



Optimum M4100

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Introduction

Wireless terminals are not new to the payments industry. The first such devices were introduced in the late 1980s and, although these units used wireless communication technologies, they were far from portable and were often transported in large bags serving as transactions kits. These “wireless” units were typically highly priced, provided unreliable coverage, at best, and had numerous other limitations.

The next generation of wireless terminals addressed the market with battery packs and wireless modems strapped to existing countertop technologies. These solutions also tended to be large, bulky and not ideal for mobility. In the past few years, however, advancements in technology have reduced the size of terminals significantly. While smaller hardware is a big step in the evolution of payment devices from wireless and “luggable” to truly wireless and portable, more can be done to the overall design of hardware and software.

The goal has always been to design a wireless product tailored to various mobile terminal markets. The product should be similar in nature to desktop architectures to allow easy adoption in the market as a device that is intuitive to use and support. Yet, the product must differentiate itself from countertop technology to meet the distinct needs of the wireless market, including portability and usability for both the merchant and the customer, especially in instances where the device is handed over for PIN entry. All of this, while keeping a close eye on cost of ownership, ease of integration and the ability to add additional value for all involved.



Background

Wireless is a generic term generally differentiated in one of two ways:

- wLAN (wireless Local Area Network)
- wWAN (wireless Wide Area Network)

wLAN technology is used to transport data over relatively short distances. The best known wLAN technology is “WiFi,” which has become popular at many coffee shops around the world to the point it is almost synonymous with wLAN. With global shipments of WiFi-enabled products ranging in the billions of dollars (USD) annually, WiFi may be the most prevalent wLAN communication worldwide. Still, there are alternatives to WiFi such as Bluetooth® that are sometimes more suitable to a merchant’s needs. No matter what wLAN is implemented, installation requires a base station or router to receive information from wireless units and route it to the host. The prime difference between WiFi and Bluetooth is that WiFi is routed directly to a host server that typically uses high-speed broadband or DSL access, while Bluetooth pairs with another Bluetooth-enabled device or ‘dock’ and then routes the transaction over any protocol residing on that base (IP, dial, wWAN communication, etc.).

wWAN terminals have no need for base stations, but require coverage provided by a wireless service provider (such as Cingular) to connect to and transmit data via a cellular network. This technology is the same as used in cellular phones and, similar to a cell phone, wWAN-enabled terminals must be within range of a network tower to process transactions. GSM/GPRS technology provides the broadest global coverage providing service to over 1.6 billion users worldwide; however, CDMA is another technology with good acceptance around the globe. wWAN technology is truly wireless and all routing is done through gateways and switches on the back end.



Situation Today

If one draws a parallel to other mobile industries, one will easily notice that people continually demand more functionality of their consumer devices. No longer can cellular phones just make and receive calls, now phones must provide calendar scheduling, numeric calculations, picture taking and sending, remote email, video and a host of benefits such as games and ring tones available through download.

The next logical step for payment devices is to increase functionality for merchants. While a catchy sound played when payment is accepted may not be necessary, the ability for merchants to have a fully functioning extension of their office that allows them to manage their business – inventory control, collecting and filing business contacts, sending and receiving messages, browsing the Internet – is quite foreseeable. It is, in fact, more than foreseeable. It's happening today.

The ability to add magnetic stripe readers and printers to PDAs and other portable computer-type devices is driving marketplace change. Now merchants can access all the power of these devices to accomplish more than merely accepting payment, and at a cost that is not prohibitive to sales. The advantage terminal manufacturers have is that, due to stringent PIN-based debit regulations, these devices are suitable only for credit transactions. The cost savings associated with accepting PIN-based debit is sufficient to push merchants toward specialized wireless POS terminals, however, it is important to learn from other mobile industries and add the additional functionality available in these computer-like devices to the payment devices targeted at the specialized wireless market.

True wireless commerce has the potential to re-invigorate the POS industry in what is quickly becoming a saturated, commodity-based market. Current estimates have wireless terminal growth between 10-20% year over year,



and the Nielsen Report predicts that wireless POS terminals will account for 30% of new terminal sales by 2008. New revenue opportunities and vertical market segments can easily be entered via wireless software integration and services. For instance, pay-at-the-table initiatives for restaurants are growing globally. Current solutions to this market allow a restaurant to either enter orders on a device or potentially accept credit or allow customers to pay-at-the-table with credit or debit using a secure payment terminal, but what if full-service eateries could also use the payment terminal to manage dining experiences from the moment guests walk through the door until they tip their waitpersons? The next logical step for a terminal manufacturer is to design a product that does both.

