



Advanced High Performance Fixed I/O PLC System

110CPU Series
\$380
Basic Unit

- ✓ Large PLC Performance in a Micro Package
- ✓ High Speed Throughput
- ✓ Compatible Communications
- ✓ System Expansion Capabilities

With the simplicity of a self-contained system package and high performance fast throughput, the OMEGA[®] 110CPU Programmable Logic Controller (PLC) offers the intelligent solution for your small machine control needs. In fact, the 110CPU brings together the best features of fixed I/O micro and large modular PLCs.

All-in-One Package

Power supply, CPU, memory, I/O and communications are contained in a single housing, measuring 10" long by 5" high, by an amazing 3" deep, that can be DIN rail or panel mounted. This enables you to door-



*For additional information, see the
OMEGA Complete Data Acquisition and Computer Interface
Handbook and Encyclopedia[®].*

mount pilot devices directly in front of the Micro in a standard 6" deep panel, reducing the space requirement and cost.

High Speed Throughput

High speed inputs, interrupt processing, and immediate updating of outputs can realize a throughput of less than 2 msec. One of these inputs can be configured as a 5 kHz high speed counter. Interrupts can be event-, time-, or count-based, giving you the power to solve high speed machinery applications never before possible.

Plug-and-Play Communications

On-board serial communication ports permit simple connectivity to computers, MMI, modems, printers, barcode readers and instrumentation. These ports can be addressed via either ASCII messaging or Modbus, one of the most commonly used communication protocols available.

System Expansion

You can expand your system capacity by simply linking up to four 110CPU's configured as "children" to one "parent" over a single cable high speed I/O expansion link. In the parent-child configuration, you can choose to have all of the child's I/O and communications controlled by the parent or split the outputs and communication ports to allow coprocessing to tailor system performance. This flexibility will serve you well when the job grows bigger than originally expected.

Built-in Nonvolatile Memory

With the OMEGA[®] 110CPU controller, you won't have to worry about handling UV-EPROM and EEPROM chips or cartridges for nonvolatile storage of program memory. Programs stored in battery- or capacitor-backed RAM can now be backed up by safe and secure, built-in Flash- PROM, the latest in low maintenance, nonvolatile, memory storage technology.

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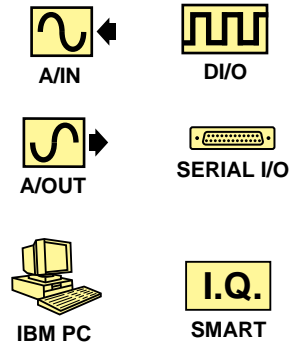
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See Inside for Specifications and Ordering Information.

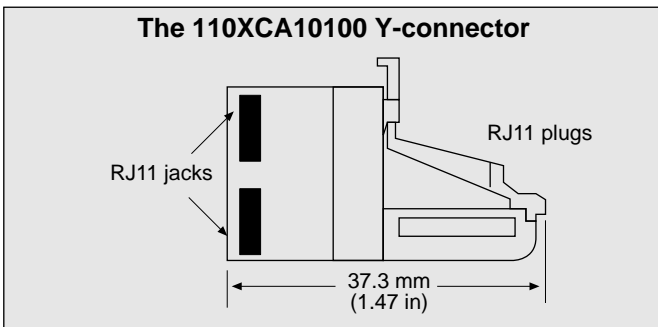


Micro-controller shown with handheld programmer, model 520VPU19200, \$395.



