such as Apple II and IBM PC have published diagrams and other documents that allowed rapid reverse engineering and third-party replacement motherboards. Usually designed to build new computers compatible with models, many motherboards offered additional performance or other features, and were used to upgrade the manufacturer's original equipment. During the late 1980s and early 1990s, it became an economy to move an increasing number of peripheral functions on the motherboard. In the late 1980s, pc motherboards began to include single ICs (also called Super I/O chips) capable of supporting a range of low-speed peripherals: PS/2 keyboard, mouse, floppy drive, serial ports, and parallel ports. By the late 1970s, many PC motherboards included audio, video, storage, and integrated consumer-class networks without the need for any expansion cards at all; Commercial computers, workstations, and servers were more likely to need expansion cards, either for more powerful functions, or for higher speeds; Laptops and computer notebooks that were developed in the 1990s integrate the most common peripherals. These panels included even with no components for the upgrade, a trend that would continue as smaller systems were introduced after the turn of the century (such as tablet and netbook). Memory, processors, network controllers, power source, and storage will be integrated into some systems. Designed by the Octek Jaguar V motherboard from 1993. [3] This tablet contains a few peripherals on board, as evidenced by the 6 slots available for ISA cards and the absence of other integrated external interface connectors. Note the large AT keyboard connector in the back right is the only peripheral interface. Motherboard for Samsung Galaxy SII; Almost all the functions of the device are integrated into a very small panel that provides motherboard electrical communication supplant that other components of the communication system. Unlike the rear plane, it also has a CPU and hosts subsystems and other devices. The typical desktop computer has its exact processor, master memory, and other basic components related to the motherboard. Other components such as external storage, video and audio display controllers, and peripherals may be attached to the motherboard as plug-in cards or via cables; In modern microcomputers, it is increasingly common to integrate some of these peripherals into the motherboard An important element of the motherboard is the microprocessor supporting chipset, which provides support interfaces between the CPU, various buses and external components. These slides determine, to some extent, the features and capabilities of the motherboard. Modern motherboards include: CPU sockets (or CPU slots) that may install one or more microprocessors. In the case of CPU packages in ball net array packages, such as VIA Nano and Goldmont Plus, the CPU is welded directly to the motherboard [4] memory slots in which the main memory of the system will be installed, usually in the form of DIMM units containing DRAM chips that can be DDR3, DDR4 or DDR5 slides that form a interface between the CPU, main memory, and non-volatile peripheral buses memory chips (usually flash ROM in modern mother panels) Containing a fixed system or BIOS clock generator that produces the system clock signal to synchronize the openings of various components of the expansion card (interface to the system via bus-supported chippers) power connectors, which receive electrical power from the computer power supply and distribution to the CPU, chipset set, main memory, and expansion cards. As of 2007 [update], some graphics cards (such as GeForce 8 and Radeon R600) require more power than the motherboard can provide, thus custom links have been introduced to attach them directly to the power source [5] links to hard drives, optical drives, or hard drives, usually SATA and NME now. In addition, almost all motherboards have logic and connectors to support commonly used input devices, such as USB for mouse devices and keyboards. Early pCs such as Apple II or IBM only included this minimum surround support on the motherboard. Sometimes, video interface devices are integrated into the motherboard, for example, on Apple II and rarely on IBM-compatible computers such as IBM PC Jr. Additional peripherals such as disk controllers and serial ports are provided as expansion cards. Due to the high thermal design strength of high-speed computer CPU and components, modern motherboards almost always include heat sinks and mounting points for the masses to dissipate excess heat. Main material factor form: Comparing computer form factors motherboards is produced in a variety of sizes and shape called computer form factor, some specific to individual computer manufacturers. However, the motherboards used in IBM-compatible systems are designed to fit different case sizes. As of 2005 [update], most