The Motorola MC9500-K:

Maximizing the return on asset (ROA) with groundbreaking modular design

Featuring Motorola Mobility Architecture eXtensions (MAX)

Motorola Mobility Architecture eXtensions (MAX) allows Motorola mobile computers to deliver extraordinary value — a truly unprecedented return on investment (ROI) and total cost of ownership (TCO). This unique set of Motorola features turbo charges Motorola mobile computers, driving ease-of-use, ease-of-management, flexibility, modularity, lifecycle and overall system performance to new heights. Features in the MC9500-K include...

MAX *Rugged*

With MAX *Rugged*, you can count on a device built for the most demanding business environments. A minimum of three specifications — industry leading mechanical stress and endurance tests plus environmental sealing — insures dependable performance and maximum lifecycle.

MAX *FlexWAN*

Customer upgradeable 3.5G WAN offers true WAN technology independence. Purchase the MC9500-K with or without the WAN subsystem and add or change WAN technologies (GSM/CDMA) as needed right in the backroom — no need to return the device to a service center.

MAX *Backroom Management*

This game-changing backroom management approach eliminates the high cost of 'rip and replace' in the backroom with a future-proof Universal Accessory System that supports the Motorola MC9500-K, popular existing Motorola mobile computers as well as future generations of Motorola mobile computers.
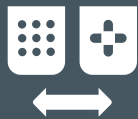
MAX *Keypad*

A modular keypad architecture allows the exchange of keypads in minutes, right in the backroom, allowing the mobile computer to adapt to changing application requirements and enabling instant on-site replacement in the unlikely event of keypad damage.

MAX *Battery*

Information indicators integrated into the battery itself, displaying the state of charge and the state of health. Users can be sure that they start the day with a battery capable of lasting a full shift — and backroom managers can more efficiently manage the battery pool.

MAX *Sensor*

Offers true enterprise class Interactive Sensor Technology (IST), including dynamic screen orientation, power management, free fall detection and the ability to integrate motion-related data into customized applications.

MAX *Secure*

MAX *Secure* provides the security features required to ensure secure data transmissions over either the WLAN or the WWAN — including highly sensitive applications in government and public safety.

MAX *Data Capture*

Integrate best-in-class advanced data capture functionality, including: 1D, 2D and DPM bar code scanning; signature capture; high resolution image and document capture; RFID and more.

MAX *Locate*

Best-in-class implementation of locationing technology, such as GPS, for line-of-business applications that further increase user productivity and ensure business continuity.

With the highly modular MC9500-K Motorola mobile computer, enterprises can improve the value of mobility solutions, achieving a new level of ROI and TCO — while effectively decreasing the cost per user.

Executive summary/ background

For many years, the Motorola MC9000 Series set the bar in rugged mobile computer design, serving as the industry's gold standard for rugged mobile computers. Every day, many of the world's largest field operations use MC9000 Series mobile computers to help streamline business processes and improve response times, data accuracy and customer service levels.

As mobile technologies continued to evolve, Motorola embarked on the planning stage for the successor to the MC9090-K/S Series, targeting the specific needs of key-based field mobility applications. Three key design objectives were identified:

- Preserve and enhance the signature rugged design of the MC9000 Series

- Add all the latest in mobile technology to create a true state-of-the-art device

- Address the key issues that mobility itself creates in the enterprise, related to everything from return on investment (ROI) and total cost of ownership (TCO) to product flexibility and day-to-day management — for users as well as in the backroom.

In order to design a product that would address these requirements, a Motorola taskforce literally took to the streets, undertaking a multi-faceted multi-year research project whose end goal was to not only identify the underlying business challenges associated with mobility solutions, but also identify the best possible means to address the top concerns of today's organizations.

