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Economical, Compact Control Solutions Increase Reliability

Micro and Small controllers now offer processing and communications technology formerly found in large rack systems. These compact controllers let you distribute intelligent I/O and control at each machine process. For simple timing control to complete machine operation, Omron has your solution.



More Uptime, Fast Troubleshooting

- More economical than installing discrete controls and simpler to troubleshoot
- Status indication and built-in alarms simplify monitoring and troubleshooting for fast response
- Set protection levels to prevent tampering
- 100% performance testing assures long reliable operation

Communications

- Share operation and production status with other machines for more integrated control
- Most have one built-in RS-232 port and offer additional communications ports as an option
- Supports RS-232C, 422 and 485 for easy serial networking

Make the Right Choice

Use the following information to make your choice of Omron controller that meets all of your requirements. Three basic elements must be investigated.

Simple as 1, 2, 3

1 - Base I/O

2 - Package Style

3 - Features

Each element described below helps you understand the terminology and identify the information you need to specify the ideal controller for your application.

1 - Base I/O

Base I/O provides the foundation of your control system. It is the amount of discrete I/O required for your application. Whether you need 10 or 60 I/O in a base CPU, Omron has a variety of controllers to choose from. Discrete I/O can include AC or DC inputs and Relay or Transistor outputs.

10 I/O	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
20 I/O	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
30 I/O	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
40 I/O	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
60 I/O	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Distributed I/O	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H

Note: Base I/O does not define the maximum expansion of the system.

2 - Package Style

What style package are you looking for? Is size crucial to your machine design or is the convenience of having all the components in one simple-to-assemble package more important? Whatever the need, Omron has a package that will work for you.

Brick

An "all-in-one" brick style package contains the CPU, I/O, and power supply in a compact housing that mounts on DIN rail track. Most brick packages are expandable and offer specialized I/O modules for analog and temperature input. Centralized control, ease of use, and convenience all make the brick package a popular choice with most designers.

Modular

A modular design lets you choose the CPU, power supply and mix of discrete and specialized I/O separately. The CPU has built-in discrete I/O and communications ports that provide a common platform for multiple machine designs. Expand the capabilities with additional specialized I/O and simple programming.

Board

A board level programmable controller offers the capabilities of a brick style system in an open board package. Use the board level controller in place of embedded control designs and in applications where space requirements and the appearance of a proprietary controller is warranted.



ZEN - Brick

Page
A-8

- 44 max. I/O
- 96 lines max. of programming
- AC and DC inputs
- Real time clock
- ZEN support software



CPM1A - Brick

Page
A-22

- 100 max. I/O (60 in/40 out)
- 2K words max. of programming
- DC inputs only
- Network connectivity
- CX-Programmer Jr. software

3 - Features

Every application has special requirements. They could be as basic as removable terminals or as complex as advanced instruction sets. Identify features that will benefit your system in all stages of development, manufacturing, and support. The mix of features is crucial to the success of your system and should complement your process to make it as efficient and effective as possible.

Online Editing	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Expansion	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Removable Terminals	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Analog I/O	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Built-in RS-232C Port	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Multiple Comm. Ports	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
RS-232C/422/485 Support	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Real Time Clock	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
High Speed Counter	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Position Control	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Quadrature Encoder Inputs	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
AC Inputs	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
EEPROM Loader	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
Temperature Sensor Input	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H
DeviceNet Slave	ZEN	CPM1A	CPM2B	CPM2A
		CPM2C	CPM2C-S	CQM1H

Complete Your System

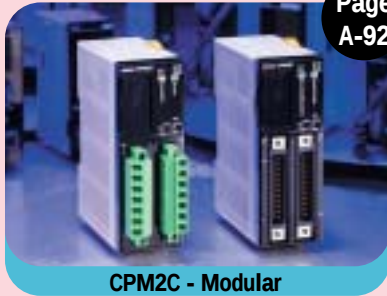
Programming tools and peripherals are a necessary part of any control system. The [Software and Programming Tools](#), [Wiring Solutions](#), and [Complementary Products](#) sections contain details on development software, handheld programmers, program transfer tools, terminal blocks to organize I/O wiring and switching power supplies.



