



Creative Strategies, Inc.

The UPC Market: Handheld XP Solutions for the Enterprise

White Paper

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TABLE OF CONTENTS

MARKET DYNAMICS.....3

CURRENT OFFERINGS FOR MOBILE USERS.....4

 TRADITIONAL LAPTOP PC..... 4

 ULTRA LIGHT PC..... 4

 PDAS (PALM, POCKETPC, IPAQ).....4

 BLACKBERRY / RIM COMMUNICATORS 5

THE ULTRA PERSONAL COMPUTER: HANDHELD XP5

 UPC CHARACTERISTICS 5

CREATIVE STRATEGIES ANALYSIS AND CUSTOMER FEEDBACK6

 CUSTOMER FEEDBACK ON UPC’S FROM DCI/CRM SHOWS..... 6

 KEEPING ALL YOUR DATA WITH YOU 7

UPC MARKET PREDICTIONS8

 LOW COST OF OWNERSHIP..... 8

Table 1: Cost Example for an IPAQ Pocket PC Device 9

 MARKET SIZE AND RATIONALE..... 9

Table 2: UPC Market Size Projection..... 10

SUMMARY OF MARKET TRENDS AND UPC ADOPTION.....10



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Market Dynamics

Enterprise users require mobile capabilities today more than ever before. Mobile users require real time collaborative data like email, instant messaging, and networked enterprise CRM applications. Likewise, enterprise users count on the ability to send word processing documents, spreadsheet files, multimedia files, digital pictures, and other types of collateral easily between users. And, they need the ability to use their Microsoft Windows-based applications out of the box as much as possible. By successfully tying together business critical data, and enabling users to access documents and applications anywhere, mobile capabilities increase the company's overall responsiveness and competitiveness.

At the same time, today's cost-conscious business climate requires especially prudent choices about which IT purchases to make, driving the careful scrutiny of computing solutions. IT buyers evaluate these options both in terms of capabilities and the total cost of ownership provided to the organization. In recent years, increasing demands for mobility has fueled the deployment of notebooks and handheld personal digital assistants (PDAs) to solve various pieces of the computing equation. IT departments turn first to PC technology to satisfy the needs of the information worker to be connected to business-critical data and applications both at work and when traveling. Notebooks provide a desirable solution to this problem, because the capabilities of a notebook can draw upon applications, networking, and all the other options provided in the PC marketplace. The portability of many notebooks, however, is limited, notebooks require table space, and after the expiration of a relatively short battery life, a power supply.

The goals of increased portability beyond what a notebook can provide have driven the deployment of PDAs into the notebook segment as notebook companions. The PDA is easier to use in the hand, when standing, and in general while traveling. This portability aspect has been well received by mobile workers, driving PDA sales higher in recent years. Despite these portability advantages, PDAs have some flaws that limit their capabilities: deployment issues, increased support, and often an increase in total cost of ownership. Once these factors are considered, the net cost of PDA purchases in some mobile environments begins to look less desirable.

Central to the shortcoming of PDAs is the desirability to standardize the operating environment of the user around a single platform, reducing the number of environments the IT infrastructure must support. All PDA solutions in the marketplace today are built upon lightweight operating systems that lack full PC capabilities, thus introducing a second operating system that IT personnel must support.

This paper considers a new kind of device that may offer all the portability benefits of a PDA but with the rich capabilities of a PC notebook. This new solution has the potential to add a new option for mobile devices deployed by IT departments to mobile users.



Current Offerings for Mobile Users

There are a range of mobile solutions available today, each with advantages and disadvantages:

Traditional Laptop PC

The bulk of the laptop market is comprised of larger form factor notebooks, with 13-15" or larger screens. The attractiveness of these PC's stems from high performance, coupled with multiple IO sources like CD or DVD drives, large disk capacity, and so on. However, these PC's tend to be large and heavy—often six pounds or more—and offer limited battery life. The weight and battery life of these PC's often limits their portability and discourages users from keeping the PC with them at all times. Likewise, a mobile user has no choice but to use a laptop of this class on a desk or table, limiting the options for mobile use.

