APPENDIX A. GLOSSARY

ADDRESS[1]. An identification as represented by a name, label, or number for a register, location in storage, or any other data source or destination such as the location of a station in a communications network.

ANALOG SIGNAL. A continuous signal that depends directly on magnitude (voltage or current) to represent some condition. For example, a voltage could represent the speed of a motor (e.g., 5 V corresponding to 200 rpm; 10 V corresponding to 400 rpm, etc.).

ANALOG-TO-DIGITAL CONVERTER. A circuit that converts a continuous signal that depends directly on magnitude to a discrete signal that represents magnitude by a coded number. For example: a 0 through 10 V signal can be represented by a set of binary signals whose numerical values from 0 through 4095 are proportional to the voltage (e.g., 0 V = 0, 5 V = 2048, 10 V = 4095).

BAUD. The measure of the number of bits per second that can be transmitted in a data communications system.

BCD. An abbreviation for Binary Coded Decimal. BCD is a system of representing decimal data in binary code. For example: in BCD, 16 is represented as 0001 (for 1) and 0110 (for 6).

BINARY. A numbering system that uses a base number, or radix, of two. There are two digits (1 and 0) in the binary system.

BIT. An acronym for **Bi**nary dig**IT**. A bit can assume one of two possible states: ON or OFF; high or low; logic 1 or logic 0; etc.

BIT CLEAR. A special function that clears a bit in a holding register or an output register. When a Bit Clear (BC) coil is energized, the designated bit is cleared to a logic 0. When the BC coil is de-energized, the designated bit is unaffected.

BIT FOLLOW. A special function coil that, when energized, sets the bit for which the Bit Follow (BF) is programmed. When a BF coil is de-energized, the designated bit clears to a logic 0.

BIT PICK. A contact used to determine the state of individual bits in registers.

BIT SET. A special function that sets a bit in a holding register or an output register. When a Bit Set (BS) coil is energized, the designated bit is set to a logic 1. When a BS coil is de-energized, the designated bit is unaffected.

BUS[1]. One or more conductors used for transmitting signals or power from one or more sources to one or more destinations.

CHAIN. To program two or more functions as a group so that the group operates as a single function with expanded capabilities. For example, Drum Controllers may be chained to expand the number of steps beyond the individual 128 step maximum.

CLOCK. A device that generates periodic signals for synchronization or timing.

CMOS. An abbreviation for Complimentary Metal Oxide Semiconductor. A family of very low power, high-speed integrated circuits used in the PC-700.

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[1] Definitions taken from the *IEEE Standard Dictionary of Electrical and Electronics Terms*, 2nd edition, by permission of the Institute of Electrical and Electronics Engineers.

CONDUCTING. A contact circuit is conducting whenever there is a complete path of conduction from the left side to the right side of the circuit.

CONTACT AREA. The area available for contact circuits when programming a function. The width of the area indicates the number of series contacts allowed left-to-right. The height of the area indicates the number of parallel paths allowed.

CONTACT CIRCUIT. A contact circuit is a collection of normally-open (NO) and/or normally-closed (NC) contacts connected in series and/or in parallel and attached to a coil or a special function block.

CPU. An abbreviation for **C**entral **P**rocessing **U**nit; used interchangeably with PROCESSOR.

CRT. The abbreviation for **C**athode **R**ay **T**ube, which is a electronic display tube similar to the familiar TV picture tube. A CRT is used as the display screen on the NLPL-780 Programming Panel.

DATA. Information (e.g., the state of a device, or the contents of a register).

DESTINATION. The location of data after the completion of an operation. For example, after two numbers are added, the destination is a holding register in which the result is placed.

DIGITAL SIGNAL. A discrete signal or set of signals that depends on the presence or absence of some quantity (e.g., voltage, current, etc.) to represent some condition. Digital signals are often combined into sets that can be interpreted as numbers. For example, binary voltages (either 0 or 5 Vdc) in sets of four (X X X X) can represent the numbers 0 through 15 using the binary system.

DISCRETE INPUTS OR OUTPUTS. Individual inputs or outputs providing one signal and operating according to a single bit of information (as opposed to register inputs or outputs, which when regrouped, provide 16 signals and operate according to 16 bits of information).

ENABLE. A circuit that allows a function or operation to be activated.

EXECUTIVE PROGRAM. In the processor, the Executive program is a set of coded instructions, programmed by the manufacturer, that controls the monitoring of inputs, the solving of the user's Ladder Diagram program, and the updating of the output states.

FORCE. A mode of operation in the program loader that allows the operator (as opposed to processor) to control the state of a contact.

