GLOSSARY

A

ADDRESS: A numeric value used to identify a specific I/O channel and/or module.

ANALOG I/O MODULE: A module (input, for example) that receives an analog signal from a user device. An analog signal is one that is continuously varying, such as a voltage or current level. The input module performs an analog to digital conversion and provides the digital result to the programmable controller. An analog output module converts the digital output from the PC to the analog signal required by the user device.

ASCII: A 7-bit digital coding of standard alphanumeric characters as established by the American National Standards Institute. ASCII stands for the American Standard Code for Information Interchange.

ASCII DEVICE: A unit which can send and/or receive ASCII characters. This includes CRT's, printers, alphanumeric displays, keyboards, bar code readers, multiplexers, badge/card readers, and floppy disks.

B

BAUD: A unit of data transmission speed equal to the number of code elements (bits) per second.

BCD (Binary Coded Decimal): A system of numbers representing decimal digits (0-9) using four binary digits (On or Off). BCD is a recognized industrial standard; BCD input (e.g., thumbwheels) and output (e.g., numerical displays) devices are readily available.

BINARY: A numeric system wherein values are represented only by numbers 1 and 0 (ON/OFF). Also called "base two". This system is commonly employed in modern electronic hardware since circuits can be economically designed for ON/OFF status.

BIT: Contraction of binary digit. A single number whose value can be either a ONE or a ZERO. The smallest division of a PC word.

BUS: An electrical channel used to send or receive data.

BYTE: A sequence of binary digits (bits) operated on as a unit. The exact number depends on the system, but normally a byte contains eight bits.

C

CANCEL: A command used to instruct the programmer to terminate the current process.

CHANNEL: A group of I/O modules that are separately connected to the mainframe. For example, a channel of I/O can contain up to 128 input points and 128 output points.

CHARACTER: One symbol of a set of elementary symbols, such as a letter of the alphabet or a decimal numeral. Characters may be expressed in many binary codes. For example, an ASCII character is a group of seven bits.

CLEAR: To return a memory or entry to the nonprogrammed state.

COIL: A discrete logical conclusion to a series of logical operations performed by the programmable controller (PC). The results can be outputs to the real world via an output module to activate motor starters, solenoids, relays, or pilot lamps. Coils are turned OFF when power is removed from the mainframe. (see LATCH.)

COMMUNICATION NETWORK: A serial data link which provides communication among multiple stations such which may be separate PC's, computers, or data terminals. It eliminates the need for separate, independently wired data links. Whether communicating or not, all stations can function independently

COMPARE FUNCTION: This function causes two matrices to be compared on a bit-by-bit basis to find all the bit locations which differ, and save the result for later use. The contents of these matrices are only examined; they are not altered in any way by using the COMPARE function.

COMPUTER: A device incorporating a CPU, memory, I/O facilities, power supply, and cabinet that accepts information, processes it in a prescribed manner, and supplies the results of these processes.

COMPUTER INTERFACE: A device designed for data communication between an intelligent device, such as a host computer and other units such as a programmable controller.

COUNTER: A type of logic that is used to simulate the operation of external counters. In relay panel hardware, a counter is an electro-mechanical device which can be wired and preset to control other devices according to the total cycle of one ON or OFF function. In a PC, a counter is internal to the processor, which is to say it is an electronic function controlled by a user programmed instruction.

CPU (Central Processor Unit): The "brain" of the controller system, wherein the program logic and the system executive is stored. All logic solving and decision making is performed by the processor. Also called a mainframe.

CRT TERMINAL (Cathode Ray Tube): A terminal containing a cathode ray tube used to display programs as ladder diagrams that use instruction symbols similar to relay characters. The terminal can also display data lists and application reports.

CURSOR: A visual movable pointer used on a CRT or programming panel by the programmer to indicate where an instruction is to be added to the ladder diagram. The cursor is also used for editing functions.

D

DIAGNOSTIC PROGRAM: A test program to help isolate hardware malfunctions in the programmable controller and application

DIGITAL: Having discrete states. Digital logic can have up to 16 states. However, most digital logic is binary logic with two states (ON or OFF).

DISCRETE REFERENCE: A reference that can be either ON or OFF. A discrete reference can be an input, output, or internal logic element.

DISTRIBUTED SYSTEM: Any combination of PC's, computers, and data terminals intercommunicating by means of a communication network.

DUMP: Recording the entire contents of user memory onto a storage medium (e.g., magnetic tape, floppy disc, etc.).

E

EDIT: To deliberately modify the user program in the PC memory.

EIA (ELECTRONIC INDUSTRIES ASSOCIATION): This organization has established several sets of communication standards, one of which is RS-232-C.

