M4RTU Controller

Features

⬊ Combines controller, I/O modules, and I/O co-processor in a single package.

⬊ Works with legacy FactoryFloor software.

⬊ Offers a broad range of communication options for remote applications.

Description

The Modular M4RTU Controller combines an Opto 22 controller, I/O modules, and an intelligent I/O co-processor in a single package. The M4RTU features communications capabilities, built-in diagnostics, and 32-bit processors. Modular controllers use the Opto 22 distributed, intelligent I/O architecture and provide a hardware foundation for Opto 22's legacy FactoryFloor software suite. The M4RTU combines the features and functions of a remote telemetry unit (RTU) with the function of a distributed automation system, in a single controller.

The M4RTU is used for remote applications in harsh environments where the M4's broad range of communications options, including radio modems, cellular modems, and even satellite communications capabilities, are critical. The M4RTU was designed for industrial field applications, such as waste water treatment, well monitoring, tank farms, petrochemical and gas pipelines, remote office/plant management, and many others.

The M4RTU consolidates two processors on a single processor board. Program control and host communications are handled by a 32-bit 68020 microprocessor, while a 16-bit 80C196 processor handles I/O interfacing and control. This dual-processor board is combined with a digital/analog I/O board, a 3-slot vertical expansion bus board (M4BUS), and a modular power supply into an aluminum extrusion package that can be mounted horizontally or vertically. For safety and convenience, the M4RTU has system monitors for temperature, AC operation, and low battery, and includes a real-time clock and watchdog timers. Removable connector technology is integrated throughout the unit for easy maintenance and wiring removal.

M4RTU Controller

Software

The M4RTU is designed to work with FactoryFloor, Opto 22's legacy suite of industrial control software applications. FactoryFloor consists of four integrated components.

- OptoControl is a graphical, flowchart-based development environment. M4RTU configurations and development are performed through OptoControl on a PC workstation.

- OptoDisplay provides full-featured HMI capabilities with advanced trending and multimendia.

- OptoServer serves your data to OPC and DDE clients on a Microsoft Windows 95, Windows 98, or Windows NT network.

- OptoConnect provides a bidirectional interface between control systems and Microsoft's SQL Server and Access databases.

The M4RTU also works with Opto 22's classic 16-bit software: Cyrano, Mistic MMI, and Mistic Data Server (MDS).
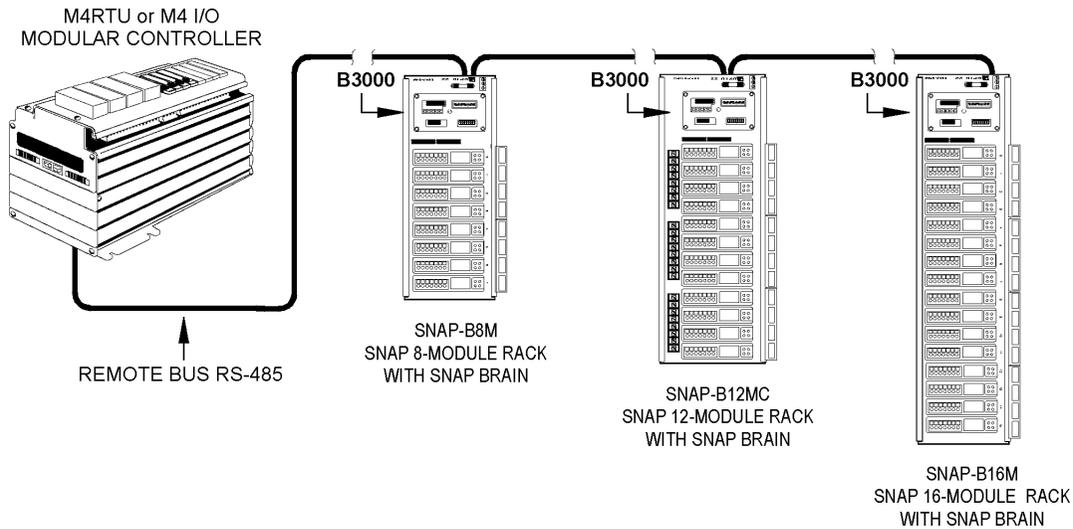
Communication Options (Standard)

M4RTU communication options include modems (direct, lease, and radio), two-way dial-up capability (host to M4RTU, M4RTU to host), and peer-to-peer communications. The M4RTU also supports remote firmware downloading to Flash memory, remote program downloading and debugging, and remote data uploading and downloading. The M4RTU base unit has two serial ports:

- One RS-232 serial port, 300–115,200 baud
- One full-duplex RS-422/485 serial port, 300–115,200 baud