INPUT CIRCUIT. An input circuit is a real-world device (e.g., limit switch, transducer, computer register, etc.), its associated wiring, and the input module point to which it is connected. The input module's function is to convert field voltage levels (e.g., 5 V, 12 V, 120 V, etc.) into proper processor signal levels.

I/O. An abbreviation for Input/Output. For example, a group of input modules and output modules might be referred to as I/O modules.

I/O UPDATE IMMEDIATE. A special function that, when enabled, causes a register pair or input/output (I/O) group to be updated immediately upon the execution of a special function, as well as at the end of the processor scan.

INTERFACE. A device that transmits data between two subsystems that often cannot be directly wired together.

LABEL. The means by which registers, coils, and contacts are identified. Each label consists of two parts: the type and the reference number. For example, the label assigned to a holding register may be HR0115.

LADDER DIAGRAM. A complete control scheme normally drawn as a series of contact circuits and coils arranged between two vertical control supply lines so that the horizontal lines of contacts appear similar to rungs of a ladder. A ladder diagram is normally the reference document used by the operator when entering the control program.

LATCH. A device that continues to store the state of the input signal after the signal is removed. The input state is stored until the latch is reset. Latches are created using the Bit Set, Bit Clear, and Bit Pick functions.

LINE. A circuit or group of circuits together with the associated coil and/or special function block. (See Figure A-1.)
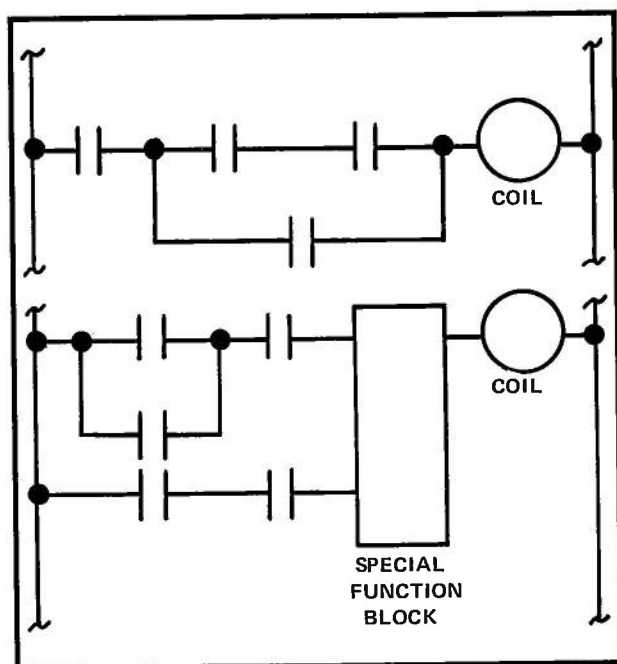

Figure A-1. Typical Circuit Lines

LITERAL. A special function format reserved for the programming of all future special functions.

LOAD. To place data (e.g., a ladder diagram) into the processor's memory.

LOGIC COIL. A coil, associated with a control relay or special function, that is not used to operate a real-world output circuit.

LOGIC 1. See the definition for **BIT**.

LOGIC 0. See the definition for **BIT**.

MEMORY[1]. A device in which data can be entered, in which it can be held, and from which it can be retrieved.

MODULE[1]. Any assembly of interconnected components which constitutes an identifiable device, instrument, or piece of equipment. A module can be disconnected, removed as a unit, and replaced with a spare. It has definable performance characteristics which permit it to be tested as a unit. A module can be a printed-circuit board or subassembly of a larger device, provided it meets the requirements of this definition.

MONITOR. The process of determining the state or condition of an input, a coil, or a register.

MULTIPLEX. To carry out multiple functions in an independent but related manner. Multiplexing often involves interleaving or otherwise combining several signals so that they may be handled by a single device.

NODE. A common connection point between two or more contacts or elements in a circuit. (See Figure A-2).
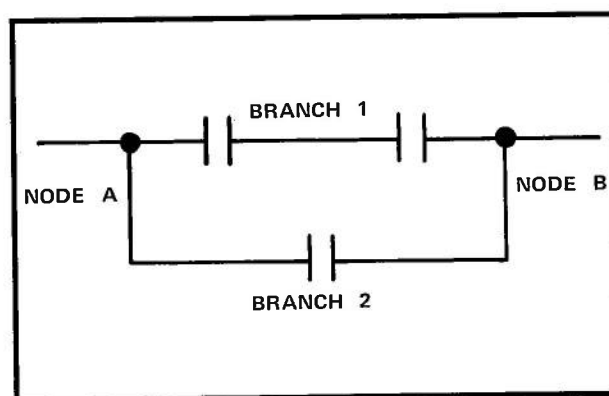

Figure A-2. Branch 1 in Parallel with Branch 2

NOISE ENERGY REJECTION. The specialized circuitry in **Numa-Logic** components that prevents voltage spikes, RFI, transients, and other electrical noise found in a typical industrial environment from causing any undesired operation.