Many hours were spent:

- Out in the field observing rugged mobile computers in use in transportation and logistics, direct store delivery (DSD) and route accounting, parcel and post, field service, sales force automation, public safety and more

- Inside the enterprise, observing processes at the start and end of the business day for the mobile workforce as well as for backroom managers

- Interviewing customers and conducting focus groups

Thousands of customer comments and observations were captured and distilled into underlying business needs. These business needs were further distilled into key polestars that became the blueprint for the development of the MC9500-K — the next evolution of the key-based rugged mobile computer.

One of the key requirements that surfaced was the need for a completely new level of modularity — a degree of flexibility that would allow enterprises to truly maximize the value of these high dollar assets. Companies specifically wanted a mobility solution that could adapt to meet changing business needs, including the ability to:

- Change cellular networks as needed instead of purchasing a device that was permanently tied to a specific carrier

- Update keypads to meet the needs of modified or new applications

- Leverage existing accessories instead of requiring the constant expense to upgrade charging cradles, battery cradles and more as well as re-tool the backroom with every mobile computer upgrade

To address these issues, Motorola added three new Motorola Mobility Architecture eXtensions (MAX) — MAX *FlexWAN*, MAX *Keypad* and MAX *Backroom Management*. (Motorola MAX is a set of unique features and functionality that turbocharges Motorola mobile computers by driving ease-of-use, ease-of-management, flexibility, modularity and lifecycle to new heights — along with return on investment and total cost of ownership.) This technical brief examines the underlying issues that gave birth to these three new features, and how Motorola addressed some of today's most pressing business concerns with groundbreaking innovations in product design.

The business issues created by mobility

One recurring theme across all industries, regardless of application, is the need to more fully maximize the investment in rugged mobile computers. A rugged mobile computer is a strategic investment. In today's tough economy, organizations are pressured to get the most value out of every business asset. But constant changes in the business environment, rapid obsolescence of mobile technologies and the constant emergence of new technologies create three key concerns that make it challenging to make the right technology buying decision:

- Cellular networks are continually evolving, upgrading coverage and modifying coverage plans. But the value of the mobile computers deployed in your field service operations is directly tied to network availability and performance. How can you be sure that the network on which you choose to standardize will best serve the needs of all your workers in all your geographies today — and in the future?

- Just as business processes evolve and change, so will your applications. How do you know what changes or new applications you may need in the future to sharpen your competitive edge — and how can you ensure that the device you buy today can best support the applications of tomorrow?

- Mobile computing technology is evolving at a rate that outpaces nearly every other industry. How can your company afford to migrate to the most current mobile computing technology and expand mobile solutions to other areas of the business when the deployment of each new device forces you to retire existing accessories, purchase new accessories and upgrade the backroom?

The solution: groundbreaking modularity… and device flexibility

To address these issues, organizations would need a mobile computing solution that offers a new level of modularity for the entire system — the device itself as well as the accessories infrastructure. Three new Motorola MAX features were developed to provide the unmatched flexibility and investment protection today's businesses require: MAX *FlexWAN*, MAX *Keypad* and MAX *Backroom Management*.

MAX *FlexWAN*: real WAN technology independence

The issues
Until recently, mobile computers were WAN-technology specific — devices were purchased with a network-specific wireless WAN (WWAN) modem and permanently associated with that cellular network (such as GSM or CDMA) and the specific network technology (such as GSM EDGE or CDMA EVDO-Rev A). This lack of flexibility created two issues:

Issue #1
Regardless of whether an organization operates in a single area, throughout an entire country or in multiple countries around the world, a single carrier often cannot meet coverage needs. Certain carriers may provide better coverage in some parts of the country than others, while other carriers may not be available in some countries. And even in a single business territory, such as a city and its surrounding metropolitan area, one carrier may provide better coverage inside the city limits, while a different carrier may provide better coverage in some of the outlying more remote suburbs.

As a result, part of your workforce may have less-than-desirable coverage, which can impact connection availability and quality, application availability and performance, and ultimately worker productivity. In addition, for distributed organizations with workers in multiple territories or countries, the asset pool becomes inflexible — devices that may no longer be needed in one location cannot be re-deployed in another location if the cellular network technology is not the same.