Likewise, a derivative of the notebook is the newly emerging category of Tablet PC's. While this market is in its infancy, we see increased interest and demand for Tablet PC's in some key enterprise markets, especially vertical segments where a "slate-like" orientation and pen input is desirable. Some example markets are in healthcare, Pharma and transportation, though Tablet PC's may also be used in other vertical segments as well

Ultra Light PC

Ultra Light PC designs are characterized by designs that are lighter and smaller than traditional laptops. Usually these devices have either a 10.4" or 12.1" and weigh less than three pounds. Laptops of this class typically provide only a single disk, relying on external drives for CD or DVD. The smaller size and weight of these systems dramatically improves the portability, reducing the burden keeping it with you more often. However, even the smallest Ultra Light notebook is difficult to use without a table. Likewise, a PC of this size requires a briefcase to carry, instead of pocket. And, because of their smaller size, they use a smaller battery that also limits their life while in portable environments.

PDA's (Palm, PocketPC, iPAQ)

Pocket PC-based handheld computers — also referred to as personal digital assistants (PDAs) — have become popular in Enterprises due to the design's high portability and large set of accessories. In addition, enterprises have been able to draw upon a large value added reseller (VAR) market for customizations. The ultra compact design of handhelds provides the ultimate in portability, with units so small they can be carried in a pocket or purse with ease. PDA deployments exploded in 2001 as companies realized the benefits these smaller handhelds offered for portability

Unfortunately with PDAs portability comes at a cost of limited capabilities. The limited capabilities and lack of true PC (X86) compatibility requires the porting of Enterprise applications to the Palm or Pocket PC OS, which can be a very expensive proposition. Consulting fees for these types of ports can be substantial and almost always provide more limited functionality than the original version due to the limitations of the PDA. One common rule of thumb states that customizing Enterprise applications costs from \$500 to \$1000 per user.



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Additionally, the IT support burden of these devices is can be high since they cannot leverage the same PC infrastructure for software and maintenance. Also, PDA's limited storage and lack of application compatibility also means the PDA never holds a substantial amount of data, and may not be able to handle large important documents, presentations and multimedia files.

Blackberry / RIM Communicators

One alternative to the traditional PDA is the Blackberry device from Research in Motion. The Blackberry enables wireless email capabilities from multiple providers making it a highly desirable and powerful device in the Enterprise market from a connectivity perspective. However, users routinely complain about the limited functionality of Blackberry devices, particularly the inability to view attachments or use familiar applications. Deployment costs in terms of license and server fees for these devices can be very high as well.

The Ultra Personal Computer: Handheld XP

We believe a strong segment of users want full capabilities when mobile: using the applications they know, offering generous amounts of storage capabilities for large documents and media, and providing a robust email experience that is fully capable of downloading and viewing multimedia files and data attachments. At the same time, they desire the portability of a PDA and ability to easily carry the device anywhere.

A new alternative is emerging in the marketplace that has the potential to alter the mobile computing landscape by satisfying both of these goals simultaneously. This alternative is called an Ultra Personal Computer (UPC), a device that provides full Windows XP™ capability in the palm of your hand. Some have also referred to this as a “handheld XP” device.

UPC Characteristics

The UPC delivers the power and performance of a desktop computer and the functionality of a laptop computer in the size of a handheld PDA sized device. UPC's feature a high-resolution screen, internal hard drive, high-speed IO capabilities, and a keyboard (in various different styles). Since the UPC is a full featured handheld PC that runs with full x86 compatibility, it supports the breadth of x86 applications that are currently available and full Windows XP capability, eliminating the need for the porting and customization of Enterprise applications.

At the office. Powered by a 1GHz or faster processor, the UPC offers the performance one would expect of a reasonable PC so that demanding Enterprise applications can be used unmodified. In the office, the UPC can be physically or wirelessly connected with an associated docking cradle to an external monitor and keyboard to deliver a normal, comfortable office experience.

When Traveling. UPCs are lightweight, ranging from 8 oz – 1.4 pounds, and small enough to fit in a coat pocket or purse. This small size and weight means you can carry the UPC at all times without the burden you would expect from a notebook. UPC's will offer a range of input alternatives like integrated thumb keyboards or fuller size keyboards in several configurations. Different vendors coming to market at the end of 2003 and beginning of 2004 will offer a range of solutions to satisfy user preferences. Unlike PDA's that provide only limited storage capability, new 1.8” disk drives



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enable capacities of 10GB-40GB in a small form factor that will clearly meet the needs of most mobile professionals.

