

A Growing Demand For Broadband

A trip to CES makes clear customers will be needing more bandwidth

By Steven S. Ross and the Broadband Properties Staff

Big screen HDTV dominated this year's giant Consumer Electronics Show in Las Vegas. But behind the screens and behind the scene, broadband networking made everything work together. The big news from our end of the industry came from the absolute extremes of the consumer electronics business: Expensive entertainment systems and cheap, utilitarian VoIP phones. As for video, the multi-room multi-media installations that up to now have been the realm of custom home installers are becoming more standard, more capable, and more mainstream. Starting now, customers will be demanding more bandwidth as a result. More importantly, they will be demanding more flexibility to use that bandwidth once the signal gets inside their home or apartment. As for VoIP: If families don't have broadband now, adding it to get less expensive and more capable phone service might be irresistible.

The Holy Grail of consumer electronics is to facilitate the combining of computers, HDTV, pervasive audio, home climate and safety controls, even appliances. HDTV is driving the bandwidth needs. But all the other items on the list are forcing vendors to refine their technologies. Many of the vendors, such as Denon, DigitalDeck, Meedio, and NetStreams mentioned below, have been used to dealing with custom home installers of high-end equipment. They still cater to that market, but are looking into more standardized, plug-and-play systems now.

And how will the programming be carried from room to room? Wireless broadband technologies continue to get more capable. But consumers can choose broadband over household wiring, broadband over cable coax, or custom networks, often professionally installed and using dedicated Cat5 coax. Transmission speeds? As high as 200 Mbps over coax, 200 Mbps over electrical wiring, and over 100 Mbps wireless. Why so high? Multiple HDTV video streams, mainly.

Oddly enough, the Microsoft vision of Windows

computers at the center of it all may not happen. Windows may be there, but most of the heavy bandwidth lifting may be done by other vendors. Why? Microsoft made a fundamental error in the design of its XP Media Center version, now being sold with computers from major vendors such as Dell, Gateway and HP. The error: Making it difficult (and sometimes impossible) for consumers to move copyrighted material from protected DVDs and downloaded audio from room to room – even though such movement for consumers' own use, is absolutely permitted by the Millennium Digital Copyright Act.

Result: Most vendors use the PC interface to help control the network, but not to run it. That means the computer can be small (less capable) and the appliances can be big.

Here's the lineup, category-by-category.

Convergence Aids

The surprise is that the custom installers have continued to get more and more PC-savvy. DigitalDeck, for instance, has historically served the custom market and still does. But using technology from Philips, it is easier for installers to expand a system and add new kinds of equipment. Many vendors have made it easier to add digital video recorders to PC hard drives, and then to move the video from the PC to HDTV. Denon has led the way in upgrading the DVD video we once thought was the ultimate, so that it looks good on wide screen TVs – and even on wide screen HDTV. Where TiVo was the ultimate a year ago, competitors such as Digeo's Moxi have moved in and are claiming adoption by cable vendors.

Verizon's FiOS service rolls out this year (it went live in Keller, Texas, just a few months ago). But Comcast is not standing still. It has deals with many vendors, most notably Digeo and Motorola, to make it easier for users to absorb HDTV feeds.

Companies that caught our eye in this category:

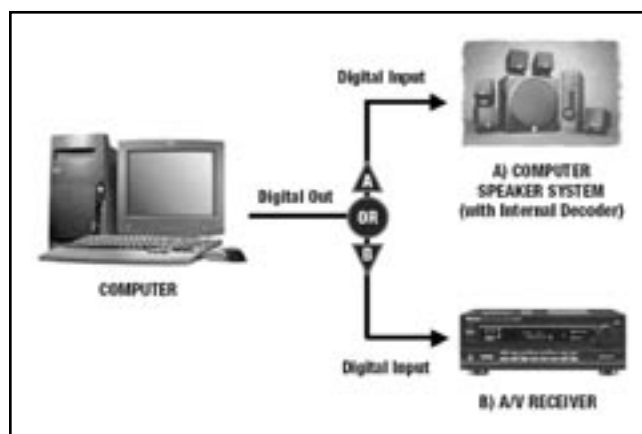
Denon, the venerable supplier of high-end audio and video, offered proof that DVD video will be woefully inadequate once users get used to HDTV on a large screen. Its new flagship DVD player, the DVD-5910, converts DVD video to HDTV. It's not cheap, at \$3500. But it has the power of a \$60,000 professional video scaler. The company also has a new multiroom A/V receiver, the AVR-4806, that's compatible with all 6.1 and 5.1 channel surround sound. It automatically up-converts the composite video or S-Video signal from DVD players, VCRs or camcorders to component video – even for HDMI and DVI-D video switching – all for \$3500 or about half the price of its earlier models. See www.usa.denon.com.



Back of Denon's 5805 shows flexible input and output options.

DigitalDeck offers integrated entertainment systems that interface with others using the Philips Nexperia chipset. HDTV and audio products dominate the line. See www.digitaldeck.com.