Issue #2
Companies that are ready to upgrade their mobile computers must make the decision 'to WAN or not to WAN' prior to device purchase. Today's mobile computers must be purchased either with or without a WAN modem — companies cannot purchase a WAN-enabled device and add a WAN modem if and when it is needed. The result is the lack of flexibility required to support companies that may be in the beginning stages of planning a WAN-based mobility solution or that are likely to need real-time communications in the field in the near future. Since these enterprises are not prepared to select or enter into a contract with a cellular carrier, they are faced with one of two decisions — neither of which is optimal:

- 'Make do' with existing mobile devices until a WAN carrier is selected — which may translate into the inability to deploy the new technology required to address pressing business issues

- Purchase LAN-only mobile computers that will enable the company to deploy the technology required to streamline business processes, but will likely be retired before realizing their lifecycle — producing a poor return on investment (ROI)

The solution: MAX *FlexWAN*

Many organizations continue to ask the same question: "Why does a mobile computer have to be manufactured to be network technology-specific, unable to upgrade to future generations of cellular network technology or provide companies with the freedom to add WAN if and when it is needed?" The answer is — it doesn't.

Continuing our legacy as a true pioneer in the mobile industry, Motorola presents a revolutionary industry first, a Motorola Mobility Architecture eXtensions (MAX) feature known as MAX *FlexWAN*. MAX *FlexWAN* turns the MC9500-K into a true network technology-agnostic mobile computer that enables IT and backroom managers to switch wireless WAN technology and carriers in minutes — no need to send the device to a Motorola service depot. As a result, the MC9500-K is a true industry first — companies now have the freedom to purchase a mobile computer with or without WAN technology that can be easily repurposed as business needs dictate. The patented self-contained WAN subsystem consists of a network card with an integrated radio and antenna. Organizations can add or swap networks (3.5G GSM HSDPA or 3.5G CDMA-EVDO Rev A) in just a five easy steps.

Swap networks (3.5G GSM HSDPA or 3.5G CDMA-EVDO Rev A) in just five easy steps

1. Remove the keypad from the MC9500-K

2. Disconnect the WWAN network card cable and remove the existing WWAN network card

3. Insert the new WWAN network card and reconnect the new network card cable

4. Replace the keypad

5. Load the appropriate network software

While other mobile computers may claim to have this same modularity, in reality, they do not. No other industrial mobile computer on the market today provides customers with the flexibility to switch WAN technologies and carriers, right in the backroom – without compromising application performance, platform longevity and investment protection. Today's competitive devices that enable a swapping of the WAN modem require a trip to the manufacturer service depot as well as a fair amount of disassembly — increasing the potential for future device issues.

The benefits

MAX *FlexWAN* technology provides several distinct business advantages:

Protects worker productivity and customer service levels

- Your workers depend on their MC9500-K mobile computers to execute everyday tasks — lack of connectivity or a poor connection can bring a worker's ability to conduct business to a grinding halt. MAX *FlexWAN* addresses this issue by providing complete flexibility in the selection of a cellular technology and carrier throughout the entire lifecycle of the MC9500-K — a feature that no other device on the market today can offer. Organizations can now select the network that will provide the best coverage for workers in a specific country, territory or city — or even for workers who may spend the day in a more remote section of a geographic area that is better covered by a different carrier. The ability to provide the best coverage for virtually every single one of your workers protects employee productivity and device uptime as well as customer service, satisfaction and retention.

