

MACMILLAN DICTIONARY OF MICROCOMPUTING

Third Edition

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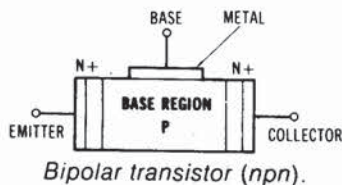
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20 bipolar transistor

known by the logic, circuit built with the process, e.g., transistor-transistor logic (TTL) and emitter-coupled logic (ECL). Actually all common bipolar technologies are remarkably similar, being based on the formation of silicon layers with different electrical properties. The usual difference is the number and sequences of diffusion operations required to manufacture the part.

bipolar transistor: A semiconductor device that has a base of either a p-type or n-type material sandwiched between two masses of the opposite type of material (the collector and emitter). The two types of transistors (pnp or npn) have opposite applied-voltage polarities.



bistable: A device with two possible settings, like a light switch, which is either on or off. Binary numbers, which consist of the digits 0 and 1 can represent conveniently the two states of a bistable device. Both a program and its data are stored in memory in binary number notation. Bistable states can be illustrated as follows: if the bistable component is in stable state A, an energy pulse will drive it to state B; if the bistable component is in stable state B, an energy pulse will drive it to state A.

bistable multivibrator: A specific circuit which has two stable states, requiring two input pulses in order to complete a cycle.

bistable relay: A relay which requires two pulses to finish one cycle composed of two operational conditions. Frequently referred to as a locked, interlocked, or latching relay.

bistable trigger circuit: A circuit that is binary; i.e., it has two states, each requiring an appropriate trigger for excitation and

transition from one state to the other. Same as flip-flop.

bit: See binary digit.

bit density: A specific number of bits of information contained within a given area, such as the number of bits "written" along an inch of magnetic tape.

bit memory organization: Each element of a memory is a binary digit (bit), capable of representing either a 1 or 0. At any instant during the execution of a program, the memory is a grid of binary 1s and 0s, with each bit representing one small piece of information.

bit position: A specific location in memory, space, or time at which a binary digit occurs or is located.

bit rate: The rate at which binary digits, or the pulses representing them, pass a given point on a communications line or channel.

bit-slice architecture: With the discovery that a complete central processing unit (CPU) could be placed on a single chip, it was found that additional functions (principally, a memory) could be added to form a computer-on-a-chip. However, it was also found that certain advantages could be achieved (namely, speed) by partitioning the CPU into slices rather than putting it all on one chip. A typical control section is assembled with several identical 2- and 4-bit slices for the arithmetic and logic unit (ALU) and the registers. The slices are connected in parallel, making it possible to put together units that have several different word lengths. This approach is used to form microprocessors with word lengths ranging from 4- to 32-bits. Bit slice architecture allows the word length to be tailored to the accuracy and precision requirements of scientific calculations. Software architecture allows the user to develop high-speed floating-point instructions and function instructions, as required for scientific calculations. Bit-slice architecture usually employs bipolar technology because of the necessity for limiting

18 binary cell

using 2 as its base and using only the digits zero (0) and one (1).

binary cell: An elementary unit of storage which can be placed in either of two stable states.

binary chain: An entire series of separate binary circuits, each capable of existing in either one of two states. They are arranged so that each circuit can affect or modify the condition of adjacent circuits.

binary code: A code in which every code element is one of two distinct types of values; for example, the presence or absence of a pulse, on or off.

binary-coded character: A letter, digit, punctuation mark, etc., represented by a fixed number of consecutive binary digits.

binary-coded decimal (BCD): A system of number representation, or an information code, in which each decimal digit is represented by a combination of four binary digits (bits), as follows:

