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Fujitsu and the Tablet PC

Explains and illustrates Fujitsu's position on
Microsoft's Tablet PC initiative.

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This paper explains and illustrates Fujitsu's position on Microsoft's Tablet PC initiative. The initiative, one of Microsoft's many efforts to expand the usefulness and applicability of the PC, is based on the idea of enhancing today's pen tablet computer with hardware and software which will allow it to become the "next-generation mobile business PC." As the pioneer and industry leader in pen tablet computing (with more than 60% of the current Windows® pen tablet market[1]) Fujitsu is often called upon to answer questions regarding the Tablet PC's concept, positioning, market, technology and direction. This paper attempts to answer those questions from Fujitsu's point of view.

Fujitsu-Microsoft relationship

Fujitsu and Microsoft have had an ongoing relationship and dialog on pen computing for years, starting in 1993 with the development of the Fujitsu Stylistic® 500 pen tablet. Fujitsu has supplied pen tablets to Microsoft for use in various research and development efforts covering everything from handwriting recognition to OS testing to automation in the "Microsoft Home." As the market leader in pen tablets, Fujitsu is often the first OEM that Microsoft turns to for information on the applications and technology of pen tablets. When Microsoft began to develop its first working prototype of the Tablet PC, much of the initial experimentation was done using pre-production samples of Fujitsu's Stylistic 3400 pen tablet.

The Stylistic 3400, which started shipping in 2000, marked a true inflection point in pen tablet history. With a Pentium® III, a 10.4" XGA TFT display, a thickness of 1.1 inch and a weight of only 3.2 pounds, the Stylistic 3400 was the first pen tablet product that approached the capabilities of an ultra-portable notebook. The first Microsoft Tablet PC prototype, shown at Comdex 2000 by Bill Gates during his keynote speech, was not substantially different from the Stylistic 3400. As a result of the keynote, the media and others began to understand that Microsoft's vision for the Tablet PC had some basis in reality.

Tablet PC Positioning

Microsoft is positioning the Tablet PC as the "evolution of the notebook." Tablet PCs are intended to be a "pure superset of today's notebook PCs," offering all the functionality of a notebook with added Tablet functionality. This added functionality allows the user to run Windows and Windows applications using a pen, to annotate documents, and to create handwritten documents using "digital ink" for later reference or conversion into text. Tablet PCs in general will have long battery life, light weight, high-resolution displays, and (in some cases) built-in wireless capability. Some Tablet PCs will look just like today's clamshell laptops, complete with a full keyboard, but with the addition of a mechanism that converts the hardware into a "slate" form (products with this form-factor are generally called "convertibles"). Other Tablet PCs will have "pure" tablet form-factors. Just like today's portable PCs, Tablet PCs can be put into a docking station on a desk to support a large-screen monitor, mouse, full-size keyboard, LAN connection, CD-ROM, local printer, speakers and other peripherals

If you've followed Fujitsu products over the last few years, then you know that Fujitsu has already "evolved"— Fujitsu has already gone where Microsoft wants to go with the Tablet PC.

Starting with the Stylistic 3400 in 2000, the usage model of pen tablets began to change significantly. Putting a 3-pound pen tablet into a mini-dock provided exactly the kind of docked capability that Microsoft envisions with the Tablet PC. Putting the pen tablet into a "portfolio case" with a lightweight wireless keyboard enabled realistic notebook capability. The combination of the mini-dock and the portfolio case caused pen tablets to migrate away from the position of "specialized vertical application devices" towards a variant of ultra-portable notebooks. The key element that's missing is an operating system that fully supports the pen — and Microsoft will be providing that as one of the fundamental underpinnings of the Tablet PC initiative.

The Tablet PC: A New OS and a Hardware Specification

The Tablet PC initiative is similar to other new platform definitions created by Microsoft, such as Windows CE 1.0 in 1995. The initiative consists of three parts:

1. A new, full-scale version of Windows, to be called "Windows XP Tablet PC Edition"
2. A Tablet PC Hardware Requirements specification aimed at OEMs who want to build Tablet PCs
3. A set of software development tools (APIs) aimed at ISVs who want to build pen-centric applications for Tablet PCs.

The Tablet PC OS will be the third member of the Windows XP family - XP Home for the consumer, XP Pro for enterprise and XP Tablet for mobile. Microsoft's five-year goal is to make the use of a pen with Windows so compelling that the market will require the majority of Windows portable computers to support a pen. In this way, Microsoft intends to make XP Tablet the new "Windows Mobile OS."