Micro I/O Expansion Link

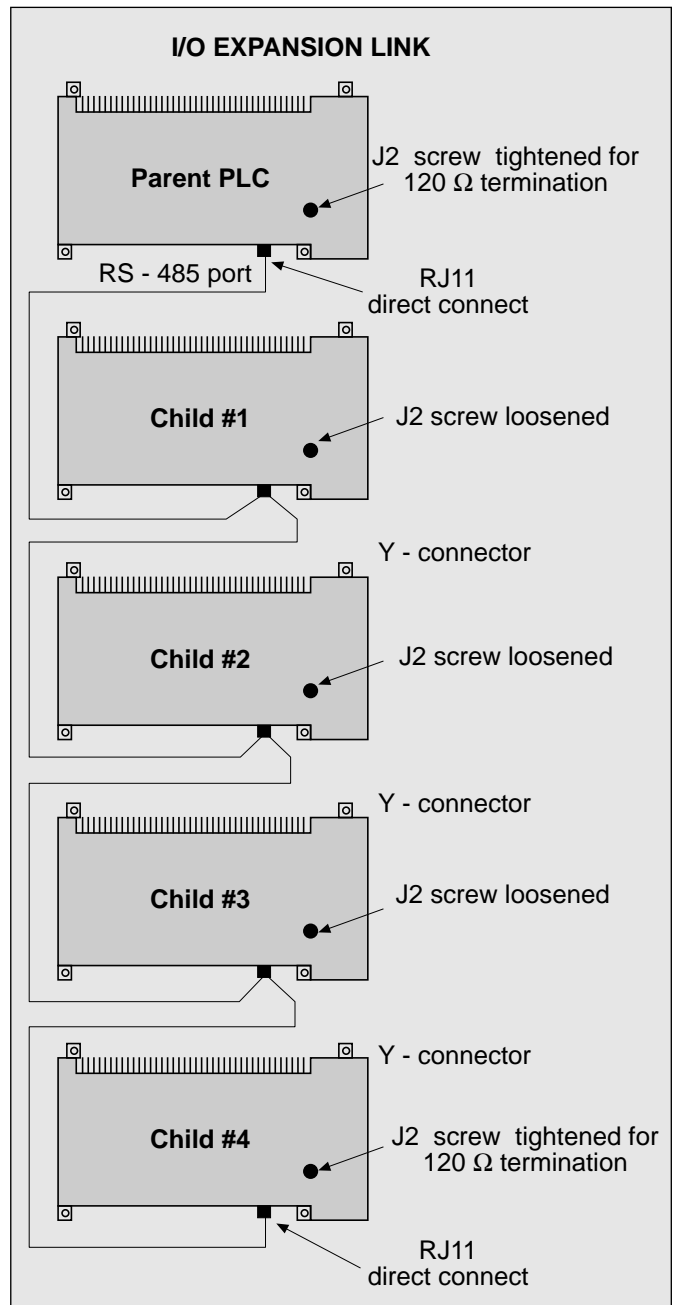
Up to five Micro controllers can be interconnected by the high speed I/O Expansion Link. The link contains one Micro configured as a "parent" PLC and one to four Micro units configured as "child" PLCs. The parent and last child on the link are terminated by an internal resistor, while the middle children are daisy-chained using a Y-connector. The link uses highly secure and noise resistant, standard foil-shielded, flat telephone cables with male RJ11 connectors on each end.



I/O Expansion Cables and Adapters

| Model Number | Price | Description |
|--------------|-------|------------------------------|
| 110XCA10100 | \$25 | Y connector for IO expansion |
| 110XCA17101 | 25 | I/O expansion cable, 61 m |
| 110XCA17102 | 35 | I/O expansion cable, 3 m |
| 110XCA17103 | 45 | I/O expansion cable, 6 m |

| I/O Expansion Link Characteristics | |
|------------------------------------|-----------------------------|
| Number of PLCs | 2 ... 5 |
| Physical comm port | RS-485 |
| Cable type | Six-position line long body |
| Connector type on cable | RJ11 male on both ends |
| Network data rate | 125 kbyte (+) |
| Length of network | 500 m max, 61 cm mini |



Advanced High Performance Fixed I/O PLC System



HANDHELD PROGRAMMER (HHP)

Specifically designed as a low cost programming tool for the OMEGA® 110CPU controller, this handheld device receives its power directly from the PLC. The HHP can configure, program, and monitor your application; including all ladder elements, data registers, implementing the high speed I/O Expansion link and entering and troubleshooting any ASCII messaging.

Configuration Mode allows the user to select from default configurations for communication port parameters and I/O addressing. Or the user can customize the configuration by editing communication port parameters and I/O addressing options.

