

vRapid Mobile® FOTA (Firmware Over-the-Air) Updates for Updating M2M Modules



Minimize downtime, expand functionality and deliver value-added services using Red Bend's vRapid Mobile FOTA (firmware over-the-air) update solution for M2M modules. vRapid Mobile FOTA dramatically shrinks update file size and overcomes barriers to reliable and cost-effective updating of firmware on cellular M2M modules deployed in the field.

■ vRapid Mobile FOTA for M2M Modules

vRapid Mobile FOTA enables M2M manufacturers and service providers to create compact firmware updates for machine-to-machine (M2M) modules and to install the updates over the air rapidly and with complete reliability. Based on Red Bend's patented update technology, vRapid Mobile FOTA is composed of two primary components: an update generator and an update installer.

vRapid Mobile's Update Generator identifies the essential changes from an existing firmware version to a new, updated version and automatically creates an extremely compact package of these changes.

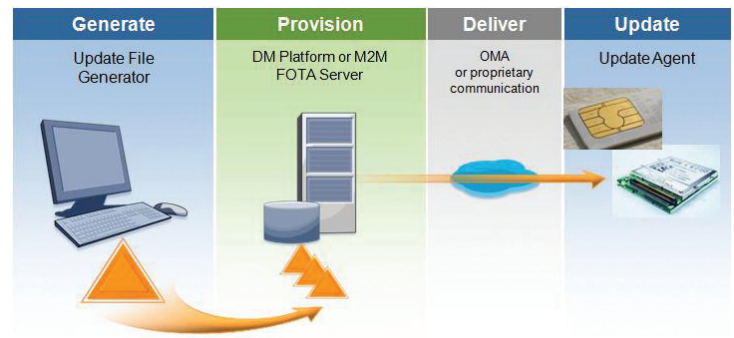
vRapid Mobile's Update Installer resides on the M2M module itself and performs the update installation. Optimized for the limited memory available within the module, vRapid Mobile Update Installer applies the updates in-place on the module's firmware accurately and reliably.

■ vRapid Mobile FOTA Advantages

Proven and patented Red Bend delta-update technology overcomes bandwidth and memory constraints. Red Bend's patented delta-update technology extracts only the essential changes between firmware versions, reducing update file size by up to 97% and lowering module memory and bandwidth requirements, while maintaining 100% data accuracy.

vRapid Mobile FOTA supports advanced device architectures. Using advanced algorithms, vRapid Mobile supports architectures that employ compressed multi-section images, read-only and read-write file systems, a combination of NAND and NOR flash, multiple CPU architectures and other advanced features.

vRapid Mobile FOTA enables advanced FOTA capabilities. vRapid Mobile FOTA enables a fully revertible FOTA process without the need for network connectivity or



human intervention. It is the only FOTA solution to perform firmware updates in the background, without taking the device offline. This minimizes the time that modules are out of service due to reprogramming. vRapid Mobile FOTA guarantees consistent update performance for an unlimited number of updates, from any firmware version to any other version.

vRapid Mobile FOTA optimizes on-device memory. Using a unique "in place update" algorithm, vRapid Mobile FOTA requires only minimal working memory to perform updates while providing control over the amount of flash memory required. This patented technology resolves complex "write before read" issues so that firmware can be updated rapidly without adding costly memory.

vRapid Mobile FOTA can be integrated into module firmware in a matter of days. vRapid Mobile FOTA's mature technology and proven integration process allow manufacturers to efficiently perform integration without restructuring module firmware and with no impact on the firmware development tool chain. As a result, integration has been proven to be significantly faster and less expensive than alternative solutions.

vRapid Mobile FOTA ensures 100% fault-tolerant update integrity and completion. vRapid Mobile FOTA eliminates

the risk of disabling modules due to errors or unexpected disruptions in the update process. In the event of a power loss, it automatically resumes the update from the point of interruption.

vRapid Mobile FOTA ensures security for all stages of the update process. Using a patented pre-installation verification technique, vRapid Mobile FOTA verifies that the newly created software version is 100% accurate and will install properly prior to the update process getting under way.

vRapid Mobile FOTA is interoperable with mobile device management solutions. vRapid Mobile FOTA works with all existing mobile device data distribution and transfer solutions and all standard protocols, including the Open Mobile Alliance (OMA).

vRapid Mobile Update Installer minimizes the on-device footprint. The Update Installer software requires only one flash sector of 64KB as permanent allocation for the Update Installer (about 20KB) and the device specific Update Agent, and one to be temporarily allocated upon running for the update-specific data, to ensure start-to-finish integrity of the update install process.

vRapid Mobile Update Installer is updateable over the entire module lifecycle. The Update Installer software itself can be quickly updated over the air, allowing it to be embedded during the manufacturing process and upgraded remotely and transparently, as required, throughout the life of the module.

vRapid Mobile FOTA enables module manufacturers and service providers to offer new value-added services. With vRapid Mobile FOTA, manufacturers and service providers can provide M2M customers with new software management services that maintain and enhance the functionality of the M2M device and its related applications over the lifetime.

Benefits to M2M Manufacturers and Service Providers

- Reduce cost of repair, service and troubleshooting
- 100% reliable software management over the air, without an on-site technician
- Accelerate time-to-market and adoption of new features and services
- Increase ROI and extend product lifecycles
- Improve customer satisfaction, strengthen customer loyalty and over value-added services

vRapid Mobile FOTA Advantages

- Smallest possible update files
- 100% reliability and security
- Optimized use of on-device memory
- Fast, accurate updating in the background
- Consistent performance for multiple updates
- Any-to-any firmware version updates
- Rapid integration into modules
- Unobtrusive to firmware development tool chain
- Proven, mature and standards-based

■ **About Red Bend Software**

Red Bend Software, the leader in Mobile Software Management (MSM), provides software solutions for managing firmware, applications and devices over the air. The company's award-winning MSM products enable device manufacturers, mobile operators and software developers to increase revenues, reduce support costs and achieve faster time to market by remotely managing their software assets on mobile devices. Red Bend's software has been deployed in more than 620 million mobile devices and adopted by eight of the top 10 handset manufacturers, including Kyocera, LG Electronics, Motorola, Sharp, Sony Ericsson and ZTE, as well as dozens of other leading companies in the mobile, M2M and WiMAX markets. Unlike device management vendors with proprietary end-to-end systems and manufacturers' internally developed solutions that are platform specific, Red Bend is the only company offering independent client software that is interoperable with any standards-based server and that works with any platform on any type of mobile device. Founded in 1999, Red Bend is a privately held, venture capital-financed company with offices in China, Israel, Japan, Korea, the U.K. and the U.S. Visit www.redbend.com.



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