

## USB 2010: SuperSpeed USB Adoption Will Lag the Pace of High-Speed USB Adoption

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### Executive Summary

USB continued its dominance as the top digital interface within PCs, PC peripherals, consumer electronics (CE), and communications devices, with over 3.14 billion devices shipped in 2009. This compares to 3.09 billion devices shipped in 2008. The limited increase is due primarily to the worldwide economic slump, rather than to anything having to do specifically with USB.

2009 was also notable because of the shipment of the first products with SuperSpeed USB, which offers a ten-fold bandwidth improvement over high-speed USB. A few desktop PCs and aftermarket cards shipped in the fourth quarter with the new 5Gbps standard.

However, the success of SuperSpeed USB over the next few years will be limited. The primary reason for this is the length of time it will take for SuperSpeed USB to be integrated into the core logic PC chipset. USB achieved its immense success primarily due to core logic integration, which effectively allowed PC OEMs to offer it for free. Integration is necessary before a new USB standard becomes prominent in PCs. Before that occurs, PC OEMs must put discrete host controller chips in their PCs to enable them with the new USB standard. In the last transition, from full-speed to high-speed USB, the gap between the introduction of high-speed discrete host controllers and core logic integration was one year. That gap is significantly wider in the current generation. In May 2009, NEC introduced a discrete SuperSpeed USB host controller, the  $\mu$ PD720200. However, the first SuperSpeed USB core logic chipset is not expected to ship until late 2011, which represents a 2.5-year gap. That means that PCs will not begin to adopt SuperSpeed USB in significant numbers until 2012.

Adoption of SuperSpeed USB in other product segments depends on PC adoption. With few exceptions, devices within the PC peripheral, CE, and communication segments will not adopt SuperSpeed until it has been widely adopted in PCs. This effectively means that SuperSpeed USB adoption will be much slower than high-speed USB adoption was at a similar point.

Meanwhile, high-speed remains the USB of choice in nearly all applications. Over 64% of USB devices shipping in 2010 are expected to have high-speed USB, a number that will peak in 2011 at two-thirds. After that, high-speed USB devices will decrease slowly over the remainder of the forecast, as SuperSpeed begins to gain traction. Low- and full-speed USB remains relevant due to their popularity in high-volume applications, such as mice and keyboards.

Figure 1 and Table 1 show the forecast for USB-enabled devices by USB type and for the total available market (TAM).

### HIGHLIGHTS

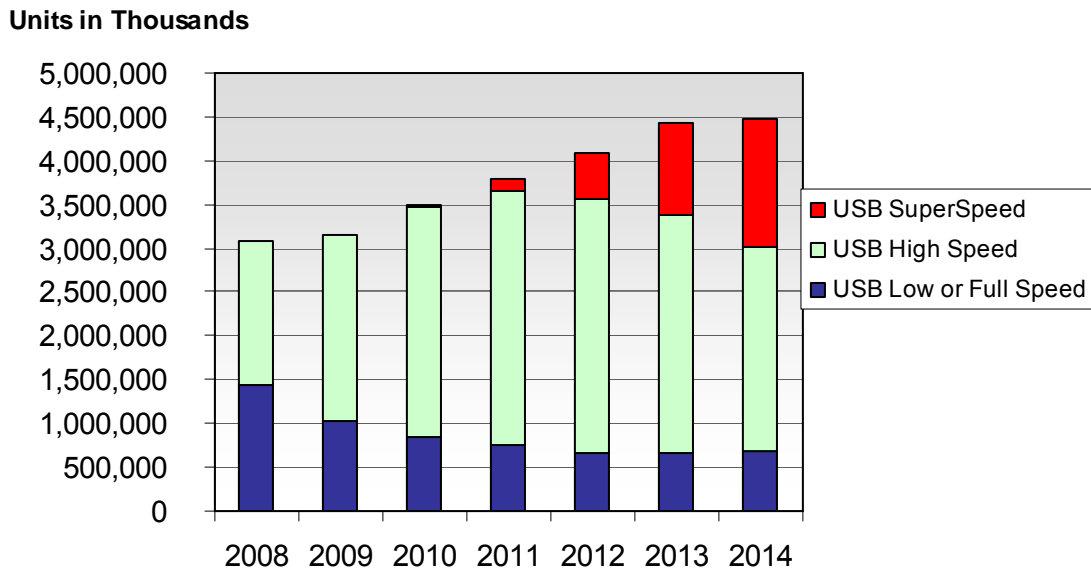
- More than 3 billion USB-enabled devices shipped in 2009; over 4 billion will ship in 2012.
- The first SuperSpeed USB devices shipped in late 2009.
- SuperSpeed integration into PC core logic chipsets will not happen until late 2011, which will slow its adoption into PCs, as well as in other applications.

**Table 1. Total Wired USB-Enabled Device Summary Forecast by USB Type 2008–2014  
(Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>TOTAL DEVICES TAM</b>	3,753,379	3,752,536	4,055,406	4,359,790	4,631,844	4,967,667	4,999,356	5.9%
<b>% w/ USB Low or Full Speed</b>	38.6%	27.5%	21.0%	17.2%	14.3%	13.5%	13.6%	
<b>USB Low or Full Speed</b>	1,449,009	1,031,404	853,124	748,409	660,835	668,368	681,469	-8.0%
<b>% w/ USB High Speed</b>	43.8%	56.2%	64.5%	66.6%	62.4%	54.6%	46.5%	
<b>USB High Speed</b>	1,644,443	2,109,437	2,615,957	2,904,165	2,889,655	2,711,337	2,323,205	1.9%
<b>% w/ USB SuperSpeed</b>	0.0%	0.0%	0.5%	3.0%	11.5%	20.9%	29.4%	
<b>USB SuperSpeed</b>	0	26	19,155	130,629	533,355	1,038,779	1,467,746	791.9%
<b>Grand Total Wired USB</b>	<b>3,093,452</b>	<b>3,140,868</b>	<b>3,488,236</b>	<b>3,783,204</b>	<b>4,083,845</b>	<b>4,418,485</b>	<b>4,472,421</b>	<b>7.3%</b>

Source: In-Stat, 3/10

**Figure 1. Total Wired USB-Enabled Device Summary Forecast by USB Type 2008–2014  
(Units in Thousands)**



Source: In-Stat, 3/10

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## Introduction

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USB stands for universal serial bus. The original USB 1.0 standard was released in 1996. An open interface standard that provided for data rates of 1.5Mbps (low-speed) and 12Mbps (full-speed), USB 1.0 was designed to provide a common interface between PCs and peripherals, eliminating the need for legacy connections, such as serial, parallel, and PS/2 ports. USB is a master/slave architecture that requires a host, usually a PC, and peripherals, such as printers, scanners, mice, and keyboards. The host, peripherals, and operating system must all support USB for the interface to operate.

The USB 1.1 standard followed USB 1.0, also with a maximum data rate of 12Mbps, with backward compatibility with USB 1.0. USB 1.1 was developed to clean up the bugs that had kept some USB 1.0-enabled devices from communicating with others.

USB 2.0 is the high-speed update to the USB standard, allowing a maximum data rate of 480Mbps. Often referred to as high-speed USB, it significantly increases the total amount of bandwidth available in a single-host design. This had been a limiting factor in full-speed USB, and it has helped to expand the penetration of USB into high-bandwidth applications, such as external storage. In addition, USB 2.0 provides complete backward compatibility with both USB 1.0 and 1.1.

The latest update to the USB standard is USB 3.0, or SuperSpeed USB, which provides for data rates as high as 5Gbps.

*Please note that in this report, the official USB standards and their descriptions will sometimes be used interchangeably. For example, USB 2.0 will be referred to as high-speed USB, and USB 3.0 will be referred to as SuperSpeed USB. This is for convenience sake; In-Stat understands that the speed of the USB specification is not equivalent to the USB specification itself.*

## Low-Speed and Full-Speed USB

Low-speed and full-speed USB refer to data rates of 1.5Mbps and 12Mbps, respectively. Please note that the forecasts in this report do not distinguish between low-speed and full-speed USB.

USB received a major boost from native support in Windows 98. This helped make USB particularly successful in PCs, where it quickly achieved 100% penetration, as well as in PC peripherals, including printers, scanners, and web cameras. Although low-speed USB was sufficient for some applications, particularly human interface devices (HID) such as mice and keyboards, most peripheral makers opted for full-speed USB at 12Mbps. However, even full-speed USB began to exhibit serious bandwidth limitations, increasing demand for a higher-speed version of USB.

Even with the advent of high-speed USB, both low-speed and full-speed USB are still going strong and are likely to stay strong for many years. Low-speed and full-speed USB chips are relatively cheap, and they have sufficient speed for some applications. In addition, it is very inexpensive to integrate these specifications into other silicon, making them even more economical.

## High-Speed USB

To overcome the bandwidth limitation of full-speed USB, members of the USB Implementer's Forum (USB-IF) sought a higher-speed interface specification. After an aborted attempt to make IEEE 1394 that specification, the USB-IF developed USB 2.0, or high-speed USB, which is theoretically capable of a maximum data rate of 480Mbps, 40 times faster than full-speed USB. The target markets for high-speed USB applications are the same as for full-speed USB, namely PCs, PC peripherals, consumer electronics, and communications, but the emphasis is on those devices that require greater bandwidth.

High-speed USB was introduced in volume in May 2002, when Intel launched three high-speed USB-enabled core logic chipsets for PCs. Intel's competitors quickly followed suit. Integrated high-speed USB spread throughout the PC market over the following year. Integration of high-speed USB in PCs led to near-universal PC adoption of high-speed USB because it allowed PC vendors to effectively offer it for free.

High-speed USB has reached the point in its product life cycle when it has become a check-off item in most PC peripheral, consumer electronics, and communications applications. Even if the device manufacturer doesn't currently require the increased data rate of high-speed USB, it is being added in order to future-proof the product because the cost-differential between high-speed and low-speed is fairly negligible. The integration of high-speed USB into application-specific integrated circuits (ASIC), systems-on-chip (SOC), and other silicon has also lowered the cost of offering high-speed USB for high-volume applications.

Even with a top data rate of 480Mbps, vendors for applications such as PCs and external storage began to look for a next-generation, higher-speed version of wired USB. This led to the development of USB 3.0, or SuperSpeed USB.

## USB 3.0—SuperSpeed USB

Intel first announced details of SuperSpeed USB, or USB 3.0, at the Intel Developers Forum (IDF) on September 18, 2007. In November 2008, the USB 3.0 Promoter's Group announced the completion of the specification. Promoter Group members include Hewlett-Packard, Intel, Microsoft, NEC, STEricsson, and Texas Instruments. In June 2009, NEC launched their  $\mu$ PD720200 USB 3.0 host controller, making samples available. In September 2009, the USB-IF announced the launching of a USB 3.0 Compliance and Certification program. At the Intel Developers' Forum (IDF) later that month, the first USB 3.0 devices were demonstrated, including the ASUS X58 motherboard, a Fujitsu notebook, and a high-definition digital video camera from Point Grey Research. The ASUS and Fujitsu devices use NEC's host controller.

The theoretical throughput of SuperSpeed USB is 5Gbps. In addition, power requirements have been significantly reduced. By decreasing the rate at which a host polls each device, SuperSpeed USB is expected to use close to zero power when idle. The form factor for SuperSpeed includes a new connector with 5 new wires, but connectors that comply with the standard will also plug into USB 1.x and 2.0 ports. Nevertheless, the new cabling to fully enable SuperSpeed USB means additional costs for PC OEMs and to consumers as well.

Because the throughput of SuperSpeed USB, ten times that of high-speed USB, is not required in some devices, adoption will not initially be as broad as for full- and high-speed USB. However, SuperSpeed USB will gain significant initial penetration in markets requiring transfers of increasingly larger pools of data. This process is already starting with applications such as external hard disk drives and USB flash drives, and is expected, in the near future, in applications such as digital still cameras, camcorders, and PMPs.

The next question then becomes: How quickly, if at all, will SuperSpeed USB penetrate those markets that don't necessarily need the increased bandwidth? The answer will likely come down to two issues: cost and product requirements. If SuperSpeed USB is close enough in cost to high-speed USB, then product designers may decide to include it in order to be future-proofed against needed increases in bandwidth. However, SuperSpeed USB is unlikely to come close to the cost of high-speed USB on either the host or peripheral side over the next three to five years.

In terms of the need for bandwidth, there are many applications that currently use high-speed USB that are unlikely to transition to SuperSpeed. In the last USB transition, in 2002 and 2003, there were several applications that had need for greater bandwidth than the 12Mbps provided by full-speed USB. Leading that list was external hard drives, but it also included optical drives, USB flash drives, scanners, printers, multi-function peripherals, web cameras, portable media players, digital still cameras, and digital camcorders. There is not currently the same range of devices that need to move to SuperSpeed USB's multi-Gbps data rates. While select external hard drives, USB flash drives and PCs are currently transitioning to SuperSpeed, few other devices are. Take printers as an example. High-speed USB, the current interface of choice in the market, is not the limiting factor for print speeds; the speed of the print head is. Therefore, an HP or Canon gains nothing for their customers by transitioning to SuperSpeed printers.

Another issue with regard to the inclusion of SuperSpeed is its lower power consumption. In high-speed USB, the host must often poll the ecosystem of devices to determine if additional USB devices have come online. This is a significant energy drain on host devices. SuperSpeed USB lowers power consumption by reducing the polling that is necessary, as it allows new devices to ping the host when they come onto the system. In addition, under previous versions of USB, the CPU of the host device had to manage every transaction, pushing the USB signal to the USB device controllers, increasing power consumption. Under the SuperSpeed USB specification that is no longer the case; more of that is now handled by the SuperSpeed USB host controller. The lower power consumption of SuperSpeed USB may be especially attractive to portable devices, but only if the cost of adding SuperSpeed is reasonable.

