Technology Brief...

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MSFT SideShow – A No Show?

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One interesting feature of Microsoft's new Vista OS called SideShow, allows a remote screen to be utilized as a second notifications-oriented display (e.g., small LCD embedded in the laptop case and viewable when the top is closed). One envisioned use is a way to enable calendar and/or push email alerts to be received by the end user even with the lid closed and the machine in standby. This is accomplished through the use of a WWAN-enabled intelligent controller card installed in the machine (developed with Novatel, a WWAN manufacturer, who worked with MSFT to define this capability). Using this card with MSFT Exchange and AirSync, an event is pushed to the card, which then wakes the machine, synchs with Outlook, puts the machine back into standby mode, and displays the information on the SideShow screen. While this is an interesting technology, is it technology users really need or want?

SideShow requires additional HW be installed in the machine (an additional ARM processor, associated memory, display and wireless connection capability, all linked to the internal machine bus and constantly drawing power). This will add significant cost (we estimate $100-$200) and complexity, not to mention reduced battery life. Further, it also requires a WWAN connection (e.g., Verizon, AT&T, Sprint). And, for this use, it requires that users have deployed the latest MSFT Exchange, which is required to make SideShow work (the card firmware interacts directly with the Exchange server via AirSync).

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We do not expect SideShow, in its current form, to be all that attractive to most users, particularly business users who are primarily targeted for SideShow functionality. Nearly all business users who so desire already have the ability to receive alerts and emails on a mobile device (e.g., BlackBerry, Treo, etc.), which are carried by the user. Further, the level of convenience associated with looking at a screen on a closed laptop is not all that compelling (why not just leave the device open, and a user can't view the screen while the notebook is in a briefcase). It would be more compelling if the display could be "remoted" from the laptop allowing the user to carry it around (perhaps via Bluetooth), but this capability is not currently available (although the SideShow spec does make provision for this). Even if it were, a smart phone would still allow more functionality and a wider range of operation by not needing to be tethered to a notebook, and adding web browsing and voice calling for an equivalent or lower cost.

We do believe that SideShow capability has a future – just not this one. The

ability to utilize SideShow capability as a secondary display for desktops and servers would allow a number of interesting options (e.g., monitoring health of the machine, remote gaming information, diagnostics, instant messaging, etc.). And, SideShow technology has some ability to work on a machine in standby mode, so allowing a remote management suite (perhaps via AMT) to interact with the machine over a WWAN, or providing a "LoJack" like capability for machine security, would be an interesting derivative (however, this would require a re-architecting, as the interface to Exchange over AirSync, and the need to interact with Outlook on the machine, would both have to be modified to work with other products – not a trivial task).

Bottom Line: SideShow is currently a No-Show, as no first-tier notebook manufacturer we surveyed, except for Toshiba, has provided this capability nor intends to do so in the near term (Toshiba only provides its Active Notifications on a high end tablet unit at a premium price). We believe that SideShow in its current form is technology implemented too late, since smart phone devices currently provide this function very well, and are already available to the majority of enterprise class users who would want SideShow functionality. However, we do believe that MSFT (and potentially Intel and HW vendors) will take the SideShow concept further and make it much more meaningful in the next few years by evolving it to a remote management, security and diagnostics capability.

Robson Technology: That little extra boot

Intel has recently been disclosing a new technology which it plans to deploy with the upcoming update to the Centrino platform, code named Santa Rosa (due out this summer). The new technology, internally called Robson, but recently officially named Intel Turbo Memory, is targeted at increasing performance of Centrino based systems by adding NAND flash technology to the machine. Specifically, a mini-card with custom drivers which talks to the storage subsystem, will be used by systems running Vista to enable a flash memory caching capability. This is similar to the Vista Ready Boost technology which uses a USB flash drive to increase performance, but being connected to the PCI Express bus and optimizing drivers for the IA architecture will provide substantially more performance for Robson. Intel has announced that is expects Robson to decrease boot times by 20%, while also offering increased performance for frequently used applications of up to 2X.

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While some skeptics may look at this as a way for Intel to boost its sales of NAND chips (for which it has made a significant investment), we believe this technology offers some key benefits to mobile users which ultimately will lead to the technology being widely adopted, and indeed may extend beyond notebook platforms and make its way to desktop or even server platforms as well. With Robson mini-cards of up to 1GB of cache, we believe the figures mentioned by Intel for performance and boot times improvements may actually be conservative. Further, we speculate that this system will substantially improve battery life by allowing applications to run faster, thus allowing machines to go into low power mode more quickly, as well as allowing machines to enter and exit hibernation more quickly and without spinning up a mechanical drive (which takes significantly greater power than flash memory and takes longer than flash

to transfer the data, further increasing Robson's power savings advantage). Finally, we believe future versions of Robson may allow application providers to optimize SW for the technology, adding to its performance advantage.