Password Mode secures access to the HHP. From this mode the Keyswitch and Passwords can be enabled and disabled. The Keyswitch, when enabled, requires a physical key for changing the HHP from program and monitor access to monitor only. When enabled, the Password will create three levels of access that allows monitoring only, monitoring with the ability to change data and force I/O, and total access to the functionality of the HHP.

Ladder Logic Mode provides single element ladder logic programming with a 4 x 11 node view of a ladder network mimic (full network size is 7H x 11W). This view indicates power flow and whether the node is occupied by a ladder element, vertical or horizontal short, or coil. This is accomplished by splitting the 4 x 20 segment LCD screen, providing the ladder logic

mimic on the left while leaving a 4 x 9 segment work area which fully displays the network number, the node number, and up to a three node high ladder element (i.e., math function block) at the same time.

There is a Data Mode for entering any register information. This mode can be reached from the initial menu or the user can toggle to the mode by pressing the DATA key from the ladder logic programming mode. This is particularly handy when programming timers, counters, math functions, etc., where it is most convenient to enter the parameters at the time of programming the function. If this is done, the HHP will remember the register number the cursor was on. By pressing the GET key, the user signals the HHP to display that register and its contents. At this point any new register information can be entered. When satisfied, the user can return to the ladder logic mode by again pressing the DATA key. Up to four registers at a time can be displayed in a number of different representations.

When using the HHP to program ASCII character strings in the Micro, the HHP can be switched to Simple ASCII Slave Mode which allows the user to see any ASCII string programmed as an ASCII message display. This unique capability makes programming and troubleshooting ASCII messaging easy.

In the Computer Transfer Mode, the HHP will be able to act as a program storage device for transfer of programs between a DOS compatible computer with Modsoft Lite programming software and a controller. Programs developed on Modsoft Lite can be downloaded into the HHP. The HHP can be carried out to a controller on the factory floor or at a remote site and the program then can be downloaded to the controller. This also works in the opposite direction. After entering a new program or editing an existing one, the HHP can upload the program into its internal memory for transportation back to the DOS work station where it can be uploaded to Modsoft for documentation and archiving.

MODSOFT LITE On-Line/Off-Line Software

Modsoft Lite is an integrated programming software environment that includes on-line/off-line programming and full annotated documentation. This friendly interface will assist in programming the OMEGA® 110CPU controller, as well as complete

tracking with a context-sensitive on-line help system, color graphics, optional mouse support, and an easy-to-use menu system. Highlights of Modsoft Lite include:

Hot Keys. Mouse or function key menu-driven, Modsoft Lite provides hot keys to reduce keystrokes.

Easy-to-Use Advanced Editing.

The program's cut, copy, paste, and delete functions enable you to edit within a single program or between multiple programs. Users can create libraries for common ladder sequences.

Sophisticated Ladder Logic Editor.

Modsoft Lite features a simple Ladder Logic editor that allows the user to create and edit Ladder Logic programs using traditional Ladder Logic symbols with reference numbers or user-defined symbol names.

Reference Data Editor.

A Reference Data editor is available for displaying and modifying data either on-line in the controller or off-line in a file. Transfer of data from the PLC to a file and back is made easy with this useful feature.

Quick and Easy Configuration. Modsoft Lite features a quick and easy method for configuring a Micro controller. The configuration allows for selecting CPU model, setting communication port parameters, configuring a Micro I/O expansion link, and selecting loadable function blocks.

Multiple Programming Modes.

The user has a choice of three programming modes; one off-line and two on-line modes, with or without performing concurrent editing of off-line files. Designed to run in a DOS environment, Modsoft Lite is compatible with IBM-compatible desktop and laptop computers.