### **Core Logic Integration**

The roadmap to core logic chipset integration for SuperSpeed USB is slower than that of high-speed USB in the previous generation. NEC released the first high-speed USB discrete host controller in March 2001. This allowed PC OEMs to enable high-speed USB in the PC by putting the controller chip on the motherboard. However, traditionally it is the integration of USB capability into the core logic chipset that drives USB adoption by allowing the PC OEM to effectively offer a new USB spec for free. Intel released the first high-speed USB core logic chipset in May 2002, about one year after NEC's discrete solution was released.

That gap is significantly wider in the current generation. In May 2009, NEC introduced a USB 3.0 host controller, the  $\mu$ PD720200. However, the first SuperSpeed USB core logic chipset is not expected until late 2011, which represents a 2.5-year gap between the two. This means that those PC OEMs that now want SuperSpeed USB will have to pay for it, in the form of a discrete SuperSpeed USB host controller. They are only likely to add a discrete solution if there is customer demand, such as in the high-end mobile and desktop PC market. Integrated USB core logic chipsets are a free lunch for PC OEMs—they get to offer new technology without having to pay for it. So SuperSpeed will not become mainstream until SuperSpeed USB core logic chipsets are introduced.

### Microsoft Support

Microsoft did not support USB 3.0 in the initial release of the Windows 7 operating system, released in October 2009. The primary reason for lack of initial Microsoft support is that the preliminary work on the USB 3.0 spec was completed in November 2008, after the code completion date for Windows 7.

The question then becomes: Will Microsoft eventually support USB 3.0, and, if so, when? Microsoft has been a staunch supporter of USB, with support of USB 1.x coming first in Windows 98. In addition, Microsoft has been active in the USB 3.0 Promoter Group, and appropriate device working groups. So it is reasonable to assume that USB 3.0 support will come. Reports of Microsoft supporting USB 3.0 in an early service pack proved premature. Microsoft will likely want to see substantial SuperSpeed penetration of the PC market before supporting the standard. Since that penetration will not come until the integration of SuperSpeed into core logic chipsets in late 2011 and 2012, Microsoft support is likely at least two years away, which means it may not come until the next Microsoft operating system is released.

In the meantime, the company is attempting to insure that Windows 7 works with third-party software stacks. It also works with the USB-IF's Product Interop Lab to ensure hardware/software interoperability. Unless and until Microsoft does support USB 3.0, the market will be left to third-party host stack providers, such as NEC and MCCI.

### Light Peak

Light Peak is a code name for an Intel initiative that is devoted to transitioning copper-based interfaces to optical technology. The theory behind the need for optical is that copper is not performing as well as it reaches a speed ceiling, and will perform worse in the future as next-generation interface speeds increase. As speed increases, copper-based interfaces require heavier gauge cable, as is the case in the transition from high-speed to SuperSpeed USB. Cables get progressively bulkier, less flexible, and less reliable. One example here is that SuperSpeed USB cables are only three meters long to deliver its greater bandwidth, compared to high-speed USB's five-meter cable length. Bulkier copper cables also lead to larger connectors.

Light Peak technology is not limited to USB, but includes all extant multi-Gbps wired interfaces. Optical technology can increase the range, as well as the data rate, of given technologies. Copper may be included for interfaces such as USB that supply power, which cannot be accomplished via optical signaling. As with optical communications technology, Light Peak would offer the possibility of a very high bandwidth ceiling via wavelength division multiplexing (WDM) technology.

As to Light Peak’s use in USB technology, it is likely a long way off. The high-speed USB standard was used for nine years before the introduction of SuperSpeed USB. This makes it unlikely that we will see any optically-based USB standard over the length of the forecasts in this report, which goes out to 2014.

## USB ASP Chip Forecasts

This section forecasts the average selling prices (ASPs) for the following discrete USB chips:

- SuperSpeed and high-speed host controllers
- SuperSpeed, high-, full-, and low-speed peripheral (or device) controllers
- SuperSpeed, high- and full-speed hub controllers

The forecasts are for discrete devices in each category, and they make no attempt to forecast prices for USB applications integrated into other silicon, such as ASICs or system-on-chip (SOC) solutions, or for intellectual property (IP) prices. They generally assume six- to seven-figure volumes shipments in coming up with the ASPs. They also assume that discrete chips in all categories will be available for the length of the forecast, even though integrated USB applications will be increasingly popular for many applications over the life of the forecast.

The ASPs for SuperSpeed and high-speed host controllers can be seen in Table 2. Peripheral or device controller ASP forecasts can be seen in Table 3, and hub controller forecasts can be seen in Table 4.

**Table 2. USB Discrete Host Controller ASP Forecast 2008–2014**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
SuperSpeed ASP	--	\$6.75	\$5.00	\$4.00	\$3.00	\$2.50	\$2.00	-21.6%
High Speed ASP	\$1.75	\$1.60	\$1.45	\$1.40	\$1.35	\$1.25	\$1.20	-5.6%

Source: In-Stat, 3/10

**Table 3. USB Discrete Peripheral Controller ASP Forecast 2008–2014**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
SuperSpeed ASP	--	\$6.00	\$4.50	\$3.50	\$2.75	\$2.25	\$1.75	-21.8%
High Speed ASP	\$1.45	\$1.40	\$1.30	\$1.20	\$1.15	\$1.10	\$1.00	-6.5%
Full Speed ASP	\$0.82	\$0.75	\$0.73	\$0.71	\$0.69	\$0.66	\$0.64	-3.1%
Low Speed ASP	\$0.34	\$0.31	\$0.29	\$0.28	\$0.26	\$0.25	\$0.24	-5.0%

Source: In-Stat, 3/10

**Table 4. USB Discrete Hub Controller ASP Forecast 2008–2014**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
SuperSpeed ASP	--	--	\$6.50	\$5.00	\$3.50	\$2.75	\$2.00	--
High Speed ASP	\$1.10	\$1.00	\$0.95	\$0.90	\$0.85	\$0.83	\$0.80	-4.4%
Full Speed ASP	\$0.70	\$0.70	\$0.68	\$0.67	\$0.66	\$0.65	\$0.63	-2.1%

Source: In-Stat, 3/10

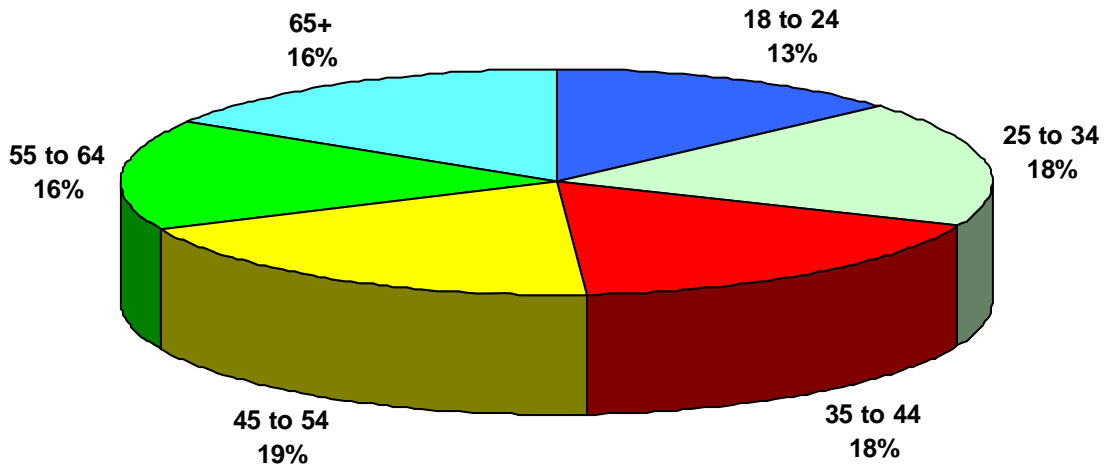
## Survey Responses on USB Usage

### Residential Technology Survey

In-Stat's annual Residential Technology Survey (RTS) was conducted in February 2010. The survey asked typical consumers across the United States questions about their ownership of, use of, and attitude toward, technology products and services in the home. The data in the survey were obtained via a web-based questionnaire that was developed by In-Stat. This survey was conducted using a large, third-party online consumer panel that consisted of over 2.5 million consumers in the US. The web panel's members were recruited by invitation, with all members having completed an in-depth profiling survey. This panel delivered a cross-section of the US population with a highly normalized demographic and geographic balance.

This survey resulted in 1,000 respondents. 515 were female, and 485 were male. The breakdown of respondents by age can be seen in Figure 2.

**Figure 2. Into Which of the Following Age Ranges Do You Fall? (N=1,000)**



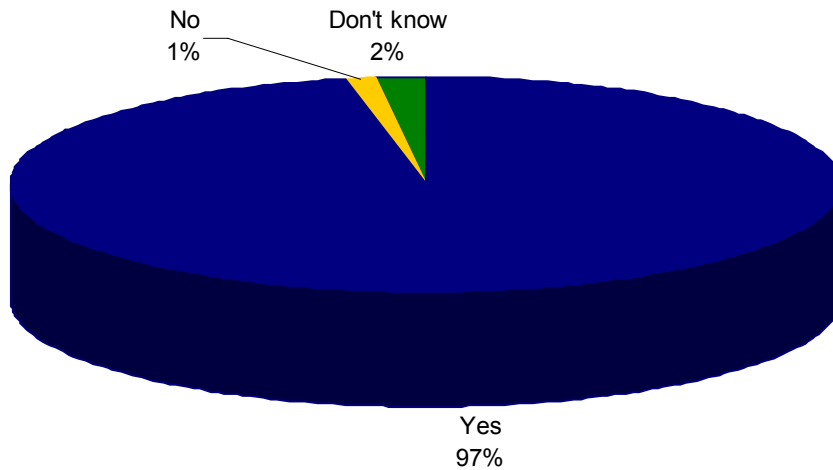
Source: In-Stat, 2/10

n=1,000

**Do Any of Your Home PCs Have a USB Port?**

Of those 988 among the 1,000 respondents with at least one home PC, Figure 3 illustrates the percentage of users that have USB ports on their PCs: 97% of the respondents have USB ports, 1% does not, and 2% do not know.

**Figure 3. Do Any of the Computers Used In Your Home Have a USB Port? (N=988)**



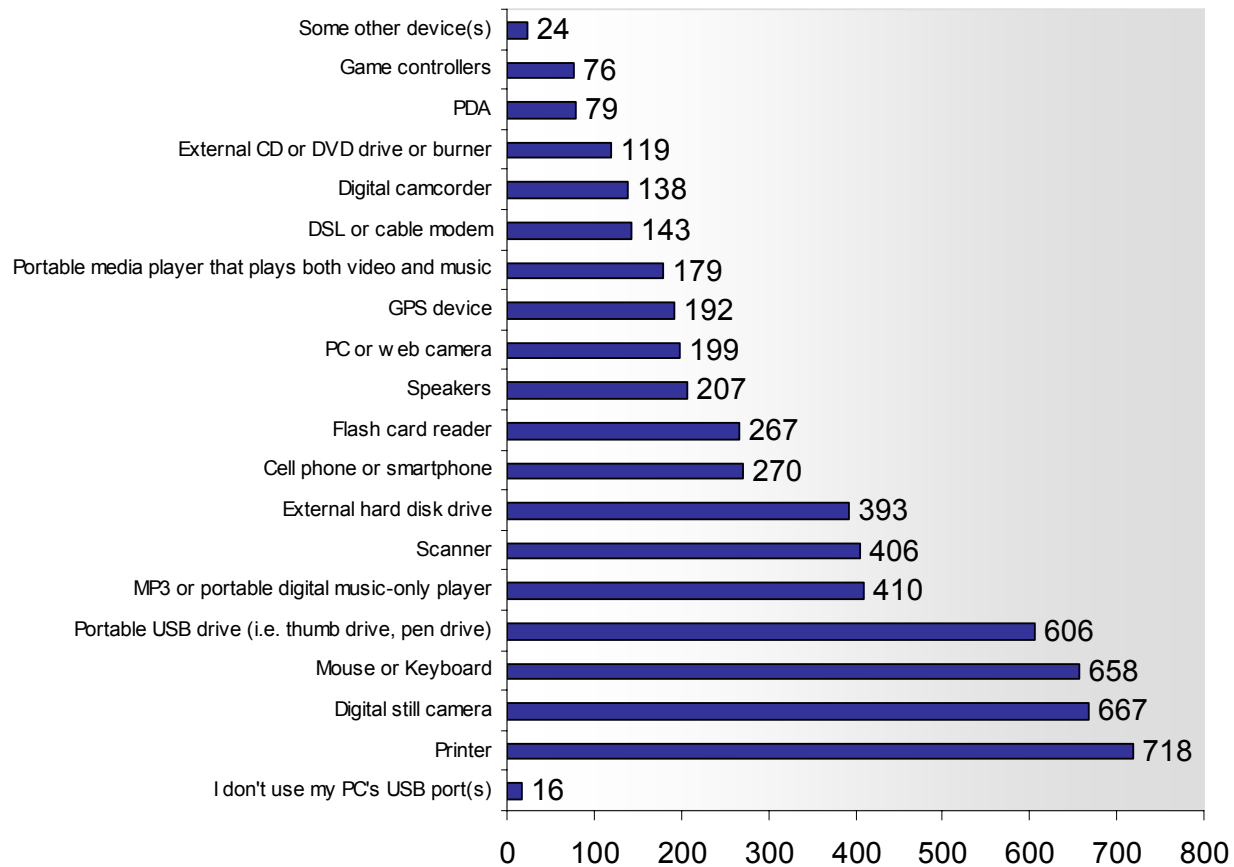
Source: In-Stat, 2/10

n=988

**What Devices Do You Connect to Your USB Port?**

Figure 4 indicates what devices the 957 respondents connected to their USB-enabled PCs. The top five devices included, in order, printers, digital still cameras, mice/keyboards, portable USB drives, and MP3 players or portable digital music-only players. The next five devices included scanners, external hard drives, cellphones or smart phones, flash card readers, and speakers.

