Ultra-Large Scale Integration Encyclopedia Article

Ultra-Large Scale Integration

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Ultra-Large Scale Integration

Ultra-large scale integration, or ULSI for short, refers to the ability to position more than one million integrated circuits on a single computer chip. An **integrated circuit** is a circuit whose components are etched onto a slice of **semiconductor** material.

The ability to pack more integrated circuits onto a chip increases the computational power and speed of the computer or other machine in which the chip resides. The use of ULSI in a device permits **operation** at a lower voltage, lowers the power consumption and provides a higher speed of operation. Some of the devices that utilize ULSI technology are processors, scanners that convert printed information to coded **data**, semiconductor **memory**, semiconductors (such as the Metal Oxide Semiconductor Field Effect **Transistor**, or MOSFET), and the bipolar transistor, which amplifies analog and digital signals. The widely used **Intel** 486 and Pentium **microprocessor**s--silicon chips that contain the computer's central processing unit--use USLI technology.

USLI is the largest type of integrated circuit. The other types rang in size from less than 100 circuits (small-scale integration) to between 100,000 and 1,000,000 (very-large scale integration, or **VLSI**). Operationally, the dividing line between VLSI and ULSI integrated circuits is often difficult to determine.