

# NR&D

# MUCM

## Momentum Universal Communications Base

### Overview

The TSX Momentum Universal Communications Module (MUCM) is a programmable serial communications module compatible with Schneider Electric's Momentum PLC. The MUCM is a Momentum specialty base that interfaces with Momentum communication adapters and processors and supports Momentum option adapters. The MUCM is a powerful module that can be used in a variety of stand-alone applications such as serial protocol converter, data logger, or ASCII serial device interface.

### Product Description

The MUCM is available in two formats. The **MUCM+102** has one RS-232 serial port and one RS-422/485 serial port. The **MUCM+103** has two serial ports, independently switchable between RS-232 and RS-422/485. This feature provides the flexibility to use the **MUCM+103** with either port set to RS-232 or RS-422/485, allowing concurrent use of two RS-232 ports, or two RS-422/485 ports, or one of each data level.

The serial ports are electrically isolated, providing protection against ground loops and minimizing potential damage from over-voltage events on the serial networks. The serial protocol of each port is independently configured.

### Features

- compatible with Schneider Electric's Momentum communication adapters and PLCs
- user programmable
- independently configurable serial ports
- electrically isolated serial ports
- thirty-two Input (3x) and 32 Output (4x) registers of data are exchanged with communications adapter or processor
- front mounted LEDs indicate Power, Ready, Transmit and Receive for each port, additional 4 LEDs under custom program control
- two 5-position screw-terminal connectors included



### Application 1 - Serial Protocol Converter

#### Option 1: Download MRPC Application

The versatile MUCM shines when used as a serial protocol converter. There are two mechanisms for programming the MUCM as a serial protocol converter. The first is to download the MRPC application to the Flash memory of the MUCM, which allows the ports to be independently configured to use one of 18 protocols. These protocols were developed by the engineers at NR&D for some of the most popular devices available from Schneider Automation and its partners. The list of protocols available are as follows:

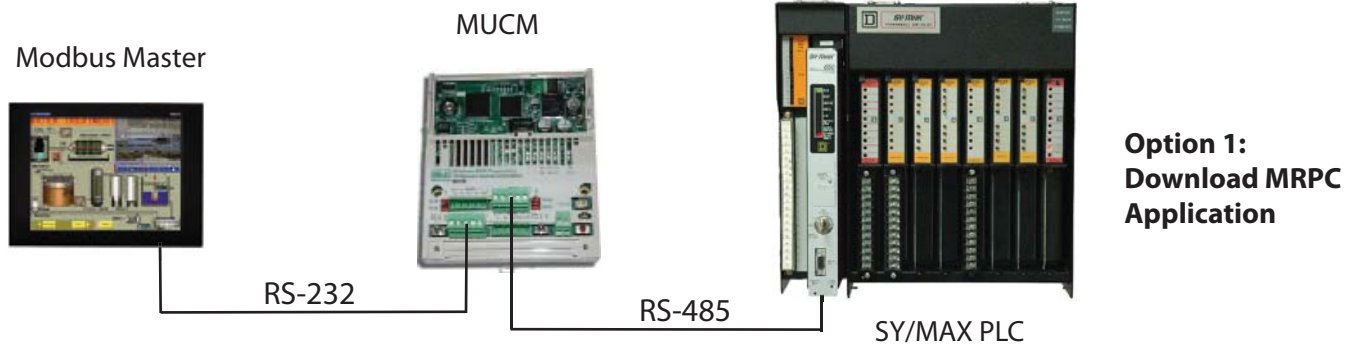
- |               |            |              |               |              |                |
|---------------|------------|--------------|---------------|--------------|----------------|
| • SY/MAX      | • Gateway  | • Net-to-Net | • Transparent | • Peripheral | • Share        |
| • PLogic      | • PNIM     | • Multidrop  | • RNIM Master | • IDEC       | • RNIM Slave   |
| • Modbus Host | • Transfer | • Chevron    | • Modbus Gate | • Dual Slave | • Modbus ASCII |

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## Application 1 (cont'd)

The MRPC application has been refined by NR&D engineers to be fast and reliable. The MRPC application comes preloaded on the standard MUCM and is provided on CD-ROM with purchase of MUCM. Any updates to the application are posted for download at [www.niobrara.com](http://www.niobrara.com).