**Figure 4. Which, If Any, of the Following Devices Do You Connect To Your Home's Primary Personal or Laptop Computer USB Port? (Please Check All That Apply, N=957)**



Source: In-Stat, 2/10

n=957

## Applications and Forecasts

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Applications for USB are broken down into five product segments:

- PCs
- PC Peripherals
- Consumer Electronics
- Communications
- Automotive

### PCs

The PC market is broken down into four categories:

- Desktop PCs
- Mobile PCs
- Mobile PC Docking Stations
- Discrete Host Controllers

Since all devices in this category already have 100% penetration of high-speed USB, the big question is how quickly SuperSpeed USB will be adopted. This has ramifications far beyond the PC segment. As a master/slave or host/device architecture, USB generally requires PCs to act as hosts. Without a large number of PC hosts in place, it is unlikely that PC peripherals, CE devices, mobile devices, or other peripheral devices will adopt SuperSpeed USB device capability.

The first SuperSpeed PCs hit the market, in very small numbers, in late 2009. Adoption will increase in 2010, but will be limited by the lack of SuperSpeed USB core logic chipsets, which are not scheduled to hit the market until late 2011.

In the past, desktop PCs adopted new versions of USB first because of faster design cycles than mobile PCs. However, that gap has narrowed over the past decade. In addition, mobile PCs have greater need to connect to external SuperSpeed-enabled devices, such as hard drives. So in our forecasts, we are projecting that mobile PCs will adopt SuperSpeed more quickly than desktops.

### Desktop PCs

Desktop PCs were among the first products to adopt USB in the 1990s and to switch from full-speed to high-speed USB. This same process should recur with the introduction of SuperSpeed USB. However, the slower introduction of SuperSpeed core logic chipsets, compared to previous generations, means the rollout of SuperSpeed will be slower than with high-speed USB.

The forecast for USB penetration in desktop PC shipments is shown in Table 5. The first PC OEM to announce the integration of SuperSpeed USB was CyberPower, a specialty PC maker based in Baldwin Park, California, which in November 2009, announced USB 3.0 capability in its Xtreme Series of desktop gaming PCs. Overall though, we expect SuperSpeed adoption to be relatively slow, and to lag mobile PCs slightly until 100% SuperSpeed attach rates are reached in 2014.

**Table 5. USB Penetration of Desktop PC Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Desktop PCs</b>	141,700	140,633	153,500	163,500	169,600	176,500	182,600	5.4%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	98.5%	89.0%	55.0%	15.0%	0.0%	
<b>Total w/ USB High Speed</b>	141,700	140,631	151,198	145,515	93,280	26,475	0	-100.0%
% w/ USB SuperSpeed	0.0%	0.0%	1.5%	11.0%	45.0%	85.0%	100.0%	
<b>Total w/ USB SuperSpeed</b>	0	2	2,303	17,985	76,320	150,025	182,600	882.0%

Source: In-Stat, 3/10

**Mobile PCs**

The Mobile PC category includes all notebook PCs, netbooks, tablets, and ultra-mobile PCs (UMPCs). Mobile PCs, like their desktop counterparts, have played a key role in establishing high-speed USB as an interface standard, and the same process will follow with SuperSpeed USB

Some mobile PC models that include or will soon incorporate SuperSpeed capability include the HP ENVY 15, EliteBook 8540p, and EliteBook 8540w notebooks, the Dell Precision M6500 notebook, and the ASUS N82 and N61 notebooks, and the ASUS Eee Box 1510U and 1210U netbooks.

As seen in Table 6, the mobile PC market is expected to adopt SuperSpeed USB at a quicker pace than the desktop PC market. In the past, we have assumed quicker uptake of new interface technologies in desktops rather than mobile PCs. However, the landscape is shifting. With mobile PCs becoming the most popular type of PC shipping in 2009, the pressures towards smaller sizes and lower costs is increasing. One example of this can be seen in the emergence of netbooks, which are essentially stripped-down notebook PCs. These lower-cost, smaller-sized mobile PCs are omitting features such as optical drives and large hard disk drives, which in turn increases the need for faster interfaces to connect to external storage solutions with minimal latency. This makes SuperSpeed USB a slightly higher priority in mobile PCs than desktop PCs. So we expect adoption of SuperSpeed in mobile PCs to be slightly more rapid.

Another potential advantage for SuperSpeed USB in smaller form factor PCs is the potential to eliminate other connections in order to save space, and allow even smaller designs in the future. This is especially true in smaller, less feature-rich mobile products such as netbooks.

**Table 6. USB Penetration of Mobile PC Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Mobile PCs</b>	121,197	163,564	198,527	232,689	261,456	299,737	333,000	15.3%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	97.0%	85.0%	45.0%	10.0%	0.0%	
<b>Total w/ USB High Speed</b>	121,197	163,564	192,571	197,785	117,655	29,974	0	-100.0%
% w/ USB SuperSpeed	0.0%	0.0%	3.0%	15.0%	55.0%	90.0%	100.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	5,956	34,903	143,801	269,763	333,000	--

Source: In-Stat, 3/10

## Mobile PC Docking Stations

The definition of a mobile PC docking station (also referred to as a port replicator) is a device that takes an input from a notebook and, in turn, connects (via cables) to a host of PC peripherals, including PC monitors, printers, scanners, multifunction peripherals, and other devices. The connection from the PC to the docking station can be via a proprietary connection or via a USB connection. Proprietary connections are usually found on docking stations obtained with a mobile PC from a PC OEM, while USB connections are usually found on docking stations purchased in the aftermarket.

As seen in Table 7, all docking stations currently have high-speed USB. The adoption of SuperSpeed will lag its adoption in mobile PCs by about a year because it makes little sense for PC OEMs to offer SuperSpeed docking stations ahead of SuperSpeed notebooks. In the aftermarket, the manufacturers also do not want to get ahead of SuperSpeed adoption in notebooks.

**Table 7. USB Penetration of Mobile PC Docking Station Market Forecast 2008–2014  
(Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Mobile PC Docking Stations</b>	18,900	19,200	19,600	19,900	20,300	20,600	20,900	1.7%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	100.0%	96.0%	75.0%	40.0%	10.0%	
<b>Total w/ USB High Speed</b>	18,900	19,200	19,600	19,104	15,225	8,240	2,090	-35.8%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	4.0%	25.0%	60.0%	90.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	796	5,075	12,360	18,810	--

Source: In-Stat, 3/10

## Discrete Host Controllers

The forecast for discrete USB host controllers is shown in Table 8. Currently, this market addresses older PCs that are upgraded with high-speed USB capability via PC or PCI cards. This product category was one of the first to feature SuperSpeed USB, as some aftermarket card solutions hit the market in late 2009. For example, ASUS introduced its X58 motherboard in September 2009. By 2012, the aftermarket for SuperSpeed solutions will begin to decline because of integration into core logic chipset, which will mean that USB 3.0 will be embedded in many PCs on the market.

**Table 8. Discrete USB Host Controller Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Discrete USB Host Controllers</b>	450	400	850	1,600	1,100	1,000	700	11.8%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	95.0%	50.0%	10.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB High Speed</b>	650	380	425	160	0	0	0	-100.0%
% w/ USB SuperSpeed	0.0%	5.0%	50.0%	90.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB SuperSpeed</b>	0	20	425	1,440	1,100	1,000	700	103.6%

Source: In-Stat, 3/10

## Summary

SuperSpeed USB was seen in very small quantities in the PC market in late 2009, primarily in aftermarket cards in addition to a few PCs. Because of core logic integration issues, high-speed USB will remain the dominant type of USB into 2012, but SuperSpeed will overwhelm it by the end of the forecast period.

**Table 9. USB Penetration of PC Market Forecast Summary 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>PC TAM</b>	282,247	323,797	372,477	417,689	452,456	497,837	537,200	10.7%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	97.7%	86.8%	50.0%	13.0%	0.4%	
<b>Total w/ USB High Speed</b>	282,247	323,775	363,794	362,564	226,160	64,689	2,090	-63.5%
% w/ USB SuperSpeed	0.0%	0.0%	2.3%	13.2%	50.0%	87.0%	99.6%	
<b>Total w/ USB SuperSpeed</b>	0	22	8,683	55,124	226,296	433,148	535,110	653.7%
<b>Total Wired USB - PCs</b>	<b>282,247</b>	<b>323,797</b>	<b>372,477</b>	<b>417,689</b>	<b>452,456</b>	<b>497,837</b>	<b>537,200</b>	<b>10.7%</b>

Source: In-Stat, 3/10

## PC Peripherals

PC peripherals refer to those devices that are generally in a nearly constant connection to a PC host, or those that require a PC host to operate. The devices in this segment include:

- Ink Jet and Laser Printers
- Multifunction Peripherals
- Scanners
- Web Cameras
- LCD Monitors
- External Hard Disk Drives
- External PC DVD and Blu-ray Writers
- Standalone Flash Card Readers
- Hubs
- Keyboards and Mice
- Gamepads and Joysticks

- USB Bluetooth and Wi-Fi Adaptors
- USB Flash Drives
- USB PC Speakers

Currently PC peripherals primarily have high-speed USB. This includes most devices in this category, with the exception of low-bandwidth devices, such as mice, keyboards, gamepads, joysticks, and some hubs. The transition to SuperSpeed USB will likely affect only some applications in this product segment. The applications making the change first include external hard disk drives and USB flash drives. Other applications in this category that should eventually make the transition to SuperSpeed include select optical writers, PC monitors, scanners, and hubs.

Other devices have relatively little need for increased speed and are not likely to transition to SuperSpeed at all. The result will be a divided market for PC peripherals; some will stick with high-speed, and some will transition to SuperSpeed. This is in contrast to the previous transition, when all applications save for human interface devices (HID) transitioned to high-speed USB.

**Ink Jet and Laser Printers**

The ink jet printer market will not transition to SuperSpeed USB. The primary reason is that there is little need for the increased speed. The current bottleneck for increased print speeds is not high-speed USB; it's the print head. Therefore, printer makers will gain nothing by adding SuperSpeed USB to their printers. A secondary reason ink jets are unlikely to add SuperSpeed is the fact that the market for the devices is declining in the face of increased shipments of multi-function peripherals, making printer makers unlikely to invest in new technology.

The laser printer market is increasingly targeted at consumers and small businesses, with prices falling rapidly in recent years. USB has been added to laser printers to satisfy these new customer segments. However, Ethernet is still found in networked printers aimed at the corporate market, though increasingly those printers also have a USB port. Like the ink jet market, laser printers have no need for SuperSpeed USB.

The forecast for USB in the ink jet and laser printer markets can be seen in Tables 10 and 11. Both these markets are dominated by high-speed USB, and will remain so.

**Table 10. USB Penetration of Ink Jet Printer Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Ink Jet Printers</b>	37,600	26,700	22,100	20,500	19,300	17,600	15,500	-10.3%
% w/ USB Low or Full Speed	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	3,760	0	0	0	0	0	0	-100.0%
% w/ USB High Speed	90.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	33,840	26,700	22,100	20,500	19,300	17,600	15,500	-10.3%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	0	0	--

Source: In-Stat, 3/10

**Table 11. USB Penetration of Laser Printer Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Laser Printers</b>	16,400	14,500	15,500	16,600	17,700	18,600	19,400	6.0%
<b>% w/ USB Low or Full Speed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
<b>% w/ USB High Speed</b>	87.0%	91.0%	94.0%	96.0%	97.0%	97.0%	98.0%	
<b>Total w/ USB High Speed</b>	14,268	13,195	14,570	15,936	17,169	18,042	19,012	7.6%
<b>% w/ USB SuperSpeed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	0	0	--

Source: In-Stat, 3/10

## Multifunction Peripherals

Multifunction peripherals (MFPs), also known as all-in-ones (AIOs), refer to devices that perform multiple functions, which can include faxing, scanning, printing, and copying. Shipments of these devices continue to grow at the expense of both printer and scanner segments, as they allow consumers to consolidate their purchases, as well as save physical space. These devices are used in small office and home office settings.

The forecast for USB penetration in MFPs is shown in Table 12. As with printers, this is a high-speed USB market. And, as with the printer market, there is no need for SuperSpeed USB over the length of this forecast. If SuperSpeed enters this market, it is not likely to begin until after the PC market is saturated by SuperSpeed because at that point manufacturers can be secure that there are SuperSpeed devices to connect to. Also at that point, SuperSpeed IP can likely be integrated into MFP silicon at a price close to high-speed USB.

**Table 12. USB Penetration of Multifunction Peripheral Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Multifunction Peripherals</b>	64,200	61,100	65,800	69,600	74,500	80,600	83,600	6.5%
<b>% w/ USB Low or Full Speed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
<b>% w/ USB High Speed</b>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	64,200	61,100	65,800	69,600	74,500	80,600	83,600	6.5%
<b>% w/ USB SuperSpeed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	0	0	--

Source: In-Stat, 3/10

## Scanners

Scanners refer to all devices that scan documents or photos for the purposes of making a digital re-creation. Flatbed scanners comprise the vast majority of the scanner market, with some sheet-fed and high-speed document and film scanners also on the market.