Or what if delivery drivers could find directions and maps for their next stop using the same device that confirms delivery and accepts payment? Or what if mobile merchants at a tradeshow could access their virtual online store and manage inventory from their standard payment devices? The possibilities available through new wireless devices are nearly limitless; all that is required is imaginative software development and a hardware platform to enable the applications. Current PDAs, cell phones, BlackBerrys and similar devices can deliver some of these capabilities today; it is essential that payment terminals evolve with them.

The Challenge

The situation at hand leaves terminal vendors in a bit of a predicament. The marketplace is asking for solutions that provide more horsepower and functionality in truly portable footprints that can be carried anywhere, all at a cost that is not prohibitive to sales. Furthermore, products must work in all wireless settings so that merchants looking for short-range wireless capabilities (similar to a "WiFi" network that one sets up at their residence) are able to find a satisfactory product and merchants needing to process payments from anywhere, anytime (think cellular phone) can also find



products that meet their needs. Both scenarios present opportunities for manufacturers and for merchants; the challenge is determining the best solutions for individual needs and doing so in a way that makes configuration, maintenance and support straightforward and effortless.

While the requirements for wireless capabilities vary from customer to customer, wLAN implementations must be consistent in every environment. Considerations for designing such implementations include an analysis of existing equipment, whether a wLAN network is currently in place and the range and security desired for transmissions. Since, in many parts of the world, entire towns and cities are working toward WiFi implementation, this may be the obvious best choice. WiFi technology such as 802.11 is convenient and easy to install, making it the choice for many consumers that want to connect to wireless networks in their homes and businesses. WiFi also provides merchants a unique value proposition by allowing them to use the same connection they use for their terminal to offer 'hot-spot' connectivity for their customers looking to use their laptop to reach the Internet at a merchant location.

Still, WiFi is not the catch-all, end-all solution for every environment. In fact there are many environments where different technologies may be more appropriate for reliable data transport. These locations are often high traffic areas where transmission connectivity can be bothered by external 'noise.' In these situations, BlueTooth technology should be considered for its ability to pair with a base and cut through transmission traffic, thus providing a consistent connection for data transport. Considering that BlueTooth implementations will require a base station to accept transactions, the base station then routes transactions to the host server or other final destination. The most important thing is to understand are the needs of the customer and the limitations of the environment (for example, signal strength may be lower in buildings with dense concrete), then choose a wLAN technology based on



those needs and install signal boosters and routers as needed to ensure high connectivity.

wWAN is for truly mobile merchants who cannot deal with the restrictions of a base station. For wWAN terminals to transmit data, service from a wireless network provider is mandatory and often these wireless network providers are the same companies that offer cellular phone service. Although in such situations merchants don't need equipment in addition to the terminal, the terminal must be equipped with an appropriate SIM card to access the wireless network. It is the SIM card that stores proprietary wireless network information and allows terminals to access wireless gateways and the signal towers of a GPRS or other wWAN carrier. In wWAN implementations, it is important to research all the possible service providers to ensure that your wireless carrier provides good strength of signal in your geography.

Benefits

Mobile wireless capabilities deliver significant value to merchants where accepting payment directly at the point of service is critical. For some merchants, this may be where wired communications are costly or simply not available. For others, the location may be in the middle of highly developed areas such as an electronics or furniture showroom floor. Many merchants may use wireless capabilities to secure impulse buys from shoppers or reduce wait times with line-busting techniques. Still other merchants may view wireless as more of an enabler providing lower costs of initiating or upgrading infrastructures rather than installing hard-wired electronic cash registers.

- *New Markets* – wireless technologies open doors to largely untapped regions, vertical markets and new sales opportunities. These include areas where wired communications is costly or not present, making wireless technology an enabler to accept payment, as well as mobile



merchants, seasonal merchants and existing merchants looking to expand payment possibilities.

- *Security* – customers, likewise, appreciate the added security of paying for purchases without losing sight of their credit or debit cards. This is especially true at restaurants offering pay-at-the-table and other situations where a consumer may lose sight of their card during the payment process.
- *Recurring Revenue* – in a commodity-based market, bundling opportunities arise for service providers wanting to generate recurring revenues via wireless terminals. Value-add software that expands current capabilities may also be sold or leased to merchants.
- *Reduced Communication Costs* – oftentimes, wireless communications offer significantly reduced costs to merchants by reducing or eliminating the need for phone lines that are replaced by Internet Protocol communications. In instances where dial communication is preferred, using a wLAN technology such as BlueTooth can allow multiple terminals to share one dial line using a docking station.
- *Convenience and Speed* – wireless implementations often result in faster check-out, decreased transaction times and reduced lines by offering payment directly at the point of purchase. Merchants also have the convenience to process and settle transactions from any location they choose.



Summary

Reaching the full potential of wireless payment technologies takes innovative design and foresight. Certainly, small form factor terminals are essential, as are user interfaces that allow complex transactions to be performed simply and easily. Also, the payment industry must protect itself against threats from the outside – PDAs, BlackBerrys, cell phones fitted with MSRs, etc. – by providing products, services *and* security requirements specifically geared for payment processes.

