THE FUTURE OF TELEVISION IS JUST AROUND THE CORNER—AND IT AIN’T HDTV. IT’S A COMPLETELY NEW VIEWING PARADIGM WHERE YOU PAY TO BE IN CONTROL AND SEE WHATEVER YOU WANT, WHENEVER YOUR HEART DESIRES.

It’s 8:30 in the evening. You sit on your couch, grab the remote control and click through your 42 cable TV channels. Same old stuff. So you suffer through the slowly scrolling program guide. Finally, you find a good movie—but it doesn’t start till 10:00 p.m. Darn.

It’s then that you realize you could be watching that big soccer match in Rio de Janeiro, but your cable company isn’t carrying it. A Richard Pryor movie would brighten your outlook, but you’d have to rent a video. One of those amateur Internet movies might be interesting, but that means sitting in your stiff desk chair staring at a small screen…and, oh yeah, the movie will take an hour to download. You smirk. After a half-century of television, you’re still hostage to a few tired broadcasters.

Stay tuned. Much of the broadcast, reception and display technology needed to let you see whatever show you want, whenever you want, on whatever screen you want, exists. The pieces just have to be improved and linked together in the right way.

Connecting the chain will be no small feat. But it will be forced by a much larger convergence already under way in digital entertainment. As digital movies and television programs become increasingly common, they are morphing with video games, Internet video and music into one uniform stream of digital content. At the same time, the distribution channels for that content—cable TV, satellite and the Internet—are widening into one big broadband pipe to your home.

BY MARK FISCHETTI
ILLUSTRATION BY STUART BRADFORD
What’s missing is a commercial platform—a box in your home containing electronics and software that will let you receive the digital entertainment, interact with it and display it on any screen. Your TV, even a digital one, isn’t powerful enough, and neither are the set-top converter boxes that receive signals from cable or satellite providers. The need for a radically new platform “has created a massive opportunity for technology companies to innovate,” says Banc of America Securities analyst William Bao Bean, who specializes in digital entertainment. A new industry composed of startups and veteran electronics firms is emerging to supply that platform, which could be an advanced set-top converter, a personal video recorder or a souped-up version of a game machine.

And what of the television set? Once the magic box arrives, we will no longer need it.

THE TEST
The technology push applied by this convergence nicely matches the pull consumers are exerting. In decades past we spent our electronic-entertainment budgets on TV sets and got programming free over the airwaves. A “better” viewing experience meant buying a color TV, then one with a bigger screen. By the late 1980s, “better” meant “more,” and we bought subscriptions to cable or satellite television.

Today, we receive more channels than we can attend to. And we must wait for the few gems we care to view. What we really crave is “custom TV,” which would offer all the digital entertainment we wanted, whenever we wanted it. “We are moving from a subscription model to a usage model,” Bean says.

Marketers are continually telling us that if we spend enough money, we can have the future of TV now. But will the next big thing really pass the test of moving us closer to custom TV? Or will it just give us a nicer picture?

Go to your local electronics store and you’ll probably hear the same pitch I heard from Mitch, an overly exuberant sales guy. “This is the future of TV right here,” Mitch bubbles, pointing at a big-screen Philips Magnavox. “It’s home theater, really. And check out these babies: projection TVs. They’re really big. Or…” he turns in awe toward the private viewing room, “you can go for a flat, plasma display. The picture is really sharp. It’ll set you back $8,000, but man, it’s worth it.”

Do these contraptions get us the shows we want, when we want them? They have impressively large and crisp screens, but we want a new entertainment experience, not just a fancier image. Test failed.

Undaunted, the salesman swoons over the new “digital TVs,” one of which can display that big innovation we’ve heard about for a decade: high-definition television. But just try to find a digital broadcast (see “United States Trails Japan, U.K.,” p. 38). In 1996 the Federal Com-

A new industry composed of startups and veteran electronics firms is emerging to supply a radically new platform for custom TV.
Neither company has fulfilled the grand vision, however. In November 2000 ReplayTV announced it would stop making boxes; digital-media company Sonicblue soon purchased ReplayTV and is integrating its technology into future products. TiVo continues, but with limited service and software. Its box can connect to the Internet, but it uses a narrowband modem, so it cannot support interactive viewing. More importantly, the central store of “all” television shows and movies has not materialized. Subscribers can only get TV shows offered by their cable or satellite providers. And they still must wait until a show is aired to record it. TiVo has not been able to convince media companies to make their content available directly through a TiVo program guide in part because its software cannot prevent consumers from making and swapping unauthorized copies, or stop hackers from stealing the signal. “It is very easy to copy a digital signal and rebroadcast it with no loss,” says Carl McGrath, vice president of Motorola’s DigiCable division. “The content industry is scared to death, and they should be.” So are the distributors.