desktopcomputers use the ATX standard model factor - even those found in Macintosh and Sun computers, which are not built from components of goods. Motherboard and power supply unit (PSU) must match in case, although there is a smaller shape Motherboards of the same family will fit larger cases. For example, an ATX case will usually accommodate the microATX motherboard. Computers generally use built-in, miniature and custom motherboards. This is one of the reasons why laptops are difficult to upgrade and expensive to repair. A single laptop component failure often requires replacing the entire motherboard, which is usually more expensive than the socket motherboard CPU sockets (CPU) or aperture is an electrical component attached to the printed circuit board (PCB) and is designed to house the CPU (also called microprocessors). It is a special type of integrated circuit socket designed for a very high pin number. The CPU socket provides many functions, including a physical structure to support the CPU, heat sink support, facilitate replacement (as well as reduce cost), and most importantly, form an electric interface with both CPU and PCB. CPU sockets on the motherboard can often be found in most desktops and server (laptops usually use mount CPU surface), especially those based on intel x86 architecture. The CPU socket type and motherboard chipset must support the CPU series and speed. Integrated terminal block chart of the modern motherboard, which supports many on-board peripheral functions as well as many expansion slots with steadily lower costs and integrated circuit size, it is now possible to include the support of many peripherals on the motherboard. By combining many functions on a single PCB, the physical size and total cost of the system can be reduced; Disc controllers for PATA drives, flexible disc drives and integrated graphics control control drives 2D support and 3D graphics, with VGA, DVI, HDMI, DisplayPort and TV output integrated sound card support 8-channel (7.1) audio and S/PDIF network output controller to connect to local network and receiver usb wireless communication interface Bluetooth heat control, voltage, and fan speed sensors that allow programs to monitor computer health components. Terminal card slots will be a typical motherboard different number of connections depending on the standard and form factor. Usually the ATX standard motherboard and modern PCI-Express x16 connection have two or three graphics card, old PCI slots or two for different expansion cards, and 1 or two PCI-E x1 (which replaced PCI). The standard EATX motherboard will have two to four PCI-E x16 connection for graphics cards, and a varying number of PCI slots and PCI-E x1. It can sometimes also be a PCI-E x4 slot (it will vary between brands and models). Some motherboards have two or more. x16 slots, to allow for more than 2 screens without special devices, or use a special graphics technology called SLI (for Nvidia) and Fire Junction (for AMD). These 2 to 4 graphics cards allow them to be linked together, to allow better performance in intense graphical computing tasks, such as games, video editing, etc. In the newer motherboards, M.2 slots are for SSD and/or wireless network interface controller. The temperature and reliability of the motherboard of the Vaio E series laptop (right) microATX motherboard with some faulty main material capacitors: cooling computer main panels are generally air cooled with heat sinks that are often mounted on larger chips in the modern motherboard. [6] Inadequate or improper cooling can damage or disrupt the internal components of the computer. Passive cooling, or a single fan mounted on the power supply, was enough for many desktop computer CPU in until the late 1990s; Since then, most fans have asked the CPU mounted on heat sinks, due to the high hour speed and power consumption. Most motherboards have connectors for additional computer fans and integrated temperature sensors to detect motherboard temperature, CPU and fan connectors that can be controlled by bios or operating system can be used to regulate fan speed. [7] Alternatively, computers can use a water cooling system instead of many fans. Some small form factor computers and home theater computers designed for quiet and energy efficient operation boastless fan designs. This usually requires the use of a low-power CPU as well as careful layout of the motherboard and other components to allow for the placement of the heat sink. A 2003 study found that some pseudocomputer accidents and general reliability issues, ranging from screen image distortions to reading/output/writing errors, can be attributed not to software or peripherals but to aging capacitors on PC motherboards. [8] Eventually this was shown to be the result of electrolyte-electrolyte fittings malfunctioning,[9] a cause called an intense plague. Standard main panels use