BASIC INSTRUCTIONS

Language: Ladder Logic/Function Block

Instructions: Relays—NO, NC, Transitional Timers—1.0, 0.1, 0.01 second; Counters—Up, Down

Arithmetic: 4-digit Add, Sub, Mult, Div; 4-digit BCD Values

Data Transfer: Register-to-Table; Table-to-Register; Table-Table; Block Move; First-In, First-Out Search, Status

Matrix: Logical AND, OR, Exclusive OR Compare and Complement

Bit Operations: Modify, Sense, Rotate

Program Optimization: Skip; Constant Sweep/Single Sweep; Subroutine; Counter, Timer, Interrupt

Communication: Simple ASCII

ENHANCED INSTRUCTIONS (512 AND 612 SERIES)

Arithmetic: Double Precision Math, Add, Sub, Mult, Div; Floating Point Math, Add, Sub, Mult, Div, Compare, Sq Root; Trigonometric, Sin, Cos, Tan, Deg-to-Rad, Rad-to-Deg; PID2

Data Transfer: Table-to-Block; Block-to-Table Communication; Checksum

ANALOG INPUTS (612 SERIES)

Channels: 4

Input Ranges: ±10 V, 0 to 10 V, 4 to 20 mA

Input Filter: Single-pole, low pass, -3 dB frequency of 10 Hz (±20%)

Input Resistance: 250 Ω (current input); >20 MΩ (voltage input)

Input Protection: 50 Vdc max differential; 30 Vdc max channel-to-channel; 25 mA max over-current

Common Mode Voltage: 25 Vdc channel-to-channel

Isolation: 1000 Vac RMS, 1 min max; analog inputs are isolated from analog outputs, input power, discrete I/O and communications ports

Resolution: 16-bit for ±10 V range; 15-bit for 0 to 10 V range; 13 to 14-bit for 4 to 20 mA range

Update: 55 msec/channel

Repeatability: ±3 counts

Accuracy: ±0.025% typ; ±0.1% max for voltage ranges; add ±0.1% ±25 ppm/°C for current

ANALOG OUTPUTS (612 SERIES)

Channels: 2

Isolation: 1000 Vac RMS (60 Hz), 1 min max; analog outputs are isolated from analog inputs, input power, discrete I/O and communications ports; 1000 Vdc,

1 min max

Current Output: 4 to 20 mA; 12 to 30 V loop supply voltage; (Vloop-7 V)/0.02 max loop resistance

Voltage Output: 0 to 10 V; 10 mA max;

Resolution: 12-bit

Linearity: ±0.05% max

Update: 10 msec/channel

Accuracy @ 25°C:

0.2% typ, 0.35% max for voltage output; add ±0.15% for current output

Memory

Battery Backup: Lithium battery for 1 year

Capacitor Backup: 72 hours typical

Non-Volatile (loads on power-up): Internal Flash RAM

Time-of-Day Clock: ±8.0 sec/day 0-60°C (not on 110CPU31100)

Environmental

Operating Ambient:

0-60°C; 0-95% RH

Temperature, Storage: -40 to +85°C

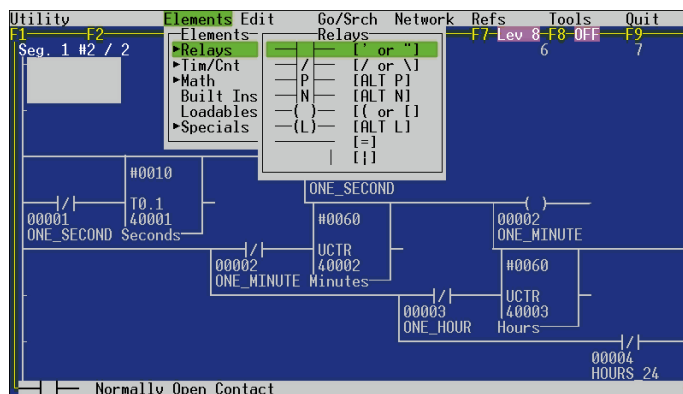
Dimensions: 141.5 H x 254 W x 76 mm D (5.57" x 10" x 3")

Power Requirements

AC Power: 115 Vac @ 0.4 A or 230 Vac @ 0.2 A Input: 24 Vdc @ 150 mA for dc Input

DC Power: 24 Vdc @ .8 A

Communications Modbus



Speed: 9,600 Bits per second

Mode: Master-Slave: RTU or ASCII

Nodes: 247 (Media dependent)