The forecast for USB penetration into the scanner market can be seen in Table 13. The scanner market continues to decline overall as a result of consumer shift to MFPs. Unlike the previous generation transition to high-speed USB, we expect that scanner makers will be reluctant to adopt SuperSpeed USB. For traditional flatbed scanners, there is little incentive to adopt the new standard because there is little need for increased speed. We expect to see a small amount of adoption in higher-end, more specialized scanners.

**Table 13. USB Penetration of Scanner Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Scanners</b>	12,700	8,600	7,400	6,400	5,500	4,500	3,600	-16.0%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	98.0%	98.0%	98.0%	97.5%	97.0%	96.0%	94.0%	
<b>Total w/ USB High Speed</b>	12,446	8,428	7,252	6,240	5,335	4,320	3,384	-16.7%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.5%	1.0%	2.0%	4.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	32	55	90	144	--

Source: In-Stat, 3/10

### Web Cameras

Web cameras refer to any camera designed primarily to connect continuously to a PC for the purpose of capturing video for two-way communication. The increasing integration of web cameras into mobile and all-in-one desktop PCs is beginning to have a negative impact on this market.

The forecast for USB in web cameras can be seen in Table 14. The web camera market is a high-speed USB market that will see only limited adoption of SuperSpeed USB in the higher-end of the market that emphasizes high-definition images. Overall, this is a very cost-sensitive market that only adopts new technologies if there is a direct return on investment, and SuperSpeed's 5Gbps transmission offers relatively little benefit to most camera makers.

**Table 14. USB Penetration of Web Camera Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Web Cameras</b>	21,100	20,100	19,500	18,800	16,700	13,000	10,500	-12.2%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	96.0%	97.0%	97.0%	98.0%	97.0%	97.0%	96.0%	
<b>Total w/ USB High Speed</b>	20,256	19,497	18,915	18,424	16,199	12,610	10,080	-12.4%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	1.0%	2.0%	3.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	167	260	315	--

Source: In-Stat, 3/10

### LCD PC Monitors

LCD monitors refer to those monitors used as PC peripherals. It does not include LCD televisions.

In the past, the penetration of USB in LCD monitors was limited to monitor hub functionality. However, over the past few years there has been a move in the market to utilize USB as a secondary display connection to the PC. Samsung and LG introduced LCD monitors in 2007 with USB as a display connection. These monitors integrate a chip from DisplayLink, which provides a proprietary method of decompressing video received over USB in the display. Software must be installed on the PC to compress the data prior to sending the data to the display. MCT of Taiwan competes with DisplayLink. These LCD monitors are primarily targeted at laptop users, as well as those who use multiple monitors at their desktop PCs. It is not intended to connect to the primary monitor. SuperSpeed USB will enable DisplayLink technology to function in larger-sized monitors and with less compression in the future.

USB penetration of the LCD monitor market is shown in Table 15. The market for USB-enabled monitors took a hit in 2009 due to the recession. Some monitor makers that had announced plans to launch USB monitors delayed or cancelled their plans.

Though the market for USB in this application is still relatively small, it will double in 2010 and 2011. This is also a market that should begin to transition to SuperSpeed in 2011, with SuperSpeed USB's increased bandwidth making the market more compelling by decreasing the need for compression.

This forecast does not consider monitor hubs, which are forecasted separately in the PC peripheral section of this report.

**Table 15. USB Penetration of LCD PC Monitor Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>LCD PC Monitors</b>	160,000	159,000	170,000	190,000	201,000	208,000	214,000	6.1%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	0.2%	0.1%	0.3%	0.5%	1.5%	2.0%	4.0%	
<b>Total w/ USB High Speed</b>	320	223	510	950	3,015	4,160	8,560	107.5%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.1%	0.5%	1.0%	2.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	190	1,005	2,080	4,280	--

Source: In-Stat, 3/10

**External Hard Disk Drives and Enclosures**

External hard disk drives were among the first peripheral applications to make the switch to SuperSpeed USB to take advantage of the greater throughput. As increasing numbers of consumers adopt the use of digital video, digital photography, and digital music, there becomes a need for additional storage space, as well as a need for having a backup of important items. The increasing size of these files necessitates even faster connectivity than high-speed USB can provide.

The external hard-disk drive market is a competitive one for interfaces. In addition to high-speed USB, 1394 is still available, and Ethernet connectivity is becoming more common as a result of the growth of network-attached storage. External Serial ATA (eSATA) drives began arriving on the market in 2006 and are gradually becoming more popular as external hard-disk drive solutions. Many hard drives incorporate dual interfaces.

The forecast for USB penetration into the external hard disk drive and enclosure market is shown in Table 16. High-speed USB has dominated the market for a number of years, but SuperSpeed is now making an appearance. All tier-one external hard drive makers either have, or will soon have, a SuperSpeed model on the market. The Western Digital MyBook 3.0 was the first such drive to be certified by the USB-IF. Although initial uptake of SuperSpeed in this market exceeds other peripheral applications, it will be slower than the transition to high-speed USB due to slow SuperSpeed core logic integration on the PC side. However, by 2011, a majority of hard drive shipments will be SuperSpeed, and by 2013 all USB-enabled hard drive shipments will be SuperSpeed.

**Table 16. USB Penetration of External Hard Disk Drive and Enclosure Market 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
External Hard Drives/Enclosures	50,800	60,800	68,100	76,200	83,800	91,200	98,000	10.0%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total w/ USB Low or Full Speed	0	0	0	0	0	0	0	--
% w/ USB High Speed	99.0%	99.0%	87.0%	45.0%	15.0%	0.0%	0.0%	
Total w/ USB High Speed	50,292	60,192	59,247	34,290	12,570	0	0	-100.0%
% w/ USB SuperSpeed	0.0%	0.0%	12.0%	54.0%	84.0%	99.0%	99.0%	
Total w/ USB SuperSpeed	0	0	8,172	41,148	70,392	90,288	97,020	--

Source: In-Stat, 3/10

**External Optical PC Drives and Writers**

This category includes external standard-definition (SD) PC optical writers, as well as external Blu-ray optical drives and writers. High-speed USB adoption in SD writers mirrored the rapid adoption in the external hard-disk drive market, driven by consumer needs for faster backup and media storage solutions.

However, unlike the external hard disk drive market, the external optical writer market is in decline, as seen in Table 17. The market will remain high-speed, and will not transition to SuperSpeed for a few reasons. The rotational speeds of DVD writers have peaked, and there is not much to be gained from additional bandwidth. Also, the market is in decline, is very cost sensitive, and so vendors are unlikely to invest in the added cost of SuperSpeed.

The forecast for external Blu-ray optical drives and writers can be seen in Table 18. There will be SuperSpeed USB in this market by 2012, but high-speed will remain prominent over the length of the forecast.

**Table 17. USB Penetration of External SD DVD PC Writer Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
External SD DVD PC Writers	6,500	5,600	4,900	4,000	3,100	1,800	1,000	-29.1%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total w/ USB Low or Full Speed	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Total w/ USB High Speed	6,500	5,600	4,900	4,000	3,100	1,800	1,000	-29.1%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total w/ USB SuperSpeed	0	0	0	0	0	0	0	--

Source: In-Stat, 3/10

**Table 18. USB Penetration of External Blu-ray DVD Drive/Writer Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
External Blu-ray DVD PC Drives/Writers	75	250	600	1,500	2,900	5,000	6,800	93.6%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total w/ USB Low or Full Speed	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	100.0%	100.0%	95.0%	75.0%	55.0%	
Total w/ USB High Speed	75	250	600	1,500	2,755	3,750	3,740	71.8%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	5.0%	25.0%	45.0%	
Total w/ USB SuperSpeed	0	0	0	0	145	1,250	3,060	--

Source: In-Stat, 3/10

**Standalone Flash Card Readers**

Flash memory card readers are about the size of a mouse and can cost less than US\$10. They facilitate the movement of data from the flash card, usually captured from digital cameras, to the PC. Many card readers provide for reading multiple formats of flash memory cards.

The forecast for standalone flash card readers can be seen in Table 19. The market for readers is declining due to the increased penetration of flash card readers into the PC and printer markets. Another reason is the ability to connect Flash cards in devices like digital still cameras directly to a PC via a USB cable. High-speed USB will remain the dominant interface in this market as we do not expect makers in this low-margin market to adopt SuperSpeed.

**Table 19. USB Penetration of Flash Card Reader Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Flash Card Readers</b>	5,200	3,700	3,100	2,300	1,600	1,300	1,000	-23.0%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	98.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	5,096	3,700	3,100	2,300	1,600	1,300	1,000	-23.0%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	0	0	--

Source: In-Stat, 3/10

**Hubs**

Hubs refer to standalone hubs, as well as hubs that are integrated into keyboards and monitors. The market for standalone hubs is now completely high-speed USB, and should see the first SuperSpeed units in 2011. The monitor market is also entirely high-speed USB currently, but will see SuperSpeed in 2012. Keyboard hubs are still primarily full-speed, and will not transition to SuperSpeed.

The forecast for all types of USB hubs can be seen in Tables 20, 21, and 22.

**Table 20. USB Standalone Hub Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Standalone External USB Hubs</b>	13,500	12,500	13,400	14,300	14,900	15,600	16,500	5.7%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	100.0%	95.0%	65.0%	40.0%	20.0%	
<b>Total w/ USB High Speed</b>	13,500	12,500	13,400	13,585	9,685	6,240	3,300	-23.4%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	5.0%	35.0%	60.0%	80.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	715	5,215	9,360	13,200	--

Source: In-Stat, 3/10

**Table 21. USB Monitor Hub Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>USB Monitor Hubs</b>	33,300	57,700	73,000	82,100	90,800	97,700	106,000	12.9%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	100.0%	100.0%	85.0%	70.0%	60.0%	
<b>Total w/ USB High Speed</b>	33,300	57,700	73,000	82,100	77,180	68,390	63,600	2.0%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	15.0%	30.0%	40.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	13,620	29,310	42,400	--

Source: In-Stat, 3/10

**Table 22. USB Keyboard Hub Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>USB Keyboard Hubs</b>	7,400	8,100	9,600	12,000	16,500	20,800	25,200	25.5%
<b>% w/ USB Low or Full Speed</b>	95.0%	90.0%	85.0%	80.0%	70.0%	60.0%	35.0%	
<b>Total w/ USB Low or Full Speed</b>	7,030	7,290	8,160	9,600	11,550	12,480	8,820	3.9%
<b>% w/ USB High Speed</b>	5.0%	10.0%	15.0%	20.0%	30.0%	40.0%	65.0%	
<b>Total w/ USB High Speed</b>	370	810	1,440	2,400	4,950	8,320	16,380	82.5%

Source: In-Stat, 3/10

### Keyboards and Mice

The forecast for USB penetration into the keyboard and mouse markets is shown in Tables 23 and 24. Low-speed USB has almost completely displaced PS/2 in both these markets over the last few years. Even wireless mice and keyboards have USB in order to link the mouse or keyboard to a dongle or adaptor, which in turn connects to the PC via USB. The only wireless mice and keyboards that don't generally have USB are Bluetooth models, which connect to embedded Bluetooth in mobile PCs. Though low-speed USB dominates in this market, increasing numbers of high-end keyboards and mice utilize full-speed USB.

The bandwidth demands in this market obviate the need for either high-speed or SuperSpeed USB.

**Table 23. USB Penetration of Keyboard Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Keyboards</b>	235,000	227,000	237,000	253,000	256,000	260,000	265,000	3.1%
<b>% w/ USB Low or Full Speed</b>	90.0%	93.0%	96.0%	96.5%	97.0%	96.0%	96.0%	
<b>Total w/ USB Low or Full Speed</b>	211,500	211,110	227,520	244,145	248,320	249,600	254,400	3.8%

Source: In-Stat, 3/10

**Table 24. USB Penetration of Mouse Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Mice</b>	322,000	312,000	346,000	377,000	387,000	389,000	399,000	5.0%
<b>% w/ USB Low or Full Speed</b>	88.0%	92.0%	96.0%	97.0%	97.5%	98.0%	98.0%	
<b>Total w/ USB Low or Full Speed</b>	283,360	287,040	332,160	365,690	377,325	381,220	391,020	6.4%

Source: In-Stat, 3/10

### Gamepads and Joysticks

The gamepad and joystick market refers to devices that are connected to PCs to enable the end-user to play PC games. This market does not include devices produced for game consoles. This market is growing, and sees more full-speed USB each year. The forecast can be seen in Table 25. High-speed and SuperSpeed USB will not be seen in this market since they have more speed than required for this application.

**Table 25. USB Penetration of Gamepad and Joystick Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Gamepads/Joysticks</b>	12,200	13,300	16,200	18,500	20,300	23,200	25,500	13.9%
<b>% w/ USB Low or Full Speed</b>	97.0%	99.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB Low or Full Speed</b>	11,834	13,167	16,200	18,500	20,300	23,200	25,500	14.1%

Source: In-Stat, 3/10

**USB Bluetooth and Wi-Fi Adaptors**

Adaptors represent a relatively cheap and easy way to enable a PC with wireless capability. USB Bluetooth adaptors continue to grow at a modest pace, as seen in Table 26. Bluetooth adaptors are primarily used for connecting mobile and desktop PCs to mobile phones for synchronization of contact lists and schedules, and sometimes to connect to headsets. Even with higher-speed versions of Bluetooth coming, high-speed USB has more than sufficient bandwidth; so SuperSpeed USB won't be seen in this market.

The market for USB Wi-Fi adaptors, as seen in Table 27, is expected to decline over the length of the forecast period, as Wi-Fi is a well-entrenched feature of mobile PCs. The market has been completely dominated by high-speed USB for some time, and that should continue for the length of the forecast.