NON-CONDUCTING. A contact circuit is non-conducting whenever there is not a complete path of conduction from the left side to the right side of the circuit.

NORMALLY-CLOSED. Symbolized by NC. NC is the designation applied to a relay contact that is closed when the coil of the relay is not energized, an input contact that is closed when its associated input converter is not activated, or a Bit Pick contact that is closed when its associated bit in a register is a logic 0.

NORMALLY-OPEN. Symbolized by NO. NO is the designation applied to a relay contact that is open when the coil of the relay is not energized, an input contact that is open when its associated input converter is not activated, or a Bit Pick contact that is open when its associated bit in a register is a logic 0.

OFFLINE PROGRAMMING. A method of programming that is done with the processor stopped and all outputs turned OFF.

ONLINE PROGRAMMING. A method of programming by which rungs in the program may be inserted, changed, or deleted while the processor is running and controlling outputs under program control.

OPERAND. 1) Either of the two numbers used in a basic computation to produce an answer. For example, in the computation 2 x 3 = 6, 2 and 3 are the operands. 2) Data required for the operation of a special function.

OUTPUT CIRCUIT. An output module point, real-world device (e.g., motor starter, digital readout, panel meter, etc.), and its associated wiring. The output module's function is to convert processor signal levels to field voltage levels that are used by real-world devices.

OUTPUT COIL. A coil, associated with a control relay or special function, which is used to operate an output circuit. Output coils are used with those lines that must directly operate output circuits. (See the definition for **LOGIC COIL.**)

PARALLEL. In a coil circuit, parallel refers to two or more branches connected between the same pair of nodes. (See Figure A-2.)

PICK. To select the state of a particular register bit.

PRESET. The time or count limit established for a timer or an up counter. When this limit is reached, the associated coil is activated. In a down counter, the preset is the value at which the counter begins and to which it is reset.

PROCESSOR. The part of the programmable controller that performs logic solving, program storage, and special functions within a programmable controller system.

REFERENCE NUMBER. 1) A number used to designate a particular coil. For example, reference numbers 1 through 128 designate output coils. 2) A number used to designate a particular input circuit, input register, holding register, or output register. (See the definition for **LABEL.**)

REGISTER. A location in memory used for the storage of data in the form of a multi-bit number. In **Numa-Logic** Programmable Controllers, there are three types of registers:

- Input Registers

  Input registers accept and store data from register input modules.

- Output Registers

  The data stored in the output registers is available from register output modules.

- Holding Registers

  Holding registers typically store intermediate processor results. Data in these registers is not directly accessible from register I/O modules.

(See the definition for **DISCRETE INPUTS OR OUTPUTS.**)

RS-232-C. An Electronic Industries Association (EIA) standard for serial data transfer. **Numa-Logic** Programmable Controllers have an RS-232-C port(s) for data communication from the processor to program loader, or with a computer.

SCAN. The scanning operation, as performed by the processor, is the sequential examination of both the ladder diagram instructions stored in memory and the status of inputs, outputs, and registers to determine whether or not to energize or de-energize each coil, or perform the desired special functions.

SCAN TIME. The time required to make one complete scan through memory and to update the status of all inputs and outputs.

SERIES. In a coil circuit, series refers to two or more adjacent contacts connected to each other. (See Figure A-3.)
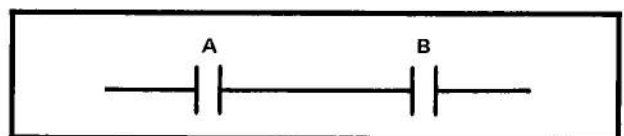

Figure A-3. Contact A in Series with Contact B

SOURCE. In special functions (e.g., the Move [MV] function and the Binary to Decimal [BD] function), the source is the place of origin for the data that is to be moved or converted. A source may be a register or a group of discrete inputs/outputs.

STORE/STORAGE. To retain information in a device from which it can later be withdrawn.

TRANSFER. The process of moving data from one device, module, or register over one or more data lines to another device, module, or register; the process of moving data from input to output.

TTL. An abbreviation for Transistor — Transistor Logic. A family of low voltage, low power integrated circuits used in **Numa-Logic** components.

TYPE. A two-letter designation used to specify a function, an input, a register, or an output. (See the definition for **LABEL**.)

WORD. An ordered sequence of bits treated as one unit.

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