The Tablet PC Hardware Requirements specification is surprisingly short. There are only eight unique requirements for a mobile computer to be a Tablet PC. The requirements, which are all aimed at ensuring the optimal usability of a Tablet PC, include the following:

1. High-performance active digitizer with "hover" mode
2. Resume from suspend in two seconds or less
3. Battery life in suspend of at least 72 hours
4. Automatic hibernation (save-to-disk) when the battery is exhausted
5. Rotation between landscape and portrait modes without rebooting
6. Docking and undocking without notifying the OS ("Grab-and-Go")
7. Legacy-free hardware (no serial, parallel, PS/2, game or FDD ports)
8. A Tablet PC without an attached keyboard must provide a dedicated hardware mechanism to produce a "Ctrl-Alt-Delete".

The Tablet PC's Effect on Fujitsu Pen Tablet Specifications

A few obvious changes are required to meet the seven Tablet PC hardware requirements listed above; for example, changing from a passive (resistive) digitizer to an active digitizer. Other than those few items and the normal changes due to the progression of computer technology, however, the transition to Tablet PCs will entail relatively little change in Fujitsu's pen tablet specifications.

One exception is LCD resolution. Today Fujitsu offers both SVGA (800 x 600) and XGA (1024 x 768) resolutions in 10.4" LCDs. In keeping with Microsoft's "strong recommendation" that all Tablet PC LCDs should have at least 120 dots per inch (dpi), 10.4" SVGA LCDs (96 dpi) will be eliminated from Fujitsu's Tablet PCs. The smaller 8.4" SVGA LCDs will remain, since they are 119 dpi. Fujitsu's strong emphasis on color LCDs that are clearly readable both indoors and outdoors will continue.

Default LCD orientation is likely to be an area where Fujitsu's current specifications remain unchanged, even though the Tablet PC may encourage a change. Historically, pen tablet applications have used landscape mode because the application-specific software used on pen tablets was derived from notebook software. In Microsoft's view, the Tablet PC is primarily a portrait-mode device because it replaces an 8.5" x 11" paper notebook. The look and feel of Microsoft's Tablet PC prototype clearly emphasizes portrait mode; Fujitsu's emphasis will be to make sure that Fujitsu Tablet PCs work perfectly in both landscape and portrait modes.

The "legacy free" requirement of a Tablet PC is another specification change that will affect some Fujitsu models. Some Fujitsu pen tablets are already legacy-free (e.g., the Stylistic LT P-600); others will require changes to eliminate legacy ports on the core device. (Legacy ports are still allowed in a docking station as long as the OS can't see them directly — i.e., it's OK to convert USB or IEEE 1394 to legacy ports in a docking station.) In the past, legacy compatibility has had a strong

effect on the specifications of Fujitsu's pen tablets; now the Tablet PC's legacy-free requirement will bring a stronger emphasis on the cutting edge of PC architecture in Fujitsu's products.

The Tablet PC and the Notebook

Today Fujitsu sells both pen tablets and notebooks. The key to choosing between the two is whether or not the user has to work while standing or walking around. A pen tablet has a significant advantage over a notebook by being able to be used while the user is truly mobile. When a pen tablet is used at a desk in a mini-dock, its capability is essentially identical to that of an ultra-portable notebook. When a pen tablet is used in a portfolio case, its capability is very close to that of a notebook.

A pen tablet is often seen as "a notebook without a keyboard." Actually this is an inaccurate view. To help correct this situation, Microsoft's positioning of the Tablet PC includes the statement that "all Tablet PCs will have keyboards." That's certainly true for Fujitsu's current pen tablets as well as for Fujitsu's future Tablet PCs. Both forms of tablet can use a wireless (infrared) keyboard, a wired (USB) keyboard, or an on-screen keyboard.

One of the significant effects of the Tablet PC will be to further blur the distinction between a notebook and a pen tablet. Since all Tablet PCs will have keyboards in one form or another (internal or external), the distinction will evolve into whether a given device supports a pen, not whether it has a keyboard or not. Microsoft believes (and Fujitsu agrees) that within five years after the introduction of the Tablet PC, as many as 50% of all mobile Windows computers will support a pen. Fujitsu is already headed in that direction. Fujitsu's LifeBook(r) B Series notebooks today support a pen — the LCD on these products (when used with a three-cell battery) can be rotated through 180 degrees and laid flat on the desk to create the effect of a pen tablet. Fujitsu is likely to enhance these products, and possibly other notebook series, to meet the Tablet PC specifications in the future.