ELEMENT: The basic building block of the PC ladder logic. An element can be a relay contact, horizontal short, vertical short, fixed numeric value, register reference, coil, or function block. Sometimes referred to as a logic element.

ENABLE: To activate a logic coil or discrete input after it has been disabled.

EXECUTIVE: An operating system that processes the user's logic program.

H

HARD COPY: Any form of printed document such as a ladder diagram program listing.

HARDWARE: The mechanical, electrical, and electronic devices which compose a programmable controller and its application. Electrical devices connected through physical wiring.

HEXADECIMAL: Also called "Base 16." The numbering system that represents all possible ON/OFF combinations of four bits with sixteen unique digits (0-9 then A-F).

HOST COMPUTER: A computer which monitors and controls other computers and peripheral devices.

I

INPUT: A signal that provides information to the controller; can be either discrete input (pushbutton, relay contacts, limit switches, etc.) or numeric input (thumbwheel, external solid-state device, etc.).

INPUT DEVICES: Devices such as limit switches, pressure switches, pushbuttons, etc., that supply data to a programmable controller. These discrete inputs can have a common return or an individual return (referred to as isolated inputs). Other inputs include analog devices and digital encoders.

INPUT MODULE: A device which is used to connect the PC with the input devices. The input module contains the circuitry required to convert the incoming voltages to signal levels compatible with processor.

INTERFACING: Interconnecting a PC with its application devices and data terminals through various modules and cables. Interface modules convert PC logic levels into external signal levels and vice-versa.

I/O: Input/Output, the controller connection to the "real world"; includes both discrete and register outputs.

L

LADDER DIAGRAM: An industry standard for representing control logic relay systems with logic lines representing rungs on a ladder. It expresses the user programmed logic of the controller in relay equivalent symbology.

LADDER LISTING: A hard copy listing of the user's logic program.

LCD: Acronym for Liquid Crystal Display. It provides reflective visual readout. Since its segments are displayed only by reflected light, it has extremely low power consumption as contrasted with LED which emits light.

LED: Acronym for Light Emitting Diode.

LINE: In communications, this term describes cables, telephone lines, etc., over which data is transmitted.

LINE PRINTER: A high-speed printing device that prints an entire line at one time.

LOGIC: A systematic interconnection of digital switching functions, circuits, or devices, as in electronic digital computers.

LOGIC DIAGRAM: A graphic description of logic functions and conditions. It is used to find the result of an addition of the contents of two registers; a logical compare of two matrices; as well as other arithmetic operations.

LOGIC ELEMENT: Any one of the elements that can be used in a ladder logic diagram. These elements include relays, coils, shunts, timers, counters, arithmetic functions, and DX functions

LOGIC LINE: A line of user logic used to construct the unique logic for the application.

M

MEMORY: Storage for binary data and programs.

MEMORY PROTECT: The hardware capability to prevent a portion of the memory from being altered by an external device. This hardware feature is under keylock or password control.

MENU: A selection of the operations you can perform at any given point the programming process. The menu will appear on the CRT screen.

MODEM: A contraction of MOdulator/DEModulator A modem converts digital signals to analog signals, which are suitable for telephone wire transmission. It also converts these analog signals back to digital signals suitable for computer communication.

MODULE: Hardware subassembly that can be easily replaced for maintenance purposes. If a failure occurs, the module is rapidly replaced to restore the control system with minimum downtime.

N

NETWORK: A group of logic elements that are connected together to form a specific function (e.g., a motor starter control circuit).

NODE: A point on a ladder diagram that can receive power from the left or provide power flow to the right. This can be an input to logic element (left side) or an output from a logic element (right side).

NOISE: Extraneous electrical signals; any disturbance which causes interference with the desired signal or operation.

O

OFF-LINE OPERATION: Describes equipment or devices that are not connected to the communications line.

ON-LINE OPERATION: Describes operations where the programmable controller is directly controlling the machine or process.

OPTICAL COUPLER: A device which couples input and output using a light source and detector in the same package. It is used to provide electrical isolation between input circuitry and output circuitry.

OUTPUT: A signal provided from the controller to the "real world"; can be either discrete output (e.g., solenoid valve, relay, motor starter, indicator lamp, etc.) or numeric output (e.g.,display of values stored within the controller).

OUTPUT DEVICES: Devices such as solenoids, motor starters, etc., that receive signals from the programmable controller.

P

PARITY: Method of verifying the accuracy of recorded data.

PARITY BIT: An additional bit added to a memory word to make the sum of the number of "1's" in a word always "even parity" or "odd parity."

PARITY CHECK: A check that tests whether the number of "1's" in an array of binary digits is odd or even.

PC: Abbreviation for Programmable Controller.