Improves asset ROI and TCO — while reducing costs

- Since the MC9500-K is not carrier specific and IT can easily change networks as mandated by business needs, the lifecycle and utilization of this high dollar pool of assets are truly maximized. Devices that are no longer in use in one region can be quickly and cost-effectively re-deployed in another region with a growing workforce. The ability to purchase a WAN-capable device that can be activated as business needs evolve on the cellular network of choice allows companies to invest in devices that are really capable of

meeting the needs of today and tomorrow. The need to retire devices before the end of their lifecycle to deploy WAN-based mobility solutions or take advantage of cellular network enhancements is eliminated, providing the truly superior investment protection required to drive a more rapid ROI and a lower TCO.
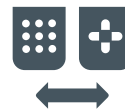
MAX *Keypad*: modular keypads for superior application flexibility

The issue

Often, a single company needs to deploy multiple field-based applications. For example, in the Food & Beverage industry, a company in the snack or soft drink sub vertical will have a direct store delivery (DSD) function, with drivers who are responsible for sales and delivery of product. In addition, the company may also have a pool of vending machines out in the field, with a team of technicians responsible for repairs, as well as routine inspections and maintenance. Each of these applications has different data entry requirements. The DSD drivers need to enter a great deal of numeric data (such as SKU numbers and pricing), while the technicians will need to enter more text and also may make more voice calls — for example, to dispatch, a co-worker or a technical support center. To maximize on the job productivity and simplify everyday tasks, the DSD driver requires a numeric calculator-style keypad, while the technician needs an alphanumeric or alpha-primary keypad.

Although most competitive products in the rugged mobile computing category typically offer a choice of two device configurations with different keypads:

- The device cannot be re-deployed in a different application with a different keypad, restricting asset usability. For example, you may initially deploy an application that requires an alphanumeric keypad to support a large amount of data entry — but a future upgrade simplifies the application with a menu-driven architecture that requires large numeric keys.

- If the keypad is damaged, the entire device must be returned to the manufacturer's service depot, adding to downtime as well as affecting the return on investment (ROI) and total cost of ownership (TCO) for the device.

The MC9500-K Keypad Portfolio

Alpha Numeric
Designed for users who will be entering heavy text and numeric data, this keypad offers a full set of both alpha and numeric keys on the primary layer.

Alpha Primary
This keypad offers a full alpha keypad on the primary layer with shifted numeric keys, ideal for users who primarily need to enter text.

Numeric Calculator
This keypad is designed for users who will enter primarily numeric data.

Numeric Telephony
Designed to support heavy phone use as well as a small amount of numeric data

The solution: MAX *Keypad*

The MC9500-K offers a simple yet sophisticated solution to this issue — MAX *Keypad*, a modular keypad architecture that is truly customer-swappable — providing a choice of keypads that can be installed in minutes.

A portfolio of keypads

Motorola understands that the keypad is at the heart of the productivity of the mobile worker, the human interface between your workers and your applications. In order to maximize the productivity of your mobile workforce, the keypad must offer maximum keypad real estate and data entry simplicity.

Motorola offers four standard keypads for the MC9500-K that are designed to meet the needs of virtually any type of application:

- **Alpha Numeric Primary:** For users who will be entering heavy text and numeric data, this keypad offers a full set of alpha and numeric keys on the primary layer.

- **Alpha Primary:** Offering full alpha keys on the primary layer plus shifted numeric keys, this keypad is ideal for users who will mainly enter text.

- **Numeric Telephony:** For users who will primarily utilize the device for phone calls and some numeric data

- **Numeric Calculator:** For users who will enter primarily numeric data in applications such as DSD

Future keypads will enable the incorporation of new technologies into the MC9500-K — enriching the feature set of your mobility deployments without requiring the purchase of new mobile computers. In addition, since the keypad design is modular, it can be easily customized in larger deployments to meet specific application needs.

Customer-swappable

There is no need to return the device to the Motorola service depot — keypads can be swapped in minutes in the operations center or the backroom through a simple four-step process:

- Remove the two keypad screws

- Remove the existing keypad and insert the new keypad

- Replace the two keypad screws

- Execute a warm reboot

There is no software change required, and all four keypad options are interchangeable — for example, a numeric telephony keypad can be replaced easily with an alphanumeric keypad.