Digital Ink

One of the key attributes of a pen is that it can be used for inking (writing and drawing). Microsoft is emphasizing the use of "digital ink" on the Tablet PC, while de-emphasizing handwriting recognition. Fujitsu's existing customer applications make almost no use of digital ink, and very little use of handwriting recognition. Most corporate project-based applications today are menu-driven and point-and-click oriented, involving forms completion or data access or acquisition. Any additional support that Microsoft provides for either digital ink or enhanced handwriting recognition in the Tablet PC therefore represents additional capabilities that can be utilized by Fujitsu customers.

The Tablet PC operating system adds substantial support for creating, manipulating and storing digital ink, as well as a major new ink-oriented application called "Microsoft Journal." Consider the typical person who takes notes in a paper notebook during a meeting. They frequently don't type up their notes and format them into a Word document immediately after the meeting. Often the notes are left in ink form and used as-is for reference. Similarly, when someone annotates a document or sketches something, the annotations and drawings are nearly always left in ink form. Ink doesn't always need to be transformed into data.

As a tool for creating, storing and manipulating ink, Microsoft Journal takes note-taking to a new level. The application allows such capabilities as:

- Moving ink words as though they were text
- Bolding, italicizing, underlining and coloring single words or groups of words
- Searching handwritten blocks of ink for a specific word or phrase
- Scaling entire blocks of ink
- Delayed or background recognition

In addition to Microsoft Journal, Microsoft plans to enhance Office® XP (Word®, PowerPoint®, and Outlook®) and Visio® to fully support digital ink. For example, suppose you're responding to an email message in Outlook. After tapping on Reply, instead of starting to type on the keyboard you can tap on a pen icon and an "inking box" appears. You can handwrite a quick response in the box, tap Send, and your reply is sent in the form of ink, along with the previous message in text below. This is made possible by Microsoft's definition of ink as a data type equal in stature to text. The support for ink as a data type extends throughout the XP Tablet operating system, and it makes a significant difference.

There will be a substantial number of additional applications from third parties (ISVs) that take full advantage of XP Tablet's support for digital ink. For example, Autodesk is enhancing AutoCAD, Inventor, Streamline, Buzzsaw and other digital design and viewing applications to make use of the extensive ink-oriented APIs that Microsoft has included in XP Tablet. These enhanced applications should be very appealing to mobile architects, construction supervisors and the many users of CAD drawings who today often use outdated paper copies. Similarly, Adobe is enhancing Acrobat to add pen-based commenting and content manipulation via the ink-oriented APIs in support of their network publishing solutions. Allscripts Healthcare Solutions and Amicore — two providers of mobile clinical and office automation software for physicians — are enhancing their products to support digital ink. This should help further extend the already-significant penetration of pen tablets into healthcare applications. Digital ink may turn out to be the "killer application" of the first generation of Tablet PCs - an interesting turn of events from the early 1990s, when handwriting recognition was supposed to be the "killer application" for pen computers.

Handwriting Recognition

Handwriting recognition has been the whipping boy for pen computers since the first pen tablet was invented in 1989. Although handwriting recognition applications have steadily improved over the last 10 years, most people's handwriting has actually deteriorated because the target audience of most handwritten material has become just the author, rather than other people. If you're the only one who has to read your handwriting, you tend to become sloppier and use more shortcuts. The result is that handwriting recognition accuracy has improved only a little over the past 10 years. The handwriting recognizer that's in the currently shipping version of Office XP is the same one that will be in XP Tablet. Microsoft believes that it's the best recognizer on the market today, and they're probably right.

While Fujitsu supports any and all progress that Microsoft makes in handwriting recognition, Fujitsu also believes that handwriting recognition will never be a fully adequate replacement for keyboard input. Handwriting recognition will never be universally reliable for all people because handwriting varies substantially from person to person. This limitation is one of the factors that will help make digital ink very attractive.

Microsoft's Vision versus Fujitsu's Market

Microsoft's primary target for the initial release of Tablet PC products is the corporate knowledge worker. According to Microsoft, there are 43.4 million knowledge workers in the United States, representing 21% of the population over 21 years of age. The initial users as envisioned by Microsoft include both "road warriors" and "corridor cruisers". Most people are familiar with the former group. Microsoft's vision is that these users, many of whom currently have ultra-portable notebooks, will be eager to upgrade their hardware to a convertible-style Tablet PC. After all, if a Tablet PC truly is a superset of today's ultra-portable notebook, why not upgrade and take advantage of the pen?