Page A-46

- 120 max. I/O (72 in/48 out)
- 4K words max. of programming
- DC inputs only
- Network connectivity
- CX-Programmer Jr. software

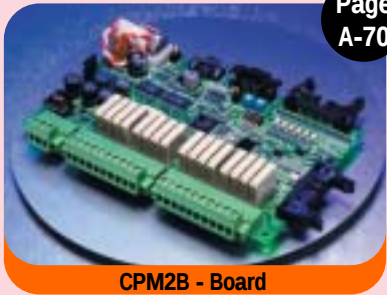
CPM2A - Brick



Page A-92

- 192 max. I/O (96 in/96 out)
- 4K words max. of programming
- DC inputs only
- Host and NT Link
- CX-Programmer Jr. software

CPM2C - Modular



Page A-70

- 128 max. I/O (64 in/64 out)
- 4K words max. of programming
- DC inputs only
- Host and NT Link
- CX-Programmer Jr. software

CPM2B - Board



Page A-126

- 96 local, 256 remote max. I/O
- 4K words max. of programming
- DC inputs only
- DeviceNet slave; CompoBus/S master built-in
- CX-Programmer software

CPM2C-S - Modular



Page A-152

- 512 max. I/O
- Up to 15.2K words of programming
- DC inputs only
- Network connectivity
- CX-Programmer software

CQM1H - Modular

Big controller features—scaled for small machine control

The functions listed below help you integrate more sophisticated control into your machine design using just the programmable controller.

ZEN

CPM1A

CPM2A

CPM2B

CPM2C

CPM2C-S

CQM1H

Online Editing

Omron's CX-Programmer software has an online editing function that lets you change ladder instructions within your program without having to stop PLC scanning. This does not interrupt production operations and shortens debugging time. This feature is available on all Omron PLCs (except ZEN).

Expandability

Expansion ports are standard on most of the controllers in this catalog. This feature gives the user the ability to add expansion modules via a single cable connection giving your system more flexibility and I/O control. Use discrete or specialized expansion modules to add I/O as your application requires it.

Removable Terminals

Removable terminals are ideal for OEM manufacturers and integrators to make your installation and maintenance as efficient as possible. By wiring the terminal strip just once, you save time in the field when it's time to install or replace the controller.

Specialized I/O

Micro and small control systems offer specialized I/O to handle more sophisticated applications:

Analog I/O - Monitor or apply analog signals within your application. Multiple input and output points can be added to most of Omron's controllers. Models are available with standard or high resolution enabling you to maximize the efficiency of your process.

Temperature Sensor Input - Monitor process temperature then use the input to start corrective action through the controller. Choose thermocouple or platinum resistance thermometer input modules.

Temperature Controller - These modules allow you to monitor and control multiple process loops directly within your control system. Multiple modes of operation and heater burn out detection are also available.

Linear Sensor Interface - This module automatically handles length measurements by converting linear analog input to a digital signal. It accepts both current and voltage inputs and has built in alarm features that you can use to work with your process.

Real-Time Clock

A real-time clock can time stamp critical events and information within your application. Set the clock to show current year, month, day, day of the week and time.

Input Filters

Configurable stabilizing filters eliminate the effects of line noise, contact bounce or chatter. Each I/O point can be assigned a different input time constant allowing the input to wait for a stable signal to be present.

High-Speed Counters

Read information from an encoder in multiple modes (including quadrature) or use the multiple high-speed counter inputs to count high speed pulse inputs. These inputs can be used for positioning or to trigger a specified interrupt routine when a set value is reached. Some models read responses up to 500kHz.

Position Control

Most Omron programmable controllers perform single or dual axis position control. Specialized instructions can easily initiate trapezoidal acceleration or deceleration or change speed and duty factor without using up valuable program space. Single phase or pulse plus direction modes are available in many models.