The benefits

The MAX *Keypad* feature provides organizations with a number of distinct advantages:

Maximizes asset flexibility, value and ROI
MAX *Keypad* helps improve the lifecycle of the MC9500-K:

- The functionality of the MC9500-K device you buy today is not tied to the original keypad. As your business or application needs change, the MC9500-K can change with it, increasing asset utilization. For example, your application today may require the entry of primarily numeric data. But a future version of that same application may require a mixture of text and numeric data. Without a modular keypad architecture, companies are forced to retire the existing device — or if possible, re-deploy in another area of the business. But with the MC9500-K, keypads can be swapped, allowing your existing mobile computers to accommodate new application needs in just minutes.

- In larger deployments, asset volume requirements for various geographic locations may change for various reasons. For example, a consolidation of two offices may result in a pool of MC9500-K devices that are no longer utilized. A modular keypad architecture enables the easy customization of the MC9500-K to meet data entry requirements in other field applications — either with one of Motorola's off-the-shelf standard keypads or a customized keypad.

- MAX *Keypad* enables the cost-effective customization of keypads in large deployments to best complement your application. For example, key size and placement can be modified for easier data entry.

- As the Motorola portfolio of keypads expands, adding new technologies (such as biometrics) to your existing device pool can be as simple as swapping keypads.

Maximizes employee productivity
Typically, when a mobile application is deployed, organizations must choose the keypad that most closely matches their requirements and adjust the business process to fit the keypad. But with the MC9500-K, you can adopt the keypad that is right

for your business processes — you no longer need to compromise and adapt your business process to a default keypad. Now, you can choose the best possible keypad for your applications — standard or custom (for large deployments) — complete with dedicated programmable soft keys to further simplify everyday processes. With maximum control over the area where end-user and application meet — the device keypad — organizations can design the most intuitive key-based mobility solutions possible, maximizing workforce productivity as well as minimizing training requirements and costs.

Improves asset uptime and reduces TCO
In the rare event that the keypad requires service, there is no need to return the entire MC9500-K to the Motorola service depot. With an onsite spares pool, a new keypad can be installed in minutes, reducing the time the device is out of service — and the TCO.
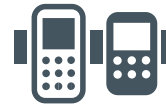
MAX *Backroom Management*: Investment protection through future proofing, higher density, modular flexibility and easy installation — and day-to-day management
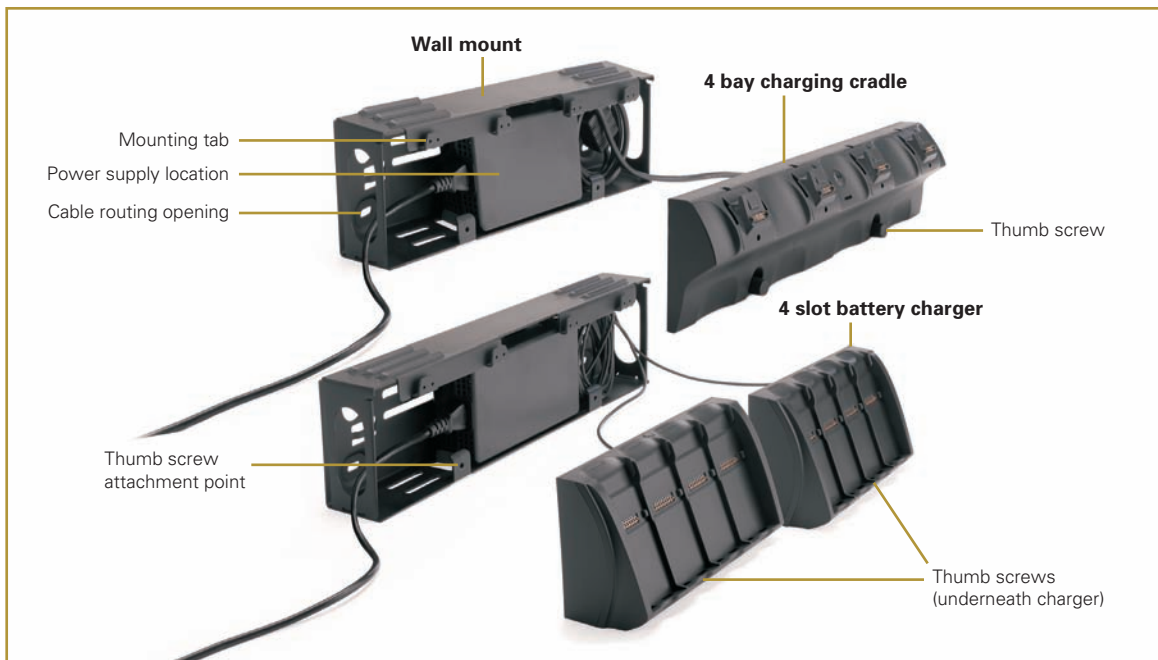
The issue

