NR&D

MEB-RT

Modbus™ Plus ⇔ Modbus / TCP Ethernet Bridge

Description

The MEB is a fully functional, bi-directional Modbus Plus™ to Ethernet bridge. Devices on either network can access devices on the other network. This network traffic can be programming commands as well as I/O and register data. In addition, the MEB-RT can act as:

- Data Concentrator
  - Auto-transfer, Global data, E-Peer
- Ethernet Gateway or MUX
  - Modbus (RTU or ASCII, Master or Slave)
  - SY/MAX, RNIM, PNIM
- Modbus Plus Gateway
  - Modbus (RTU or ASCII, Master or Slave)
- Ethernet NIM
  - SY/MAX, Plogic, RNIM, Net-to-net
- Ethernet Protocol Converter
  - Modbus/TCP⇔SY/MAX Ethernet
- Serial Protocol Converter

The MEB-RT replaces all previous versions of the MEB and MEB-TCP. It has a 10BaseT RJ45 Ethernet port and a redundant-cable Modbus Plus port. The Modbus Plus port works with single- or redundant-cable Modbus Plus networks.

"...communication between devices on the Modbus Plus network and devices on the Ethernet network"

Enterprise-wide access to plant floors

Ethernet has long been established as the network architecture of choice for data and information exchange. Its widespread use has made it very affordable and readily available. The information technology departments of many companies already have in place an Ethernet infrastructure that includes cabling, repeaters, switches, hubs, network management and support.

Modbus Plus is a well-established, highly reliable, high-speed control network. Devices that utilize Modbus Plus technology include PLCs from Schneider Electric and automation and control equipment from the various CAPP® partners. The MEB-RT itself is a certified CAPP product. There exists a large installed base of Modbus Plus networks and devices on numerous plant floors.

"...ideal for companies that require information from their Modbus Plus devices"

The MEB-RT is ideal for companies that require information from their Modbus Plus devices and would like to leverage their existing Ethernet infrastructure. Information from these devices is readily available to the entire enterprise since any Ethernet device with a Modbus/TCP driver can access or control the Modbus Plus devices with the help of the MEB-RT.

When Ethernet access to several Quantum™ processors is needed, an Ethernet NOE can be installed in the local rack of each Quantum. Instead of installing a NOE at each Quantum it can often be more cost effective to use a single MEB-RT to bridge between the Ethernet and the Modbus Plus network, especially since Quantum processors already have Modbus Plus ports.

Collaborative Automation Partner Program

Transparent Ready

Integrating Modbus Plus into an Ethernet control architecture

Companies are beginning to adopt Ethernet as a control network as well as an information network. Burgeoning numbers of Ethernet addressable I/O blocks and Ethernet control devices, available now, are driving this change. The MEB-RT enables enterprises that are changing their control strategy to Modbus/TCP Ethernet to protect their investment in their Modbus Plus network, PLC programming software, SA-85 cards, and engineering.

Programming stations added to the Ethernet network can also program the Modbus Plus PLCs. Mod-

soft®, Concept™, ProWORX®, and Unity® all have Modbus/TCP drivers that can route through the MEB-RT and program the PLCs on the Modbus Plus network. Likewise, HMIs using Modbus/TCP drivers can route through the MEB-RT to access the Modbus Plus devices.

Other connectivity problems solved by using the MEB-RT

Sometimes, Modbus Plus networks are too far apart to use a Bridge Plus. In this case, a pair of MEB-RTs has been used to bridge Modbus Plus networks together across the in-plant Ethernet. More than two Modbus Plus networks can be connected in this manner just by adding an MEB-RT for each Modbus Plus network. Every Modbus Plus device can access every other Modbus Plus device no matter which network it is on. Every Modbus Plus programming station can program every Schneider Electric Modbus Plus PLC no matter which Modbus Plus network it is on.

MEB-RTs have been successfully used in conjunction with Token Ring-to-Ethernet converters to place networks of Modbus Plus devices onto a plant-wide Token Ring network. In such an instance, a PC equipped with a Modbus Plus card can utilize the MEB-RT and Modicon programming software to program any of the PLCs on any of the Modbus Plus networks. Likewise, any of the PLCs can communicate with all of the other PLCs on the various Modbus Plus networks connected by the Token Ring.