Part Numbers

Part	Description
M4RTU	Modular M4RTU Controller

M4RTU Controller

M4RTU or M4 I/O
MODULAR CONTROLLER

B3000

B3000

B3000

REMOTE BUS RS-485

SNAP-B8M
SNAP 8-MODULE RACK
WITH SNAP BRAIN

SNAP-B12MC
SNAP 12-MODULE RACK
WITH SNAP BRAIN

SNAP-B16M
SNAP 16-MODULE RACK
WITH SNAP BRAIN

Optional Accessories

The M4BUS has three expansion slots to accommodate optional accessories. All modular interface cards for serial communications or network connectivity are supported as standard selections in the FactoryFloor software.

Optional Accessories	Function
M4SENET-100	10/100 Mbps Ethernet (Category 5 UTP)
M4SSER	Two additional serial ports, up to 155 Kbd (configurable as RS-232 or RS-485/422
M4SARC	High-performance ARCNET
M4SARCF	Fiber optic ARCNET connection
M4SARCFR	Fiber optic ARCNET repeater connection
M4RTUX	Eight digital + four analog I/O channel

I/O Connectivity

A total of eight digital and four analog I/O channels are available on the base unit and may be populated with Opto 22 G4 analog and digital I/O modules. The G4 digital I/O modules provide optical isolation, come in a variety of AC and DC voltages, feature an integral status LED and fused outputs, and offer an optional integral automatic/manual diagnostics switch. The G4 analog I/O modules provide both optical and transformer isolation, eliminating ground loops and channel-to-channel interference.

The M4RTUX I/O Extender Brick, which connects to the base unit using an Opto 22 shielded 25-pin cable, can provide an additional eight digital and four analog channels.

The built-in RS-485/422 COM1 port can be used as a serial link to communicate with remote digital and analog I/O units. Up to 4096 I/O points can be connected. The M4SSER adapter card can provide two additional serial ports.

RAM and ROM

The RAM can be used to store a control strategy (program) and data. The flash memory (ROM) stores firmware (an operating system, also called a *kernel*) and can be used to store a control strategy permanently. The use of flash technology allows you to remotely download new firmware offered by Opto 22.

RAM: 1 MB

Flash memory (ROM): 1 MB

Power Supplies

 To accommodate a wide variety of applications, seven power supplies are available. These fuse-protected power supplies feature input-to-output isolation protection, a built-in EMI filter, and an on/off switch. They supply enough power to operate the M4RTU base unit, three M4BUS expansion options, and I/O modules for both the base unit and the M4RTUX I/O extender.

Power Supply Model Number	Voltage
M4PS12D	12 VDC input (9–15 V)
M4PS24D	24 VDC input (18–30 V)
M4PS48D	48 VDC input (36–60 V)
M4PS125D	125 VDC input (94–156 V)
M4PS120A	120 VAC input (95–130 V)
M4PS240A	240 VAC input (190–250V)
M4PSF	Line Filter - requires 24 VDC and 5 VD

M4RTU Controller

Specifications

Item	Specification
CPU	32-bit Motorola 68020 processor 16-bit 80C196 I/O processor IEEE floating-point math
CPU clock frequency	16.67 MHz
Memory: RAM Flash EEPROM on controller Flash EEPROM on brain board	1 MB with battery backup (user programs & data) 1 MB (firmware and user programs) in Rev. 2 controllers (256 KB in older ones.) 128 KB (I/O firmware)
RAM/clock battery	3.6-volt lithium, non-rechargeable
I/O: Base unit Extender unit Expansion	8 digital, 4 analog, multifunction Adds 8 digital, 4 analog, multifunction Via RS-485 ports, using Opto 22 I/O
Communication: Base unit Expansion Modem support	1 RS-232 and 1 RS-485/422 port Via daughter cards: configurable serial ports, Ethernet, ARCNET Direct, lease, and radio
Real-time clock	Clock/calendar, Epson 62421A with battery backup
Power requirements	5 VDC at 3.5 A (maximum) 24 VDC at 300 mA (maximum)
Typical operating temperature	-20° C to 70° C
Storage temperature	-40° C to 85° C
Humidity	5% to 95% relative humidity
Software	FactoryFloor (OptoControl, OptoDisplay, and OptoServer) Classic Software (Cyrano, Mistic MMI, and MDS)
System monitors: Host communications Watchdog timers RAM battery backup low Operating temperature	Detect communication errors from processor, I/O, etc. Detect main power supply operation Detects program corruption (checksum RAM test) Detects temperature