High quality screens. The inclusion of very high quality screens in UPC devices allows users to have a rich Windows experience, easily viewing an entire Windows desktop in the palm of your hand. These screens, ranging from 4" on very small devices up to roughly 6", will offer resolutions from 800x400 all the way up to 1024x768. Many of the screens used in UPC devices were initially designed for portable video players or camcorders, so they are well suited to display high-resolution images and video. We believe users will be surprised at the high quality of the latest LCD screens, enabling a full Windows desktop to be viewed on a small screen. For those users with weaker eyesight, font sizes and display options can be changed to ensure visibility while mobile. Compared to most PDAs, the screen in a UPC is a pleasure to use.

Creative Strategies Analysis and Customer Feedback

Customer Feedback on UPC's from DCI/CRM Shows

Over the last six months, Creative Strategies has had a chance to show major enterprise buyers the concept of the Ultra Personal Computer during our DCI CRM shows. Most of the IT managers shown these devices were in the processes of evaluating the use of Pocket PC's within either field force or sales force projects, and in a few instances, they were to be used by CRM managers within campus environments. Their reaction to XP in a handheld was that of serious interest, but with a healthy skepticism about the ability to run real applications on a device that employs a small screen. However, the key to their interest was the ability to use Windows XP applications off-the-shelf and without any modifications or need for customization of the applications to be used.

Customer example. In one case, an IT manager was about to deploy 100 PDA's in a field force application and the software that would be used on the PDA was highly customized. The cost of the software customization was to be around \$100,000. The IT manager put the software cost at about \$1000 per PDA and had factored in another \$250 of support costs *per device* over the life of the project. When asked about the potential of using a handheld device that could run XP instead, he surmised that he would still need to plan about \$100 per device for custom drivers and some unspecified database hooks, but estimated he could do the software component of the project for about 90% less than originally forecasted. He also thought that since the handheld XP device was similar to an XP laptop in terms of support costs, the estimated that the projected \$250 PDA support cost could be reduced by at least 50% over the life of the project.

Customer example. In another case, an IT manager was going to utilize a PDA that was to be used in a 150-person sales project. This manager felt that by using a UPC instead, with the Windows XP application they already have, he could reduce the costs for software customization by at least 70%.

Across these shows, we demonstrated the Ultra Personal Computer or handheld XP concept to about 35 IT managers who were looking at using a PDA in their CRM project. 60% said that they would highly consider one of these devices in their project even if the cost of the device were twice the price of a fully loaded PDA. Key to their acceptance of this new platform was the ability to use Windows XP applications as-is, avoiding the need to create either special software for a handheld device or develop customized software applications from the ground up.



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However, the sticking point for all of them was the size of the screen. Since we could not actually demonstrate an Ultra Personal Computer device running Windows XP, they all questioned the ability to run a full-blown Windows XP application on a handheld that had a 4-6" inch screen. And, in all cases, they said that input would be a critical factor for them in determining their use of a UPC device. While most agreed that pen input was desirable, 60% said that they felt the device needed either an attached keyboard or have some type of keyboard as part of the overall solution.

Although the small screen was clearly a concern for these IT managers, the ability to run a Windows XP application out of the box was so important that a UPC would be of high interest for deployment within their CRM projects. The CRM projects where they had the highest interest in a device like this was for field or sales force deployments, though at least 30% said that they could see its use in CRM management projects as well. It is clear from the interviews with these CRM managers that key vertical markets such as healthcare, transportation, emergency services, insurance, real estate and other vertical segments could benefit from a device of this nature running full Windows XP applications.

Another area of interest to these IT managers was the ability to run Web hosted apps on this platform. Because UPC devices run Windows XP, they have full Web Browser support, instead of the limited browser capabilities on today's handhelds. Five of the IT managers had sales force projects in the works in which they were considering the use of SalesForce.com or Upshot.com. They immediately saw that a handheld XP device could be used within these hosted applications without any modifications. Network security support is also critical to accessing networked applications, and UPCs can readily support VPNs, as requested by IT managers we met. PDA's have traditionally been unable to handle industrial strength VPN security due to platform limitations.

