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Manager's Guide to AV Design and Development

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CTIA Fall 2007: The Third Screen

By Rob Baum

Consumers regularly view three screens in daily life: TV, PC, and, increasingly, their cell phone. The technology and market for cell phones is changing the most rapidly, even when compared to the significant changes in digital television and personal computers. Many useful functions are converging in phones offering advanced functionality at the top of the market—computing power, e-mail, instant messaging, wireless Internet, navigation, audio and video entertainment and, of course, communication. And at the bottom of the market there are the sheer numbers of basic phones, about three million sold. Every day.

In the future, portable devices such as smart phones, already linked to billing systems, may drive "local" (to the user) electronic commerce if mobile search and discovery can lead user-relevant content to the handset. For example, a vending machine on the corner with something in it you have bought before, or a local retail store that senses your phone's presence and entices you to walk in with a targeted ad or coupon delivered to your handset.

I will take a quick look at a recent



mobile phone trade show held in San Francisco in October 2007. Cell phones represent a large—and growing—sector of the consumer electronics market. Over one billion handsets will be sold this year, plus accessories such as headsets and docking stations—as well as services, such as music and video downloads. CTIA (Cellular Telecommunications and Internet Association) focused on wireless data technologies and the emerging role wireless is playing in the enterprise and entertainment worlds. CTIA is a lobbying organization, originally founded in 1984, advocating for the wireless telecommunications industry—carriers, manufacturers, and wireless Internet providers—according to one of their press releases.

CTIA REPRESENTS BIG NUMBERS

There is much business flowing through large telecom networks, dominated by large carriers in entrenched positions, currently with mostly closed networks: ATT/Cingular, Verizon, and Sprint Nextel (all with 50-60 million US subscribers each), T-Mobile (with about 25 million), and two smaller firms, Alltel and US Cellular, both with about 10 million customers. Each of

these operators brings in around \$50 per subscriber per month, with data revenues running from 8 to 14% of that.

The Wireless Association, as the CTIA bills itself, announced during the show that wireless data service revenues (e.g., non voice services) for the first half of 2007 rose to \$10.5 billion (a 63% increase over the first half of 2006)—adding up to 15.5% of all wireless service revenues. Text messaging again set new records, with 28.8 billion messages reported in the month of June 2007 alone—almost one billion messages a day (up 130% over the previous June). Other highlights of the survey include: wireless customers using more than 1.1 trillion minutes in the first half of 2007, up 18% over the first half of 2006, and generating more than \$67 billion in total wireless revenues in six months. The US has 243 million wireless subscribers, about 81% of the population, according to CTIA.

While the big players have traditionally kept their networks closed to outside (“off-portal”) traffic, this is beginning to change, opening up these large networks to direct-to-consumer firms that sell services such as games, social networking, video, and, of course, music downloads.

SPEAKERS

The keynote speakers included Microsoft’s CEO, Steve Ballmer, discussing his company’s take on the enterprise side of wireless, and by his presence signaling that smart cell phones are a market Microsoft wants more of for Windows Mobile. Ballmer noted that interoperability among systems such as text messaging was key to effective collaboration. Ballmer noted (and I agree) that people are looking for a single handheld device that is useful

for both social and business uses. This is already reflected in the increasing “consumerization” of leading business phones designed for the enterprise, such as Research In Motion’s BlackBerry product line, for example, by adding MP3 player functionality and better interfacing with Facebook.com, the social networking website. Microsoft’s goal is clearly to get businesspeople to use phones running their software—while making the phone operating system simple enough for the average consumer to actually use—which will not be easy, because RIM is the leader in smart phones for business.

It remains to be seen whether Apple’s fashionable, consumer friendly, easy-to-use iPhone can ultimately work well as a business tool integrated into the enterprise. This is a jump which Palm’s Treo line was sadly never able to make before the iPhone upped the bar in terms of interface, industrial design, ease of use, video, and compact size, effectively marginalizing the company. Palm’s latest, the Centro, at \$100 (with contract), is certainly an excellent value for the money for core PDA functions.



