Remote RMM-1400, RMB-1, and RMB-2

LTE-Enabled

The Remote RMM-1400 is a monitoring and control device that provides IP management to sites and equipment. The RMM-1400 enables site alarm monitoring, protocol conversion, and equipment connectivity and acts as an intelligent extension of your Operations Support Systems (OSS). It is designed to enhance your network management strategy, reduce operational costs, and improve operational efficiency with reduced truck rolls.

The Remote RMM-1400 is a cost-effective site management solution for small sites or locations where a limited number of systems require integration. It provides four serial and four Ethernet ports and supports the Remote RMB-1 and Remote RMB-2 to provide more than 80 I/O ports. The RMM-1400 includes Ethernet connectivity and is orderable with integrated GSM or CDMA wireless for data network connectivity. The RMB-1 and RMB-2 connects to the RMM-1400 via Ethernet to provide alarm, sensor, and control interfaces for site management. It also receives power over this single Ethernet connection.

An integral part of the site management solution by Kentrox, the Remote RMM-1400 resides at your network's locations and connects to each element via a wide variety of interface options. The RMM-1400 performs protocol mediation and interface conversion, collects alarms and monitoring data, and supports bi-directional management control with the Optima management system via Ethernet or wireless communication options. Together, the Remote RMM-1400 and Optima provide detailed monitoring, remote control, and management for virtually all site devices.

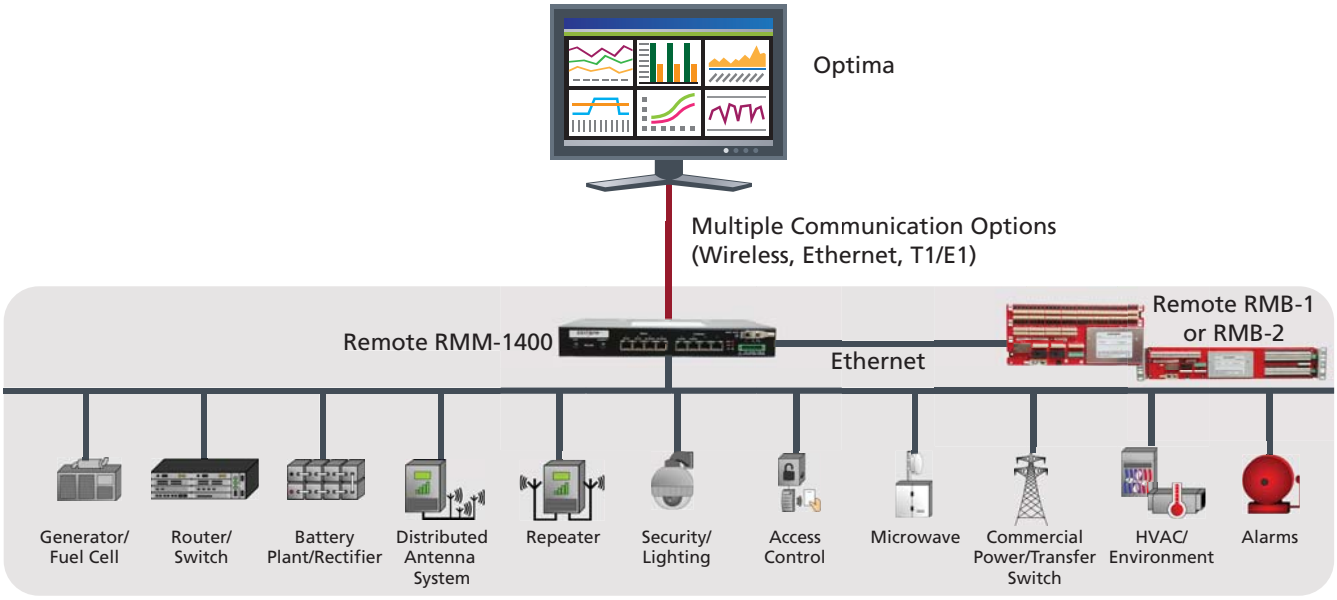
Remote RMM-1400

Remote RMB-1

Remote RMB-2

Remote RMM-1400 provides IP network connectivity for site management and alarm monitoring for small sites and focused applications. RMM-1400 highlights include:

- Capacity to support targeted applications at small sites
- Ethernet and wireless connectivity options
- PoE for site security and other applications
- Easy-to-use GUI with Optima
- Advanced equipment management and protocol conversion
- Alarm aggregation for reduced network management complexity



Proactively manage all critical site elements

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Application examples

Hybrid power management

Kentrox supports hybrid power, where commercial power has either failed or is unreliable. The Remote RMM-1400 can be connected to a generator, fuel cell, battery, commercial power and transfer switch to monitor and control devices at a site. Traditional power systems only momentarily revert to battery power when a commercial power outage occurs while an Automatic Transfer Switch engages, and the generator is immediately started. However, the RMM-1400 can be configured to discharge batteries until voltage levels reach a configured end-of-discharge limit. When the limit is reached, the RMM-1400 starts the generator which runs until the batteries have been recharged.

By optimizing battery discharge cycles, generator run hours are reduced and fuel consumption is minimized. In addition, fuel levels and overall consumption are continuously monitored. When high fuel consumption thresholds are crossed, the RMM-1400 generates an alarm which notifies service providers of degraded generator efficiency or potential fuel theft.

In-building system management

Bi-directional amplifiers, repeaters, and distributed antenna systems (DAS) are used to extend coverage areas within offices, retail centers, and buildings that have less than optimal service for wireless handsets, PDAs, and data cards.

The RMM-1400 provides a centralized multi-vendor alarm collection system and an economical, proactive method to verify the operational status of deployed infrastructure. It provides connections to repeater and DAS equipment and monitors these systems by consolidating their alarms and conveying the data to management systems. Both Ethernet and wireless WAN options are available for communication with monitoring facilities, and the RMM-1400 supports VPN technology to keep critical management data secure over the Internet or any public network.

Ordering information

Remote RMM-1400	Remote RMM-1400 system
Remote RMM-1421	RMM-1400 with EVDO wireless
Remote RMM-1431	RMM-1400 with HSPA wireless
Remote RMB-1	RMB-1 alarm collector
Remote RMB-2	RMB-2 rack mounted alarm collector
Remote RMM-1400-A	RMM-1400 with included RMB-1 alarm collector
Remote RMM-1421-A	RMM-1400 with included RMB-1 alarm collector
Remote RMM-1431-A	RMM-1400 with included RMB-1 alarm collector

RMM-1400 supported protocols

NTP client (RFC 1305)
Serial protocols: RS232 (two ports), RS422/RS485 (two ports)

RMM-1400 management & management access

Command Line Interface (CLI)
Console port local access via Ethernet
Wizard configuration support
Telnet / SSHv2 / FTP / SFTP
SNMP MIB
SMS
Optima management support

RMM-1400 intelligent applications support

Optional Intelligent generator monitoring
Intelligent battery management
SNMP status reporting

Reliability/maintenance

MTBF - 200,000 hours @ 25°C
MTTR - 30 minutes

Remote RMM-1400 physical specifications

Depth:	8.6 in. (21.8 cm)
Height:	1.6 in. (4.1 cm)
Width:	11.8 in. (30 cm)
Weight:	3.35 lbs. (1.5 kg)
Mounting:	19 or 23 inch racks (1RU) or wall mount
Power requirements:	Dual input (A/B feed) +/- 20-60 VDC; 40W (max)

Remote RMB-1 physical specifications

Depth:	1.25 in. (3.2 cm)
Height:	4.8 in. (12.2 cm)
Width:	11 in. (27.9 cm)
Weight:	1.85 lbs. (0.8 kg)
Mounting:	Wall mount hardware included. Available in 19 or 23 inch rack mounting options
Power requirements:	802.3af Power over Ethernet (PoE) Class 4

Remote RMB-2 physical specifications

Depth:	1.75 in. (4.45 cm)
Height:	3.5 in (8.89 cm)
Width:	17.5 in. (44.45 cm)
Weight:	4 lbs (1.8 kg)
Mounting:	Rack mount hardware included. Supports 19, 21, or 23 inch EIA and ETSI racks
Power requirements:	802.3af Power over Ethernet (PoE) Class 4