**Table 26. USB Bluetooth Adaptor Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>USB Bluetooth Adaptors</b>	10,400	10,100	10,300	10,900	11,800	12,200	12,500	4.4%
<b>% w/ USB Low or Full Speed</b>	30.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	3,120	1,010	0	0	0	0	0	-100.0%
<b>% w/ USB High Speed</b>	70.0%	90.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	7,280	9,090	10,300	10,900	11,800	12,200	12,500	6.6%

Source: In-Stat, 3/10

**Table 27. USB Wi-Fi Adaptor Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>USB Wi-Fi Adaptors</b>	18,689	15,886	12,232	8,807	5,901	3,835	2,751	-29.6%
<b>% w/ USB Low or Full Speed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
<b>% w/ USB High Speed</b>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	18,689	15,886	12,232	8,807	5,901	3,835	2,751	-29.6%

Source: In-Stat, 3/10

**USB Flash Drives**

USB flash drives are flash chips in small packages with a USB device controller and USB connector that can be plugged directly into the USB host port of any device to download or upload data. These devices are also referred to as pen drives and thumb drives.

The forecast for USB flash drives is shown in Table 28. The overall market continues to grow rapidly, even from a high base. With 32GB and 64GB drives currently available, the need for the higher bandwidth of SuperSpeed is becoming evident, and the first SuperSpeed drives will hit the market in the second half of 2010. However, SuperSpeed USB drives will be limited by the adoption of SuperSpeed USB in PCs.

**Table 28. USB Flash Drive Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>USB Flash Drives</b>	146,000	192,000	230,000	250,000	267,000	275,000	282,000	8.0%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	99.0%	88.0%	55.0%	30.0%	20.0%	
<b>Total w/ USB High Speed</b>	146,000	192,000	227,700	220,000	146,850	82,500	56,400	-21.7%
% w/ USB SuperSpeed	0.0%	0.0%	1.0%	12.0%	45.0%	70.0%	80.0%	
<b>Total w/ USB SuperSpeed</b>	0	4	2,300	30,000	120,150	192,500	225,600	791.8%

Source: In-Stat, 3/10

### USB PC Speakers

The proliferation of USB PC speakers has been driven by consumer use of the desktop PC as an entertainment device. Increasing numbers of vendors produce USB speakers for multi-channel uses, providing for surround sound, subwoofers, and other audio setups. Vendors in this market include Bose, Logitech, Sony, Samsung, Yamaha, and Altec-Lansing.

The market for USB PC speakers can be seen in Table 29. Although the overall market for PC speakers is dominated by speakers that plug into the PC's standard audio input, the market for USB PC speakers is growing rapidly. The transition to high-speed USB is nearly complete. We do not anticipate SuperSpeed USB in this market because of a lack of bandwidth requirement for this audio application.

**Table 29. USB PC Speaker Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>USB PC Speakers</b>	4,900	4,700	5,800	7,200	8,800	9,500	10,400	17.2%
% w/ USB Low or Full Speed	10.0%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	490	235	0	0	0	0	0	-100.0%
% w/ USB High Speed	90.0%	95.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	4,410	4,465	5,800	7,200	8,800	9,500	10,400	18.4%

Source: In-Stat, 3/10

### Summary

The summary forecast for USB penetration of the PC peripheral market is shown in Table 30. 2010 will see significant SuperSpeed USB in peripherals, while low-/full-speed will remain relevant due primarily to mice and keyboards.

**Table 30. Summary of USB Penetration of PC Peripheral Market Forecast 2008–2014  
(Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>PC Peripherals TAM</b>	1,177,964	1,213,636	1,330,532	1,439,707	1,505,101	1,548,435	1,598,251	5.7%
% w/ USB Low or Full Speed	44.2%	42.8%	43.9%	44.3%	43.7%	43.0%	42.5%	
<b>Total w/ USB Low or Full Speed</b>	521,094	519,852	584,040	637,935	657,495	666,500	679,740	5.5%
% w/ USB High Speed	36.6%	40.5%	40.7%	36.0%	28.0%	21.6%	19.5%	
<b>Total w/ USB High Speed</b>	430,842	491,335	540,866	518,732	420,709	335,167	311,207	-8.7%
% w/ USB SuperSpeed	0.0%	0.0%	0.8%	5.0%	14.0%	21.0%	24.2%	
<b>Total w/ USB SuperSpeed</b>	0	4	10,472	72,085	210,749	325,138	386,019	892.9%
<b>Total Wired USB - PC Peripherals</b>	<b>951,936</b>	<b>1,011,191</b>	<b>1,135,378</b>	<b>1,228,752</b>	<b>1,288,953</b>	<b>1,326,805</b>	<b>1,376,966</b>	<b>6.4%</b>

Source: In-Stat, 3/10

## Consumer Electronics

Consumer electronic (CE) devices forecast in this section include:

- Digital Still Cameras
- Digital Camcorders
- Digital Televisions
- Personal Digital Assistants
- Set-Top Boxes (STBs)
- Standalone PVRs
- Portable Media Players
- Video Game Consoles
- Handheld Game Consoles
- DVD Recorders
- DVD Players
- Blue Laser DVD Recorders
- Blue Laser DVD Players
- A/V Receivers
- Digital Photo Frames

The use of USB in CE began with devices that were primarily connected to the PC, such as digital still cameras, digital camcorders, and portable media players (PMP). It then began to transition to fixed CE devices, such as digital televisions, set-top boxes, and DVD players and recorders. The market for SuperSpeed is likely to also be seen first in portable CE devices, particularly those that have increasing capabilities and accompanying memory increases, and includes digital camcorders, digital still cameras and PMPs. However, the transition of devices in these categories will not come before widespread adoption of SuperSpeed in PCs. In addition, there are likely to be many other CE applications for which high-speed USB will suffice.

### Digital Still Cameras

USB has been extremely successful in the digital still camera market because most users want to download images to PCs to store or print pictures. The forecast for USB penetration in digital still cameras is shown in Table 31. There are other competitors for connectivity in this segment, including Wi-Fi, but wired USB will remain the dominant interface option. As picture file sizes increase with camera resolution, SuperSpeed USB will be adopted in this market. The first cameras with SuperSpeed USB will be available in 2011, increasing to 50% of cameras by 2014.

**Table 31. USB Penetration of Digital Still Camera Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Digital Still Cameras</b>	123,500	109,600	113,800	126,800	135,000	145,300	154,800	7.1%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	99.0%	100.0%	100.0%	98.0%	80.0%	65.0%	50.0%	
<b>Total w/ USB High Speed</b>	122,265	109,600	113,800	124,264	108,000	94,445	77,400	-6.7%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	2.0%	20.0%	35.0%	50.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	2,536	27,000	50,855	77,400	--

Source: In-Stat, 3/10

### Digital Camcorders

The forecast for USB penetration in the digital camcorder market is shown in Table 32. USB's popularity in camcorders has increased with the emergence of DVD-, hard drive-, and flash-enabled camcorders. High-speed USB became the interface of choice for these types of camcorders. The next transition in camcorders is underway, from standard-definition (SD) to high-definition (HD). This should help to drive the adoption for SuperSpeed USB in this market, as the increasing amounts of data that HD camcorders create lead to a need for a faster interface. SuperSpeed USB can move 25GB of data in 70 seconds; the same amount of data would take nearly 14 minutes using high-speed USB. The first SuperSpeed USB camcorders should hit the market in the second half of 2011.

**Table 32. USB Penetration of Digital Camcorder Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Digital Camcorders</b>	20,000	19,500	20,700	22,100	22,900	23,900	24,700	4.8%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	97.0%	97.0%	98.0%	96.0%	75.0%	55.0%	40.0%	
<b>Total w/ USB High Speed</b>	19,400	18,915	20,286	21,216	17,175	13,145	9,880	-12.2%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	4.0%	25.0%	45.0%	60.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	884	5,725	10,755	14,820	--

Source: In-Stat, 3/10

### Digital Televisions

USB in the digital television (DTV) market is one of the fastest-growing markets for USB overall, considering both the attach rate and the unit shipments. The primary reason for this rapid growth is the inclusion of high-speed USB capability in DTV SOCs.

The forecast for USB penetration in DTVs can be seen in Table 33. DTVs include a number of digital interfaces, including HDMI, 1394, USB, and Ethernet, in addition to legacy analog connectors. Additionally, some DTV manufacturers are experimenting with wireless technologies for video and image transfers. The adoption of SuperSpeed USB will exceed its adoption in many other fixed CE devices. It will likely be used to connect to SuperSpeed-enabled portable devices, such as digital cameras, to display video and still images on screen. However, the adoption will be slow, beginning in 2012, and hitting a 12% attach rate in 2014.

**Table 33. USB Penetration of Digital Television Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Digital Televisions</b>	111,305	118,648	128,992	145,051	162,405	181,839	198,513	10.8%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	45.0%	50.0%	60.0%	65.0%	68.0%	70.0%	68.0%	
<b>Total w/ USB High Speed</b>	50,087	59,324	77,395	94,283	110,436	127,287	134,989	17.9%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	2.0%	5.0%	12.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	3,248	9,092	23,822	--

Source: In-Stat, 3/10

**Set-Top Boxes (STBs)**

Set-top boxes refer to digital cable, digital broadcast satellite (DBS), digital terrestrial (DTT), and Internet protocol/digital subscriber line (IP/DSL) or telco set-top boxes. One of the primary drivers for integration of USB into the set-top box market is as a USB host to connect to external hard drives for additional storage in personal video recorder (PVR)-enabled boxes. USB connectivity is most common in HD set-top boxes. Other possible applications include connecting to portable digital media players, digital still cameras, and digital camcorders for direct viewing of images and video on a DTV.

The forecast for USB in the set-top box market can be seen in Tables 34, 35, 36, and 37. The cumulative set-top box forecast can be seen in Table 38. The transition from full-speed to high-speed set top boxes is ongoing in cable, and complete in the other categories. The key for USB inclusion in these markets is generally the integration of USB into the set-top box system-on-chip (SOC). The relative success of high-speed USB is due to this integration. SuperSpeed will not have much of an impact on this market in the forecast period, but some high-end box makers will begin to experiment with it in the later portions of the forecast period, primarily to connect to SuperSpeed external hard drives. In general, set-top box makers are very slow to add new technology.

**Table 34. USB Penetration of Digital Cable Set-Top Box Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Digital Cable Set-Top Boxes</b>	46,655	44,070	42,335	41,870	40,750	39,535	38,428	-2.7%
% w/ USB Low or Full Speed	21.0%	20.0%	15.5%	9.5%	7.0%	4.5%	4.5%	
<b>Total w/ USB Low or Full Speed</b>	9,798	8,814	6,562	3,978	2,853	1,779	1,729	-27.8%
% w/ USB High Speed	9.0%	10.5%	13.0%	16.0%	19.5%	21.5%	21.5%	
<b>Total w/ USB High Speed</b>	4,199	4,627	5,504	6,699	7,946	8,500	8,262	12.3%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	1.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	198	384	--

Source: In-Stat, 3/10

**Table 35. USB Penetration of DBS Set-Top Box Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Digital Satellite Set-Top Boxes</b>	84,772	90,453	97,866	101,618	103,764	105,233	107,085	3.4%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	23.0%	26.0%	28.0%	31.0%	33.0%	25.0%	25.0%	
<b>Total w/ USB High Speed</b>	19,498	23,518	27,402	31,502	34,242	26,308	26,771	2.6%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	1.0%	3.0%	5.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	1,038	3,157	5,354	--

Source: In-Stat, 3/10

**Table 36. USB Penetration of Digital Terrestrial Set-Top Box Market Forecast 2008–2014  
(Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Digital Terrestrial Set-Top Boxes</b>	44,373	49,850	40,702	44,971	41,388	34,728	30,519	-9.3%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	4.6%	5.2%	8.0%	11.0%	14.0%	18.0%	18.0%	
<b>Total w/ USB High Speed</b>	2,041	2,592	3,256	4,947	5,794	6,251	5,493	16.2%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	0	305	--

Source: In-Stat, 3/10

**Table 37. USB Penetration of IP/DSL Set-Top Box Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>IP/DSL Set-Top Boxes</b>	13,151	14,110	15,157	16,093	17,289	19,087	20,786	8.1%
% w/ USB Low or Full Speed	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	263	0	0	0	0	0	0	-100.0%
% w/ USB High Speed	90.0%	92.0%	93.0%	94.0%	90.0%	80.0%	80.0%	
<b>Total w/ USB High Speed</b>	11,836	12,981	14,096	15,127	15,560	15,269	16,629	5.1%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	1.0%	2.0%	4.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	173	382	831	--

Source: In-Stat, 3/10

**Table 38. USB Penetration of Total Set-Top Box Market Forecast 2008–2014  
(Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Total Set-Top Boxes</b>	188,951	198,483	196,060	204,552	203,191	198,582	196,818	-0.2%
% w/ USB Low or Full Speed	5.3%	4.4%	3.3%	1.9%	1.4%	0.9%	0.9%	
<b>Total w/ USB Low or Full Speed</b>	10,061	8,814	6,562	3,978	2,853	1,779	1,729	-27.8%
% w/ USB High Speed	19.9%	22.0%	25.6%	28.5%	31.3%	28.4%	29.0%	
<b>Total w/ USB High Speed</b>	37,574	43,719	50,259	58,275	63,543	56,329	57,155	5.5%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.6%	1.9%	3.5%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	1,211	3,736	6,875	--

Source: In-Stat, 3/10

### Standalone PVRs

Standalone PVRs, such as TiVo and ReplayTV, record television programming on a hard disk. This category does not include other devices, such as set-top boxes, that integrate PVR functionality. Those devices are included in the set-top box section. Because set-top boxes are increasingly integrating PVR functionality, consumer demand for standalone PVRs continues to fall.