Palm Centro

Apple didn’t corner the market on cool phone features, however. Several of Sony-Ericsson’s Walkman MP3 phones have “Shake” or “Gesture”

Control in which, like the Nintendo Wii controller, the user flicks the wrist while holding the phone to change songs or control games. This would be a great mechanism for toggling to an incoming call while putting the existing caller on hold. There is also no tactile feedback (“haptics”) on the iPhone, a feature which Motorola (and suppliers to the industry) are working on to revive their buzz in the handset market, because the iPhone has drawn all the oxygen out of the air for other consumer smart phones, in particular, the Razr2.

Brian Hoskins of Microsoft demonstrated the mobile VPN capability of the new Microsoft Systems Center Mobile Device Manager, a critical tool for large businesses looking to deploy mobile applications to their workforce. These software tools enable IT departments to more simply manage advanced mobile phones of business users in large companies, send applications to devices, monitor security, and so on, clearly attempting to move into the well-established terrain of RIM’s BlackBerry. Naturally, Microsoft has the money to just buy RIM (as it has bought other firms to acquire their customer base or technology); that would be one solution. Just like Apple, RIM sells hardware and software, which both increases control,



RIM BlackBerry



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allows the firm to see the whole picture, as well as offer a high level of service to customers.

The third keynote focused on the network side and the coming migration to 4G (fourth generation) wireless communications system, which will be fast, multimedia capable and all IP (Internet Protocol) based only. AT&T's VP of Business Mobility Marketing, Mike Woodward, noted in an interview with CTIA that iPhone allows people to see, even though it's a consumer product, how good an interface can get (and indirectly, how poor the typical phone interface really is).

Another variable is a Linux operating system-powered phone running Google applications ("Android"). The consortium of firms Google has assembled in the Open Handset Alliance will build phones which combine several popular Google applications such as Maps, the YouTube video service, and their e-mail service, Gmail. It remains to be seen (as of this writing) how the Google phone gets to market, because in the US most mobile phones are sold through the carriers—and thus the large operators or carriers must benefit from any Google phone if they are to go through existing distribution. Two US carriers (Sprint and T-Mobile) are in the Alliance, as are other established industry suppliers. There is also a large auction of 700MHz wireless spectrum set for late January (after this article has gone to press), which will be very important to the future of the industry.



The iPhone passed over one million units of sales in less than 90 days, on the way to achieving Apple's goal of 10 million sales by 2008. The iPhone is a closed ecosystem: customers can use their phones on only one carrier network

(AT&T in the US) and buy content from iTunes only. This is just at the time the large carriers—in particular, Verizon—who traditionally controlled content within their "walled garden," are opening up their networks.

In another corner, handset maker Nokia has opened the Nokia Music Store to sell over-the-air music downloads in WMA (Windows Media Audio, Microsoft's audio compression technology and file format—which competes with MP3, MPEG4, AAC, and Real Audio formats) format to users of their premium music phones, such as the N81, regardless of what carrier an individual



subscriber uses. This move, however, has alienated some carriers, who have decided not to sell it, perhaps because in the US carriers have more market power than elsewhere—where Nokia sells more phones (such as Europe).

SPRINGS AND MIRRORS POWER DISPLAY

Qualcomm is a wireless telecom R&D company with a long history in the wireless business, particularly in CDMA phones. In handheld multimedia, they are known for their video platform, MediaFLO, used by Verizon (which competes with the DVB-H and T-DMB standards). At CTIA the company ventured into the display arena with the industry's first direct view MEMS (micro electromechanical systems) display. Qualcomm's "Mirasol" uses a low power reflective display (and so can always be on), requires no backlighting, is thin, and has a very fast response time (tens of microseconds). Because the technology can scale up, future, higher resolution iterations could ultimately display video and real time GPS (or cell tower) based navigational maps.