Seeing the potential to sell a new type of box and attract monthly TV subscribers, Microsoft entered the fray in March 2001, when its competing digital video recorder and service, called UltimateTV, hit retail shelves. It gives consumers DirecTV’s satellite programs but feeds them through a video recorder box. The package also includes Microsoft’s WebTV software, which lets you connect to the Internet through a phone line and display Web pages and e-mail on your TV. But like TiVo, UltimateTV is too slow to download Internet video. It cannot provide piracy- or copy-protection either.

Motorola is also taking aim at the magic box. It makes more than two-thirds of set-top cable boxes. New boxes in its DCT5000 series, for sale this year, will have more computing power than a digital video recorder and include a broadband cable modem. “It really is a video workstation,” says McGrath. The successor device now being developed will have a hard drive for storing and replaying video, turning the set-top box into a broadband digital video recorder.

Nonetheless, Motorola must clear the same copy protection hurdles as Microsoft and TiVo before it can offer custom TV. Protection schemes will likely be part of a box’s underlying operating system, which puts the onus squarely on companies like Liberate Technologies and OpenTV that supply platform software to hardware makers like Motorola. The specter of Microsoft dominating this critical arena with its own proprietary operating-system standard—just as it has PCs—seems to have galvanized action. In June, just three months after Microsoft’s UltimateTV hit the market, it began offering a digital-advertising platform. And it is not alone: Motorola’s DigiCable division is also marketing a similar system. The companies are betting that consumers want to control their own viewing experience and are willing to pay for it.”

## The U.S. TV Picture

### Broadcast Format

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<tr>
<th>TECHNOLOGY</th>
<th>DESCRIPTION</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
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<tr>
<td>Analog TV</td>
<td>Analog signal; picture resolution up to 480 vertical lines</td>
<td>Can be sent through air or cable; can be received on any inexpensive TV</td>
<td>Less clear picture than digital, even at same resolution; can’t support interactivity</td>
</tr>
<tr>
<td>Standard digital TV</td>
<td>Digital signal; picture resolution at 480 vertical lines</td>
<td>Sharper picture than analog, even at same resolution; supports interactivity</td>
<td>Few digital broadcasts to date; 91-centimeter set costs $1,100</td>
</tr>
<tr>
<td>High-definition TV</td>
<td>Digital signal; picture resolution at 1,080 vertical lines</td>
<td>Much sharper picture than analog or standard digital; supports interactivity</td>
<td>Few digital broadcasts to date; 91-centimeter set costs $1,700</td>
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### Possible Platforms

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<tr>
<td>Digital video recorder</td>
<td>Receives signal from cable or satellite, feeds to TV or display</td>
<td>Records and plays simultaneously; stores up to 35 hours; can access Internet</td>
<td>Average $350, plus $10 monthly subscription; can’t play video games or receive Internet video</td>
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<tr>
<td>Digital set-top box</td>
<td>Receives signal from cable or satellite, feeds to TV or display</td>
<td>May be provided by TV distributor for a few dollars a month; can access Internet</td>
<td>Can’t record or store TV; can’t play video games or receive Internet video</td>
</tr>
<tr>
<td>Game system</td>
<td>Plays video games on TV or display</td>
<td>Has PC-level processor; can access Internet; can play Internet video</td>
<td>Can’t receive, store or record TV shows; average $300</td>
</tr>
<tr>
<td>Personal computer</td>
<td>Receives data over Internet, processes and feeds to monitor</td>
<td>Can play Internet video, DVDs and video games</td>
<td>At least $900; receiving and recording TV requires costly added hardware and software</td>
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### Displays