The corridor cruiser is a person who works in an office building or in a campus of buildings. They're not heavy travelers. Instead, they spend a lot of time out of the office in meetings in the building or on the campus. Today this user often has a desktop computer in the office, and a paper notebook that they carry with them to meetings. They typically don't have a notebook computer because, (a) using a notebook computer in Western business meetings, with the screen forming a barrier between participants along with the keyboard generating noise, is considered to be impolite, and, (b) without

heavy travel, the user typically can't justify the cost of a notebook.

Microsoft's short-term vision is that the corridor cruisers replace their desktop computers with slate-style Tablet PCs. When they're in the office, the Tablet PC is docked, supporting a large-screen monitor, standard 101 keyboard, mouse, LAN connection, CD-ROM, speakers — all the normal desktop peripherals. When it's time to go to a meeting, the user grabs the Tablet PC out of the docking station and brings it to the meeting. In the meeting, the Tablet PC is used not only for taking notes (like a traditional paper notebook), but also for referring to the user's data, such as budget reports, forecasts, offline web pages and anything else that's needed on the spot. If the user finds the meeting boring or isn't one of the primary contributors to the meeting, they can even write and send an "ink" email (via wireless LAN) surreptitiously from the Tablet PC on their lap.

However, Microsoft isn't focused exclusively on road warriors and corridor cruisers. Microsoft acknowledges that "vertical markets that use proprietary devices or digital appliances for pen-based input may find the Tablet PC's broader functionality and power appealing." This statement (from the FAQ on the Microsoft Tablet PC website) acknowledges that Tablet PCs will be appealing in corporate project-based applications the same way pen tablets are today.

Fujitsu agrees with Microsoft in the belief that the Tablet PC is a natural extension and evolution of the mobile business computer. When technology enabled business users to bring their computers with them, the notebook computer market was born — beginning with the "luggable." At the outset of the notebook market (and sometimes even today), potential users were often required to present a business case demonstrating increased productivity prior to receiving a notebook computer. The motivation for today's purchase of pen tablets is no different. It's the desire to increase efficiency and yield a positive Return on Investment (ROI). With the welcome introduction of a broadly accepted, fully pen-enabled operating system, the ROI-based business market for Fujitsu's products will broaden and expand significantly.

Fujitsu regards the enterprise corridor cruiser as a significant incremental business opportunity for Tablet PC products. Fujitsu has been selling Windows pen tablets to Fortune 1000 companies for almost ten years in steadily increasing numbers for project-based business applications. Selling through corporate IT to groups of knowledge workers in the enterprise who want to improve their personal efficiency through the use of a Tablet PC is a natural extension of Fujitsu's current business. Corporate IT already recognizes Fujitsu as a stable, long-term supplier of portable computers; Microsoft's strong support for the Tablet PC will simply increase IT's awareness of Fujitsu's products and make access to those products easier.

Neither Microsoft nor Fujitsu are targeting the consumer in the first round of Tablet PC products. Since the majority of notebooks today are sold to business users, it's very reasonable to avoid trying to address the consumer market until the Tablet PC is well established in the enterprise. Of course, there will always be a few early-adopters who want to try the latest PC innovation. While Fujitsu will probably offer Tablet PCs on the Web and through existing retail channels, Fujitsu doesn't plan to make any particular effort to attract the consumer.

Summary

Fujitsu believes that Windows XP Tablet PC Edition is a welcome and enabling technology, which will allow the existing pen tablet market to take its natural next step. Hardware, software and connectivity have advanced enough to make this next step possible. Through increasing use of natural interfaces, the Tablet PC will expand the existing pen tablet market from the truly mobile, on-their-feet users to the broader business portable market — notebook computer users. In both cases, the market drivers remain the same: increased efficiency through business process automation, and optimal Return on Investment. Over the past ten years of leadership in the design of truly mobile hardware and solutions-based sales, Fujitsu has helped many of the world's leading corporations. In the era of the Tablet PC, Fujitsu will continue supplying state-of-the-

art pen tablets to the same Fortune 1000 corporations who are Fujitsu customers today. The range of applications will expand, and the technology will continue to advance, but Fujitsu's expertise in both will be just as necessary as it is today.

Resources for Further Reading on the Tablet PC

http://www.microsoft.com/windowsxp/tabletpc/
http://www.pencomputing.com/frames/tablet_pc.html
http://www.tabletpctalk.com/

Note 1: Market share data for the North American market from IDC, 2001

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