electric capacitors to filter the power current distributed around the board. These capacitors age at a temperature-based rate, as water electrolytes evaporate slowly. This can lead to loss of capacity and subsequent motherboard malfunctions due to voltage instability. While most capacitors are rated for 2000 hours of operation at 105°C (221°F),[10] life's projected design almost doubles for every 10°C (18°F) below this. At 65° (149°F) the age of 3 to 4 years can be expected. However, many manufacturers offer substandard capacitors,[11] which significantly reduce life expectancy. Insufficient cooling condition and high temperatures around the CPU socket exacerbate this problem. With the top blower, the plate components can remain below 95°C (203°F), effectively doubling the motherboard Medium-range and high-range motherboards, on the other hand, use exclusively solid capacitors. For every 10 degrees Celsius lower, its average life span is about three, resulting in a 6-fold increase in life expectancy at 65°C (149°F). [12] These capacitors can be classified for 5,000, 100,000 or 12,000 hours of operation at 105°C (221°F), extending life expectancy compared to standard solid capacitors. In desktops and laptops, motherboard cooling and monitoring solutions typically rely on a super-I/O controller or built-in controller. The boot using the primary I/O system motherboards contains ROM (and later EPROM, EEPROM, and NOR flash) to configure the devices, and download the operating system of the terminal device. Microcomputers such as Apple II and IBM PC use ROM chips mounted in sockets on the motherboard. In power up the cpu central download the program counter with the boot ROM address and start implementing the instructions of the boot ROM. These instructions format and test the system device, display system information on the screen, perform RAM checks, and then download an operating system from a terminal device. If nothing is available, your computer will perform tasks from other ROM stores or display an error message, depending on the computer's model and design. For example, both Apple II and the original IBM Cassette BASIC (ROM BASIC) computer may start if any operating system can be downloaded from a floppy disk or hard disk. Most modern painting designs use BIOS, stored in EEPROM or flash chip light mede to or socket on the motherboard, to run the operating system. When the computer is turned on, the BIOS firmware tests and configures memory, circuits, and peripherals. This self-powered test on (POST) may include testing some of the following things: video card expansion cards inserted into slots, such as traditional PCI and PCI Express flexible drive temperatures, voltage, and fan speeds to monitor CMOS memory devices used to store bios keyboard configuration and mouse audio card adapter optical disk network adapter: CD-ROM or DVD-ROM PARALLEL ATA or serial ATA hard drive ATA NVMe hard drive Saxe hard drive Hard Drive SAS hard drive or hard drive security devices, such as fingerprint reader or lock key case to detect USB intrusion devices, such as a large-capacity USB storage device many panels now use behind bios called UEFI. It became popular after Microsoft began requiring it for a system to be supported to run Windows 8. [13] [14] See also terminal components connect (PCI) PCI-X PCI Express (PCIe) speeding graphics port (AGP) M.2 case computer screws CMOS battery expandlist of pc manufacturers basic I/O system Unified Extended Firmware Interface (UEFI) overclocking the single-board computer power system operating system consistent power applications references multiple processors ^ Miller, Paul (July 8, 2006). Apple sneaks into the new logic board in the MacBook's right-back pros. Engadget. Archived from the original on October 4, 2013. Accessed October 2, 2013. ^ ^ Old Gold: 1993 Meddge. Archived from the original on May 13, 2007. Retrieved June 27, 2007. ^ CPU types of explained socket: From socket 5 to BGA [MakeUseOf explains]. January 25, 2013. The original version was archived on April 7, 2015. Accessed April 12, 2015. ^ 1Zard' (April 6, 2005). Pinout from PCI-Express power connector. PowerUp technology. Archived from the original on October 4, 2013. Accessed October 2, 2013. ^ Carbo, Michael. 