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<tr>
<td>TV set</td>
<td>Cathode-ray tube</td>
<td>Inexpensive: 91-centimeter set costs $750 analog to $1,100 digital</td>
<td>Bulky, heavy; square screen only</td>
</tr>
<tr>
<td>Flat screen</td>
<td>Cathode-ray tube</td>
<td>Less distortion and glare; square or wide screen</td>
<td>Bulky, heavy; expensive: 91-centimeter display costs $1,300 analog to $2,200 digital</td>
</tr>
<tr>
<td>Plasma display</td>
<td>Gas-filled cells emit light when a charge is applied</td>
<td>No distortion or glare; very thin and light; square or wide screen</td>
<td>Very expensive: 107-centimeter (smallest) display costs $8,000</td>
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Digital television is being implemented widely in Japan and Britain. But it's still uncommon in the United States. Broadcast standards, cost and a laissez-faire U.S. regulatory environment make it difficult to close the gap. Indeed, it could be decades before the United States fully enjoys digital TV.

Japanese broadcasters were the world's first to offer digital TV. In 1989, the Japanese public broadcasting network, NHK, launched an experimental one-hour broadcast dubbed “Hi-Vision.” Today, 14 million households receive one or more digital channels from various networks, broadcast 24 hours a day by satellite. The Japanese government has already established a second-generation Integrated Services Digital Broadcasting standard and pushed broadcasters and consumer electronics companies to agree on technical protocols. As a result, manufacturers such as Panasonic and Sharp sell competing set-top boxes that can receive digital signals from all broadcasters, giving viewers inexpensive access to many shows. Takeatsu Yamauchi, an associate director of NHK, says digital TV should prevail nationwide by 2006.

The United Kingdom also moved quickly to implement digital television. In 1998, British media company ONdigital began providing terrestrial digital service; now about 20 percent of British homes subscribe to digital TV. That quick ramp-up is partly due to nationwide adoption of the Digital Video Broadcasting standard, which allows consumers to view a digital signal on an analog “tellie,” simply by adding an inexpensive converter. Converter prices have dropped to a pittance in Britain—Europe’s digital-TV leader. The United Kingdom’s Independent Television Commission aims to complete a nationwide changeover by 2010.

Had the United States used either Japan’s or Europe’s standards, it wouldn’t be frozen in digital paralysis. But it adopted “eight-level vestigial-sideband modulation,” a standard picked by an industry consortium, the Advanced Television Systems Committee. This choice favors a “high-definition” digital scheme—the most costly and difficult service to implement. Unlike the “standard” digital signal used in the U.K., the data-intensive U.S. signal requires new set-top receivers and expensive televisions.

This has created a chicken-and-egg situation that may prevent further progress: Consumers aren't buying the pricey sets partly because there is not enough digital programming. Yet broadcasters don’t want to install the expensive equipment needed to send digital signals until enough consumers have digital TVs. FCC rules do nothing to resolve the problem; they require broadcasters to turn off their analog signals by 2006—but only if 85 percent of the households in their viewing areas can receive digital TV. Any less, and the deadline drifts further into the future until that penetration is reached. As of June, less than one percent of U.S. homes had digital TVs, according to Lynn Claudy, senior vice president for science and technology at the National Association of Broadcasters.

The standoff is likely to continue. Congress could impose the 2006 deadline regardless of TV penetration. Alternatively, the government could require TV makers to include digital receivers in analog TV sets. Market-minded FCC chairman Michael Powell may be reluctant to impose regulations, Claudy says; but if the government simply lets the marketplace decide, he adds, “the learned estimates are that a changeover to digital TV could be a 20-year transition.”
Tomorrow’s TV could function as the home’s central controller, directing the security system, appliances, computers and wireless devices.

includes an on-screen program guide that could form part of the software needed for a magic box, but it lacks the hardware.

News Corporation is another vast content empire, and Rupert Murdoch has a worldwide assortment of cable networks, broadcast television stations and direct-broadcast satellite services. In May, the company became the largest shareholder in Gemstar-TV Guide International, the world’s leading provider of electronic program guides, notably the electronic version of TV Guide. But like AOL, News Corporation doesn’t have a magic box.

