



SERIOUSLY SMART RADIOS FOR LINKING CRITICAL COMMUNICATIONS INFRASTRUCTURE

OPTIONAL SOFTWARE FEATURE ENABLERS (SFEs)

VIA **MiMOMAX CONFIGURATION, CONTROL & MONITORING SOFTWARE (CCMS)**

MiMOMax Software Feature Enablers (SFEs) are optional advanced software features for enhancing the performance of a standard MiMOMax radio. These are easily configured via MiMOMax CCMS; a web-based network management software that allows easy and secure access to radio configuration, calibration and alarm functions. Having three optional operational modes: Local, Remote (through the local Ethernet port) and Remote Over-The-Air, tasks that can be performed via CCMS include:

- » Changing Passwords
- » Monitoring Radio Performance
- » Configuring Radio Link
- » Configuring SNMP
- » Editing RF Modem Parameters (incl. Sync. Serial)
- » Changing IP settings of MiMOMax radios
- » Performing Software Upgrades
- » Enabling/ Disabling SFEs
- » Programming Power Levels & Frequency
- » Preparing Radio Settings Back-up

Local CCMS

This allows local access to the CCMS web application via the Ethernet port of the local radio. The application is password protected and allows restricted control of the local modem.

Remote CCMS/Over-The-Air Configuration (OTAC)

Remote CCMS enables access through both the local Ethernet port and over-the-air link (WAN). This allows Over-The-Air-Configuration (OTAC) of the remote radio link and often replaces the need to travel to both radio sites. Remote CCMS includes local CCMS.

Over-The-Air Programming (OTAP)

OTAP allows the user to perform complete software and database updates or upgrades remotely via the radio link. With this feature enabled, the operating and application software can all be upgraded over-the-air (OTAP). The radios will revert to the last known working version of the software and re-establish the link, if an error occurs during the re-programming process. Without this feature, the software and database on the radio can only be updated or upgraded locally via the wired Ethernet port. OTAP includes OTAC SFE plus local CCMS.

SNMP (Simple Network Management Protocol) Support

MiMOMax radios can be accessed via SNMP (Simple Network Management Protocol) for network monitoring purposes. The radio can also send various traps or notifications via SNMP to a configured SNMP manager on the network. MiMOMax does not provide SNMP clients as this product is designed to interoperate with generic SNMP clients.

Terminal Server

The Terminal Server software supports up to two RS-232 ports*. The terminal server packs the serial data into IP packets for transport across IP networks. *Only applicable to MiMOMax ND & MDL

Out Station Licenses

This software enables a Radio Base Station (BRU) to support a specified number of Remote Radio Out Stations (RRU). The number* of RRU licensed depends on the application requirements.

*One BRU can support up to 1024 RRUs



M-PoD (MiMOMax Power On Demand)

This is a unique power saving feature, which promptly turns on (<100ms link establishment time) the remote end of a radio unit transmitter only when there is data to be transmitted between RUs. The M-PoD is specifically designed for the ND.L.

This feature is suited to remote sites where power consumption is an issue. It also supports cascaded links. M-PoD automatically and rapidly turns on the transmitter by promptly keying it up from idle mode in typically 80 ms to enable over-the-link data transmission. Once it is completed, the M-PoD ensures that the transmitter will stay active for a programmable time period between 1 and 255 seconds.

During this time, the M-PoD confirms that all data is processed before automatically deactivating the transmitter. The stand-by power consumption in idle mode is typically 8W. MiMOMax also offers low power options for links that have to run continuously on shorter paths thereby further reducing the power consumption to less than 55W @ +26 dBm power output and less than 40W @ +23 dBm power output.

M-RAP (MiMOMax Routing Adaptation Protocol)

M-RAP is an optional suite of protocols that provides dynamic routing. This allows communications to continue in the event of a failure if alternate communication links exist. Protocols include:

- » **OSPF** (Open Shortest Path First) is used at the WAN level to determine the shortest path between two sites. OSPF selects an alternate path if and when a communication link fails thereby ensuring that communication continues.
- » **VRRP** (Virtual Router Redundancy Protocol) is used at a LAN level to ensure that devices on that LAN have redundant local gateways. In the event of a failure, the remaining MiMOMax routers elect a new default gateway to ensure that devices on the local network continue to communicate with the WAN
- » **GRE** (Generic Route Encapsulation) is used to transfer OSPF monitoring statistics to a central monitoring server.

DNP3 (Distributed Network Protocol v.3.0) Support

MiMOMax radios can be accessed via DNP3 (Distributed Network Protocol version 3.0) for network monitoring purposes.

DNP3 is a highly robust, flexible and interoperable communications protocol used to communicate between RTUs (Remote Terminal Units), IEDs (Intelligent Electronic Devices) and SCADA master stations (aka Control Centres).

Various DNP3 points can be easily added/removed using MiMOMax CCMS depending on the user's monitoring needs. Using DNP3, MiMOMax radio can also be configured to have unsolicited events enabled/disabled by default.

M-DAP (MiMOMax Data Acceleration Protocol)

MiMOMax Data Acceleration Protocols (M-DAP) is designed to enhance real-time applications such as VoIP. M-DAP achieves a significant increase in capacity and quality through the following:

- » Header compression
- » Quality of Service
- » Payload compression
- » Traffic Classifier

M-CAM (MiMOMax Cognizant Adaptive Modulation)

M-CAM is MiMOMax's proprietary smart Adaptive Modulation scheme designed to optimise the data throughput and simultaneously maintain the radio link in adverse conditions. It achieves this by adapting the radio unit to appropriate modulation scheme, depending on the measured quality of the received signal.

M-CAM enables the radio unit to transverse between QPSK and the maximum modulation scheme available, depending on the RF channel conditions. In some circumstances, this may not be desirable (e.g. synchronous data where fixed latency is required). If M-CAM is disabled, the radio unit's modulation logic will stay fixed to the set modulation scheme, independent of signal quality.

M-SEC (MiMOMax Security)

This feature enhances the critical communications network security by providing Stateful Packet Inspection (SPI); a software-based firewall that is programmed to distinguish legitimate packets for different types of connections. It only allows access to data packets that match a known active connection.

Unlike stateless firewall that has no memory of previous packets, Stateful firewall holds significant attributes of each connection. Therefore, it is highly secure against "spoofing attacks" while offering network administrators "finer-grained control of network traffic".

Furthermore, the anti-lockout feature prevents the administrator from configuring firewall rules in a way that will lock him out of the web interface. With a predetermined set of rules, M-SEC optional security feature assists the network user in securely managing the web-administered devices.

Nitro Boost

Nitro Boost allows the radio unit modulation logic to go up to the full 256QAM. This boosts data throughput to reach user data rate of up to 256kbps (raw data rate of 320kbps).

Diversity Enabled (future option)

Diversity software enabler offers a license for the 0x2 Diversity Receiver (Rx) to function and provide additional Rx in a link. The 0x2 MiMO Rx provides additional spatial diversity, which increases reception and lowers the probability of data loss under severe fading conditions.