



NETWORK CARDS

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Abstract: Nowadays, we cannot imagine our daily lives without the internet, which we use as a tool in various sectors and corporations. Therefore, we use network cards to facilitate data exchange and the functioning of the internet. Network cards are considered the primary device extensively used to provide internet in our daily lives.

Keywords: network card, motherboard, coaxial cable, operational memory, port.

Currently, internet connection is essential because many things can be accomplished via the internet due to technological advancement. Consequently, people seek ways to access the internet on their computers, and for this purpose, a device called a network card is used; it is a device composed of compatible cables providing the necessary connections.

Through a motherboard, one can connect to a home network or even an office network; it relies on radio waves for data transmission, making it possible to activate the web browser. This device is present in all computer components since there is a market demand for devices with internet connectivity.

The operation of a motherboard is quite broad, which makes it one of the most critical components present in a computer, even more than an audio card or a video card. Its advantage is that it operates automatically in the computer, only requiring the correct connection.

If you do not have a network card, you cannot download various drivers needed to work in the operating system, similarly, you will lack the ability to solve problems that arise in the computer, which could become a notable issue.

A network card (network plate, network board, network adapter, Ethernet adapter, NIC(**network interface controller**)) is a peripheral device of a computer, designed to connect the computer with other devices in the network. Network cards can come in three forms:

1. Internal network card. A card that can be connected to the ISA, PCI ports of a computer.
2. External network device. This network device is a separate device that connects to a computer via USB, PCMCIA, or LPT ports. Mainly, laptop users use this type of network device.
3. Integrated (integrated) network card. It is combined with the computer's motherboard. Modern computers establish a connection with other computers via this type of network device.

Network cards can receive and transmit data simultaneously, capable of operating at speeds of 10,100,1000 Mbit/sec.

The first network cards were built on a discrete logic microchip, with buffer memory having 1 frame. Their reliability was quite low. If data flows were numerous and continuous, buffer memory could not catch up, leading to data loss. This required the network card to

resend requests repeatedly, significantly reducing the work speed. Moreover, each of these initial network cards required a separate driver.

The second-generation network cards have buffer memory based on multiple frames; the second frame can be accepted while the frame loaded from the computer is transmitted to the network. These network cards began to use integrated microchips, indicating increased reliability. Moreover, drivers have been standardized by companies like 3Com, Microsoft, Novell.

It's possible to connect via network cable or wireless, using the device to direct or connect to various devices, this operation is explained through its structure, as it has a system responsible for preparing schemes and systems to send data to each connected computer, simplifying the process of working with computers.

An example of using a network card is when you need to enter a home network, the device is responsible for transforming the request sent by the computer into data that can be managed by the processor. to transmit data via cable, but in its current form, when it reaches the device, it converts it back into digital data.



Figure 1. ISA bus-based AUI port network card.



Figure 2. ISA bus: 4 x 16-bit and 1 x 8-bit ports.

Third-generation network cards process data from the operational memory in a buffer memory based on a conveyor scheme. This increases the speed of the work process by 25-55%. These generation cards are assembled based on specialized integrated circuits, which increase their efficiency and reliability while decreasing their cost.

Fourth-generation network cards are the ones currently being manufactured. These generation network cards have the ability to remotely control the computer through the network, load the operating system from the network, and have other capabilities.



Figure 3. PCI port network card.



Figure 4. PCI bus.

Current network cards are designed for **RJ (Registered Jack) 45** ports and can provide very high speeds. Data exchange can be carried out via copper cables or optical cables. However, in older ISA bus-based network cards, coaxial cables were used.

Network card installation and correct operation

The installation of a network card and its operation are determined by the driver and the operating system. Mutual agreement of these parameters and their strict observance during the use of the device is essential. Still, it is necessary to take into account the adapter's operation. The manufacturer, over the years, does not leave bad connectors that have been proven. Unknown firms can sell cheap products that can quickly fail or not meet the stated specifications.

When buying a network adapter, a decision must be made about the type of bus connection. Or trust the capabilities of your computer's network chip underneath the buses it supports. Usually, it is a PCI or PCI-E bus, rarely USB. The ISA specification is used only on very old motherboards. It is considered that almost no one produces devices under this bus.

Features and functions

A network card is necessary to set up an internet connection, but it also allows access to a specific network that interacts with printers, external storage, and others. Thus, it can perform its function, which consists of exchanging certain information with the component requested through a program that executes protocols through its own command or operating system.

Computers connected to each other do not always have the same operating system, but this is not a problem for the network card responsible for preparing information suitable for each computer according to the commands and programs executed. In practice, you can even manage information about external accessories connected to a computer.

Setting up the mutual connection of the device to the network, it provides the possibility of distributing available resources, i.e., the Internet is shared with each device connected to a network. This ensures the use of the main operational advantages of its internal and external devices within a certain limit, while organizing every necessary protocol to be executed in the system.

It also allows setting up a connection for various devices to use a characteristic hardware system located on another computer, for which they set up a chain of transmitted information and organize management that includes all the information in the network and, in turn, deals with the operation of the operating system.

One of the unique features of a network card is that it improves the level of operation of a computer, thereby improving its performance and increasing the speed of data transmission, but this also depends on the type of transmission or capabilities. Additionally, it is appropriate to obtain relevant information from the computer to understand which model you want to use all the advantages.

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