

## APPENDIX A GLOSSARY OF TERMS

### A

- Address:** A numeric value used to identify a specific I/O channel and/or module.
- Address Index Pin:** A technique used to establish proper identification of I/O modules.
- Address Selector:** A switch on an I/O housing used to establish housing address.
- 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 frequency. The 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.

### B

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

### C

- CD (Carrier Detect):** A signal indicating that the carrier is being received. CD is pin 8 of an RS-232-C connector.
- 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.
- Clear:** To return a memory to a nonprogrammed state.
- CMOS Memory:** Advanced semi-conductor memory that requires DC power to retain its content. However, the amount of DC power is very low when compared to other memory techniques, allowing relatively small batteries to maintain this memory for years without application of AC power.
- Communication Network:** A serial data link which provides communication among multiple stations 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.

- 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.
- CPU (Central Processing 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 mainframe.
- CRT:** A terminal containing a cathode ray tube to display programs as ladder diagrams that use instruction symbols similar to relay characters. The terminal can also display data lists and application reports.
- CTS (Clear To Send):** A signal that tells the transmitting device that it may now place data on the transmit data line (Pin 2). Pin 5 of an RS-232-C connector.

#### **D**

- 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.
- DSR (Data Set Ready):** A signal indicating that the modem is connected, powered up, and ready. Pin 6 of an RS-232-C connector.
- DTR (Data Terminal Ready):** A signal indication that the transmitting device is connected, powered up, and ready. Pin 20 of an RS-232-C connector.
- Duplex:** A means of two-way data communication. See also Full Duplex and Half Duplex.

#### **E**

- EIA:** Electronic Industries Association. This organization has established several sets of data communication standards, one of which is RS-232-C.
- Executive:** An operating system that processes the user's logic program.

#### **F**

- Full Duplex (FDX):** A mode of communication in which data is transmitted in two directions at the same time.

#### **H**

- Half Duplex (HDX):** A mode of data transmission capable of communicating in two directions, but in only one direction at a time.
- 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, push-buttons, 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 circuiting required to convert the incoming voltages to signal levels compatible with processor.
- I/O:** Input/Output, the controller connection to the "real world"; includes both discrete and register signals.

## L

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

## M

- Memory:** Storage area 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 control.
- Microprocessor:** The control and processing portion of a small computer with large scale integration (LSI) circuitry, usually on a single chip.
- Modem:** The term modem is a contraction from ModulatorDemodulator. It is so called because it converts the digital signals to analog signals suitable for transmission over a telephone line, for instance, and vice-versa.
- Multiplexing:** The time-shared scanning of a number of data lines into a single channel. Only one data line is enabled at any instant.

## N

- Non-volatile Memory:** A memory that does not lose its information while its power supply is turned off.

## O

- 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.
- Output Module:** A device which is used to connect the PC with the user's devices. The output module contains the circuitry required to convert the PC output signals to voltage levels compatible with the user's device.

## P

- Parity:** Method of verifying the accuracy of recorded or transmitted data. An additional bit is added to indicate the state of the byte or word as ODD or EVEN.
- Peripheral Equipment:** Units that may communicate with the programmable controller, but not part of the programmable controller (e.g., teletype, cassette recorder, CRT terminal, tape reader, programming panel, etc.).
- PID (Proportional, Integral, Derivative):** A mathematical function which controls a desired input by manipulating the value of an output. The control technique responds to an error with an output signal that is proportional to the error, the error's integral, and the error's rate of change (derivative). The exact response depends on constraints entered by the customer or the operator.
- Programmable Controller PC:** A solid-state control system which has a 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. 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):** Device for inserting, monitoring, and editing a program in a PC.
- PROM (Programmable Read-Only Memory):** A retentive memory used to store data.
- Protocol:** A defined means of establishing criteria for receiving and transmitting data through communication channels.

## R

- RAM (Random Access Memory):** A memory where individual bits are stored and accessed, in lieu of groups of bits as used for numeric storage. Random Access Memory is used to store the state (ON or OFF) of discrete references.
- 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).

- Register:** A location within the controller allocated to the storage of numerical values. All holding registers are retentive on power failure. There are three types of registers: input 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".
- Register Module:** A device used to select, convert, and condition binary coded decimal (BCD) and analog signals that pass between a user's device being controlled and the PC.
- 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:** A 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.

## **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.
- SG (Signal Ground):** The common ground reference for all signal lines. Pin 7 of an RS-232-C connector.

## **T**

- Traffic Cop:** A portion of the PC executive that controls how input and output data is interpreted relative to its channel number and address index position.

## **U**

- Unit of Load:** The internal DC current required to drive an I/O module. A unit load in the 200 series is 300 mA (milliamps). In the 500 series it is 18 mA per unit load for input and 69 mA per unit for output.

## **V**

- Volatile Memory:** A memory that loses its information if the power is removed from it.

## **W**

- Word:** A grouping or a number of bits in a sequence that is treated as a unit.
- Write:** Process of loading information into memory.

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