"Each of the serial ports can be individually configured to speak one of many protocols…"

Besides an Ethernet port and a Modbus Plus port, the MEB-RT has two RS-422/485 serial ports. Each of the serial ports can be individually configured to speak one of many protocols supported by Niobrara. Of special interest to Schneider Electric customers are the modes Modbus RTU (host or gate) and Modbus ASCII. Since the MEB-RT allows routing from any port to any other port it can be thought of as an Ethernet MUX and a Modbus Plus MUX simultaneously.

Both Modbus Plus devices and Ethernet devices can access serial Modbus slave devices connected to an MEB-RT serial port. If the slave device is a Modicon PLC then programming packages on either Modbus Plus or Ethernet can program the PLC.

"...an HMI, building automation system, SCADA package or programming terminal…can access devices on both the Modbus Plus and Ethernet networks."

The MEB-RT also allows master devices to use its serial ports as gateways to the high-speed networks. A serial Modbus master device, such as an HMI, building automation system, SCADA package or programming terminal connected to an MEB-RT serial port can access devices on both the Modbus Plus and Ethernet networks. A user with a laptop can use a Niobrara SC902 cable and transformer connected to an MEB-RT serial port to program Modicon PLCs anywhere on either network.

Connecting POWERLOGIC® Circuit Monitors and Power Meters to the serial port of an MEB-RT allows System Manager™ Software and Modbus Plus PLCs simultaneous access to these serial devices. System Manager uses its Modbus/TCP driver to access the devices for power management while the Modbus PLCs use their Modbus Plus ports to access the devices for load shedding or power factor correction. Since the serial ports are RS-422/485 they each can support a network of up to 32 devices.

Ethernet Port

The MEB-RT's Ethernet port has a 10BaseT port with an RJ45 connector for use with CAT5 cable. Conversion to other media, such as ThinWire™ or fiber optic cable, requires the use of an external media converter. Media converters are widely available.

Modbus Plus Ports

The MEB-RT's Dual-Cable Modbus Plus port uses two DB-9 female connectors with the standard Modbus Plus pinout so that standard Modbus Plus cabling can be used. The MEB-RT may be used in single cable systems by connecting the Modbus Plus cable to Port A. The MEB-RT supports the full five-drop routing of Modbus Plus. The MEB-RT's internal mailbox registers can participate in Modbus Plus Global Data.

Internal Registers

There are three kinds of internal registers: mailbox registers, configuration registers and statistic registers. All of the MEB-RT's registers appear as 4x registers to Modicon devices and they are available from any port on the MEB-RT. The first 2048 registers are user-defined mailbox registers.

Statistics are kept for each port and can be useful for diagnosing communication problems. The configuration registers are accessible to permit dynamic configuration of an active system. For example, the protocol of a serial port can be changed so new equipment can be added without disrupting existing communications or rebooting the MEB.

"...allows placement of Modbus Plus devices on a company Intranet or even on the Internet."

Configuration

The MEB-RT is supplied with PC software that allows configuration through any communication path between the PC and the MEB-RT. The software can use a serial connection, an SA-85 card or an Ethernet connection. The MEBSW software allows the saving of MEB-RT configurations to disk.

The MEB-RT can have its IP address, subnet mask and default gateway address configured through DHCP or BOOTP protocol over Ethernet. To use this method, a DHCP or BOOTP server must be present on the network. The IP address of the MEB-RT must remain fixed for communications to function properly.

"All of the MEB-RT's registers...are available from any port on the MEB-RT."

The MEB-RT's firmware is stored in FLASH memory and can be updated through a serial port. The MEB-RT's configuration is stored in capacitor-backed RAM but can be stored in EEPROM for long term storage.

Of Interest to SY/MAX users

The MEB-RT is a SY/MAX register-rack mount module. The 2048 internal mailbox registers can be rack-addressed by a SY/MAX PLC. All of the registers in the MEB-RT appear as processor equivalent registers to SY/MAX devices.