The other key reason that this platform got such serious interest from these CRM IT managers was its ability to handle full email attachments with no compromises. Although the Pocket PC and Palm devices can handle attachments, their ability to allow for general editing is highly limited and for some file types, not provided. Since UPC devices will run all Windows XP applications, all attachments are fully viewable, and can be modified, updated and expanded at will. Another aspect of these devices is that they can also store large multimedia files on its hard drive and handle the processing necessary to support today's latest media types.

Customer example. We spoke with an IT executive from a multinational firm who had surveyed the field of mobile devices and had so far been unsatisfied. This buyer had already deployed a test of Blackberry devices and PDA's, but failed to find a satisfactory set of capabilities, battery life, and connectivity. When we reviewed the UPC concept, his reaction was strong, particularly to the ability to use wireless in a handheld portable device, but retain the ability to use full email capabilities including the manipulation of standard attachments and media types.

Keeping All Your Data With You

While we have pointed out the main merits of a device like this for use in CRM and potential IT mobile projects, there is one key technology component that we believe is critical to the success of an Ultra Personal Computer. The Ultra Personal Computer will, in many cases, find its place in an IT program as a secondary device in much the same way a PDA has today. Although we do see it being used mainly in mobile sales and field projects and within key vertical segments, it has the potential of being a highly mobile extension of a person's desktop or laptop in a more horizontal application.



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As a result, we believe this platform should offer not only a cradle or USB direct connection, but also synchronization software that allows a person to sync the UPC with the desktop or laptop. In a PDA, the synchronization process converts PC files into a lightweight version suitable for a PDA's reduced capabilities. This process is fraught with difficulties, and often leaves users frustrated at the conversion process, or at the data that could not be stored on the PDA.

In a UPC device, synchronization does not need to convert file formats, or selectively leave data behind due to capability limitations. The synchronization layer is much richer, focusing on synchronizing the file system, Office application data, full email, attachments, as well as the full calendar, contacts, and notes. Where a rich enterprise notes system is in place, the synchronization process is far more capable of reflecting the database offline than could any PDA.

The real promise of an UPC or handheld XP device is its ability to be a more complete mirror of a person's primary PC that can fit in the pocket and be carried with them at all times. Unlike a PDA, after synchronizing a UPC, the user knows their full set of data is with them. Moreover, once mobile, the UPC can also allow the user to work with this information as if it was their primary device.

Work is under way from various software synchronization companies to provide this key component and we expect this to be a major part of the Ultra Personal Computer or handheld XP program by early 2004.

UPC Market Predictions

The emergence of a viable Windows-based handheld — one that contains the performance of a desktop computer and the power saving and efficient aspects of a notebook computer — will most likely become a disruptive technology in the mobile Enterprise marketplace. When considered from a total cost of ownership perspective, it can be argued that the UPC device is far less expensive than today's handhelds

Low Cost of Ownership

The street price of UPC devices will generally be comparable to some Ultra Light laptops initially, with cost reductions over time, ranging from \$1000-1600. When compared to PDA solutions, that initially seems expensive. Upon further analysis one finds the price to be competitive,

PocketPC solutions used by the enterprise today often cost more than \$500 for the base unit. Just like automobile accessories and prices, Pocket PC devices ship with only the most basic capabilities requiring users to individually purchase additional accessories to fully enable the complement of features offered by the platform. When appointed with accessories typical of the average enterprise user running business applications, that cost can quickly reach \$1000. Even with all of the accessories, Pocket PC devices still do not provide the same level of features and functionalities as a UPC.