The forecast for USB in standalone PVRs can be seen in Table 39. High-speed USB is very popular, and is used to connect to additional, external hard drives. SuperSpeed USB is unlikely to catch on, as this market is declining, and the box makers are unlikely to invest in new technology.

**Table 39. USB Penetration of Standalone PVR Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Standalone PVRs</b>	335	290	265	260	240	235	220	-5.4%
<b>% w/ USB Low or Full Speed</b>	18.0%	15.0%	11.0%	5.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	60	44	29	13	0	0	0	-100.0%
<b>% w/ USB High Speed</b>	72.0%	75.0%	85.0%	91.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	241	218	225	237	240	235	220	0.2%
<b>% w/ USB SuperSpeed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	0	0	--

Source: In-Stat, 3/10

**Portable Media Players**

The portable media player (PMP) market is comprised of music-only players (aka, MP3 players) and media players which play both digital audio and video. The market is dominated by high-speed USB, which offers rapid connectivity between PMPs and PCs.

Wireless connectivity is also an option for downloading music and video from a PC in this market, as seen in Microsoft’s Zune and Apple’s iPod Touch. However, over the length of this forecast, we fully expect all vendors to continue to offer wired USB connectivity. As to SuperSpeed attach rates in this market, much depends on Apple. The company is both a market and technology leader in PMPs. If they embrace SuperSpeed, then SuperSpeed is likely to be successful.

The forecast for USB penetration of PMPs can be seen in Table 40. The forecast assumes there will be interest in SuperSpeed by Apple, among others, as memory capacities increase, video capabilities increase, and the need to quickly move more data on and off the devices increases.

**Table 40. USB Penetration of Portable Digital Media Players Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Portable Media Players</b>	215,000	225,000	234,000	240,000	245,000	250,000	247,500	1.9%
<b>% w/ USB Low or Full Speed</b>	5.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	10,750	4,500	0	0	0	0	0	-100.0%
<b>% w/ USB High Speed</b>	95.0%	98.0%	100.0%	100.0%	95.0%	80.0%	60.0%	
<b>Total w/ USB High Speed</b>	204,250	220,500	234,000	240,000	232,750	200,000	148,500	-7.6%
<b>% w/ USB SuperSpeed</b>	0.0%	0.0%	0.0%	0.0%	5.0%	20.0%	40.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	12,250	50,000	99,000	--

Source: In-Stat, 3/10

**Video Game Consoles**

Video game consoles refer to line-powered gaming devices that connect to a television. The forecast for USB-enabled game consoles is shown in Table 41. Of the previous generation of video game consoles, both the Sony PlayStation 2 and the Microsoft Xbox had full-speed USB ports. The PlayStation 2 is still being shipped. Of the current generation of consoles, the Microsoft Xbox 360, the Sony PlayStation 3, and the Nintendo Wii all incorporate high-speed USB. We do not expect SuperSpeed USB in this market over the length of the forecast, as we do not expect a new console to ship in that time.

**Table 41. USB Penetration of Video Game Consoles Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Video Game Consoles</b>	48,342	46,900	41,100	35,900	32,510	29,800	21,500	-14.4%
<b>% w/ USB Low or Full Speed</b>	14.4%	13.2%	8.5%	3.3%	1.5%	0.3%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	6,961	6,191	3,494	1,185	488	89	0	-100.0%
<b>% w/ USB High Speed</b>	85.6%	86.8%	91.5%	96.7%	98.5%	99.7%	100.0%	
<b>Total w/ USB High Speed</b>	41,381	40,709	37,607	34,715	32,022	29,711	21,500	-12.0%

Source: In-Stat, 3/10

### Handheld Game Consoles

Handheld game consoles refer to all handheld, battery-operated devices that are primarily game consoles, including the Nintendo DS and the Sony PlayStation Portable (PSP). Currently, the Sony PSP is the only USB-enabled handheld console on the market. The PSP utilizes high-speed USB. The USB penetration of handheld game consoles, shown in Table 42, assumes that a next-generation Sony handheld ships in 2013.

**Table 42. USB Penetration of Handheld Game Console Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Handheld Game Consoles</b>	44,900	41,800	35,000	27,800	22,900	36,000	42,200	0.2%
<b>% w/ USB Low or Full Speed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
<b>% w/ USB High Speed</b>	30.7%	28.2%	28.9%	27.0%	26.2%	22.5%	23.2%	
<b>Total w/ USB High Speed</b>	13,800	11,800	10,100	7,500	6,000	8,100	9,800	-3.6%

Source: In-Stat, 3/10

### SD DVD Recorders

The forecast for USB penetration in the standard-definition (SD) DVD recorder market can be seen in Table 43. The market for high-speed has been fairly positive, and we expect it to increase over the length of the forecast because of USB's inclusion into DVD recorder systems on chip (SOC). With regard to SuperSpeed, the overall market is declining, and we doubt that vendors will invest to add SuperSpeed.

**Table 43. USB Penetration of SD DVD Recorder Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>SD DVD Recorders</b>	12,590	6,848	4,475	2,826	1,780	310	250	-48.4%
<b>% w/ USB Low or Full Speed</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
<b>% w/ USB High Speed</b>	20.0%	23.0%	28.0%	33.0%	40.0%	45.0%	51.0%	
<b>Total w/ USB High Speed</b>	2,518	1,575	1,253	933	712	140	128	-39.5%

Source: In-Stat, 3/10

### SD DVD Players

The forecast for USB in DVD players can be seen in Table 44. USB will not be a significant factor in DVD players over the length of this forecast. The cost sensitivity in this market is simply too great to justify the inclusion of USB on the vast majority of players. Some DVD chip vendors have included high-speed USB in their DVD solutions. However, we do not expect this application to adopt SuperSpeed USB.

**Table 44. USB Penetration of SD DVD Player Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>SD DVD Players</b>	118,455	112,165	104,412	98,104	95,265	90,249	84,533	-5.5%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	7.0%	8.0%	10.0%	14.0%	17.0%	19.0%	21.0%	
<b>Total w/ USB High Speed</b>	8,292	8,973	10,441	13,735	16,195	17,147	17,752	14.6%

Source: In-Stat, 3/10

**Blue Laser DVD Recorders**

Blue laser DVD recorders refer to standalone Blu-ray recorders in the CE cluster, which are currently not available in the US. Sony includes high-speed USB on some of its Blu-ray recorders available in Japan. Panasonic has not offered it to date. The forecast for USB penetration in the blue laser DVD recorder market is shown in Table 45. SuperSpeed USB is expected to debut in 2012.

**Table 45. USB Penetration of Blue Laser DVD Recorder Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Blue Laser DVD Recorders</b>	1,519	2,490	3,303	4,460	5,776	7,276	9,273	30.1%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	40.0%	50.0%	55.0%	60.0%	65.0%	70.0%	75.0%	
<b>Total w/ USB High Speed</b>	608	1,245	1,817	2,676	3,754	5,093	6,955	41.1%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	5.0%	10.0%	15.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	289	728	1,391	--

Source: In-Stat, 3/10

**Blue Laser DVD Players**

Panasonic and LG seem to be the leaders in integrating high-speed USB into the Blu-ray players, while Sony and Samsung lag behind. The forecast for USB in blue laser DVD players can be seen in Table 46. Please note that the forecast does not include the Sony PlayStation 3 game console, which has Blu-ray player capability, and is included in the game console forecast elsewhere in this report. We don't expect to see any SuperSpeed USB until 2012. Wi-Fi is becoming increasingly popular in this segment, in order to allow Internet connectivity through BD-Live, a service that allows Internet access to additional content. However, on some models this service is enabled through a Wi-Fi dongle that plugs into a high-speed USB port.

**Table 46. USB Penetration of Blue Laser DVD Player Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Blue Laser DVD Players</b>	4,050	13,769	27,449	50,267	65,539	74,858	81,413	42.7%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	40.0%	45.0%	50.0%	55.0%	60.0%	65.0%	70.0%	
<b>Total w/ USB High Speed</b>	1,620	6,196	13,724	27,647	39,323	48,658	56,989	55.9%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	3.0%	5.0%	11.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	1,966	3,743	8,955	--

Source: In-Stat, 3/10

**A/V Receivers**

The forecast for USB penetration in the A/V receiver market can be seen in Table 47. USB in the A/V receiver market is still a relative rarity, even in high-end units. Currently, A/V receiver brands on the market incorporating USB include Yamaha, Onkyo, Pioneer, and Denon. Pioneer seems to offer USB in more models than its competition

USB is primarily offered in high-end A/V receivers. High-speed USB is expected to increase slowly over the length of this forecast. SuperSpeed USB should be available in a small number of high-end units beginning in 2012.

**Table 47. USB Penetration of A/V Receiver Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>A/V Receivers</b>	6,900	7,100	7,600	8,100	8,800	9,300	9,900	6.9%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	8.0%	9.0%	10.0%	11.0%	13.0%	15.0%	15.0%	
<b>Total w/ USB High Speed</b>	552	639	760	891	1,144	1,395	1,485	18.4%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	1.0%	3.0%	5.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	88	279	495	--

Source: In-Stat, 3/10

**Digital Photo Frames**

Digital photo frames, as seen in Table 48 below, all use high-speed USB, particularly high-speed host capability, in order to connect to digital still cameras, camcorders, USB flash drives, PMPs, and other USB peripherals. Since these devices do not require the bandwidth of SuperSpeed, they will not transition to that standard. Wi-Fi is also a popular technology in these devices.

**Table 48. USB Penetration of Digital Photo Frame Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Digital Photo Frames</b>	15,600	25,000	32,000	38,000	43,000	50,000	58,140	18.4%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
<b>Total w/ USB High Speed</b>	15,600	25,000	32,000	38,000	43,000	50,000	58,140	18.4%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	0	0	0	--

Source: In-Stat, 3/10

**Summary**

The summary forecast for USB penetration of the CE total available market (TAM) is shown in Table 49. This is, and will remain, a high-speed USB market for the length of the forecast. SuperSpeed will enter the market in very limited numbers in 2011, before expanding significantly in 2012.

**Table 49. Summary of USB Penetration of Consumer Electronics Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>CE TAM</b>	911,448	927,593	949,157	1,004,220	1,044,306	1,097,650	1,129,760	4.0%
<b>% w/ USB Low or Full Speed</b>	3.1%	2.1%	1.1%	0.5%	0.3%	0.2%	0.2%	
<b>Total w/ USB Low or Full Speed</b>	27,832	19,548	10,085	5,175	3,340	1,868	1,729	-38.4%
<b>% w/ USB High Speed</b>	56.9%	59.1%	63.6%	66.2%	64.6%	59.4%	53.2%	
<b>Total w/ USB High Speed</b>	518,188	548,413	603,667	664,371	674,295	651,685	600,893	1.8%
<b>% w/ USB SuperSpeed</b>	0.0%	0.0%	0.0%	0.3%	5.0%	11.8%	20.6%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	3,420	51,777	129,188	232,758	--
<b>Total Wired USB - CE</b>	<b>546,020</b>	<b>567,961</b>	<b>613,752</b>	<b>672,966</b>	<b>729,411</b>	<b>782,741</b>	<b>835,380</b>	<b>8.0%</b>

Source: In-Stat, 3/10

**Communications**

Communications devices forecast in this section include:

- Mobile Phones
- External Cable and DSL Modems and Gateways
- External Cellular Modems

**Mobile Phones**

There are three issues related to USB in mobile phones. First is USB capability in mobile phones. Second is USB ports on mobile phones. And third is USB charging in mobile phones.

USB has had great success in the mobile phone market as a connection from the phone board to the phone connector to transport data on and off the phone, replacing RS-232. Full-speed USB provided much greater bandwidth than RS-232, and was a better solution as the amount of Flash memory and multimedia demands on phones increased. USB also allowed for significantly faster phone software updates.

As seen in Table 50, high-speed USB is currently in a majority of mobile phones. This is due to greater bandwidth demands on phones, which has led to mobile phone baseband chip makers integrating high-speed USB. We expect to see some SuperSpeed USB in phones beginning in 2012. It will likely appear in higher-end phones with large amounts of memory, including phones with PMP capability. In addition to greater bandwidth, SuperSpeed USB’s appeal to phone makers includes its power efficiency.

As seen in Table 51, the success of USB within the phone has not yet translated to external success via external USB ports—but this will change over the forecast period. The primary reason for limited success in the past has been the need for only one connector on the phone. Most mobile phones have had, and most still have, a custom connector for charging, as well as data downloads and uploads. Two connectors on a phone increase expense, and there is little room on many phones to accommodate a second connector. So for a USB port to be included on a phone, it must generally be the only port,

including all the support that entails. Currently, only a few phones, including the BlackBerry and some other models, have made this leap to including a USB Port.

One significant factor that should drive the proliferation of USB ports is the transition from mini-USB connectors to micro-USB connectors. The most prominent proponent of micro-USB ports, Nokia, has been an early adopter, including it on several models in 2009, including the N97, N900, E72, E63, E66, 5800, and X6. Research in Motion's (RIM) BlackBerry units originally included a mini-USB port, but most newer BlackBerry devices have transitioned to the micro-USB port. The Palm Pre also has a micro-USB port. The micro-USB connector lowers the mini-USB's 3.5mm height, and decreases its depth, but the width is similar to the mini-USB connector. The micro-USB connector is expected to dramatically increase USB's presence as a connector in the phone market.

Another significant factor moving mobile phones to micro-USB connectors are standards centered around USB mobile phone charging. At the March 2009 Mobile World Congress in Barcelona Spain, the GSMA, a European wireless trade association, and several mobile operators and mobile phone makers pledged to implement a cross-industry standard for a universal charger for new mobile phones over three years. The parties agreed that by January 1, 2012 over 50% of new mobile phones would support a universal charging connection. The group had previously agreed that the micro-USB port would be the charging interface. This is primarily a European initiative, but some companies, such as Qualcomm, are not based in Europe. Part of the reason for the initiative is due to environmental concerns, since the universal charging mechanism will decrease the need for proprietary phone chargers.