Media: Twisted pair or telephone

Modsoft Lite

Development Software

Includes: Two 5.25" system disks; one 3.5" system disk; Modsoft Lite User Manual

Editors: Configuration, Ladder Logic, Reference Data

Ladder Lister Features:

Selected Ladder; Diagram Symbol

Table- Alphanumeric; Symbol

Table - Alphabetic; Coil Cross

Reference/Unused References;

Configuration/I/O Map

Page Headers/Footers; Importable to

Desktop Publisher

Required Hardware: IBM PC/XT, AT or compatible; DOS 3.0 or greater; 640 K RAM memory, hard disk with 1.5 Mbyte available

DISCRETE INPUTS

| TYPE | 115 Vac | 230 Vac | 24 Vdc | High Speed dc |
|----------------------|------------------|--------------------|---|---|
| On Level | 79 to 132 Vac | 164 to 253 Vac | 15 to 30 Vdc | 15 to 30 Vdc |
| Off Level | 0 to 20 Vac | 0 to 40 Vac | 0 to 5 Vdc | 0 to 5 Vdc |
| Input Impedance | 12 kΩ @ 60 Hz | 33 kΩ @ 50 Hz | 3 kΩ with input on @ 24 Vdc 7.8 kΩ with input off | 1.95 kΩ with input on @ 24 Vdc 1.58 kΩ with input off |
| ISOLATION | | | | |
| Method | Opto-Coupler | Opto-Coupler | Opto-Coupler | Opto-Coupler |
| Channel-to-bus | 1780 Vac; 2 kVdc | 1780 Vac; 2.5 kVdc | 1780 Vac; 2 kVdc | 500 Vdc |
| Group-to group | 1780 Vac; 2 kVdc | 1780 Vac; 2.5 kVdc | 1780 Vac; 2 kVdc | 500 Vdc |
| RESPONSE TIME | | | | |
| Off-> On | 25 to 30 ms | 25 to 30 ms | 2 ms | 10 to 20 μs |
| On->Off | 25 to 30 ms | 25 to 30 ms | 2 ms | 10 to 20 μs |

DISCRETE OUTPUTS

| TYPE | Triac | Relay | 24 Vdc |
|---------------------------|--|-----------------------------|--|
| Working Voltage Range | 24 to 132 Vac for -01 models; 24 to 250 Vac for -02 models | 24 to 30 Vdc, 24 to 250 Vac | 24 to 30 Vdc |
| Maximum Voltage | 500 Vac | 30 Vdc 250 Vac | 56 Vdc for 1.5 ms |
| Frequency | 47 to 63 Hz | N/A | N/A |
| Maximum Load Current | 0.5 A/channel to 60°C | 2 A/channel | 0.5 A/channel to 60°C; 2 A/group 6 A total |
| Minimum Load Current | 50 mA | 20 mA | 10 mA |
| Surge Current | 5A for 1 Cycle | 20 A for 1 cycle | 5 A for 0.5ms @ 6pulses/min |
| Maximum Switching Rate | 20 Hz | 5 Hz | 4 Hz |
| Maximum Off State Leakage | 1.5 mA | N/A | 1 mA @ 30 Vdc |
| ISOLATION | | | |
| Method | Opto-coupler | Dry contact | Opto-coupler |
| Channel-to-bus | 1780 Vac; 2500 Vdc | 1780 Vac; 2500 Vdc | 1780 Vac; 2500 Vdc |
| Group-to-group | 1780 Vac; 2500 Vdc | 1780 Vac; 2500 Vdc | 500 Vdc |
| RESPONSE TIME | | | |
| On -> Off | 8 ms | 10 ms | 1 ms |
| Off ->On | 8 ms | 10 ms | 1 ms |