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For keyboards that are normally provided with IBM PS/2 computers, see the M. keyboard for peripherals and game conversions for the video game console, see PlayStation 2. PS/2 PORT PS/2 COLOR-CODED COMMUNICATION PORTS (PURPLE FOR KEYBOARD AND GREEN FOR MOUSE) KEYBOARD TYPE AND COMPUTER MOUSE DATA CONNECTOR HISTORYPRODUCTIONDESIGNED IBMDESIGNED 1987; 34 years ago (1987) replaced the DIN connector, DE-9 connector and Minidin-9 InPortSupersed by general USB specifications provided by connecting NoExternal YesCable 4 wires plus shieldPins 6Connector Mini-DIN-6Signal 5 VDCMax. Voltage 5.0±0.5 VMax. Current 275 mADataData serial data signal at 10.0-16.7 KHz with 1-10-bit start-up data (LSB first), 1 bit symmetry (individual), 1 bit stop, [1 ack bit (if host to device)] bit rate of 7-12 kbps/sMax. Hardware 1 or 2 [a] SerialPin protocol outside the female connector of the frontPin 1 + Data DataPin 2 is not connected [b] pin 3 GND GroundPin 4 Vcc +5 V DC at 275 mAPin 5 + CLK ClockPin 6 offline [C] ^ Keyboard and mouse may be integrated into a single port which can be used to connect both via the partition cable. ^ Occasionally, a keyboard for the partition cable. ^ Occasionally, keyboard clock for cable break. The PS/2 port is a mini connector of 6 pin DIN used to connect keyboards and mouse to a PC-compatible computer system. Its name comes from IBM's personal system/2 series of personal computers, which was introduced in 1987. The PS/2 mouse connector generally replaces the old DE-9 RS-232 serial mouse connector, while the PS/2 keyboard connector replaces the larger 5 pin/180° DIN connector used in the IBM PC/AT design. The PS/2 keyboard port is electrically and logically identical to IBM's keyboard port, differing only in the type of electrical conductor used. The PS/2 platform displayed a second port with the same design as the keyboard port for use to connect the mouse; So the keyboard/2-style mouse interfaces are similar electrical and use the same communication protocol. However, unlike apple's similar Desktop Bus connector, the keyboard and mouse port of a particular system may not be interchangeable because the two devices use different sets of commands and device drivers are generally encrypted to connect with each device on the port address traditionally assigned to that device. (that is, keyboard drivers are written to use the first port, and mouse drivers are written to use the second port. [1] The communication protocol each port executes a serial synchronous channel. [2] The channel is slightly asymmetrical: it prefers to send from the input device to the computer, which is the majority case. The IBM AT and PS/2 two-way keyboard interface is a development of ibm's one-way PC keyboard interface, using the same signal lines but adds an add To send data back to the keyboard from your computer, which explains the asymmetry. [3] The interface has two main signal lines, data and clock. These are one-end signals driven by open collector drivers at each end. Usually, it is transmitted from the device to the computer; Then, the peripheral attachment device generates the clock signal. To move byte, the device simply outputs a sequential frame of data (including 8 bits of data and bit symmetry) on the data line sequentially while switching the hourline once per bit. The host controls the direction of the connection using the hour line; The host can interrupt the device by dragging the low clock while sending the device; The device can detect this by the watch to stay low when the device launches it to go as high as the clock signal switch created by the device. When the host pulls the low clock, the device must stop the transmission immediately and release the watch and data to both the high float. (So far, all this is the same as the one-way communication protocol from the IBM PC keyboard port, although the serial frame formats vary.) The computer can use this state of the interface simply to prevent the device from transmitting when the computer is not ready to receive. (For the IBM PC keyboard port, this was the only normal use of the signal from the computer to the keyboard. [4] To send bytes of data to the keyboard, the computer pulls the clock low, waits briefly, then replaces it with the computer-generated clock signal, while a frame output of bits on the data line, one bit per hour beat, just as the attached device does to send it in the other direction. The device postpones to the computer control across the hour line and receives data bytes. (This keyboard usually interprets the byte as an order or byte tagged for a previous command.) The computer releases the clock line when it is finished. The device will not attempt to send to the computer until the clock and data are high for a minimum period of time. [5] Transmission from the device to the computer is preferred because from a normal idle state, the device does not have to grab the channel before it can transmit - the device only starts transmitting immediately. In return, the computer must grab the channel by dragging the low hour line and waiting for the device to have time to release the channel and get ready Receiving; Ports provide old laptops and the most contemporary panels have a single port that supports a keyboard or mouse. Sometimes the port also allows one device to be connected to the two normally unused pins in the connector to allow both to be connected simultaneously through a special divider cable. [6] This configuration