Synchronized Pulse Control

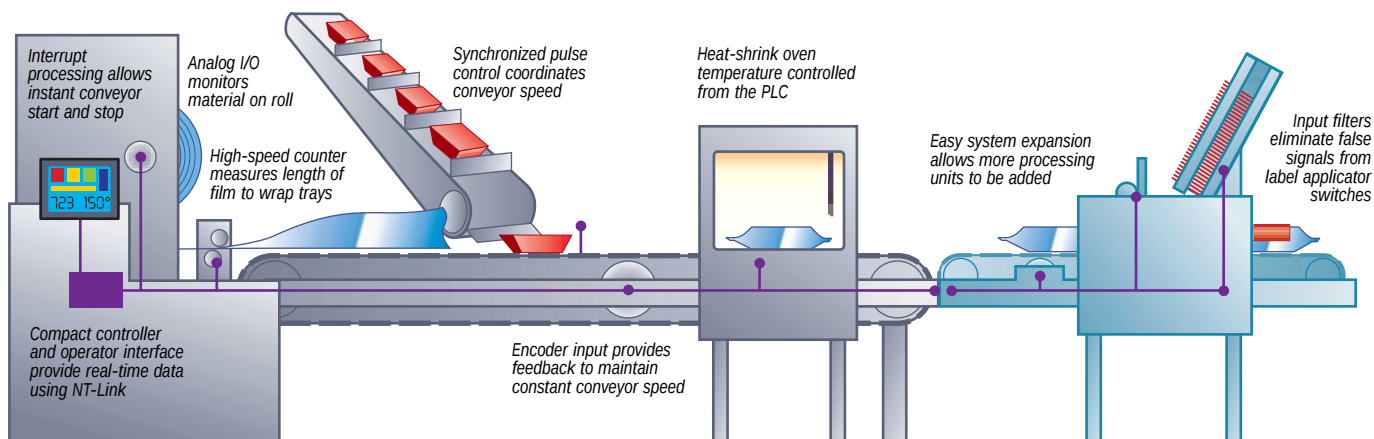
Use this function to match conveyor speeds or in closed loop control for coordinated positioning. Scale the output pulse frequency to a multiple of the input pulse frequency with just a single instruction.

Interrupt Processing

These inputs interrupt the scan time to provide an immediate piece of corrective programming for the control system. Set them for quick-response inputs with input signals as short as 50 μ s, or for high-speed counter mode to trigger an interrupt when the count matches a preset count value.

EEPROM Loader

Use the compact EEPROM program transfer unit to repeat the same program installation on multiple machines and to distribute updated programs in the field. Ideal for OEMs, this time-saver can up- or download programs and system parameters with the push of a button.



Get connected for **integrated** production

Communications between your small or micro controller and networks or other devices has never been easier. Many models have built-in communication ports or can be upgraded via adapters or “inner boards,” enabling communications with Omron's

ZEN

CPM1A

CPM2A

CPM2B

CPM2C

CPM2C-S

CQM1H

larger PLCs in a distributed control environment. Most Omron controllers are accessible via a single programming cable, eliminating the need for multiple cables to support an installation.

Serial Communications

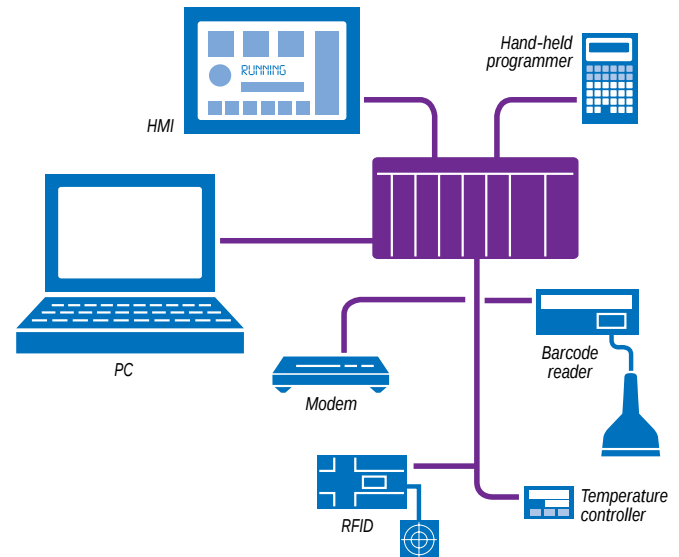
All models offer RS-232C communications, some with built-in ports, others use an adapter. Multiple ports are available for simultaneous communication to modems, barcode readers, hand-held programmers, HMIs and other devices. Use the RS-232C port to connect your personal computer for programming the controller. Communication adapters can convert the peripheral port for RS-232C use.

Serial Networks

RS-422 and RS-485 communication ports can be implemented into your controller system for an easily configured multi-drop serial network.