Table 1: Cost Example for an IPAQ Pocket PC Device

SUMMARY	SALES PRICE
iPAQ™ h5450 Pocket PC with Intel® (XSCALE) 400 MHz processor, 64 MB SDRAM / 48 MB ROM, 64K color, TFT Transflective LCD, MS Pocket PC 2002, 1250 mA-h Removable battery, one year parts and labor warranty, Bluetooth for iPAQ™ h5450, and Integrated Wireless LAN	\$649.99
iPAQ™ Expandable Case	\$19.99
iPAQ™ Extended battery for h5150, h5400, h5500	\$119.99
iPAQ™ A/C Power Adapter	\$27.99
iPAQ™ 128MB Memory Expansion	\$69.99
Margi Presenter-to Go CF Card	\$199.99
TOTAL	\$1,087.97

As alluded earlier, there is a secondary cost associated with customizing enterprise applications. Between support costs and consulting fees, this is generally viewed as an additional cost of between \$500 to \$1000 per user.

Market Size and Rationale

We expect a deployment and adoption pattern for UPC devices to be similar to the historical adoption of Microsoft Windows CE.net and Pocket PC devices for the following reasons:

- UPC systems will primarily be targeted at corporate and Enterprise channels initially, just as the PocketPC platform was in 2000.
- The UPC devices of today are filling the same end user needs as Pocket PC devices did in 2000, but with significant cost and compatibility benefits
- Wireless is expanding rapidly, and the UPC platform is more desirable to leverage these technologies

However, the adoption rate will be slower than the Pocket PC devices in the Enterprise market due to the higher initial price of UPC devices. Despite the lower total cost of ownership, the higher initial price will slow the growth. IDC's estimates for Enterprise Pocket PC devices are between \$500 and \$600. Given these theories, it is our belief that the total available market (TAM) for UPC devices should be as follows:



Table 2: UPC Market Size Projection

Year	Market Projection
2003	30,000
2004	350,000
2005	1,000,000
2006	1,600,000 – 1,800,000

- **2003 — 30,000 Units** – This number represents the order forecasts as seen from various UPC device designers and manufacturers coming to market near term.
- **2004 — 350,000 Units** – This number represents a judged down fraction of the PocketPC adoption rate as the market takes hold. At least 6-8 devices of various styles and in various markets are expected to be available in the year 2004.
- **2005 — 1,000,000 Units** – This number represents half the Pocket PC device rates for the equivalent adoption schedule but takes into account second generation products in volume production. It is estimated that 3-4 more OEMs will arise and that UPC devices will reach a \$1000 price point.
- **2006 — 1,600,000-1,800,000 Units** – This estimated forecast represents mainstream devices that should be well under \$1000 in cost by this time

Summary of Market Trends and UPC Adoption

It is our opinion that the Ultra Personal Computer or handheld XP is a valuable product category and has real potential within various enterprise applications. Our projected forecast above reflects our view of the adoption cycle for UPC devices based on its unique value proposition, cost trends over time, and market expectations. In 2003, UPC's will be entering the market at a time when mobile computing is rebounding and enterprise buyers have many choices in front of them for use in their various business environments. We believe this is an opportunity for new devices like UPC's to see significant interest.

As for positioning, we believe that the Ultra Personal Computer or handheld XP platform will initially go head to head with PDA's in various enterprise markets, and be especially attractive in major verticals where mobility and full Windows compatibility is a key part of the application. We continue to be bullish on the role of PDA's as personal digital assistants and see them increasing their role in managing personal contacts, schedules and highly personalized information for business users of all types. We also see PDA's continuing to gain market acceptance in many enterprise programs where mobility is important and the applications deployed are available off the shelf.

We believe, however, the current move of PDA's is towards more consumer-focused applications. Devices are shifting to incorporate digital cameras, support for MP3 music files, and ability to play rudimentary video. The emphasis of these new functionality choices, combined with a move towards



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aggressive price points suggests that any major growth for PDA's may be with consumers and not necessarily with enterprise markets that have more stringent requirements

The new category of TabletPC's has also caused users to rethink somewhat the form factors for computers they use. While TabletPC's have gained some acceptance, it is our contention that many of those same sectors would also benefit from the increased portability offered by a UPC. Some UPC's will offer pen-based input as well, further increasing the ways that a UPC can be utilized.

While initially UPC devices will be offered at higher price points, we believe these prices will drop quickly over time. The price of LCD panels and compact hard disks—some of the major cost drivers of a UPC—will drop rapidly as they are incorporated into more devices. We believe that as the prices for UPC's decrease to the price ranges of today's high end PDA's, they may likely receive more widespread acceptance.