is common on IBM/Lenovo Notebook among many others. The PS/2 keyboard interface is electrically the same as the 5-pin DIN connector on earlier AT keyboards, and keyboards designed for one can be connected to one with a simple wire adapter. These wire transformers and transformer cables were available for sale. Note that IBM PC and PC XT use a one-way protocol with the same DIN connector as the AT keyboard even if the computer or XT keyboard can be connected to the PS/2 port using the AT keyboard wire adapter, the previous keyboard will not work with the PS/2 port. (At least, it can't work with a normal PS/2 keyboard driver, including the system BIOS keyboard driver.) By contrast, the PS/2 mouse interface is very different from the RS-232 (which was commonly used for personal computers without PS/2 ports), but however, many mice were made that could work both with a simple negative wire converter, where mice detect the presence of the adapter based on its wires and then switch protocols accordingly. PS/2 mouse and keyboard connectors also used in computer systems that are not compatible with IBM PC devices, such as the Alpha Station DEC line, early IBM RS/6000 CHRP machines, Indy SGI, Indigo 2, and the latest (Octane, etc.) computers. [7] Macintosh clone computers based on LPX-40 logical panel design featured PS/2 mouse and keyboard ports, including Motorola StarMax and PowerBase PowerComputing Power. [8] The status of the old port and USB PS/2 is now an old port, with USB ports now usually preferred to connect to keyboards and mouse. This is due to at least the 2001 Intel/Microsoft PC 2000 specification limit. However, PS/2 ports continue to be included on many pc motherboards, preferred by some users, for various reasons, including the following: ps/2 ports may be best for security reasons in the company environment because they allow USB ports to be completely disabled, preventing the connection of any removable USB discs and harmful USB devices. [9] The PS/2 interface does not provide any restrictions on key renewal, although USB keyboards do not have such a restriction, unless they are working in BOOT mode, which is the exception. To free USB ports for other uses such as removable USB devices. Some USB keyboards may not be able to play BIOS on some motherboards due to driver issues or lack of support. The PS/2 interface has semi-universal compatibility with BIOS. From mice mouse USB send data more quickly than PS/2 mouse devices because the standard USB mouse is explored at a default rate of 125 Hz while standard PS/2 mouse devices send interrupts at a default rate of 100 Hz when they have data to send to the computer. However, mouse devices and PS2 keyboards are preferred by many players because they are mainly zero latency through the port. There is no ballot required by the operating system. The device notifies the operating system when it's time to receive a bundle of data from it. [10] Also, USB mouse devices do not interrupt the system's USB controller when they do not have any change in status to report it according to the mouse's default USB HID specification profile. [12] PS/2 and USB allow the sample rate to exceed, with PS/2 supporting a sampling rate of up to 200 Hz[2] and USB supports a voting rate of up to 1 kHz[10] as long as the mouse runs at full-speed USB speeds or higher. USB key extension restrictions require the HID USB keyboard interface to explicitly process the key renewal process, with the full HID keyboard class that supports the n key renewal process. However, the USB boot keyboard class (designed to allow BIOS to provide the keyboard easily in the absence of USB OS HID support) allows only 6-key extension. Some peripherals support only the last category keyboard, and some OSes may fail to switch to using the full HID keyboard class with a device after boot. [13] Switching between PS/2 and USB many consoles and mouse devices is specifically designed to support both USB and PS/2 interfaces and protocols, and to determine the appropriate type of connection when operating. These devices are generally equipped with a USB connector and charge with a passive wire adapter to allow connection to the PS/2 port. These negative adapters are not standardized and therefore may be specific to the device that came with. They cannot be used to adapt other devices to PS/2 ports. [Need to cite] While combi devices that support USB and PS/2 are still available, most USB keyboards and mice in the 2010s no longer come with adapters or even PS/2 protocol support. [The need to citation] requires that it be connected to a PS/2 port as a protocol adapter, active translation between protocols. These adapters only support certain categories of USB devices such as keyboards and mouse devices, but they are not a model - or a private resource. Old PS/2 peripherals can only be connected to a USB port via an active adapter, which