The MUCM can perform auto-scan and auto-transfer between the ports, permitting use as a data concentrator, SCADA interface, or allowing data to be shared between slave devices. Auto-scan can also collect and distribute data for or from an attached processor or communications adapter.

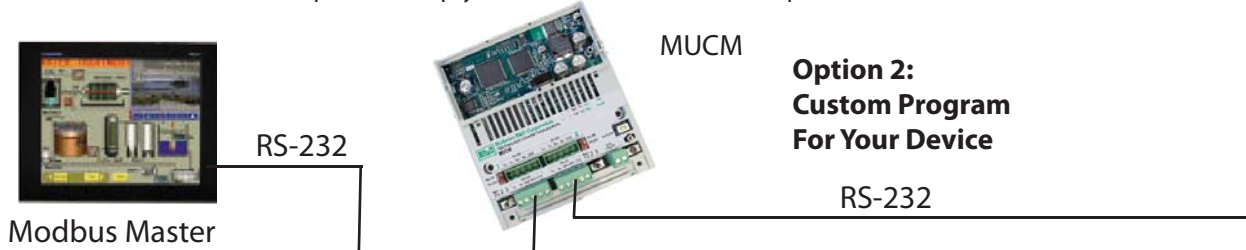


## Option 2: Custom Program For Your Device

The MUCM is also user programmable and can handle communications to any serial device for which the protocol is available. Using Niobrara's powerful yet intuitive UCM programming language, an engineer with moderate programming experience can create complete communications solutions. The MUCM's programming language is similar to BASIC in its simplicity, but contains powerful communication and register manipulation extensions. Programs are also compiled, rather than interpreted by a runtime module, so the MUCM is fast. Using a favorite text editor, the user writes the code for the application at hand. The completed program is then compiled and loaded into the MUCM's Flash memory. The compiler is furnished with each MUCM.

For users without programming experience or resources, custom programming by Niobrara engineers is available. Required elements include the communication protocols for the devices to be attached and access to samples of those devices for test purposes. For further details on this service, contact Niobrara at 800-235-6723.

No matter which method you choose, the communication tasks are handled without the addition of a Momentum communication adapter. An empty base cover is available; order part number **METH-001**.



## Application 2 - Data logger

The MUCM has a real-time clock and Flash memory that allows it to act as a data logger, storing time-stamped data. The logged data can arrive via the serial ports or the communication adapter. Flash memory and non-volatile RAM are available for data storage. Up to 320 Kbytes are available for data storage.

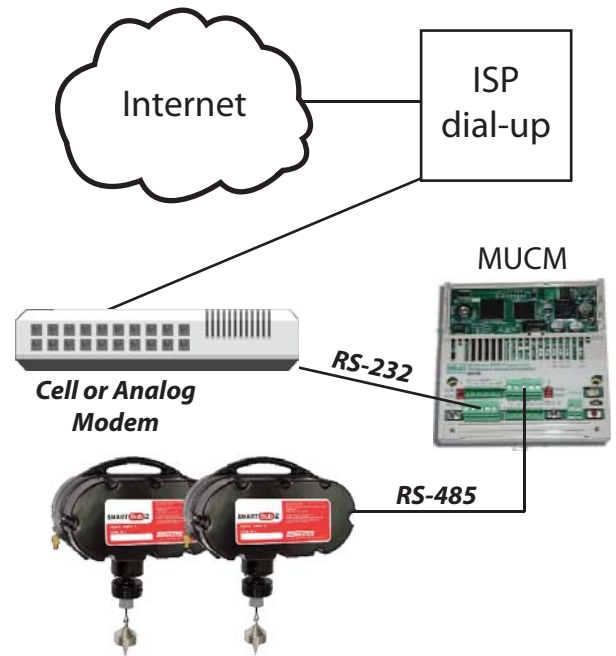
The logged data can be read either from a serial port or from the communication adapter by multiplexing registers through the I/O interface. Custom programming is required for this feature; contact the factory for an example program.