Environmental

Extended temperature range of -30°C to +60°C (-22°F to 140°F)
Humidity – 0%-95% (non-condensing)

Certifications

FCC certified
EN 60950 Safety
CE Mark
Temperature hardened

Product	Async Ports	Ethernet Ports	Discrete Ports	Control Outputs	0-10 VDC Inputs	4-20mA Inputs	Voltage
Remote RMM-1400*	4	4 (2 PoE)	--	--	--	--	20-60 VDC
Remote RMB-1**	--	1 ***	64	4	4	4	PoE Class 4
Remote RMB-2**	--	1 ***	64 ****	4	4	4	PoE Class 4

* Supports monitoring three 0-60 VDC voltage sources (two on power inputs and one auxillary input)
** Requires a host Remote RMM-1400
*** For connection to host RMM-1400 only
**** Supports wet or dry contact inputs and input voltages of 4-72 VDC with positive or negative grounding

Additional applications supported

In addition to the functionality provided in the Optima Management System and Remote suite of products, modules are available for specific applications. These modules are pre-packaged and designed to support specific systems. The three modules currently available include:

- Tower management
- Power management
- Environmental management

Each packaged module supports several applications and includes the information, reports, measurements, network elements, alarms, and sensors/controllers that are needed for each application. The modules include a new Optima Live View showing the per site status overview of the specific application's alarms and key performance indicators (KPIs). It provides an auto-refresh and single click links to pre-defined reports, alarms, analysis, and controls. The standardized reports are context sensitive and provide a one click zoom to the selected alarms or KPIs to better understand site status.

Tower Management module

Tower providers and their footprint are growing rapidly. As their footprint expands, understanding site conditions becomes more challenging. One of the most difficult requirements is monitoring tower assets (access, commercial power, tenant power, generators, batteries, tower lights, etc.) and more importantly, knowing how to accurately bill each tenant for energy consumption, including the varying cost of providing the power (commercial, fuel-based back-up sources, etc.).

Detailed site power and energy management is required, including the analysis and monitoring of three phase power at the tenant level. This allows the tower provider to support multiple tenants and to accurately bill and manage each individual tenant.

Optima Live View report for tower management module showing status of tower site

The Kentrox tower management module provides the applications needed to help tower providers meter, monitor, and manage multi-tenant sites. The applications use Optima and the Remote suite of products to monitor tower assets by providing the following:

- Environmental monitoring: monitors the indoor and outdoor temperature and humidity at the tower site and initiates alarms on conditions that are outside of a specified range. Monitors and reports on tower lights and alarms in any failure condition.
- Battery monitoring: monitors the voltage during float and discharge conditions and predicts the battery discharge time during outages.
- AC power monitoring: monitors power quality and energy usage including support for multi-tenant billing scenarios.
- Generator management and control: monitors the generator status, initiates alarms when potential issues arise, and starts/stops supported generator systems.
- Fuel monitoring and management: monitors fuel level and consumption, initiates alarms for potential theft, and helps to prioritize fuel delivery.
- Tenant energy metering: provides detail on site power and energy used for each tenant for accurate billing for commercial AC and generator power.

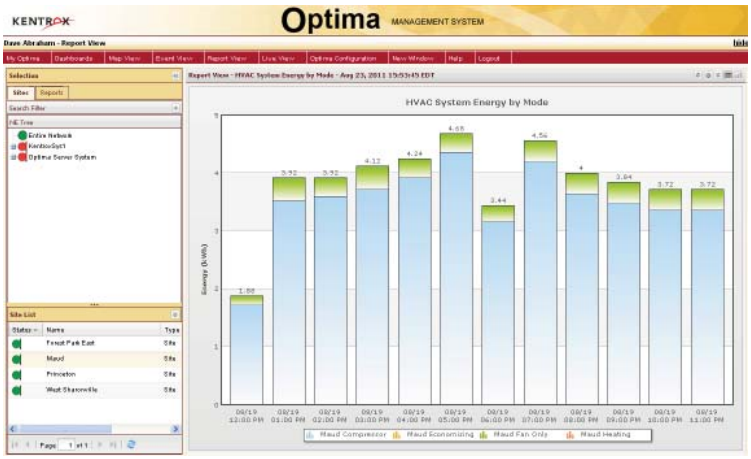
Optima provides complete visibility and control of network infrastructure sites, such as cell sites, substations, and remote communication huts and all its systems, such as power, environmental, security, and networking. Optima gives immediate operational cost reductions for organizations that need to access, monitor, and manage large numbers of sites. Optima delivers these benefits by providing remote monitoring, control, and automation over the maintenance and management of site infrastructure and physical elements.