PERIPHERAL EQUIPMENT: Units that may communicate with the programmable controller, but are not part of the programmable controller. (e.g., teletype, cassette recorder, CRT terminal, tape reader, programming panel, etc.).

PORT: An I/O connection on a processor or a peripheral device.

PROCEED: A command used to instruct the programmer to start or continue with the indicated operation.

PROCESSOR: The "brain" of the controller system, wherein all the user's logic and executive are stored. All logic solving and decision making is performed by the processor. Also called the CPU or mainframe.

PROGRAMMABLE CONTROLLER (PC): A solid-state control system which has user programmable memory for storage of instructions to implement specific functions such as; I/O control logic, timing, counting, arithmetic and data manipulation. A PC consists of a central processor, an input/output interface, memory, and a programming device that typically uses relay equipment symbols. A PC is purposely designed as an industrial control system that can perform functions equivalent to a relay panel or a wired solid-state logic control system.

PROGRAMMING PANEL (PROGRAMMER): A user's primary interface with the programmable controller. A device used for editing, inserting, and monitoring programs in a PC.

PROM (PROGRAMMABLE READ-ONLY MEMORY): A retentive memory used to store data. Once programmed, the contents of this memory are not easily altered.

PROTOCOL: A defined means of establishing criteria for receiving and transmitting data through communication channels.

R

RAM (RANDOM ACCESS MEMORY): A semiconductor memory where data can be entered, altered, or retrieved at any time. RAM memory is volatile; it loses its stored contents when power to the memory is removed. A battery back-up system is required. Random Access Memory is used to store the state (ON or OFF) of discrete references.

READ: To sense the presence of information in some type of storage, storage which includes: RAM memory, magnetic tape, punched tape, etc.

REAL TIME: The actual time during which physical events take place.

REFERENCE NUMBERS: Numbers which identify the elements of the relay ladder logic. References can be either discrete (logic coils, inputs, or sequencer steps) or register (input or holding registers).

REGISTER: A location in the controller's memory allocated to the storage of numerical values. There are three types of registers: input registers whose contents are controlled by the "real world" outside the controller; holding registers whose contents are controlled from within the controller; and output registers, which are special holding registers since their contents can also be provided to the "real world." All holding registers are retentive on power failure.

REGISTER MODULE: A device used to select, convert, and condition binary coded decimal (BCD) and analog signals that pass between the user's device(s) being controlled and the PC.

RELAY: An electromagnetic device operated by a variation in conditions of an electric circuit. When so operated, it controls other devices such as switches.

RELAY ELEMENT: A logic symbol used to simulate the effect of an electrical relay. Contacts can be normally open, normally closed, or transitional contacts.

REMOTE I/O: The portion of the controller's I/O that is installed at a location away from the controller. Communication between the Remote I/O and the controller is provided via a single cable or two cables.

ROM (Read-Only Memory) is a digital storage device specified for a single function. Data is loaded permanently into the ROM when it is manufactured. This data is available whenever the ROM address lines are scanned.

RS-232-C: Electronic Institute of America (EIA) standard for data communications, RC-232 type C. Data is provided at various rates, eight data bits per character.

RUN LIGHT: An LED indicator on the processor that indicates, when lit, that logic is being processed.

S

SCAN: The technique of examining or solving logic networks one at a time in their numeric order. After the last logic network is solved, the next scan begins at network one; logic is always solved in this fixed cyclic process.

SCAN TIME: The time it takes to completely execute an entire PC program one time.

SEGMENT: A section of a logic program that contains one or more networks.

SELF-DIAGNOSTIC: The hardware and firmware within a controller which allows it to continuously monitor its own status and indicate any fault which may occur within it.

SERIAL OPERATION: Type of information transfer within a Programmable Controller whereby the bits are handled sequentially rather than simultaneously (as in parallel operation).

SOFTWARE: Application programs and internal programs used to support the performance of the controller function.

SOLID STATE: Circuitry designed using only integrated circuits, transistors, diodes, etc.; no electro-mechanical devices such as relays are utilized. High reliability is obtained with solid-state logic, reliability which would be degraded by depending upon electro-mechanical devices.

START-UP: The time between equipment installation and the full operation of the system.

STATE: The logic "1" or logic "0" condition in the PC memory or at a circuit's input or output.

SYSTEM: A collection of units combined to work as a larger integrated unit having the capabilities of all the separate units.

T

TABLE: A group of consecutive registers used to store numerical values.

TIMER: PC logic used to measure and record the time of an event or sequence of events. Timers can accumulate time in either seconds, tenths of seconds, or hundredths of seconds depending on the PC.

TOPOLOGY: The layout of the units within a system, including interconnections, specifications, and variables of layout.

W

WORD: A grouping or a number of bits in a sequence that is treated as a unit.

WRITE: The process of loading information into a memory.