DTS makes equipment for the professional audio market. Its latest boxes can be used to create 96 kHz 6.1-channel soundtracks, and even 96 kHz audio for DVD video discs. Conventional CDs are recorded at 44 kHz in two channels; this audio requires six times the bandwidth. See www.dtsonline.com.



DTS has several options for easily getting audio out of a PC.

Entropic's c.LINK technology – its chips are embedded in others' products -- allows consumers to share digital entertainment over existing cable TV coax cable at speeds as high as 270 Mbps. The company demonstrated a downloaded HDTV show from Starz entertainment Group, stored on a PC hard drive, and transmitted over in-home coax back to the HDTV screen in another room. One equipment vendor using the technology is Avtrex, a Silicon Valley based software startup specializing in digital video recording. Another is Ucentric systems of Maynard, Mass. See www.entropic.com, www.ucentric.com, www.avtrex.com.



Portable, networked Meedio tablet PC controls all smart house functions.

InterVideo, well known in the computer world for its WinDVD DVD-burning software, introduced a remote control device called InstantON. It converts a Windows multimedia PC into a consumer video player, TV and music box. See www.intervideo.com.

Meedio combines audio, video, and household control and monitoring in one installation controlled from a personal computer. It can all be controlled from a tablet PC, in fact. See www.meedio.com.

Motorola's Broadband Media Center HDTV is going to be combined with Digeo's MOXI menu system in a 40,000-home Comcast trial later this year. Customers will also get a dual-



DigitalDeck aims at simplicity but covers all the basics beautifully.

Home Networking

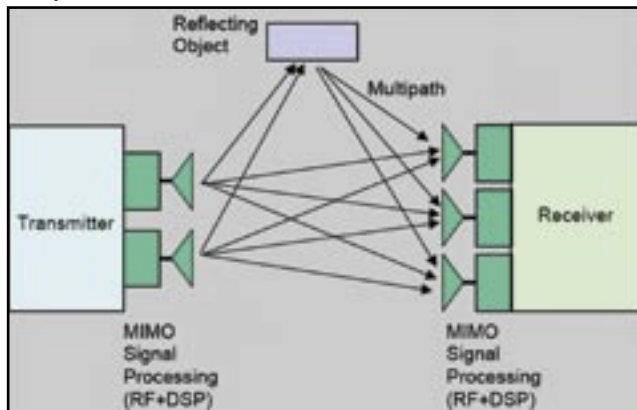
Do you want 270 Mbps? MoCA, the Multimedia over Coax Alliance, made a splash at CES with promises of bandwidth that high. Association members showing equipment included Zoran, Ucentric Systems, Thomson Consumer Electronics, Sigma Designs, Panasonic, Motorola, Entropic Communications, D-Link Systems, Avtrex and others. But that's not all. You can get wireless networks that use multiple antennas, bouncing signals all over the building, or wireless mesh networks. Bandwidths to 1 Gbps are possible. Broadband over home wiring started out a few years ago at 1.5 Mbps. It is now at 85 Mbps with 200 Mbps promised for later this year.

Here are the companies to watch in this category:

Airgo Networks of Palo Alto announced that it had shipped more than 1 million of its MIMO (multiple input/multiple output) Wi-Fi chipsets. The chips end up in wireless router products by Belkin, Linksys, Planex and others, for 20 Mbps home wireless networks. The technology, which uses multiple antennas at the sending and receiving end to bounce signals throughout the home, is compatible with older 802.11a, b, and g standards. The next broadband wireless standard,



An elegant, compact surge protector for those data-over-powerline installations, from TiiNetTech.



MIMO wireless network signals bounce through the house and around walls and other obstacles, yet deliver huge bandwidth.

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802.11n, will not be ready until 2007 at the earliest. All the 11n proposed standards use MIMO, but not necessarily Airgo's flavor of it, so future compatibility is not assured. See www.airgonetworks.com.

DS2 (it stands for Design of Systems on Silicon) has been the leading supplier of chips and software for Broadband Powerline installations. This Spanish company has now moved indoors, supplying technology to Vancouver-based **Corinex Communications** for the first combined video, voice and data over powerline system for the home. The Corinex Ethernet powerline adapter allows up to 200 Mbps over household wiring – enough for multiple HDTV video streams. Encryption is built-in. See www.ds2.es and www.corinex.com.

Freescale Semiconductor of Austin, TX, formerly the semiconductor division of Motorola, demonstrated a number of ultra-wideband (UWB) wireless home networking applications. Its home mesh network can handle 110 Mbps at 30 feet. For long-range applications using very low power (months on a pair of alkaline batteries) bandwidth is less but meets the ZigBee Alliance specification. UWB operates in the 3.1 to 10.6 GHz band (normal Wi-Fi is at 2.4 GHz, with 11a at twice that frequency) and implements the IEEE 802.15.3 streaming Media Access Control (MAC) protocol. The Freescale chips provided to device manufacturers are low power (750 mW and 3.3 volt). Existing systems with a mini-PCI interface (most widescreen TV's, for example) can accept UWB modules from vendors like Global Sun. Products using the technology include the world's first ultra-wideband cell phone. See www.freescale.com.