Virtually any type of system can be integrated with Optima to provide detailed surveillance, remote control, and periodic maintenance automation. This visibility into the network allows users to work proactively to prevent problems. When outages do occur, Optima reduces the need for site visits while enabling the operations team to resolve most network problems in 50% less time.

Power Management module

Power - all networks require it. Whether it is a cell site, roadside cabinet, hut, vault, utility facility, or any other type of site, power is a necessity for the equipment. It can come from commercial service, solar panels, generators (diesel or propane), batteries, wind turbines, or hydrogen fuel cells, and it must be provided 24 hours per day, 7 days a week, to ensure the network availability that customers expect.

Remote RMM-1400, RMB-1, and RMB-2



Environmental management module report displaying HVAC energy consumed by type of equipment

Power failures for service providers, whether it's from infrastructure issues, malicious intent, contractor error, or adverse weather conditions, usually cause network downtime, lost revenue, safety issues, and potentially customer turnover. Reliable back-up power is critical, and preventative maintenance is ideal. A comprehensive power management solution reduces the need for physical site visits and enables structured and routine preventative maintenance. Service providers can monitor primary and backup power sources and their energy consumption from anywhere at any time.

The Kentrox power management module provides the applications needed to help service providers monitor and control multiple power sources at remote sites. The applications use Optima and the Remote suite of products to monitor site power and provide the following:

- Battery monitoring: monitors the voltage during float and discharge conditions and predicts the battery discharge time during outages.
- Rectifier monitoring: monitors detailed rectifier conditions (voltage, current, temperature, etc.) for supported rectifier systems.
- Generator management: monitors the generator status, initiates alarms when potential issues arise, and starts/stops supported generator systems.
- AC power monitoring: monitors power quality and energy usage including support for multi-tenant billing scenarios.
- Hybrid power management: monitors, manages, and controls power from multiple sources (commercial power, generators, batteries, wind turbines, solar panels, bio-fuel, hydrogen fuel cells, etc.).
- Fuel monitoring: monitors fuel consumption, initiates alarms for potential theft, and helps providers to prioritize fuel delivery based on information provided.

Environmental Management module

Maintaining critical infrastructure at remote sites requires strict control over environmental site conditions. A failed Heating, Ventilating, and Air Conditioning (HVAC) system can be devastating for a remote site enduring harsh weather conditions. Water exposure can destroy huge equipment investments. Technicians must be notified quickly of pending damage or equipment failures to initiate proactive maintenance and minimize or prevent damage to systems and site availability.

The Kentrox environmental management module provides the applications required to help service providers monitor and control remote site conditions to ensure normal operation, provide notification of poor conditions, and enable remote management to reduce costly site visits. Required repairs or adjustments can be accomplished before service is affected. The applications use Optima and the Remote suite of products to provide the following:

- Environmental monitoring: monitors the indoor and outdoor temperature and humidity at the tower site and initiates alarms on conditions that are outside of a specified range. Monitors and reports on tower lights and alarms in any failure condition.
- HVAC management: centralizes control of HVAC conditions and initiates alarms on conditions outside of a specified range. Identifies sites where HVACs are underperforming or where systems can be replaced for better efficiency.
- HVAC energy monitoring: monitors real-time energy consumption of HVAC systems to verify efficiency of cooling systems. Provides valuable data for decision making of HVAC setpoints and future equipment purchases to obtain maximum efficiency.
- Hazardous gas monitoring: identifies presence of hazardous gases such as hydrogen, fuel vapor, or carbon monoxide and helps indicate where preventative maintenance may be required.

Tower and environmental module report indicating indoor/outdoor temperature and humidity

For more information, visit www.kentrox.com, email info@kentrox.com, or call 800-733-5511 (US), +1 614-798-2000 (outside US).

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