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Prices Shown in U.S. Dollars

| Model Number | Price | Power | Discrete Inputs (16) | Discrete Outputs (12) |
|--|--------|---|-----------------------|-----------------------|
| CPU311 Series - Basic CPU | | | | |
| 110CPU31100 | \$380 | 115/230 Vac (24 Vdc output for all dc inputs) | 24 Vdc Sink or Source | Relay |
| 110CPU31101 | 470 | 115/230 Vac | 115 Vac | 8 Triac/4 Relay |
| 110CPU31102 | 470 | 115/230 Vac | 230 Vac | 8 Triac/4 Relay |
| 110CPU31103 | 380 | 24 Vdc | 24 Vdc Sink or source | 24 Vdc Source |
| CPU411 Series (CPU311 Series with Clock, 2-3 ms Throughput, 2 High Speed dc Inputs) | | | | |
| 110CPU41100 | \$440 | 115/230 Vac (24 Vdc output for all dc inputs) | 24 Vdc Sink or Source | Relay |
| 110CPU41101 | 530 | 115/230 Vac (24 Vdc output for high speed dc inputs) | 115 Vac | 8 Triac/4 Relay |
| 110CPU41102 | 530 | 115/230 Vac (24 Vdc output for high speed dc inputs) | 230 Vac | 8 Triac/4 Relay |
| 110CPU41103 | 440 | 24 Vdc | 24 Vdc Sink or Source | 24 Vdc Source |
| CPU512 Series (CPU411 Series with Additional Memory, Ports, 1-1.5 ms Throughput) | | | | |
| 110CPU51200 | \$750 | 24 Vdc | 24 Vdc Sink or Source | Relay |
| 110CPU51201 | 830 | 115/230 Vac (24 Vdc output for all dc inputs) | 115 Vac | 8 Triac/4 Relay |
| 110CPU51202 | 830 | 115/230 Vac (24 Vdc output for all dc inputs) | 230 Vac | 8 Triac/4 Relay |
| 110CPU51203 | 750 | 24 Vdc | 24 Vdc Sink or Source | 24 Vdc Source |
| CPU612 Series (CPU512 Series with 4 Analog Inputs, 2 Analog Outputs) | | | | |
| 110CPU61200 | \$1000 | 24 Vdc | 24 Vdc Sink or Source | Relay |
| 110CPU61203 | 1000 | 24 Vdc | 24 Vdc Sink or Source | 24 Vdc Source |

CPU Features

CPU311 Series

- 1 k Words User Logic
- 400 Words Data
- 16 Discrete Inputs
- 12 Discrete Outputs
- 4.25 to 5 ms per K logic Scan
- Modbus/ASCII Port
- High Speed I/O Expansion Port
- Basic Instruction Set

CPU411 Series

All Features of CPU311 Plus:

- Time-of-Day Clock
- 2 to 3 ms Throughput with Interrupt Processing (Depending on interrupt Program)
- 2 High Speed dc Inputs

CPU512 Series

- 2 k Words User Logic
- 1820 Words Data
- 16 Discrete Inputs
- 12 Discrete Outputs
- 2.5 ms per K logic Scan
- 2 Modbus/ASCII Ports
- High Speed I/O Expansion Port
- 3 High Speed dc Inputs (2 on ac Versions)
- 1 to 1.5 ms Throughput with Interrupt Processing (Depending on Size of Interrupt Program)

CPU612 Series

All Features of CPU512 Plus:

- Enhanced Instruction Set (Including PID II and Floating Point Math)
- 4 Analog Inputs ± 10 V 16 Bit; 4-20 mA 14 Bit
- 2 Analog Outputs 0-10 V, 4-20 mA; 12 Bit
- Time-of-Day Clock

Programming Tools

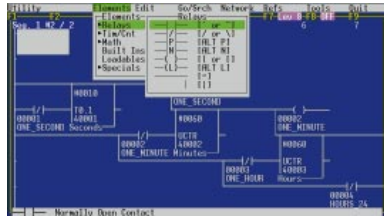
| Model Number | Price | Description |
|--------------|-------|--|
| 371SPU92100 | \$500 | Modsoft lite programming software |
| 520VPU19200 | 395 | Handheld programmer |
| 520VIA19200 | 95 | Handheld program transfer kit (connects handheld programmer to computer for interfacing to Modsoft Lite software), requires communications cable |