Intellon and **TII Technologies** teamed up to produce the first surge protector for homeplug networks – nets that use home wiring to carry Ethernet. The units will handle signals up to 85 Mbps, with 200 Mbps announced at the show and due late this year. Intellon has been working with Comcast, Sharp, Belkin and network-system providers Asoka and BridgeCo as well. See www.tiinettech.com.

VoIP and Other Phone Services

By now, most consumers have probably heard about at least one VoIP provider, Vonage. The range of equipment and services shown at CES by dozens of vendors shows the strength of this category. Indeed, cheap, flexible phone service rather than video may be the “killer app” that brings broadband to homes and small businesses. Let's say a home is served only by cable modem, at the typical monthly fee of \$44.95. Add \$30 to that and the family gets unlimited calling in North America, pennies-a-minute calling anywhere else, more flexible voice mail than the sequential messages



A Wi-Fi portable phone for VoIP; models are available for regular POTS service as well.

available in typical cell and conventional phone services, all kinds of call waiting, conferencing and blocking options, and often a full rebate on the price of the phone itself. Add \$100 to \$200 more for the equipment and maybe \$5 a month for the VoIP provider and they get video over the phone as well.

On the small business side, providers talked about turnkey solutions at attractive prices. The issue, of course, is reliability. Even at 99.99 percent availability, VoIP providers can't match plain old telephone service for reliability. But with cell phones as a backup, and maybe a few cheap POTS landlines, even the slightly lower reliability will be acceptable to many. The bonus: A \$49.95 calling plan for POTS typically has \$15 in federal, state and local taxes and fees thrown in, plus some sneaky add-on charges from the phone company itself. VoIP bills, by comparison, are unencumbered by taxes and only lightly touched with fees.

What are the POTS providers doing about it? They've decided VoIP is inevitable and have started to join the competition. Here's what caught our eye:

Leadtek showed VoIP videophones, video surveillance boxes and multiple devices for turning PCs into digital video recorders. See www.leadtek.com.

Pulver.com Enterprises released its pulver.Communicator to the OEM market. It combines instant messaging, VoIP, and social networking. The program, which enhances VoIP service, is a free download that runs on Windows 2000 or XP (from www.pulver.com/communicator). The software was developed by FWD Communications, a Pulver subsidiary. Pulver expects that OEMs in the VoIP business will use it to add features to their services; it already has arrangements with more than 60 to do so. Even international calls among users of the partners' phone are free. Other features include:

- On-the-fly conference calls that support voice and instant

messaging, even among multiple providers.

- Instant Messaging sessions with AOL, Yahoo!, MSN and ICQ! as well as with VoIP providers.
- Video calls to SIP-based contacts
- VoIP connectivity to non-VoIP-enabled contacts through a call-back service that does not require special software to be installed.
- Share “buddy lists” with other users, at the customers’ discretion.

Verizon iobi. Verizon is rolling out the iobi service in three flavors – Home, Professional for small businesses, and Enterprise for large businesses with existing Centrex systems. The overarching idea is to combine “plain old telephone service” and any computer that has Internet access. In the home version, it is basically a software package to manage phone calls, voice mail, calendar, address book and e-mail. In its initial release it synchronizes with Microsoft Outlook and Palm desktop applications. Eventually, Verizon promises to add instant messaging, call blocking, text-to-speech messages and photo viewing. Also promised is access for Blackberry, Pocket PC and VoIP SmartPhone. In the service, you see your voice mail on-screen and can select to hear the messages in any order. You can also see information about an incoming call on-screen before you decide to answer. The Professional (small business) version also interfaces with Lotus Notes. Verizon is also offering a VoIP product, VoiceWing, with similar on-screen controls.

See www.verizon.com/showcase.



Compact appliance from Motorola handles instant messaging.

Safety

Designers envision home devices to be linked together, either over a broadband hard-wired network or with “ZigBee-ready” devices. ZigBee (www.zigbee.org) is a new IEEE standard (802.15.4) that connects small, embedded sensors and transmitters that do not need much bandwidth but do need long battery life (think 2 alkaline AA’s lasting months or even years), continuous operation, built-in network security (typically 128-bit right now) and scalability.

A few of the pacesetters:

Eaton’s new Home Heartbeat may be the start of true machine-to-machine communication (or should we say appliance to appliance to computer communication) for the home. Add simple remote monitoring to almost any item in the home. It can be set up to send e-mail or cell-phone text messages if it detects a problem. It uses

low-frequency wireless; because it is wireless, it is easy to add new monitors to the system, up to a maximum of 32. The final connection to PC is through a USB port.

See www.homeheartbeat.com.

HAI (Home Automation, Inc.), the New Orleans-based home automation and safety folks, have added control of computers running Windows Media Center to the mix. The company has 20 years’ experience selling home alarm systems and started adding links to PCs in 1997.

See www.homeauto.com.

HomeSeer released a new interface for Windows XP Media Center PCs that lets users control home functions from a TV-style remote “clicker.” It supports all the older families of control systems, including X10, Lutron and Lightolier, as well as the newer Z-Wave.

See www.HomeSeer.com. ♦



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