generally provides a pair of PS/2 ports (which may be set as a single keyboard and a single mouse, although both ports may support both protocols) at the expense of a single USB port on the host computer. [14] The original color code PS/2 connectors were black or had the same color as the connecting cable (mainly white). Later the standard PC 97 introduced the color code: the keyboard port, the plugs on compatible keyboards, were purple. Mouse ports and sockets were green. (Use some vendors at first Color code; Logitech used the orange color of the keyboard pluglet for a short time, but soon turned purple.) Today this code is still used on most computers. The nails of the connectors are the same, but most computers will not recognize devices connected to the wrong port. Description Color colors problems green mouse devices color keyboard this section: Hardware problems needs additional citations to check. Please help improve this article by adding citations to reliable sources. Unsourced materials may be challenged and removed. Search for sources: PS/2 Port - News · Newspapers · Books · World · JSTOR (March 2011) (learn how and when to remove this template message) This section lacks information about i8042 issues as described in Glasgow. Please expand the section to include this information. Other details may be found on the talk page. (December 2020) PS/2 Hotplugging ports are designed to connect the digital i/o lines of the microcontroller directly to the digital lines of the microcontroller on the motherboard. It is not designed to be hot interchangeable. Hot PS/2 hardware swapusually does not cause damage because more modern microcontrollers tend to have more powerful I/O lines that are more difficult to damage than those of older controllers; [15] However, a quick exchange can cause damage to older devices or devices with less powerful port applications. If the switch is heated, the devices must be similar enough that the driver that runs on the host system recognizes and can be used with the new device. Otherwise, the new device will not work properly. While this is rarely a problem with standard keyboard devices, the host system rarely recognizes the new device connected to the PS/2 mouse port. In practice most hot keyboards can be switched but this should be avoided. The PS/2-to-USB connectors are not designed for a robust, powered PS/2 adapter to be plugged out and often out, which may lead to curved or broken pins. Additionally, PS/2 links only insert in one direction and must be rotated correctly before trying to connect. (If a user tries to insert the connector in the wrong direction and then tries to rotate it in the right direction without pulling it first, it may result in curved pins.) Most connectors, not all, have a flat arrow or clip that is usually aligned to the right or top of the jack before it is connected. The exact direction on old or non-ATX computers may vary and caution should be exercised to avoid damaged or bent pins when connecting devices. This problem is slightly alleviated in the modern era with the advent of a PS/2-to-USB adapter: users can leave the PS/2 connector connected to the PS/2-USB adapter at all times and do not risk damaging the pins in this way. This issue does not contain a USB-to-PS/2 adapter. Error In standard execution, each OFPS/2 ports are usually controlled by a single small controller on the motherboard. This makes the design and manufacturing extremely simple and cheap. However, one of the rare side effects of this design is that a faulty device can cause the controller to become confused, resulting in both devices acting intermittently. (A well-designed and programmed controller will not behave that way.) It can be difficult to explore the resulting problems (for example, an incorrect mouse can cause problems that appear to be keyboard error and vice versa). See also bios interrupt din connector connection on IBM PC bus mouse connections on mouse connector devices DE-9 USB references ^ There is actually no technical reason that any port can not work with any type of device, if the appropriate program is written to support this arrangement. ^ AP ^ Compare the logical diagrams in IBM's personal computer technical directory with those in IBM's PC in the technical reference manual. ^ IBM Personal Computer Reference Art, Pmenik Cobondia In Return Art ^ ^ AP Either Computer in Technical Reference ^ Pdlim Player S/2D Plum Bell' (IBM Thinkpad) Y Adapter. RU: Pins. Accessed june 14, 2011. ^ Lineers, Gerhard (7 November 2006). Common input devices. Devices. (Sgestedov) is from the original version on June 26, 2007. Accessed march 14, 2007. ^ Power Computing PowerBase. Low end mac. Retrieved April 4, 2011. ^ Huge, undetectable security flaw found in USB: It's time to get your PS/2 keyboard out of the closet. Extremetech. 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