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## Application 3 - MUCM Modem Interface

The MUCM operating system includes an Internet Protocol stack with support for a PPP client connection. This allows custom MUCM programs to use a standard external serial modem to dial up a local Internet Service Provider (ISP) and connect to the Internet. The MUCM may then send logged data by email, FTP, or any other TCP/IP protocol. The MUCM can also send emails for alarm conditions to notify you immediately of any problems with your process or application. While the MUCM is connected to the ISP it may also serve Web pages or Telnet sessions for testing purposes.

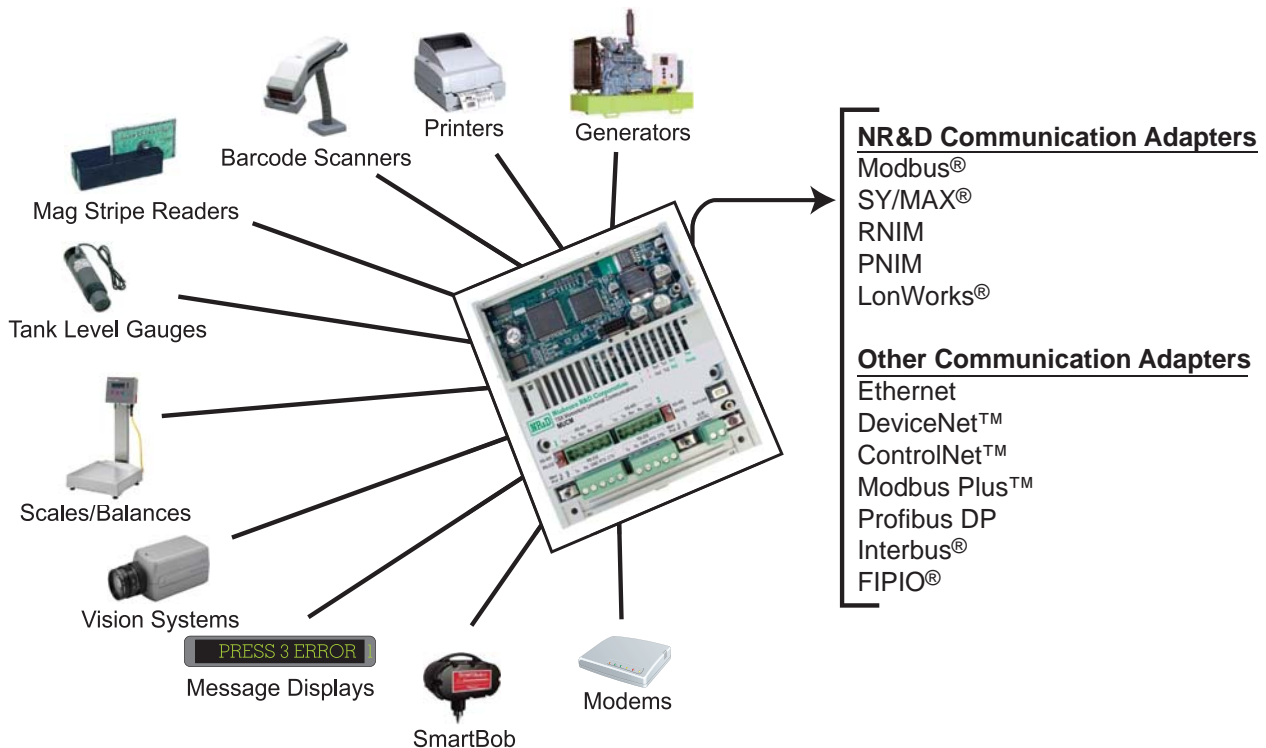
Remote direct dial-in modem applications are also supported by the MUCM. Niobrara engineers can provide sample programs to allow the MUCM to be a YMODEM server to allow the transfer of logged data files back to a central location.



## Application 4 - ASCII Serial Device Networking

Data from ANY device using ASCII protocol can be acquired and manipulated by an MUCM before passing the pertinent data to a Momentum processor or to a communications adapter via data registers. Once the serial data is passed to the communication adapter, it is available to every other device on the network including PLCs, HMIs, or SCADA systems.

