RZ Mediator

The RZ Mediator is the most advanced Information Technology (IT) and systems integration platform utilizing the Internet Protocol (IP).

The Mediator MPX enables two-way communication over a TCP/IP network between the control system and all of the sensors, devices, and systems within a facility. It collects data from numerous sources, including the RZ system, that use disparate protocols and are otherwise unable to intercommunicate, converts the data into a single, widely used format such as XML, and provides information to the end user in a uniform presentation. It enables users to specify the type of information they want to receive, and omit anything they consider unessential.

In addition, the Mediator MPX is able to receive input through the RZ perfectHost user application and convert it into commands and data that conform to the protocols required by the facility’s sensors, devices and systems. The Mediator can run many services and protocols at the same time and still have the capability to respond immediately to events generated in the network environment.

The Mediator MPX includes a specially focused configTOOL that is used to configure the system and network settings, system and sub system protocols, integration, point mapping and proxy services, data loggers, log formatters and exporters, system alarm configuration, messages emails and text pages in RZ Mediators and M2s.

TOOLS AND APPLICATIONS

Mediator MPX Configuration Tool Services
- Supports remote installation, configuration (including network configuration), management, and software upgrade via TCP/IP
- Supports offline configuration
- Supports date/time/time zone setting for the Mediator operating system and hardware
- Supports time synchronization with an external time server
- Provides a simple summary page of all configured/logged devices and their values

RICHARDS-ZETA BUILDING INTELLIGENCE (RZ)
- Full support of RS 485 connectivity to the RZ network (up to 32 nodes per port. There are four (4) RS 485 ports on the Mediator. Many more nodes using Multi-net. Contact RZ for more information.)
- Supports up to four (4) individual RZ networks
- RZ perfectHost Graphical Application Programming and Monitoring control system
- PHwin Graphical Programming and Monitoring for any system or data supported by and connected to the Mediator

PULSE CONFIGURATION
- Converts pulse inputs to energy data (kWh)
- Supports configuring calculators on any node
Web-Based Controllers

GENERAL MODBUS SUPPORT
• Enables data extraction from the registers of any Modbus device via the device address
• Supports Modbus RTU & Modbus TCP Master-Slave

GENERAL BACnet SUPPORT
• The Mediator allows the user to communicate with devices that are compliant with the BACnet protocol, and thereby incorporate BACnet devices into systems that include components that are not BACnet compliant. Communication is two-way: the Mediator brings data in from BACnet devices, and also allows the user to send commands out to those devices. In addition, the Mediator makes information acquired from BACnet devices available to other devices on the network that are not BACnet compliant. Conversely, information acquired from non-BACnet devices becomes available to BACnet devices through the Mediator.
• Like the BACnet standard, the Mediator Framework, the core software application that runs on the Mediator, incorporates object-oriented design. The similarity in design methodology means that the Mediator is well suited as a platform for implementing BACnet functionality. Currently, the Mediator supports BACnet over Ethernet and BACnet/IP networking. MS/TP and FTP support are planned for future releases.

The Mediator currently support the following BACnet object types:
• Device Object
• Analog Input Object
• Analog Output Object
• Binary Input Object
• Binary Output Object

METER INTERFACE
• Provides four pulse/digital inputs for collecting data from multiple pulse meters
• Interfaces with Modbus RTU meters via RS-232/485
• Includes built-in interfaces to Veris meters, ABB SCD2000, ABB PCD2000, and Siemens Quad4
• Accepts data from up to four pulse inputs and two RS232/485 serial ports simultaneously
• Supports DL06 PLC modules

DATA LOGGER
• Logs data in time-stamped files from all connected meters
• Logs energy values calculated from pulse inputs
• Logs delta values (change of counter values over log interval)
• Allows the user to configure specific log intervals
• Allows the user to specify max log sizes (e.g., in bytes)
• Allows selection and viewing the current accumulated value of a log locally

COMMUNICATION
• Supports Ethernet TCP/IP connectivity, including configuration and data export
• Supports dial-in/out modem communications
• Supports Mediator configuration and restart via modem
• Supports configuration of the modem using the Mediator MPX Configuration Tool
• Supports data export via optional modem
• Supports local serial null modem connection via the console port
Web-Based Controllers

ENTERPRISE EXPERT
- Supports FTP, SMTP, HTTP_post, HTTP_get
- Provides built-in exporters for currently supported EEM software applications (Silicon Energy, Enerwise, and ABB EI, standard XML, and standard CSV
- Allows the user to define export intervals
- Enables export of all logged data not yet exported (possibly due to power interruption of network problem)

EVENT LOG
- Logs local events such as warnings, exceptions, and restarts

SECURITY
- Provides password protection for the Mediator MPX Configuration Tool
- Allows password protection for the Mediator’s configuration

ALARMS
Allows configuration of FOUR types of alarms:
- Generic Calculated Alarm (allows user to define logical expressions that trigger alarms when true
- Less Than (logical expression that triggers an alarm when a node value falls below a user-defined threshold)
- Greater Than (logical expression that triggers an alarm when a node value exceeds a user-defined threshold)
- Allows generating e-mail alarm notifications and exports alarms via SMTP

SOFTWARE
Two main software components run on the Mediator:
1. The Mediator Framework Software application, which provides the core functionality of the system
2. The System Software, which is based on the most recent version of the Linux kernel

The Mediator Framework Software
The Mediator Framework Software provides the core functionality of the Mediator system. This includes:
- assembling a running system from configuration data
- getting and setting values
- processing raw data
- presenting data from disparate sources in a uniform format
- making data easily available to end users
- providing services such as data logging and HTTP services
- providing an environment for custom system configuration
- providing an environment for developing custom solutions

The Mediator Framework Software is written in Python, an open-source programming language that support robust, object-oriented applications. In addition to being powerful, Python is easy to learn and has an interpreted mode that allows users to develop their own extensions in less time and with less effort than other languages require.

