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Universal Serial Bus Evolution

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Increase in number of the devices connected to the personal computer and, respectively, development of external interfaces led to quite unpleasant situation: on the one hand, the computer should have a set of different connectors, and on the other hand most part of them isn't used. Such situation is defined by historical development of PCs interfaces each interface had its own specialized connector.

Vendors of computer "hardware" started to think about the creation of the common and universal interface

The standard of the Universal Serial Bus (USB) - is the industry standard of extension of architecture of PC oriented on integration with smartphone and devices of consumer electronics.

USB as a standard appeared more than twenty years ago. The first specifications on USB 1.0 appeared in 1994 and solved three key problems: unification of the connector on which it was connected expanding the PCs functions of the equipment, simplicity for the user, high data transmission rate on the device and from it [1].

Representatives of the largest corporations - vendors of an ADP equipment and the software to it, such as NEC, Microsoft, Intel, Compaq, Hewlett-Packard, Lucent took part in the creation of the specification [2].

In 2001 there were first commercial implementations of that USB which is customary and clear to us: version 2.0. Any USB cable of version 2.0 and below has four copper

conductors insider. Two of them are a supply, two others are data transferred [3].

The USB cables are strictly oriented: one of the ends is connected to the host and it is called Type-A, another is connected to the device, it is called Type-B.

The most popular connector which everyone used — USB Type-A of the classical size: it is located on USB sticks, USB modems, at the ends of wires of mice and keyboards. Slightly less often full-size USB Type-B meet: usually such cable connects printers and scanners. The USB Type-B mini-version is still often used in digital cameras, USB hubs. The micro Type-B version became the most popular connector in a pattern: all urgent phones, smartphones and pads produced with the USB connector Type-B Micro.[3]

The new USB 3.0 specification which contained the following key differences was developed for improving of characteristics of the standard:

Five additional contacts, four of which provide additional communication lines;

Increase in the maximum throughput from 480 Mbit\s to 5 Gbit\s;

Increase in a maximum current from 500 mA to 900 mA.

Since fall of 2013 specifications on the updated USB 3.1 standard, which brought us the Type-C connector, transmission to 100 W of a supply and doubling of data transmission rate in comparison with USB 3.0 are accepted [3].

The connector USB Type-C is a little larger than customary USB 2.0 Micro-B, however is noticeable more compactly than the doubled USB 3.0 Micro-B, not to mention classical USB Type-A.

Connector overall dimensions (8, 34×2, 56 mm) allow to use without special difficulties it for devices of any class, including smartphones and tablets [4].

As a result, only with arrival of USB 3.1, at last it is possible to connect to the single connector practically everything: an external disk, the display, the periphery, the adapter of a supply and even an array from SSD disks.

References:
1. Mode of access: https://en.wikipedia.org/wiki/USB/. – Date of access: 10.02.2017.
2. Mode of access: https://arstechnica.com/gadgets/2014/08/a-brief-history-of-usb-what-it-replaced-and-what-has-failed-to-replace-it/. – Date of access: 07.03.2017.
3. Mode of access: http://www.usblyzer.com/brief-usb-overview-and-history.htm/. – Date of access: 15.03.2017.
4. Mode of access: http://www.allusb.com/usb-history/. – Date of access: 10.03.2017.