In April 2009 the CTIA, a US-based wireless standards body, endorsed the Universal Charging Solution, a plan to create a common platform for all mobile phone chargers. The organization endorsed micro-USB as a common charging interface. China also supports a charging standard that embraces USB.

**Table 50. USB Penetration of Mobile Phone Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Mobile Phones</b>	1,244,710	1,144,196	1,233,327	1,316,241	1,447,669	1,641,117	1,550,847	6.3%
% w/ USB Low or Full Speed	72.0%	43.0%	21.0%	8.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	896,191	492,004	258,999	105,299	0	0	0	-100.0%
% w/ USB High Speed	25.0%	55.0%	78.0%	91.0%	97.0%	91.0%	80.0%	
<b>Total w/ USB High Speed</b>	311,178	629,308	961,995	1,197,779	1,404,239	1,493,416	1,240,678	14.5%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	3.0%	9.0%	20.0%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	43,430	147,701	310,169	--

Source: In-Stat, 3/10

**Table 51. USB Port Penetration of Mobile Phone Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Mobile Phones</b>	1,244,710	1,144,196	1,233,327	1,316,241	1,447,669	1,641,117	1,550,847	6.3%
% w/ Mini-USB Ports	4.8%	3.0%	1.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ Mini-USB Ports</b>	59,746	34,326	12,333	0	0	0	0	-100.0%
% w/ Micro-USB Ports	0.3%	4.0%	10.0%	23.0%	35.0%	52.0%	65.0%	
<b>Total w/ Micro-USB Ports</b>	3,734	45,768	123,333	302,735	506,684	853,381	1,008,051	85.6%

Source: In-Stat, 3/10

**External Cable and DSL Modems and Gateways**

This category includes both single-function cable and DSL modems, as well as more full-featured gateway devices that add routing and switching to the cable and DSL modem capability. Gateways are becoming more popular than modems because of their increased capability. Gateways often combine either Ethernet or Wi-Fi connectivity with USB. Modems often have USB capability.

The forecast for USB penetration into the external cable and DSL modem and gateway markets can be seen in Table 52. High-speed USB predominates in the market, while we expect to see some SuperSpeed USB in very small volumes in 2012.

**Table 52. USB Penetration of External Cable and DSL Modem and Gateway Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>External Cable &amp; DSL Modems &amp; Gateways</b>	110,368	107,389	121,429	129,407	134,578	137,188	141,736	5.7%
% w/ USB Low or Full Speed	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	3,892	0	0	0	0	0	0	-100.0%
% w/ USB High Speed	74.9%	82.7%	87.9%	90.4%	91.3%	91.4%	91.4%	
<b>Total w/ USB High Speed</b>	82,706	88,788	106,783	116,937	122,844	125,352	129,542	7.8%
% w/ USB SuperSpeed	0.0%	0.0%	0.0%	0.0%	0.8%	2.6%	2.6%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	1,104	3,604	3,690	--

Source: In-Stat, 3/10

**External Cellular Modems**

External cellular modems refer to modems that use technologies such as EV-DO, WCDMA/HSPA, and LTE. It does not include modems that use WiMAX technology.

The external cellular modem forecast can be seen in Table 53. Besides USB, external cellular modems are also available in ExpressCard and PC Card configurations. Users have been showing an increased preference for the USB form factor over the last few years, since it is a very well-known technology. We do not expect any SuperSpeed USB in this application over the length of the forecast due to the relatively low data rates required by cellular modems.

**Table 53. USB Penetration of External Cellular Modem Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>External Cellular Modems</b>	23,742	32,425	43,784	46,027	39,534	33,940	27,662	-3.1%
% w/ USB Low or Full Speed	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	0	0	0	0	0	0	0	--
% w/ USB High Speed	69.0%	75.0%	78.0%	81.0%	84.0%	87.0%	90.0%	
<b>Total w/ USB High Speed</b>	16,382	24,319	34,152	37,282	33,209	29,528	24,896	0.5%

Source: In-Stat, 3/10

**Summary**

The summary forecast for USB in the communications segment can be seen in Table 54. The large total available market (TAM) in this segment is due to the size of the mobile phone market, which therefore determines the success of USB in this segment.

**Table 54. Summary of USB Penetration of Communications Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>Communications TAM</b>	1,378,820	1,284,010	1,398,540	1,491,675	1,621,781	1,812,245	1,720,245	6.0%
<b>% w/ USB Low or Full Speed</b>	65.3%	38.3%	18.5%	7.1%	0.0%	0.0%	0.0%	
<b>Total w/ USB Low or Full Speed</b>	900,083	492,004	258,999	105,299	0	0	0	-100.0%
<b>% w/ USB High Speed</b>	29.8%	57.8%	78.9%	90.6%	96.2%	91.0%	81.1%	
<b>Total w/ USB High Speed</b>	410,266	742,414	1,102,930	1,351,998	1,560,291	1,648,297	1,395,116	13.4%
<b>% w/ USB SuperSpeed</b>	0.0%	0.0%	0.0%	0.0%	2.7%	8.3%	18.2%	
<b>Total w/ USB SuperSpeed</b>	0	0	0	0	44,534	151,305	313,859	--
<b>Total Wired USB - Communications</b>	<b>1,310,349</b>	<b>1,234,418</b>	<b>1,361,929</b>	<b>1,457,297</b>	<b>1,604,825</b>	<b>1,799,601</b>	<b>1,708,975</b>	<b>6.7%</b>

Source: In-Stat, 3/10

**Automotive**

USB is increasingly seen in new vehicles. Additionally, aftermarket car stereo manufacturers have been integrating USB interfaces to satisfy customers wishing to stream music to their car stereo, via PMPs players or USB Flash drives. Another driver for USB adoption in vehicles is the infotainment segment, which includes Microsoft’s and Ford’s Sync auto media system.

The forecast for USB-enabled car stereos and infotainment systems is shown in Table 55. All USB in this segment is high-speed. Given the long design times of automobiles, we expect high-speed to remain the only type of USB found in this market for the length of the forecast. In addition, we expect that aftermarket units will far lag portable CE devices in the adoption of SuperSpeed USB, thus we have not forecast any SuperSpeed in this application.

**Table 55. USB-Enabled Car Stereos and Infotainment Systems Market Forecast 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>USB-Enabled Car Stereos and Infotainment Systems</b>	2,900	3,500	4,700	6,500	8,200	11,500	13,900	31.8%

Source: In-Stat, 3/10

**Forecast Summary**

Table 56 and Figure 5 show a summary of all USB-enabled devices broken down by USB type. The transition to SuperSpeed USB is occurring more slowly than we anticipated last year, due to the slow integration of the new standard into core logic chipsets. Nonetheless, for a mature technology, USB will grow rapidly, at 7.3% through 2014. Most of that growth will come from SuperSpeed devices, particularly after 2011. Both low-/full-speed and high-speed USB will remain relevant throughout the forecast period as well. Low-/full-speed will remain the interface of choice in HIDs, and high-speed will remain in PC peripheral and CE application that do not need multi-Gbps data rates.

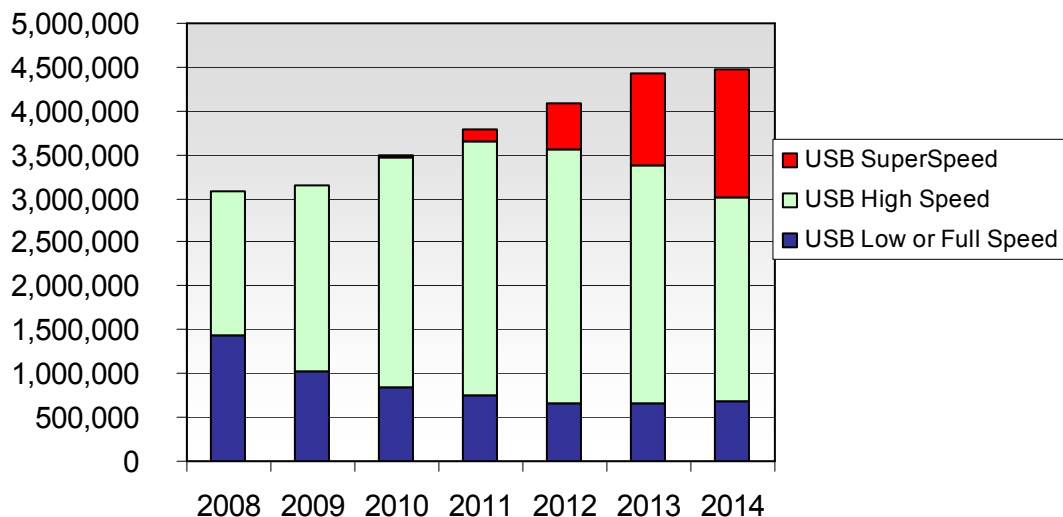
**Table 56. Total USB-Enabled Device Summary Forecast by USB Type 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>TOTAL DEVICES TAM</b>	3,753,379	3,752,536	4,055,406	4,359,790	4,631,844	4,967,667	4,999,356	5.9%
% w/ USB Low or Full Speed	38.6%	27.5%	21.0%	17.2%	14.3%	13.5%	13.6%	
<b>USB Low or Full Speed</b>	1,449,009	1,031,404	853,124	748,409	660,835	668,368	681,469	-8.0%
% w/ USB High Speed	43.8%	56.2%	64.5%	66.6%	62.4%	54.6%	46.5%	
<b>USB High Speed</b>	1,644,443	2,109,437	2,615,957	2,904,165	2,889,655	2,711,337	2,323,205	1.9%
% w/ USB SuperSpeed	0.0%	0.0%	0.5%	3.0%	11.5%	20.9%	29.4%	
<b>USB SuperSpeed</b>	0	26	19,155	130,629	533,355	1,038,779	1,467,746	791.9%
<b>Grand Total Wired USB</b>	<b>3,093,452</b>	<b>3,140,868</b>	<b>3,488,236</b>	<b>3,783,204</b>	<b>4,083,845</b>	<b>4,418,485</b>	<b>4,472,421</b>	<b>7.3%</b>

Source: In-Stat, 3/10

**Figure 5. Total USB-Enabled Device Summary Forecast by USB Type 2008–2014 (Units in Thousands)**

Units in Thousands



Source: In-Stat, 3/10

Table 57 and Figure 6 show a summary of all USB-enabled devices in the markets discussed in this report, broken down by product segment. In many of these segments, USB is effectively universal, and its growth is dependent on the growth of the overall market. The primary issue then becomes: what type of USB does it use? This is particularly true in PCs. USB penetration of USB peripherals continues to grow at a modest pace. CE applications for USB continue to be driven by digital still cameras, DTVs, and PMPs. The communications segment is driven by the mobile phone market. Finally, the automotive segment will come into its own as a market for USB as USB-enabled car stereos become common to allow the connection of PMPs.

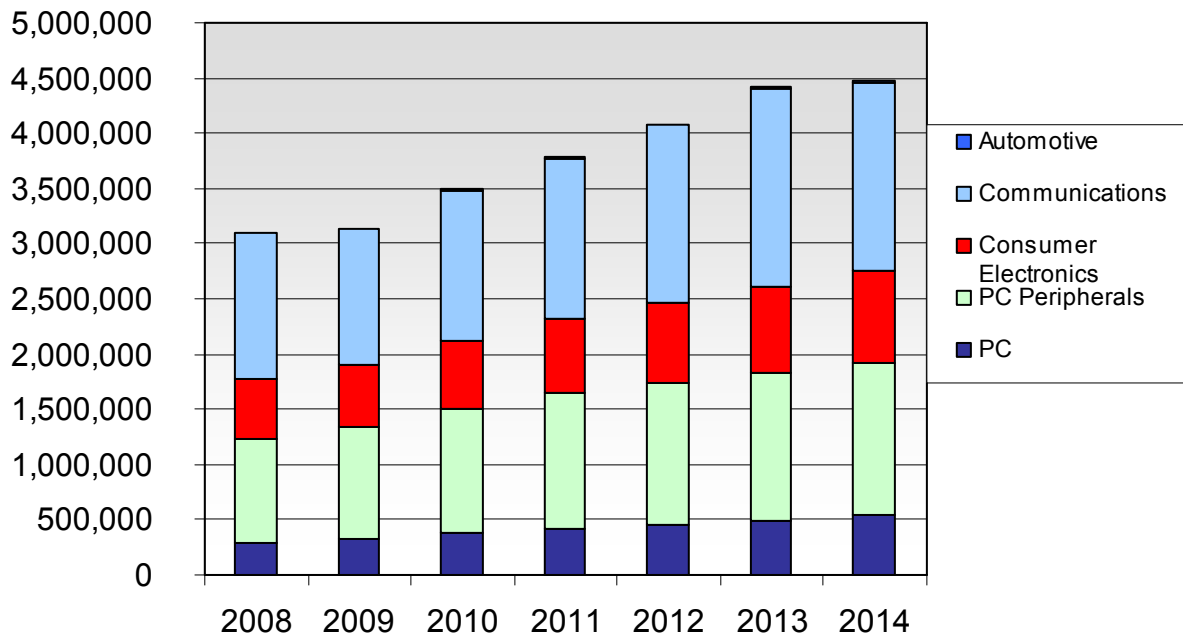
**Table 57. Total USB-Enabled Device Summary Forecast by Product Segment 2008–2014 (Units in Thousands)**

	2008	2009	2010	2011	2012	2013	2014	CAGR '09-'14
<b>PC</b>	282,247	323,797	372,477	417,689	452,456	497,837	537,200	10.7%
% PC	9.2%	10.3%	10.7%	11.0%	11.1%	11.3%	12.0%	
<b>PC Peripherals</b>	951,936	1,011,191	1,135,378	1,228,752	1,288,953	1,326,805	1,376,966	6.4%
% PC Peripherals	30.8%	32.2%	32.5%	32.5%	31.6%	30.0%	30.8%	
<b>Consumer Electronics</b>	546,020	567,961	613,752	672,966	729,411	782,741	835,380	8.0%
% Consumer Electronics	17.7%	18.1%	17.6%	17.8%	17.9%	17.7%	18.7%	
<b>Communications</b>	1,310,349	1,234,418	1,361,929	1,457,297	1,604,825	1,799,601	1,708,975	6.7%
% Communications	42.4%	39.3%	39.0%	38.5%	39.3%	40.7%	38.2%	
<b>Automotive</b>	2,900	3,500	4,700	6,500	8,200	11,500	13,900	31.8%
% Automotive	0.09%	0.11%	0.13%	0.17%	0.20%	0.26%	0.31%	
<b>Grand Total Wired USB Devices</b>	<b>3,093,452</b>	<b>3,140,868</b>	<b>3,488,236</b>	<b>3,783,204</b>	<b>4,083,845</b>	<b>4,418,485</b>	<b>4,472,421</b>	<b>7.3%</b>

Source: In-Stat, 3/10

**Figure 6. Total USB-Enabled Device Summary Forecast by Product Segment 2008–2014 (Units in Thousands)**

Units in Thousands



Source: In-Stat, 3/10

## USB Silicon Suppliers

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Brief descriptions of some USB silicon, software, and IP suppliers are provided below.