Mobile computing technologies experience a very fast churn, with many of the ingredient technologies — including CPUs, operating systems, wireless WAN and LAN modems and data capture technologies — evolving at different pace. Many enterprises are continually seeking to expand mobile solutions to new areas of the business and when justified, migrate existing mobile computing solutions to next generation devices to embrace newer technologies.

But today, accessories in the backroom are device or form-factor specific. The adoption of newer technologies on newer devices requires not only the purchase of new accessories, but also the high cost of 'rip and replace' in the backroom. For example, in addition to the cost of re-planning the backroom, cables must be re-wired and shelves must be re-installed to accommodate new cradles, new battery chargers, new power supplies and new cables. The capital costs associated with the purchase of new accessories plus the operational costs related to updating the backroom can easily exceed 50 percent of the cost of the mobile computers themselves.

Combination Wall Mount Cradle/Battery Charger

Wall mount

4 bay charging cradle

Mounting tab

Power supply location

Cable routing opening

Thumb screw

Thumb screw
attachment point

4 slot battery charger

Thumb screws
(underneath charger)

In the backroom, universal mounts are as easy to install as hanging a phone on a wall, and are designed to support the charging of Motorola MC9500-K mobile computers and MC9500-K batteries as well as future Motorola mobile computers and in the near future, the most popular current Motorola mobile computers (via an adapter). Mounts contain the appropriate power supplies and cables, and can be easily configured and re-configured into either a 4-bay device charging cradle or an 8-slot battery charger by simply attaching the appropriate facing with two thumbscrews.

As a result, enterprises struggle to justify migration to next generation devices until the end of the lifecycle of the existing installed base of mobile computers. Yet the delay in procurement and deployment of the new technology in the latest mobile computing devices can prevent enterprises from realizing the benefits of the latest technology — and even impacting the ability to compete.

The solution: MAX *Backroom Management*

The solution is the creation of truly form-factor agnostic accessories. The MC9500-K offers just that — an industry breakthrough — the creation of a highly modular accessory strategy known as MAX *Backroom Management*. At the heart of MAX *Backroom Management* is the Motorola Universal Accessory System, a portfolio of form factor agnostic accessories designed to live beyond the MC9500-K, supporting future next generation Motorola mobile computers as well as the most popular current Motorola mobile computers in the near future via an adapter.

In the backroom, rows of universal mounts are as easy to install as hanging a phone on a wall. Each mount, which contains the power supplies and cables, can then be easily configured and re-configured into either a 4-bay device charging cradle or two 4-slot battery chargers by simply attaching the appropriate facing with two

thumbscrews. Going forward, all next generation Motorola mobile computers will be compatible with the Universal Accessory System. The ability to accommodate new devices and their associated batteries in the backroom will be as simple as swapping the 4-bay facing — an inexpensive part that can be installed in minutes.

The modular system also provides a new level of flexibility. For example, a desk mount is available to convert a 4-bay wall cradle into a 4-bay desk cradle with very little effort. And a single-bay desk cradle, individual vehicle cradle and spare battery charger can be purchased individually and 'mixed and matched' as needed — and to accommodate space constraints in the vehicle or on the desk.