Binary	Decimal	Binary	Decimal
0000	0	0101	5
0001	1	0110	6
0010	2	0111	7
0011	3	1000	8
0100	4	1001	9

binary-coded decimal (BCD) place value: The 8421 system represents each decimal digit with four binary digits with the place value of each bit equal to 8, 4, 2, or 1, reading from left to right. A conversion of the decimal number 3571 into its BCD equivalent using the 8421 place value concept would be as follows:

Digit:	Binary value:	Place value:
3	0011	0021
5	0101	0401
7	0111	0421
1	0001	0001

binary counter: A flip-flop or toggle circuit that gives one output pulse for two input pulses, thus dividing by two.

binary digit (bit): 1. Most commonly, a unit of information equalling one binary decision, or the designation of one of two possible and equally likely values or states.

It is usually conveyed as a 1 or 0 of anything that can be used to store or convey information (such as 1 or 0, yes or no). 2. A single character in a binary number. 3. A single pulse in a group of pulses. 4. A unit of information capacity of a storage device. The capacity in bits is the logarithm to the base two of the number of possible states of the device. See also byte.

binary dump: A dump or printout of the contents of a memory unit (in binary form) onto some external medium, such as paper tape or printout forms.

binary loader: This is used to load a binary format, such as those produced by a binary dump program, a link editor, or an assembler, into memory.

binary point: The point mid-way between integral powers of two in a particular binary number.

binary search: A method of searching for an element in a table or serial file; the location is successively narrowed down by halving the table or file at every iteration. In other words, if the key is not located after the search interval is divided by two, the binary search is continued on the half which is known to contain the key.

binary signalling: A communications mode in which information is passed by the presence and absence, or the plus and minus variations, of one parameter of the signalling medium only.

binary synchronous communications (BSC): First introduced in 1966, it became the industry standard for medium- and high-speed data communications. However, as new digital networks, satellite communications, and other advanced transmission techniques came on the scene, they created a need for a full duplex line protocol that was more efficient than BSC. This need is being met by newer standards, such as the high-level data link control (HDLC).

binary-to-decimal conversion: The actual process of converting a binary number to its equivalent in conventional decimal notation.

signal: 1. A visible, audible, or other conveyor of information. 2. The intelligence, message, or effect to be conveyed over a communication system. 3. A signal wave. 4. The physical embodiment of a message. 5. A detectable impulse (voltage, current, magnetic field, or light impulse) by which information is communicated through an electronic or optical means, or over wire, cable, microwave, or laser beams.

signal, interrupt: A signal that causes a processor to suspend the current execution and transfer control to special interrupt-handling software. Vectored interrupts use a set of memory locations that have the addresses of interrupt-service routines to which control is transferred.

signal, supervisory control: Refers to character or signal used to indicate the various operating states of circuit combinations. These characters or signals may automatically actuate equipment or indicators at a remote station.

signature analysis: 1. A technique for data compression, in which the entire data record is compacted into one or more hexadecimal words through an algorithm that weights each bit equally. For all practical purposes, this signature is unique to the data and may be compared to a known good signature. 2. This refers to the conversion of bit patterns into easily identifiable alphanumeric equivalents. One system compresses a long data stream into a unique readily recognizable "signature" of four hexadecimal characters. This signature enables users to isolate system faults right down to a single node or component level. Signature analysis will not fill all testing needs; it can tell only whether or not a particular node is operating correctly. It cannot tell what the problem is or why it occurred, only what component must be replaced to fix the system. On the other hand, signature analysis can detect problems caused by out-of-tolerance components.

signature image system: On some systems, 2K to 4K bits of information can be

stored on a disk subsystem for later retrieval. The storage subsystem contains both the disk and a processor that accepts requests for signatures, retrieves the stored data, and then transmits the compressed signature data to the correct crt terminal, where it is displayed by the display subsystem. Often a signature request can be made via dial-up lines just by entering such information as an account number or a credit card number into the keyboard of a terminal. Then, when the stored signature is displayed on the crt screen, the operator can determine its validity by comparing the displayed signature with the signed document prepared by the customer.