### Cypress Semiconductor

Cypress makes a variety of USB products available in a number of packages, including low-, full- and high-speed USB peripheral controllers, embedded host controllers, and full-speed and high-speed hub controllers. The product line includes everything but PC host controllers; in addition, Cypress makes complete USB board solutions, including silicon, board, and software.

Cypress' West Bridge family of products is designed to connect PCs to portable devices using high-speed USB, freeing processor resources on the portable device by limiting its involvement in high-bandwidth transfers.

Cypress has among the widest family of USB products, and includes the following:

- M8, Encore I and Encore II low-speed peripheral controllers
- FX I and Encore III full-speed peripheral controllers
- FX2LP, FX2LP18, NX2LP-FLEX, and AT2LP high-speed peripheral controllers
- M8 full-speed hub and peripheral controllers
- HX2 and HX2LP high-speed hub controllers
- SL811HS, EX-HOST and EZ-OTG full-speed host controllers

Cypress has plans to launch a SuperSpeed USB peripheral controller by the end of 2010.

### DisplayLink

DisplayLink is a San Francisco, California-based company that enables USB as a display interface between PCs and monitors by providing a proprietary method of decompressing video received over USB in the display. Software must be installed on the PC to compress the data prior to sending it to the display, and a DisplayLink chip is required on the monitor side to enable their solution. The compression required is done in the CPU and GPU subsystem in the laptop, is lossless, and is done in real time.

DisplayLink's first-generation solution, launched in 2008, used high-speed USB. In May 2009, the company announced the development of three new chips, the DL-125, DL-165, and DL-195—all high-speed USB products. The DL-125 is designed for entry level monitors, mini-monitors, and projectors, and can handle resolutions up to 1440 x 1050. The DL-165 is designed for docking stations, mainstream monitors and adaptors, and can handle resolutions up to 1920 x 1080. The DL-195 is designed for high-end monitors and docking stations and can handle resolutions up to 2048 x 1152.

In early 2010, the company released a Zero Client solution, which is a discrete box or integrated chip and software solution that, via a USB input, allows a single USB port to enable multiple Windows 7 sessions.

The company demonstrated a SuperSpeed USB display solution at CES in January 2010, and it will release the solution before the end of 2010.

## Fresco Logic

Fresco Logic was founded in Beaverton, Oregon in January 2008. Its founders have backgrounds in high-speed chip and chipset architecture, and came from PCI Express controller maker Cascade as well as Intel. A key investor in Fresco is Faraday of Taiwan, the design arm of UMC.

Fresco's sole focus is on USB technology, specifically USB 3.0 chip solutions. At the Consumer Electronics Show (CES) in January 2009, the company demonstrated its discrete SuperSpeed USB 3.0 host and device chip solutions on a Windows Vista PC. The company demonstrated a single-chip SuperSpeed USB host solution via PCI Express at the USB Developer Conference, in Tokyo, in May 2009. The product is called the FL1000.

Fresco sampled the FL1000 in the third quarter of 2009, and has dual- and single-port products. The FL1000 will be in volume production by July 2010. Fresco's immediate target markets for its SuperSpeed USB silicon include Express Cards, PCI Express cards, and external storage solutions.

## Fujitsu

Fujitsu announced in July 2009 that it was shipping the MB86C30A, a USB 3.0-Serial ATA (SATA) bridge IC built with Fujitsu's own USB PHY. In January 2010, the company announced that the solution had achieved USB-IF compliance certification.

## Gennum

Gennum is a Burlington, Ontario, Canada-based semiconductor and IP vendor in broadcast, data communications, and connectivity. In March 2009, its subsidiary Snowbush IP Group released integrated USB 3.0 PHY and controller IP. Though initially available in 120 nanometers, Snowbush now has both PHY and controller IP available in 90, 65, and 40 nanometer process geometries. Its targets include companies making USB solutions for PCs, external storage, solid-state drives, direct drive displays, printers, and hubs.

## Intel

Intel has long been a main proponent of the USB standard. It was both an advocate of the original USB specification, as well as a prime component of its widespread success by supporting successive USB generations in its chipsets. Intel is the prime mover behind the USB-IF, the standards body that develops and approves all USB standards.

## Jungo Software

Jungo is a 12-year-old software vendor active in many segments, including USB and Bluetooth. Within USB, it targets the following markets: automotive, mobile handsets, set-top boxes, data cards, and Bluetooth connectivity. In February 2010, the company announced the launch of its ZeroDriver software, which enhances the user experience by enabling seamless connectivity between USB data cards (both 3G and 4G) and any laptop or PC, without the need to install drivers or applications on the host PC.

## LucidPort Technology

LucidPort Technology is a Mountain View, California-based, fabless semiconductor company developing SuperSpeed USB controllers. In May 2009, LucidPort introduced the USB300, a single chip USB 3.0 to SATA-II bridge designed for external storage devices. The company demonstrated the solution at the USB Developers conference that same month. Samples of the chip were available in the third quarter 2009. In January 2010, LucidPort announced that the USB300 had achieved USB-IF certification.

## MCCI

MCCI is a private software company based in Ithaca, NY that focuses on software to enable wired USB in the mobile phone industry. MCCI provides embedded USB stacks and protocols for hosts and devices, and embedded host-side class drivers for their customers, who are primarily phone vendors.

In November 2008, MCCI announced a partnership with Synopsys to combine MCCI's SuperSpeed DataPump USB 3.0 software drivers and firmware with a version of Synopsys DesignWare IP that will be optimized for SuperSpeed USB. In February 2009, the company announced the release of its RmNet PC host drivers to mobile phone vendors. RmNet is a proprietary USB virtual Ethernet framework developed by Qualcomm for its mobile phone platforms. Also in February 2009, MCCI announced the availability of its USB host software stack for the USB 3.0 xHCI Host Controller. In May 2009, the company announced the availability of Windows 7 USB Host Drivers. In September 2009, it announced at IDF that it had partnered with Symwave to demonstrate speeds over 270Mbps using a PC and commercially available PC and solid-state drive using MCCI's USB 3.0 host software and Symwave's USB 3.0 SuperSpeed SATA controller.

## NEC

NEC manufactures discrete, high-speed USB host controllers, high-speed USB device controllers, and high-speed USB hub controllers, in both 4-port and 7-port configurations. NEC also makes an IDE to USB 2.0 bridge chip. NEC makes no full-speed USB silicon. Additionally, NEC's ECOUSB product family includes low-voltage 3-port USB 2.0 host controllers ( $\mu$ PD720102) and 4-port USB 2.0 hub controllers ( $\mu$ PD720114). NEC also makes the  $\mu$ PD720150, an integrated USB 2.0 host and peripheral controller, which is also part of the ECOUSB family.

In May 2009, NEC introduced a USB 3.0 host controller, the  $\mu$ PD720200. Samples were made available in June 2009 with free Windows device driver software. In September 2009, the host was certified by the USB-IF, the first SuperSpeed product to be recognized. Also in September 2009, the company announced the availability of a USB 3.0 system-on-chip (SOC) design solution that customers can use to kick start the development of custom USB 3.0 products. NEC also has released USB 3.0 host reference designs for both Express Cards and PCI Express add-in cards. In March 2010, the company announced that it expected to produce two million of the host controllers in April 2010.

## PLX

PLX is a Sunnyvale, California-based maker of USB bridge, controller and PCIe solutions. PLX acquired Oxford Semiconductor at the end of 2008. PLX was primarily in USB device controller market before the acquisition, with Oxford adding USB bridge chips for external storage to their line.

PLX products include the NET 2272, a USB 2.0 local bus controller, and the NET 2282, a USB 2.0 - PCIe 3.0 bridge. The NET 2282 is optimized for netbook to PC connectivity; it allows the netbook to be seen as an external USB drive by the main PC. Also in the PLX line are the OXU210HP, a single-chip, high-speed USB host and USB peripheral controller with integrated transceivers, and the OXPCIe200, a single-lane PCI Express end-point controller and SerDes to enable the host system to access the USB 2.0 host. PLX also has 13 USB 2.0 to SATA controllers.

PLX has made no announcements of USB 3.0 products.

## SMSC

SMSC (Standard Microsystems) specializes in high-speed USB products, including peripheral controllers and hub controllers. Their three core areas in USB include USB hubs, flash media, and USB-Ethernet solutions. The company does not offer any SuperSpeed USB solutions, nor has it made any specific announcements concerning the release of SuperSpeed products.

## STEricsson

STEricsson represents the February 2009 merging of ST-NXP Wireless and Ericsson's Mobile Platform Group. Ericsson added 2G/3G baseband and software experience to ST-NXP's hardware expertise.

STEricsson has over 100 USB products in all areas, including host, peripheral, and hub controllers, in full-speed and high-speed. The company also provides a full USB software stack for embedded solutions. STEricsson is currently working on SuperSpeed USB device controllers, with target markets including mobile phones, digital still cameras, PMPs, and camcorders.

## Symwave

Symwave is a San Diego, California-based fabless semiconductor designer of high-performance analog/mixed-signal integrated circuits and system solutions targeted at high-bandwidth applications, such as external storage, portable phones, media players, and HD camcorders. The company has leveraged its 1394b design expertise to move into SuperSpeed USB silicon. At CES 2009, the company demonstrated its SW6318 USB 3.0 to SATA controller in a Seagate external storage solution. The chip supports two drives and has been available in production quantities since January 2010. The company's SW6316 USB 3.0 to SATA controller supports a single USB 3.0 drive, and has been available in production quantities since December 2009.

In September 2009, Symwave announced at IDF that it had partnered with MCCI to demonstrate speeds over 270Mbps using a PC and commercially available PC and solid-state drive using MCCI's USB 3.0 host software and Symwave's USB 3.0 SuperSpeed SATA controller.

## **Synopsys**

Synopsys is among the world's leading semiconductor IP companies. It has been involved in USB IP for several years, and is currently involved in work on SuperSpeed USB. Synopsys has both SuperSpeed USB host and device solutions, and has produced over 25 tapeouts of SuperSpeed USB products. At IDF in September 2009, the company showed SuperSpeed host, peripheral and hub controllers.

## **Texas Instruments**

Texas Instruments (TI) supplies both full-speed and high-speed peripheral controllers, USB transceivers, and full-speed hub controllers. In addition, the company also makes eight types of high-speed USB switch chips. The company is also developing a SuperSpeed USB hub controller, and will have samples available in mid-2010.

## Methodology

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This report covers applications for the universal serial bus (USB) in five mass-market segments: PCs, PC peripherals, consumer electronics, communications, and automotive. It does not cover USB in more specialized commercial or vertical applications, such as measurement, control, or point-of-sale systems.

This report includes all PCs, PC peripherals, consumer electronics, communications, and automotive devices that have USB capability. Please note that this is not the same as all devices that have USB ports. For example, mobile phones and PMPs may have USB device controllers and use full-speed or high-speed USB, but transmit and receive information through a proprietary connector. However, for most applications, USB capability and the presence of a USB port or ports can be assumed.

The information contained in this report comes from both primary and secondary sources, and it includes the following:

- Telephone, email, and in-person interviews with chip vendors, software vendors, PC, PC peripheral, consumer electronics, automotive and communications device manufacturers conducted during the first and second quarters of 2010.
- Background research about USB, including magazines, journals, trade show attendance, trade publications, and Web searches, over the past year. It also includes analysis of previous In-Stat reports and consultation with other In-Stat analysts in the first and second quarters of 2010.

All forecasts represent worldwide shipment figures. The numbers for a given year represent the number of products shipped in that year, not the number of products purchased.

### Methodology for General Consumer Survey

This report also includes consumer survey data that resulted from USB-related survey questions inserted into our annual US Residential Technology Survey (RTS). The survey asked typical consumers questions about their ownership of, use of, and attitude toward, technology products and services in the home. This process was completed in February 2010, with 1,000 respondent completions. This survey was conducted using a large, third-party online consumer panel that consisted of over 2.5 million consumers in the US. The Web panel's members were recruited by invitation, with all members having completed an in-depth profiling survey. This panel had the ability to deliver a cross-section of the US population with a highly normalized demographic and geographic balance.

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