

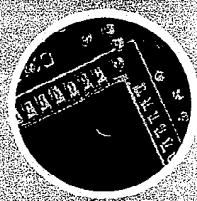
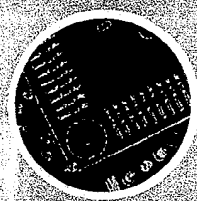
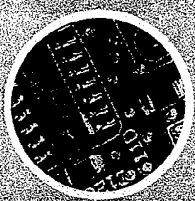
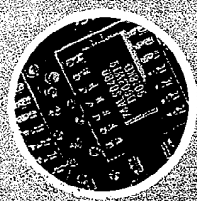
# **EXHIBIT 12**

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# WILEY ELECTRICAL



# ELECTRONICS ENGINEERING DICTIONARY



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**logarithmic growth** An increase in a quantity, such as radiation or charge, whose rate of change follows an exponential function. Also called **exponential growth**.

**logarithmic response** A response, such as that of a component, circuit, or device, which is proportional to the logarithm of an input signal or other stimulus. The human response to loudness is logarithmic, so as to accommodate the wide range of sound pressure levels that can be detected.

**logarithmic scale** A scale in which the graduations are spaced logarithmically, so that distance between each indicated value corresponds to an equal ratio of increase, along the entire length of said scale. A dB meter, for instance, utilizes a logarithmic scale to indicate values.

**logarithmic taper** Same as **log taper**.

**log.** Symbol for **natural logarithm**.

**logic** Also called **computer logic**. 1. The functions performed by a computer which involve operations such as mathematical computations and true/false comparisons. Such logic is usually based on Boolean algebra. 2. The circuits in a computer which enable the performance of logic functions or operations, such as AND, OR, and NOT. These include gates and flip-flops. Also, the manner in which these circuits are arranged. Also called **machine logic (2)**. 3. The totality of the circuitry contained in a computer. Also called **machine logic (3)**.

**logic 0** Same as **logic low**.

**logic 0 input** Same as **logic low input**.

**logic 1** Same as **logic high**.

**logic 1 input** Same as **logic high input**.

**logic add** Same as **logical sum**.

**logic analysis** The use of a **logic analyzer** for debugging programs and evaluating system performance.

**logic analyzer** An instrument which performs various functions which assist in the maintenance, testing, and troubleshooting of logic circuits. A logic analyzer, for instance, may monitor hundreds of signals simultaneously to help debug computer hardware or software, and incorporates a display for viewing the various signals being examined.

**logic array** An IC consisting of an array of logic gates. The specific arrangement of the gates, and hence their function, is determined late in the manufacturing process. This customization for a specific application can save design and manufacturing time, but a significant proportion of the chip may go unused. Also called **gate array**.

**logic board** A circuit board, such as a motherboard, incorporating logic circuits.

**logic bomb** A logic error or program routine which causes a complete and unexpected program or system halt. A logic bomb is usually triggered by a specific event, and can result in significant or complete losses of data.

**logic chip** A chip incorporating logic circuits, as opposed, for instance to memory chips which only store data.

**logic circuit** A circuit which carries out a logic function or operation. Such a circuit has multiple inputs and one output. Its output will depend on specified input conditions, such as a given combination of states. The three basic logic circuits are the AND, OR, and NOT gates. Also called **digital logic circuit**.

**logic controller** A chip-based control system often used for industrial applications. It utilizes data links to communicate with other process control components, devices, and equipment, and is utilized for tasks such as complex data manipulation, timing processes, sequencing, and machine control. Also called **programmable logic controller**.

**logic design** A functional design of a digital computer, or other system utilizing logic elements.

**logic diagram** A diagram representing logic elements, and the way each is interconnected with each other. Also called **logical diagram**.

**logic element** A component, circuit, or device which carries out a logic function or operation. It is the smallest entity that can be represented by a logical operator. Gates and/or flip-flops are examples.

**logic error** An error in a program due to faulty code. Such an error may or may not make a program or system crash. Also called **logical error**.

**logic function** A function which utilizes logical operators. Examples include the function of AND, OR, XOR, or NOT circuits. Also called **logical function**.

**logic gate** A circuit or device which carries out a logic function or operation. Such a circuit or device has multiple inputs and one output. Its output will depend on specified input conditions, such as a given combination of states. The three basic logic gates are the AND, OR, and NOT gates. Also called **gate (2)**.

**logic high** In digital logic, a level within the more positive of the two ranges utilized to represent binary variables or states. A logic high level corresponds to a 1, or true, value. Also called **logic one**, **logic 1**, **logical one**, **one state**, **logic high state**, or **high level**.

**logic high input** An input, such as that of a flip-flop or logic gate, corresponding to a **logic high state**. Also called **logic one input**, **logic 1 input**, or **one input**.

**logic high state** Same as **logic high**.

**logic input level** In digital logic, a voltage or current level which determines the **logic level**.

**logic instruction** An instruction which executes a **logical operation**.

**logic level** In digital logic, either of two non-overlapping ranges utilized to represent binary variables or states. The less positive of the two ranges is logic low, or low level, and the more positive of the two ranges is logic high, or high level.

**logic low** In digital logic, a level within the less positive of the two ranges utilized to represent binary variables or states. A logic low level corresponds to a 0, or false, value. Also called **logic zero**, **logic 0**, **logical zero**, **logic low state**, **low level**, or **zero state**.

**logic low input** An input, such as that of a flip-flop or logic gate, corresponding to a **logic low state**. Also called **logic zero input**, **logic 0 input**, or **zero input**.

**logic low state** Same as **logic low**.

**logic network** An electric network which carries out a logic function or operation.

**logic one** Same as **logic high**.

**logic one input** Same as **logic high input**.

**logic operation** Same as **logical operation**.

**logic operator** Same as **logical operator**.

**logic probe** A probe utilized to determine the logic level at test points within a logic circuit. Usually used for inspection and troubleshooting. Such a probe is useful, for instance, for detecting high-speed transient pulses which could not be seen on an oscilloscope.

**logic programming** A programming style based on symbolic logic, rules, and relationships between objects. Used, for instance, in artificial intelligence applications, and an example of such a language is Prolog.

**logic pulse** A transient signal which changes the logic state of a logic circuit.

**logic pulser** A probe utilized to pulse, or change the logic state, of a logic circuit. Such an instrument may be used in conjunction with a logic probe, to trace a pulse through