The displays use interference in reflected light to produce color. When ambient light hits the structure, it is reflected from the top of the thin-film and the bottom of the reflective membrane. Depending on the height of the optical cavity between the two mirrors, light of certain wavelengths reflecting off the membrane will be in or out of phase with the light reflecting off the thin-film structure. Based on the phase difference, some wavelengths will constructively interfere, while others will destructively interfere (Fig. 1).

At CTIA, Qualcomm showed in monochrome with color prototypes. Displays have demonstrated reflectivities of greater

than 60%, contrast ratios greater than 15:1, and drive voltages below 5V. An applied voltage produces an electrostatic force that balances the linear mechanical spring force of the micro-mirror into one of two stable states, open or collapsed (Fig. 2). Qualcomm has established a strategic alliance with Prime View International (PVI), a Taiwanese manufacturer of small- and medium-format display modules, to commercialize Qualcomm MEMS displays. This display was shown in Audiovox's Acoustic Research Bluetooth headset (model ARWH1, a rebranded



Lubix UBHS-PH2) and will be coming in 2008 in phones from Chinese supplier Qingdao Hisense Communication. The display will let the user see caller ID, battery level, and status alerts.

Motorola featured "CrystalTalk," a patented dual mike noise cancellation adaptive technique in the RAZR2 V8 and V9. CrystalTalk is a bundling of microphone noise reduction, noise adaptive speaker enhancements, and, on some products, a full duplex speakerphone. These enhancements attempt to improve the clarity and intelligibility of speech in a noisy environment, a significant consideration for cellphone users.

CTIA is a small show—in square footage, booths, and attendees—but it is influential and revealing in what is to come as mobile electronics product categories such as MP3, cell phone, and PDAs coalesce.

Rob Baum is employed at Menlo Scientific, Ltd., which serves as a consultant to a number of loud-speaker firms. He may be reached with comments: rob@menloscientific.com

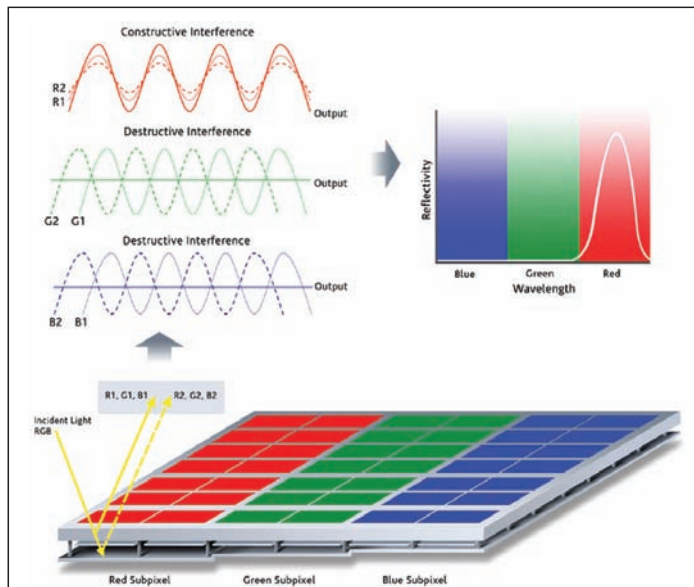


FIGURE 1: Qualcomm's Interferometric Modulator (IMOD) structure showing light reflecting off the thin-film stack and mirror interfering to produce color.

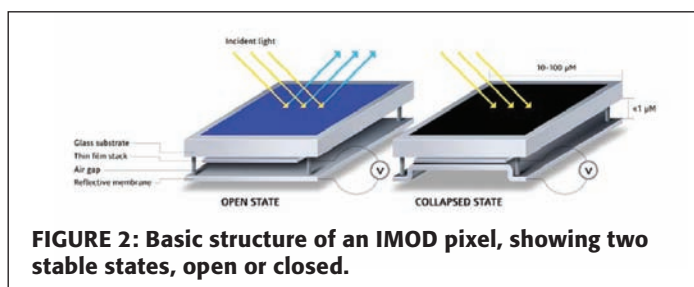


FIGURE 2: Basic structure of an IMOD pixel, showing two stable states, open or closed.