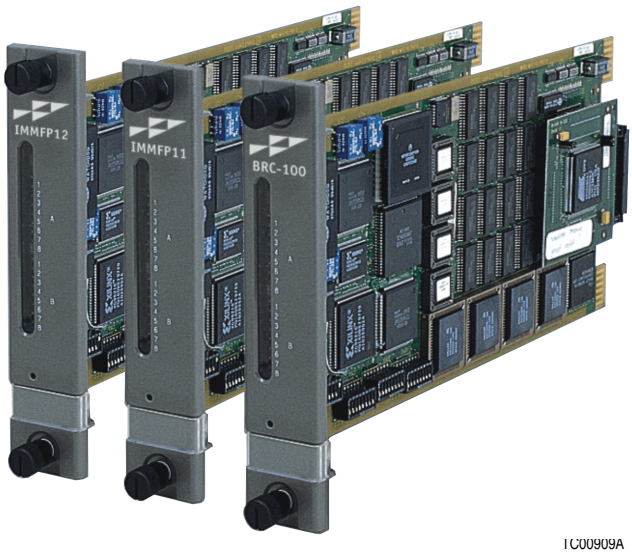
Control^{IT}
Harmony Rack Controllers

Features and Benefits

- **I/O support:** Supports both Symphony™ Harmony block and rack I/O systems.
- **Redundant Harmony Net:** Provides a new, highly fault-tolerant redundant interface with Harmony block I/O.
- **Single unit width:** Occupies a single slot in the module mounting unit.
- **Surface mount technology:** Improved reliability and compactness.
- **High processing power:** Uses an advanced 32-bit processor.
- **Controller redundancy:** Provides high availability and fault tolerance in a redundant pair configuration.
- **Serial communications channel:** Includes two serial channels and a station link for Analog Control Stations (IISAC01) and Digital Control Stations (NDCS03).
- **Peer-to-peer communications:** Information available to any other module in the system via the communications network.
- **Upward compatibility:** Functionally compatible with existing multifunction processors.
- **On-line configuration:** Make configuration changes or add points to redundant controllers without interrupting the process.



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The Harmony Rack Controllers are high-performance, high-capacity process controllers. They are designed to interface with Harmony block I/O in the Symphony Enterprise Management and Control System. The Harmony rack controllers are fully compatible in functionality, communications, and packaging.

The Harmony rack controllers collect process I/O, perform control algorithms and output control signals to process level devices. They also import and export process data from and to other controllers or other system nodes, and accept control commands from operators and computers connected to the network. The controllers communicate on the Controlway with other rack controllers. They communicate with other system nodes on the control network (Cnet) via Harmony rack communication modules.

Multiple control languages are supported in the Harmony rack controllers, including function codes, C, Basic, Batch 90™ and Ladder. The superior processing power and large capacity of the Harmony rack controllers enable them to meet the needs of a wide range of requirements from data acquisition to the most complex process management and control strategies.

Additional Features

- **Batch processing.** The Harmony rack controller provides batch control through either Batch function codes or the high-level Batch programming language (Batch 90). Features include data storage (timers, counters, etc.) and recipe storage in on-board nonvolatile memory (NVM). The NVM provides for automatic saving and restoration of information and configuration on power failure.

- **Eight execution segments.** Eight segments that run at different cycle times are available. Assign higher priority function blocks (safety interlock logic) to segments with very fast scan times. Assign lower priority (advanced control algorithms) to segments with slower scan times.

- **Foreign device interface.** The Harmony rack controller has two on-board RS-232-C serial ports. These allow you to interface the Harmony rack controller to foreign devices such as PLCs. Protocol conversion is through Basic or C in the Harmony rack controller. The ports are optically isolated to prevent ground loops and potential equipment damage.

- **I/O types.** The controller uses analog/digital modules for I/O. It supports a wide variety of field I/O signals without external signal converters. These signals include low and high level analog, TC, RTD, pulse, frequency, digital and ABB smart transmitters.

Description

The Harmony rack controllers refer to a series of three controllers differentiated by their configuration memory capacity, execution speed and I/O support. The Harmony Bridge Controller (BRC-100/200) can support block and rack I/O simultaneously. The Harmony Multifunction Processors (IMMFP11 and IMMFP12) support only rack I/O.

Each controller occupies a single slot in the module mounting unit. It consists of a single-board module that plugs into the module mounting unit. In the case of the Harmony Bridge Controller, a Process Bus Adapter card is connected at the rear of the module to provide cable connections to the Harmony I/O subsystem and termination unit. As is standard, the module mounting unit provides built-in connections for rack modules.

The Harmony rack controllers use a powerful 32-bit processor. On-board nonvolatile storage is provided for the control algorithms and user configurations. LEDs on the module front-plate display error messages and diagnostic data. One red/green LED displays module operating status.

Operation

The Harmony rack controller receives process I/O from a variety of sources such as Harmony block or rack I/O modules, or both for the Harmony bridge controller. Additionally, data within the controller may be imported or exported to Cnet.

An extensive library of 200 function codes and user-defined functions, that include Ladder, Batch 90, Expert 90, C and Basic languages, gives users the tools needed to design complex control strategies to fit any control application. The control strategy is stored in NVRAM. If system power should be lost for any reason, the control strategy is retained until power is restored.

In a redundant controller configuration, if the primary controller fails, the secondary is waiting in standby with the same control strategy and current process data, and assumes control immediately. Diagnostic routines are constantly checking the integrity of the module hardware and

firmware. The operator can monitor module status through the LEDs on the module front-panel or view module status reports on operator consoles or stations.