RS232 Communication Cables and Adaptors

| Model Number | Price | Description |
|--------------|-------|--|
| 110XCA20300 | \$25 | RJ45 9-Pin shell adaptor for AT serial port (requires communications cable) |
| 110XCA20400 | 25 | RJ45 25-Pin D shell adaptor for XT serial port (requires communications cable) |
| 110XCA28201 | 25 | Communications cable, 1 m, RJ45 connector (requires shell adaptor) |
| 110XCA28202 | 35 | Communications cable, 3 m, RJ45 connector (requires shell adaptor) |
| 110XCA28203 | 45 | Communications cable, 6 m, RJ45 connector (requires shell adaptor) |



520VPU19200 handheld programmer sold separately, \$395



Sample screen of Modsoft Lite on-line/off-line development software

I/O Expansion Cables and Adapters

| Model Number | Price | Description |
|--------------|-------|----------------------------------|
| 110XCA10100 | \$25 | Y connector for for IO expansion |
| 110XCA17101 | 25 | I/O expansion cable, 61 m |
| 110XCA17102 | 35 | I/O expansion cable, 3 m |
| 110XCA17103 | 45 | I/O expansion cable, 6 m |

Batteries for Data Backup

| Model Number | Price | Description |
|--------------|-------|--------------------------|
| 110XCP98000 | \$30 | Lithium battery assembly |
| 110XCP99000 | 40 | Capacitor assembly |

**Note on batteries: The PLC's standard program is backed up by flash prom. For optional data backup, the lithium battery or capacitor assembly may be used. The lithium battery provides long-term backup but requires periodic replacement. The capacitor provides short term back up (typically 72 hours), but does not require replacement.*

Ordering Examples:

Single Micro System with Modlite Software

| Model Number | Description | Qty. | Unit Price | Extended Price |
|--------------|--|------|--------------|----------------|
| 110CPU41100 | Programmable Logic controller | 1 | \$440 | \$440 |
| 371SPU92100 | Modsoft Lite Programming Software | 1 | 500 | 500 |
| 110XCA20400 | RJ45 25-Pin D shell adaptor for XT serial port | 1 | 25 | 25 |
| 110XCA28202 | Communications cable, 3 m, RJ45 connector | 1 | 35 | 35 |
| | | | Total | \$1000 |

Multiple Micros with Modlite Software

| Model Number | Description | Qty. | Unit Price | Extended Price |
|--------------|--|------|--------------|----------------|
| 110CPU61200 | Programmable logic controller | 1 | \$1000 | \$1000 |
| 110CPU51200 | Programmable logic controller | 1 | 750 | 750 |
| 110CPU31100 | Programmable logic controller | 1 | 380 | 380 |
| 110CPU31101 | Programmable logic controller | 1 | 470 | 470 |
| 110XCA10100 | Y Connector for I/O expansion | 2 | 25 | 50 |
| 110XCA17103 | I/O expansion cable, 6 m | 3 | 45 | 135 |
| 371SPU92100 | Modsoft Lite programming software | 1 | 500 | 500 |
| 110XCA20400 | RJ45 25-pin D shell adaptor for XT serial port | 1 | 25 | 25 |
| 110XCA28202 | Communications cable, 3 m, RJ45 connector | 1 | 35 | 35 |
| | | | Total | \$3345 |

Single Micro with Handheld Programmer and Modlite Software

| Model Number | Description | Qty. | Unit Price | Extended Price |
|--------------|--|------|--------------|----------------|
| 110CPU51201 | Programmable logic controller | 1 | \$830 | \$830 |
| 520VPU19200 | Handheld programmer | 1 | 395 | 395 |
| 520VIA19200 | Handheld program transfer kit | 1 | 95 | 95 |
| 371SPU92100 | Modsoft Lite programming software | 1 | 500 | 500 |
| 110XCA20400 | RJ45 25-Pin D shell adaptor for XT serial port | 1 | 25 | 25 |
| 110XCA28202 | Communications cable, 3 m, RJ45 connector | 1 | 35 | 35 |
| | | | Total | \$1880 |