The Ethernet port of the MEB-RT can be configured to speak the SY/MAX 802.3 protocol in addition to Modbus/TCP. SY/MAX 802.3 is the protocol used by the SY/MAX 450 and 650 processors. With this protocol the MEB-RT can be used to create a Modbus Plus to SY/MAX Ethernet bridge. This is an ideal way to integrate Modbus Plus PLCs into your existing SY/MAX Ethernet network. Also the Ethernet port may be configured for both SYMAX 802.3 and Modbus TCP at the same time. This allows for Modbus/TCP óSY/MAX 802.3 Ethernet translators to integrate your SYMAX Ethernet devices into your Modbus TCP System.

The serial ports of the MEB-RT have the same pinout as a SY/MAX NIM port. They can be set to a mode that allows both SY/MAX and Modicon programming from a laptop's serial port. Connect an SC902 cable between the PC's serial port and the MEB-RT and run any Schneider PLC Programming package to program Modbus Plus PLCs or run SY/MATE Plus to program SY/MAX processors on the Ethernet network. If the second serial port is connected to a NIM in net-to-net mode then SY/MATE Plus can also program SY/MAX processors on a SY/NET network.

Niobrara Research & Development Corporation
www.niobrara.com

Ordering Information

The MEB is available as:

- **MEB-RT** with 2 RS-485 ports, 1 Dual Cable Modbus Plus port, 1 Ethernet port (RJ45 10BaseT connector)

MEB-RT Accessories

- **SC902** 6' programming cable with TR92 transformer
- **NRK2** Single slot rack with built in power supply for stand alone installations.
- **DC1** RS-422 cable for connecting the MEB to a SY/MAX PLC or NIM.

Specifications

Warranty / Manual	The MEB-RT 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.
Dimensions	Standard SY/MAX register module. 1.5" wide by 13" tall by 6.5" deep. Approximately 2.5 pounds net. Rugged welded steel enclosure with baked on finish. All connectors and indica tors are front mounted except the SY/MAX bus card edge connector on the back and Ether net connector on bottom.
Power Requirements	From SY/MAX bus or optional NRK2 power supply. 5 volts, 0.9 A.
LED Indicators	Module: Power, Module Active and Error Serial Ports: Transmit and Receive for each port Ethernet: Link Ok, Active, Error Modbus Plus: Active, Channel A Error, Channel B Error
Modbus Plus Ports	Front mounted dual cable Modbus Plus port with two DB9 female connectors with screw-lock posts. Standard MB+ pinout. Global Data compatible.
Ethernet Port	10BaseT port with RJ45 connector on bottom of unit. Modbus/TCP and/or SY/MAX 802.3 protocols. E-Peer compatible.
Serial Ports	Two DB9 female connectors with slide-lock posts. SY/MAX compatible pinout. RS-422 or RS-485. 50*, 75‡, 110, 134.5, 150‡, 300, 600, 1200, 1800‡, 2400, 4800, 7200*, 9600, or 19,200‡ baud. NOTE: If one port is set to a baud rate marked (*), the other port cannot be set to a baud rate marked (‡). 7 or 8 data bits; odd, even or no parity; 1 or 2 stop bits. 2- and 4-wire compatible.
Serial Port Modes	Each serial port can independently operate in any of the following modes: Modbus (RTU or ASCII, Master or Slave), SY/MAX; Net-to-Net; Peripheral; PLogic; Multidrop; IDEC; Gateway; Transparent; Share; PNIM; RNIM (Master or Slave); Transfer; Chevron. Dual slave.
Mailbox Registers	2048 processor equivalent registers addressed 1 through 2048. All of which may be rack addressed as needed for user applications. Any rack addressed register can be a PLC input or a PLC output as required by the application.
Setup Registers	Module configuration is stored in internal registers. These setup registers can be accessed through any of the MEB's ports (in most modes). Configuration is maintained by rack power (when present) and by internal capacitor, for up to one week, when the module is not powered. For longer unpowered storage, module configuration may be stored in EEPROM.

"...an ideal way to integrate Modbus Plus PLCs into your exist-ing SY/MAX Ethernet network."

Niobrara Research & Development Corporation
P.O. Box 3418
Joplin, MO 64803
(800) 235-6723
(417) 624-8918
www.niobrara.com