### Application 4: ASCII Serial Device Networking



# Niobrara Research & Development Corporation

[www.niobrara.com](http://www.niobrara.com)

## Ordering Information

### The MUCM is available as:

- **MUCM+103** two switch-selectable RS-232 or RS-422/485 ports, with isolation
- **MUCM+102** one RS-232 and one RS-485 port, with isolation

## Related Equipment

- **METH-001** Blank communication adapter cover for MUCM
- **MST** Momentum Serial Communications Adapters Family
- **MU1** Cable, MUCM RS-232 port to PC COM: port, Screw Terminal to DB9S
- **MU3** Cable, MUCM RS-232 port to 9-pin DCE Device; gives MUCM 9-pin port like a PC serial port
- **MU4** Cable, MUCM RS-232 port to 25-pin DCE Device such as a modem
- **MU7** Cable, MUCM RS-485 port to SY/MAX pinout port, Screw Terminal to DB9P
- **MU10** Cable, MUCM RS-485 port to Momentum PLC, Screw Terminal to RJ45
- **MU11** Cable, MUCM RS-485 port to Momentum PLC, Screw Terminal to DB9P
- **TR121ST** Wall transformer, 110 US input, 120VAC 1000mA, stripped/tinned for MUCM power connector

Visit [www.niobrara.com](http://www.niobrara.com) for more MUCM cables

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## Specifications

<b>Warranty / Manual</b>	The MUCM is furnished with a user manual on CD and carries a one year warranty from the date of shipment. During the warranty period, free firmware upgrades are available. See Niobrara's Standard Terms and Conditions of Sale for additional warranty information.
<b>Dimensions</b>	Standard Momentum base module; 4.9" wide x 5.6" tall x 1.6" deep (124 x 142 x 41 mm). Approximately 7.5 ounces (282g) net. Durable polycarbonate enclosure.
<b>Power Requirements</b>	9-30 VAC or VDC; 5 Watts max. Removable screw terminal power connector is included.
<b>Serial Ports</b>	5-position removable screw terminals included. Isolated (500V Max). 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 14400 or 19200 baud; 7 or 8 data bits; odd, even or no parity; 1 or 2 stop bits. Selectable checksum (BCC or CRC) supported in some modes.
<b>RS-232 Port</b>	RTS/CTS handshaking
<b>RS-422/485 Port</b>	Supports 4-wire RS-422 point-to-point or 2- or 4-wire RS-485 multidrop.
<b>MRPC Port Modes</b>	Auto-scan and Auto-transfer; each serial port can independently operate in any of the following modes: SY/MAX; Net-to-Net; Peripheral; PLogic; Multidrop; IDEC; Modbus Host (RTU - Master and Slave); Modbus Gate (RTU - master and slave); Modbus ASCII; Gateway; Transparent; Share; PNIM; RNIM Master; RNIM Slave; Transfer; Chevron; or Dual Slave.
<b>Switches</b>	2 Memory Protect/Run/Halt switches, run/load switch, recessed reset switch, 1 RS-232/RS-485 selector for each serial port MUCM+103).
<b>Indicators</b>	LED Rx and Tx for each serial port, LED run indicator for each program, LEDs for power and ready, four LEDs under user program control. 12 total indicators.
<b>Mailbox Registers</b>	2048 4X registers addressed 1 through 2048; 58 3X registers addressed 1 through 58. 32 input (3X, addressed 1-32) and 32 output (4X, addressed 1-32) registers available to the communication adapter.
<b>Configuration Registers</b>	3X registers 33-58 (unwritable - status only) and 4X registers 33-99 store the configuration of the unit. These registers are maintained by external power when present or by internal capacitor for up to one week when unpowered.
<b>Program Storage</b>	2 program storage areas; 128 Kbytes of Flash memory each.
<b>Real Time Clock</b>	Maintained by external power when present or by internal capacitor for up to one week when unpowered.
<b>Operating Conditions</b>	0 to 50 degrees C operating temperature; -40 to 80 degrees C storage. Humidity up to 90% noncondensing. Pressure altitude -200 to +10,000 feet MSL.
<b>RoHS</b>	The <b>MUCM+102</b> and <b>MUCM+103</b> are RoHS compliant.