signal charge: A quantity of electrical charge in a potential well (or a discrete region of a bucket-brigade device) that, in conjunction with the bias charge (if used), defines the signal level.

signal conditioner, industrial: In harsh industrial environments, some signal conditioners feature high noise rejection, filtering, input protection, and excellent temperature stability in order to assure measurement integrity. Economical and easy to use, they provide a prepackaged, cost-effective analog signal-handling and interface capability for a wide variety of transducers or process signals.

signal conditioning: To process the form or mode of a signal so as to make intelligible to, or compatible with, a given device, including such manipulation as pulse shaping, pulse clipping, digitizing, and linearizing.

signal conversion: The process of changing a signal from one form to another as in mixing or modulating.

signal converter: A particular transducer designed to convert one standardized transmission signal to another. Signals on this type circuit originate in the data-terminal equipment to select whether the signal converter is to be conditioned to transmit or receive.

signal element: 1. Also called a unit interval. That part of a signal which occupies the shortest interval of the signaling code. It is considered to be of unit duration in building up signal combinations. 2. A pulse or signal. An absence or presence of voltage or current in a communication medium.

signal frequency noise: Refers to noise that lasts for a significant time period and is highly localized in frequency.

signal generator: An oscillator, designed to provide known voltages (usually from 1 volt to less than 1 volt) over a wide range of frequencies; used for testing or ascertaining performance of radio-receiving equipment. It may be amplitude, frequency, or pulse-modulated.

signal level: The level at any point in a transmission system, as measured by a voltmeter (VU meter) across the circuit when properly terminated; a level expressed in dB or VU in relation to a reference level, now 1 mW in 600 ohms.

signal processors, digital: Macroarithmetic processors (MAP) allow minicomputers and large scientific computer systems to perform complex mathematical operations in real time, while still acquiring data. The programmable MAP can provide the host computer with the capability of a fast-Fourier-transform processor, array processor, display processor, image processor, voice processor, or data-acquisition system. The main advantage of MAP is its speed and its fast powerful signal-processor memory and its input/output capacity. It is available with multiported memory having cycle times of 125 or 500 nanoseconds and can optimally be addressed in 8-, 16-, or 32-bit words. A multiprocessor, MAP consists of up to 4 arithmetic processors, a control processor, up to 4 multiported memories, up to 64 input/output devices, and the host computer. The control processor is a stripped-down version of a minicomputer. It has some arithmetic capacity but no memory of its own, since it is used to set up I/O operations and calculate

addresses and address patterns (in some systems).

signal shaping and filtering: Refers to procedures that are used in modems to confine the signal to a specific frequency band, to minimize influence of noise, and to control intersymbol interference. The long-haul portion of a typical voice-channel facility has a well-defined frequency band determined by the channel-bank filters.

signal tracing: The tracing of a signal through each stage in order to locate a fault.

signal transducer: Refers to a particular transducer designed to convert one standardized transmission signal to another.

signal transmission: 1. Conveying electrical energy over a distance by wires, either to operate controls or make indications (telemetry), process acoustic information (telephony, broadcasting), or pass pictorial information (facsimile, television). Also used to denote radio, optical, or acoustic wave propagation. 2. Conveying electrical energy from point to point along a path. 3. The sending of data to one or more locations or recipients. 4. The sending of data from one place for reception elsewhere. 5. In ASCII coding and communications, a series of characters including headings and texts.

sign control, flip-flop: Refers to the control of a specific flip-flop which is used to store the algebraic sign of numbers.

sign digit: A character (+ or -) used to designate the algebraic sign of a number.

signed magnitude: A binary representation for integers where the Most Significant Bit (MSB) acts as the sign (0 for "+", 1 for "-") and the rest of the bits contain the magnitude, of absolute value, or the number.

significant digit: A digit that contributes to the precision of a number. The number of significant digits is counted beginning with the digit contributing the most value, called