Although we expect the initial implementation of Robson technology to add as much as $100-$200 to the cost of a notebook, this will eventually be reduced (due to the standard silicon cost reduction curve) to half that amount or less fairly quickly (1-2 years). But even at $100-$200, the performance and battery life improvements will be seen by many users as an essential requirement of a mobile platform. With users often sighting limited battery life as the number one complaint they have, being able to improve battery life by 10%-20% is substantial and significant (e.g., a current 5 hour battery would become a 6 hour battery with Robson). It is unlikely battery chemistry alone will be able to produce such improvement anytime soon. Increased battery life may be the most important sales point for mobile workers, though increased performance will also be seen as an advantage (and even more so in desktops and servers, while reduced overall power requirements in servers could also help Intel win the battle for low power "Green" platforms).

However, Robson technology will likely offer little or no benefits in a machine with a solid state drive. Although the price of solid state drives is currently cost prohibitive for most uses, we do expect an increasing use of the technology in high end and specialty applications. But since we expect the cost of magnetic storage to remain substantially less costly than solid state drives for the next several years, Robson will offer a significant advance in performance for most machines.

Bottom Line: We believe that Intel has a significant competitive advantage in the Robson technology, although it is unclear how long it may maintain that competitive differentiation. Nevertheless, we believe this will indeed give Intel a boost in its competitive race with AMD and others. Within 2 years, we believe Robson will be a must-have for all but the most cost sensitive machines, provided Intel can indeed produce the benefits claimed.

The Core the Merrier

"…We expect the continued migration of computing systems to more cores… and expect a doubling of cores approximately every 3 years….."

Although most mid to high range PCs and mid range servers currently exploit dual core processors, we expect quad core to make it into the mainstream in servers within the next 1-2 years, desktops in 2-3 years, and notebooks in 3-4 years. This is a logical response as the need for increasing amounts of compute power for more powerful applications and richer media accelerates. Indeed, much like Moore's Law predicting a doubling of CPU power every 24 months, we believe that the law of "multiple cores" will provide for a doubling of cores within mainstream processors, driven by increasingly complex OSes and applications, every 3-4 years. Those who say that this amount of processing power isn't necessary for most of the applications users run are wrong, as it is almost a universal truth that applications, and users themselves, always find a way to utilize additional processing power, memory and storage space. Further, with decreasing chip sizes due to the move to smaller physical geometries (90 nm to 65 nm to 45 nm and eventually 32 nm), we expect the price of these advanced devices to be cost equivalent with previous generation devices very quickly (within 6-12 months after introduction). Indeed, several quad core PCs (e.g., HP

workstations and gaming machines) have been introduced with a reasonable premium over dual core systems that make them attractive and affordable for performance driven applications. Such performance will "flow down hill" in many organizations in short order.

The biggest challenge to making the most out of the increasing number or cores is the need to optimize SW (both OS and applications) to take maximum advantage of the multiple cores. Indeed, although multiple cores can work to some advantage without optimization of code by processing multiple apps in parallel or operating on background tasks, providing optimization can increase the performance by several times. In fact, it is much harder for applications providers to re-architect their SW to utilize the increasing numbers of cores than it is for the chip vendors to create the multi-core chips and architectures. We do not expect this to change in the next few years, although better tools and techniques will be implemented to make this easier. Nevertheless, we expect the SW industry to lag behind the HW for the foreseeable future.

It is not only PCs and servers which will be empowered with increasing numbers of cores. We expect smaller form factor devices (e.g., smart phones, specialty PDAs, entertainment and consumer devices) to increasingly utilize multi-cores for performance or, as in the case of a smart phone, a single multi-core chip to provide phone features on one core while another core provides multimedia and other capabilities. We have already seen some of this and expect to see much more of this in the next 1-2 years. We expect cores in this class of chip to be optimized for specific functions in smart phones and other consumer devices, rather than containing general purpose cores as in PC targeted chips.

Bottom Line: We expect the continued migration of computing systems to more cores for their improved performance and ultimately, improved SW functionality. Users must be prepared to upgrade to multi-core machines as they move through a normal purchasing cycle and expect a doubling of cores approximately every 3 years. We also are convinced that more complex applications and data types will drive the need to increase cores in even casual user machines over the next few years.

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