Notes for Rev. 2 Controllers

The M4RTU controller was re-engineered in June 2007 because older parts were no longer available. Redesigned controllers can be recognized by the **Rev. 2** sticker on the unit.
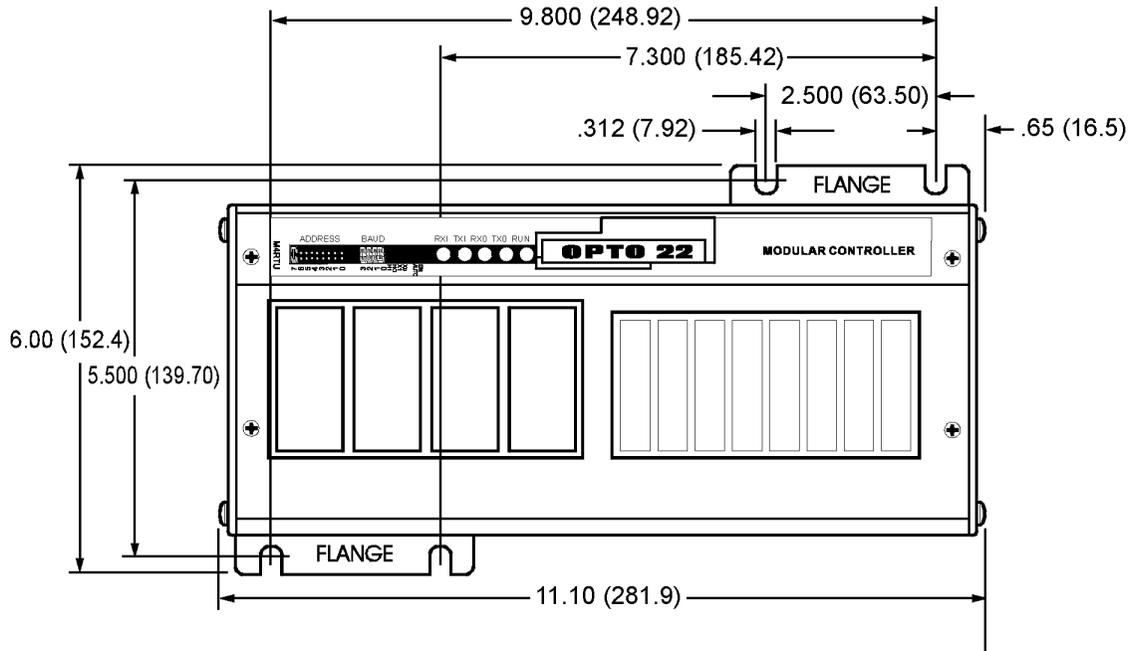
Please note the following changes.

- **OptoTerm version 4.1b or higher must be used** to install new firmware on this controller. OptoTerm is included on the CD shipped with the Rev. 2 controller.

- **Firmware version 4.1d or higher is required** for any M4RTU controller with the Rev. 2 sticker.
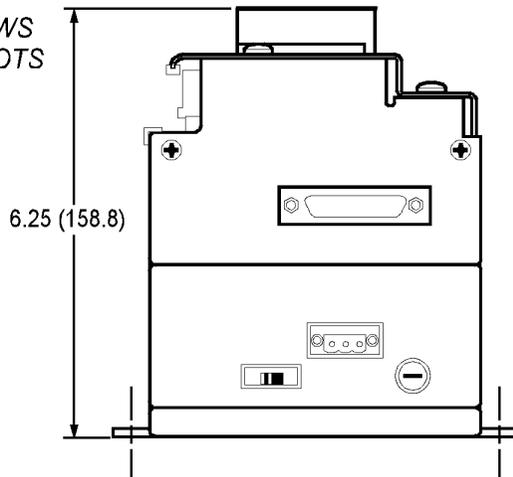
- The Rev. 2 controller has 1 MB RAM and 1 MB Flash memory, so no upgrades are necessary.

- Rev. 2 controllers do not support the obsolete daughter cards M4SENET-U and M4SENET-C. **Use the current Ethernet card, M4SENET-100**, with these controllers.

Dimensional Drawing

9.800 (248.92)

7.300 (185.42)

2.500 (63.50)

.312 (7.92)

.65 (16.5)

FLANGE

ADDRESS BAUD RXI TXI RX0 TX0 RUN

M4RTU

OPTO 22 MODULAR CONTROLLER

6.00 (152.4)

5.500 (139.70)

FLANGE

11.10 (281.9)

USE 1/4-20 SCREWS
IN MOUNTING SLOTS

6.25 (158.8)

Dimensions are in: inches (millimeters)