Designing hardware to not only meet today's wireless market needs, but to also spur a quantum leap over existing competitive products is, indeed, a challenge. Form factor must be considered a top priority. To draw a parallel to the cellular phone industry, the trend is toward 'smaller is better.' However, in reducing footprint size, it is important to not lose sight of overall functionality. Users must be able to interact with the terminal in way that include being able to initiate payment processes, input transaction data and read information from the screen. The unit should also be able to work for all merchants and not be limited to one wireless technology; this means the same hardware can be equipped with wLAN or wWAN technologies. Despite the challenge this presents for hardware manufacturers to build a single platform for all vertical needs, it saves help desk support teams from dealing with the logistical nightmare of having to service multiple product types.

In meeting the evolving needs of the wireless market, Hypercom created the Optimum M4100 wireless terminal, the first point-of-service device to truly target the nuances of wireless payment. The Optimum M4100 redefines industry possibilities by integrating high functionality and high security into a fully portable, palm-sized form factor. It provides a completely modular approach from wLAN and wWAN communication modules to optional snap-on printer and docking station, the device is adaptable to all environments and customer needs.



- *Form Factor* – palm-sized and lightweight for optimal portability. Modular design adds on equipment such as space-saving, fan-fold printer, as needed. Easily fits in pocket or work bag or clips onto belt.
- *Full-Color Display* – large, active matrix color screen can be read easily in all indoor and outdoor environments. Touch-screen design helps reduce size, eliminating the need for screen-addressable function keys while supporting signature capture benefits. Large size (240x320) display provides real estate for intuitive graphical interfaces and software customization geared for vertical market customization.
- *Software* - based on existing Intel® XScale® countertop technology for consistent user interface and migration strategy from current Hypercom products. Advanced multi-application support and fully functional developer's toolkit enables custom applications and software solutions that increase business efficiency.
- *High Memory Capacity* – backed with large memory, the Optimum M4100 combines advanced Adaptive Application Environment (AAE) architecture with a large graphical display and functional environment that allows software to be customized for specific needs such as portable ECRs, inventory management and pay-at-the-table solutions.
- *Illuminated, Secure PIN entry* – designed to global security standards including EMV and PCI, the Optimum M4100 supports all types of electronic transactions including credit, debit and contactless payment cards. The illuminated keypad conforms to international design requirements for key layout and ease of PIN entry.



- *Advanced Power System* – Hypercom’s patent pending *POWER MAX* power management system allows the Optimum M4100 and printer to share power. Each device incorporates its own swappable, Li-Ion battery pack, Our *POWER MAX* system allows the combined devices to give maximum operation time by the shared distribution of battery power. This ability to easily swap out both or either of the batteries, the M4100 and printer can be fully functional on the power of a single battery, when necessary, to ensure optimal performance.

The modular design of the Optimum M4100 allows merchants to begin with what they need and expand as business grows. It delivers more features, more functionality, more power and a smaller footprint than any other wireless terminal on market at an affordable price.



Terminology

802.11 – a family of WLAN specifications, generally associated with WiFi, for the transport of data wirelessly between a wireless client and a base station or 2 wireless clients.

BlueTooth – short-range WLAN specification aimed at simplifying communications among wireless devices.

CDMA – a digital cellular technology that uses spread-spectrum techniques to deliver voice and data communications to wireless devices such as mobile phones and portable computers.

Gateway – a company or organization that serves as an interface between a merchant's point-of-sale systems, acquirer payment systems and issuer payment systems. Gateways generally receive encrypted information from the POS devices wirelessly or over IP and routes them to the proper processor for authorization.

GSM/GPRS – Global System for Mobile Communication(GSM)/General Packet Radio Services (GPRS) is a wireless communication services that provides data rates between 56 and 114 kbps and continuous Internet connection for mobile phone and mobile computer device users.

SIM Card – **S**ubscriber **I**dentify **M**odule is a small electronic card inserted into mobile phones or data devices that provides a unique ID for the person's billing details and phone network permissions.

WiFi – a set of standards that set forth the specifications for transmitting data over a local area wireless network.



wLAN – Wireless Local Area Network. A standardized technology for (relatively) high-speed wireless data communication in local network environments (currently covering areas of up to 20-60 meters inside buildings and up to 300 meters outside). Several wLAN nodes may be connected to cover larger local areas.

wWAN – *Wireless Wide Area Network*, is a form of wireless network. Uses cellular network technologies such as GPRS / CDMA2000 / GSM / CDPD to transfer data. These cellular technologies are offered regionally, nationwide, or even globally and are provided by a wireless service provider such as AT&T Wireless, Cingular Wireless, Sprint PCS or Verizon for a monthly usage fee.

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