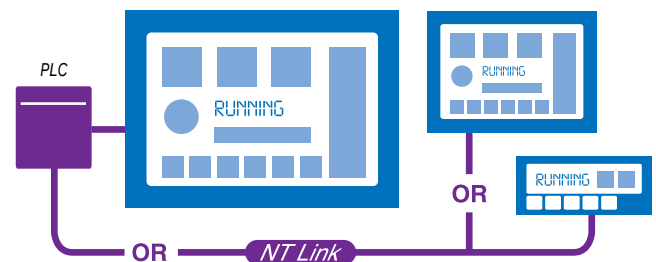
Protocol Macro

This advanced serial communication feature incorporates a separate co-processor that allows a programmer to customize serial communication strings that will communicate with virtually any serial device.



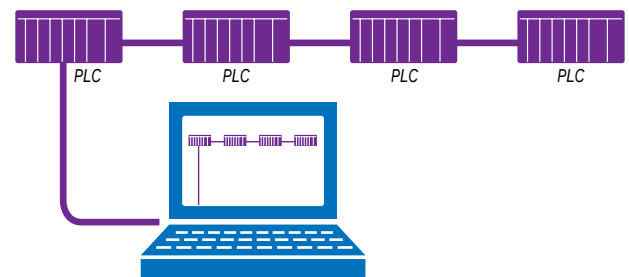
Direct HMI Connection

Omron offers direct, high-speed communications with NT/NS-series touch screens and message displays using simple plug-and-play connection to the peripheral port or an RS-232C port. The NT2S message display gets both data and power from the peripheral port. Machine operators get real-time information on work in process to keep productivity high.



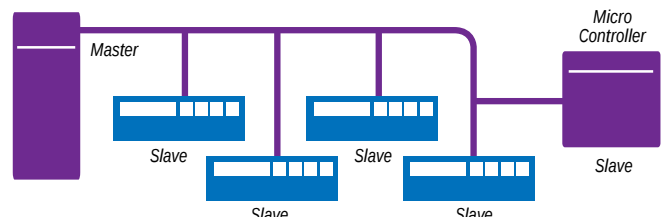
Controller Link

Omron's high-speed Controller Link network transfers information at 2Mbps to up to 32 nodes. From a PC, open up the included network configuration tool, identify the nodes, and watch the network develop in front of your eyes. The programmable controllers that support ControllerLink include: C200Hα, CS1, CJ1, CQM1H, and CV-Series.



Field Networks

Both open and proprietary device-level architecture can be implemented within Omron's micro and small controller families. Whether your application requires an interface to DeviceNet, AS-I or Omron's fast CompoBus/S network, Omron can meet your needs.



Learn about programmable controllers **hands-on**

Omron offers completely self-contained course packages to learn programming techniques hands-on. Each kit contains a compact micro PLC, input simulator and easy-to-follow guide to ladder logic programming with extensive examples of the most typical control functions used in small machine applications. Use the guide as a self-study course for design engineers new to using programmable controllers and as continuing education for persons not familiar with the technology.

Learn to program the ZEN nano controller and CPM1A, CPM2A and CPM2C micro controllers using the various self-study kits offered by Omron Electronics LLC and Omron Canada.

PLC Platform	Description	US Part Number	Canada Part Number
ZEN	CPU, programming cable, software, manuals, simulator switches	ZEN-STARTER01	ZEN-STARTER01
	CPU, programming cable, software, manuals, simulator switches with DC power supply	ZEN-STARTER02	–
CPM1A	CPU, AC power supply, 10 I/O, input simulator, manuals	–	MICRO TUTOR
	CPU, AC power supply, 10 I/O: DC inputs, Relay outputs	–	MICRO MATES-10IO
	CPU, AC power supply, 20 I/O: DC inputs, Relay outputs	CPM1A-CHIEVER-20A	MICRO MATES-20IO
	CPU, DC power supply, 20 I/O: DC inputs, Relay outputs	CPM1A-CHIEVER-20D	–
	CPU, AC power supply, 30 I/O: DC inputs, Relay outputs	–	MICRO MATES-30IO
CPM2A	CPU, AC power supply, 20 I/O: DC inputs, Relay outputs	CPM2A-CHIEVER-20A	–
CPM2C	CPU, DC power supply, 20 I/O: DC inputs, Relay outputs	CPM2A-CHIEVER-20D	–
	CPU, DC power supply, 10 I/O: DC inputs, Relay outputs	CPM2C-CHIEVER-10D	–



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- Convenient training locations
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- Hands-on classes ideal for every skill level
- Use real-life application examples to reinforce lessons
- Learn to apply advanced software features
- Configure the hardware for maximum performance
- Integrate the controllers into existing larger networks
- Connect different devices
- Take advantage of expansion options