The benefits

Substantial increase in ROI and TCO for your overall mobility solution
When you invest in accessories and backroom infrastructure for the MC9500-K, you invest in a system designed to serve your needs well beyond the lifecycle of the MC9500-K, significantly reducing the need for additional ongoing investment in new accessories as well as your backroom as you adopt newer mobile computing technologies into your field operations. There is no need to 'rip and replace' the backroom infrastructure — what you purchase today will serve your needs in the future.

In addition, the backroom wall mounting system maximizes backroom density, reducing backroom space requirements and related costs. For example, an installation of 48 MC9500-K mobile computers reduced mobile computing device density in the backroom by more than 30 percent compared to competitive devices in the same class. Accessory durability is doubled — mounting tabs are designed to withstand 20,000 insertions, twice the prior specification of 10,000 insertions — doubling the lifecycle of your accessories. In addition, the universal cleat (the point of connection between the cradle/charger and device) is customer-serviceable. And finally, modularity allows you to buy what you need today and add or reconfigure as needed tomorrow — whether you need more chargers or cradles in the backroom or want to add spare battery chargers to existing desk or vehicle cradles.

The superior future proofing and design of Motorola's Universal Accessory System dramatically improves the ROI for your accessories, while substantially decreasing the TCO for your entire mobility solution. As a result, companies can more easily justify the expansion of mobility into more areas of the business, as well as migration of existing mobility solutions to next generation product.

NOTE: For more information on the design and benefits of Motorola's Universal Accessory System, please see the Motorola MC9500-K Accessories Guide and the Technical Brief entitled "The Motorola MC9500-K: Improve the ROI and TCO of your mobility solution with game-changing backroom management", available for download at www.motorola.com/mc9500.

Summary

Given the rapid developments in the mobile computing industry, modularity is not a 'nice-to-have', but a 'have-to-have'. Wireless networks are continuing to evolve — coverage is continually expanding and next generation wireless networks will offer increased bandwidth and better application performance. In addition, every day, companies are finding new applications for mobility to further streamline everyday processes, improve operational efficiency and sharpen the competitive edge — including emerging technologies, such as biometrics and RFID.

By creating a mobile computing solution that offers unmatched WAN technology, cellular network, keypad and accessory flexibility, Motorola allows enterprises to improve the value of mobility solutions while effectively decreasing the cost per user. With the MC9500-K, organizations can leverage the modular WAN subsystem to deploy the right mix of WAN technologies and carriers as well as help future proof your applications — and your backroom.

The result is a new level of modularity for key-based field mobility applications — and a new level of ROI and TCO for your mobility investments.

For more information on how you can put Motorola's MC9500-K rugged mobile computer to work in your organization, please visit us on the Web at www.motorola.com/mc9500 or access our global contact directory at www.motorola.com/enterprisemobility/contactus

Why Motorola

Every day, organizations of all sizes all over the world count on Motorola mobility solutions to maximize personnel effectiveness, improve services, and increase revenue potential. When you choose Motorola for your mobility solution, you get the peace of mind that comes with choosing an industry leader as your technology partner. Motorola offers the proven expertise and technology you need to achieve maximum value and a fast return on investment — as well as first hand experience in virtually every size organization in nearly every major industry. And our end-to-end solutions offer the simplicity of a single accountable source — regardless of the number of vendors involved.

Our comprehensive product offering includes: rugged and enterprise class mobile computers with extensive advanced data capture and wireless communications options; rugged two-way radios for always on voice communications; private wide area and local area wireless and outside the four walls — and to network multiple locations; comprehensive RFID infrastructure, including fixed, mobile and handheld RFID readers; a partner channel delivering best-in class applications; software solutions that enable centralized and remote management of every aspect of your mobility solution; and a complete range of pre-and post-deployment services to help get and keep your mobility solution up and running at peak performance every day of the year.

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