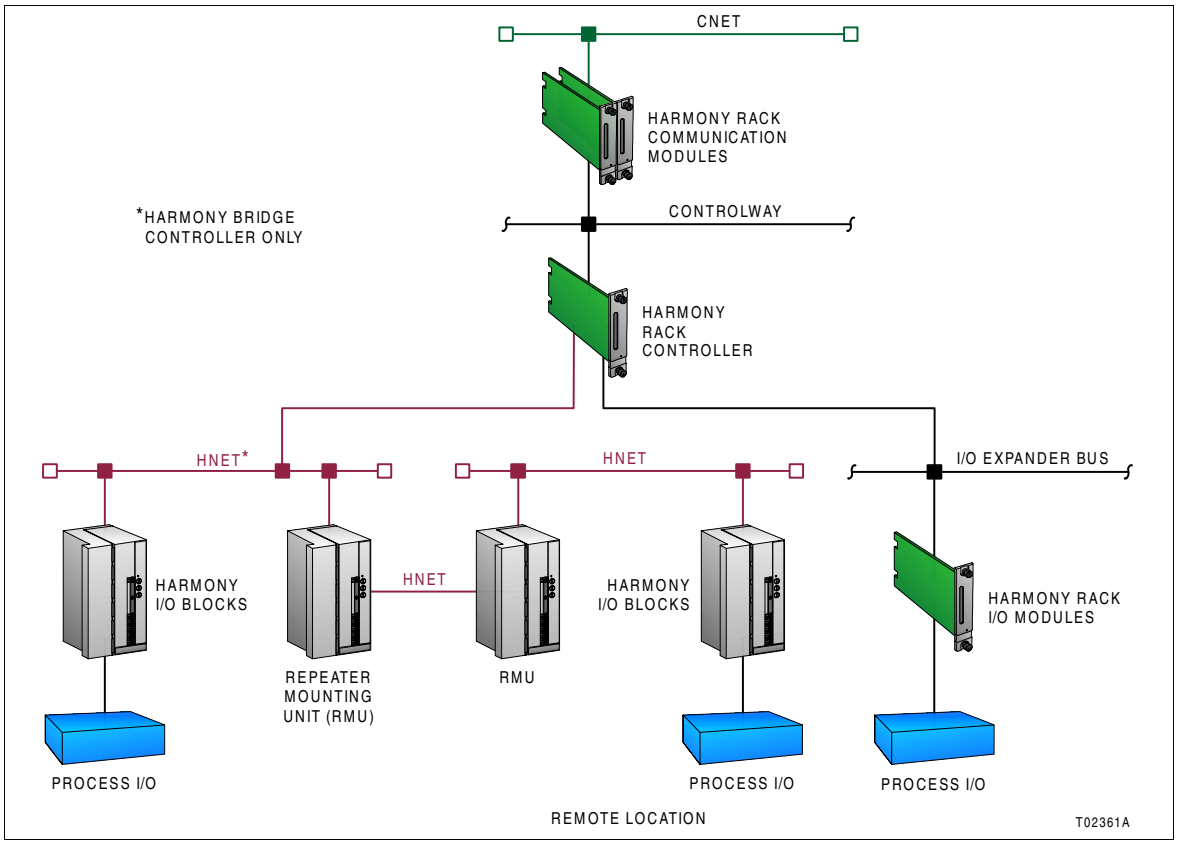

Figure 1. Harmony Rack Multifunction Controller Architecture

Related Hardware

Hardware	Nomenclature	Description
Analog input	IMASI13	15 analog inputs: 1-5 VDC, 0-1 VDC, 0-5 VDC, 0-10 VDC, 4-20 mA, smart transmitter (BC, EQ) ±10 VDC
Analog output	IMASO11	14 analog outputs: 1-5 VDC, 4-20 mA
Control I/O	IMCIS12	4 analog inputs: 1-5 VDC, 4-20 mA 3 digital inputs: 24 VDC, 125 VDC, 120 VAC 4 digital outputs: 24 VDC, 250 mA 2 analog outputs: 1-5 VDC, 4-20 mA
Digital input	IMDSI12	16 digital inputs: 24 VDC, 125 VDC, 120 VAC
Digital Input	IMDSI13	16 digital inputs: 24 VDC
Digital input	IMDSI14	16 digital inputs: 48 VDC,
Digital input	IMDSI15	16 digital inputs: 125 VDC, 120 VAC
Pulse input	IMDSM04	8 pulse inputs: 0-50 kHz, 4-6 VDC, 21.6-27 VDC
Digital output	IMDSO14	16 digital outputs: 24 VDC or 48 VDC
Digital output	IMDSO15	8 digital outputs: 48 VDC or 120 VAC
Frequency counter	IMFCS01	1 magnetic pickup input (turbine controls)
Hydraulic servo	IMHSS03	1 servo coil output (turbine controls)
Quick response	IMQRS12	Same I/O as IMCIS12 (12 times/second scan)

For more information on the Control IT suite of products, contact us at ControlIT@us.abb.com
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WBPEEUS230002B1 Litho in U.S.A. May 2003

Automation Technology Products
Wickliffe, Ohio, USA
www.abb.com/processautomation
email: industrialitsolutions@us.abb.com

Automation Technology Products
Västerås, Sweden
www.abb.com/processautomation
email: processautomation@se.abb.com

Automation Technology Products
Mannheim, Germany
www.abb.de/processautomation
email: marketing.control-products@de.abb.com