Microsoft has ubiquitous software and two hardware choices: UltimateTV and the Xbox. But the regime has little content, and it falls short in distribution. It’s no secret, however, that Bill Gates has a keen interest in building a low-earth-orbit satellite network. And Murdoch has courted Gates as a potential bidding partner for DirecTV. If Murdoch and Gates worked together, both companies could complete the digital-entertainment chain. News Corporation and Microsoft both declined to discuss strategy for this story.

That brings us to Sony. It has plenty of content (Sony Pictures, Sony Music), and plenty of hardware and software. Sony’s platform strategy is clear: turn the PlayStation 2 and its successor, PlayStation 3, into the magic box. It’s got distribution too.

In late May Ken Kutaragi, CEO of Sony Computer Entertainment, announced that Sony Entertainment had formed a strategic alliance with none other than AOL Time Warner. Sony gets distribution and AOL Time Warner gets a box. Sony also announced that networking giant Cisco Systems would develop software to give PlayStations broadband Internet access. Other plans include technology to let Sony video camera users upload their movie creations through the company’s Vaio laptop computer or PlayStation 3 onto its So-Net Internet portal, where any subscriber could retrieve and watch them. “You could even broadcast your own show live,” says Masaaki Oka, a producer in Sony’s creative-development department, “or create your own online video game.”

Sony bills such moves as creating a new world of broadband entertainment “through the fusion of games, music, movies, and broadcasting.” But critics question whether any one company could corner the digital-entertainment industry. “It’s logical for [Sony] to try,” says Claudy, the National Association of Broadcasters’ technology guru. “But they have different core competencies and may not be good at providing the missing links.”

The most likely outcome, he and other experts say, is a few giant companies that compete by offering custom TV services. Which package consumers choose will depend largely on price. “The cable and satellite companies are not sure how much consumers might pay,” Claudy agrees. “Eventually, the enigmatic desires of consumers will become clear. That will drive up volume, which will drive down cost.”

**THE LAST 12 FEET**

Once companies integrate digital content and distribution with a platform, we might finally have custom access to all TV shows, movies, music and online gaming for a low price. But it may not stop there. Since a magic box will accept broadband, it could become the lauded gateway to the home for everything digital, including Internet and telephone. And because it will have an operating system that can control peripherals, it could function as the home’s central controller, directing the security system, appliances, heating, desktop computers and all sorts of wireless devices.

One of the first real-world trials of such a system began in August, in Ajax and Pickering, Ontario, just east of Toronto. Rogers Cable, the local cable provider, installed small silver-and-black boxes in 50 subscribers’ homes. A Linux-based networking platform made by Ucentric Systems of Maynard, MA, connects each home’s computers and appliances to each other and the Internet. The system can provide television, Internet and telephone services on all TVs, plus voice mail and e-mail on all telephones and computers. The Ucentric unit does not yet have digital-video-recorder capabilities or its own electronic programming guide, however, and it can’t receive digital TV signals—so custom TV remains out.

It’s not the magic box, but it’s an indication that the technology is within reach. That’s why, says Beaus, “the battle in broadband distribution is no longer the last mile to the home, it’s the last 12 feet inside that home”—delivering not just bandwidth capacity but a custom broadband experience people can enjoy from a comfortable seat in any room.

The day that arrives, you’ll go to the electronics store and buy a “home gateway” box the size of today’s VCR for maybe $300. You’ll hook it to a broadband cable, then connect it to your wired or wireless home network. You’ll call the cable provider and sign up for its custom-TV digital recording service for maybe $50 a month. You’ll hang a flat plasma display (prices will have dropped since Mitch’s day) on the living-room wall and connect it to a wall socket that also taps into the home grid. You’ll put modest displays in other rooms, too. As you leave the bedroom you’ll say “off” to its screen, and as you enter the kitchen you’ll say, “Screen, show me my stock numbers.” During a commercial you’ll use a little wireless remote to instruct the hidden gateway box to find, download and play an original Star Trek episode. When the episode ends you’ll grab the game controller off the coffee table, become Captain Kirk on the plasma screen and engage in a live, online dogfight in the Neutral Zone with an opponent from Tokyo.

And you’ll wonder: will anyone buy that old “TV” stashed with the other junk for your tag sale Saturday? Hmm. Maybe some collector of obsolete technology.