The Mediator Framework architecture has been designed so that it is not tied to any single platform or technology. The Mediator is designed to run the Mediator Framework Software, however, and is therefore the optimal platform for it.
Hardware

A key feature of the Mediator Framework architecture is dynamic system configuration. The Mediator Framework is not a hard-coded representation of a site. The Mediator Framework Software provides the structure on which it builds the system that represents a site. It also provides the functionality to assemble the system from configuration data. It then provides the operating environment in which that system runs. Consequently, the Mediator Framework allows any site configuration to be represented in software. In addition, it allows an existing system to be modified or extended easily and quickly, without shutting it down.

In the standard version, the Mediator Framework Software runs under the Linux operating system. However, the Mediator Framework can be modified to run on any platform, under any operating system currently in wide use. Its technology independence allows it to be easily updated to incorporate advances in hardware and operating system technology.

System Software

The Mediator system software is based on the current Linux kernel. Linux is a Unix-like, Posix compliant, open-source, fully-featured operating system that provides true multi-tasking, multi-threads, virtual memory, shared libraries, demand loading, shared copy-on-write executables, proper memory management, loadable device driver modules, video frame buffering, and TCP/IP networking. It allows the Mediator to run many services and protocols at the same time and still respond to events such as load curtailment signals. Linux is small, modular, and scaleable, and therefore ideal for embedded systems such as the Mediator.

Linux is robust and reliable. It can run without having to be rebooted for months, even years. In the event of a system failure, its full journaling file system restores the data on the disk to its prefailure configuration. It also recovers unsaved data and stores it in the location where it would have gone if the system had not failed, making it an important feature for mission-critical applications.

Linux is used and supported by many corporations worldwide, including IBM, Dell, Cisco Systems, Netscape, Sun Microsystems, and many others. Because of its reliability, it has been chosen as the operating system for two critical systems on the International Space Station (ISS).

Networking Capabilities

Linux supports a broad range of networking capabilities, including:

- Integrated web server with HTTP, CGI, SSI, Secure Socket Layer (SSL) and HTTPS protocol support
- Secure Shell (SSH) and Secure Copy (SCP)
- Integrated IPSec (Virtual Private Networking) functionality
- Routing
- Packet filter firewall
- Packet logging
- Intrusion Detection
- Quality of Service (QoS)
- Network Address Translation (NAT)
- Dynamic Host Configuration Protocol (DHCP)
- Simple Network Management Protocol (SNMP)

Security

The Linux-based system software running on the Mediator supports UNIX user security, as well as Framework security and ACL (Access Control List). Encryption support includes SSL (Secure Socket Layer; for example, HTTPS), SSH (Secure Shell), and IPSec for VPNs, plus a packet filtering firewall.
Mediator Linux has been optimized for security. Because Linux is scalable, it allows some components normally included on a general-purpose system to be omitted. Some have been omitted because they are insecure, and in some cases these have been replaced with secure components that perform the same functions.

## Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Pentium class- 286 @ 266 MHz</td>
</tr>
<tr>
<td>I/O Co-Processor</td>
<td>Used for counters/relays/Dallas-1 wire ports</td>
</tr>
<tr>
<td>Memory</td>
<td>64 MB of SDRAM* and 64 MB of Compact Flash*</td>
</tr>
<tr>
<td>Communications</td>
<td>1- Console Port (RS-232)</td>
</tr>
<tr>
<td></td>
<td>2- Operational Internal modem port</td>
</tr>
<tr>
<td></td>
<td>2- RS-232</td>
</tr>
<tr>
<td></td>
<td>4 RS-485</td>
</tr>
<tr>
<td></td>
<td>2- 10/100 Base-T Ethernet Port</td>
</tr>
<tr>
<td></td>
<td>4- Dallas 1-wire™ ports (for distributed I/O points)</td>
</tr>
<tr>
<td></td>
<td>2- USB ports</td>
</tr>
<tr>
<td>Inputs</td>
<td>4- Counters (optionally, general purpose digital inputs)</td>
</tr>
<tr>
<td>Outputs</td>
<td>2- Solid-State single pole relay outputs (0-60V, 1.0A AC/2.0A DC outputs, opto-isolated)</td>
</tr>
<tr>
<td>Power</td>
<td>24 VAC- Optional UPS with external battery (unit has built-in battery charging)</td>
</tr>
<tr>
<td>Wattage</td>
<td>Typically 6 watts (max 10 Watts)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 35 oz.</td>
</tr>
<tr>
<td>Size</td>
<td>Approx. 8”x6”x1” (housing cover)</td>
</tr>
<tr>
<td>Temperature</td>
<td>Recommended ambient range- 0° - 70°C (32° to 158°F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>90% non-condensing</td>
</tr>
<tr>
<td>Agency Listings</td>
<td>FCC Class A and CE Listed</td>
</tr>
</tbody>
</table>
Web-Based Controllers

RZ Mediator Wiring Diagram

Transformer must be floating, (not grounded)