

# Face-to-Face Face Off

Are today's set-top  
videophones ready for  
prime time? *DHE* puts  
on some decent  
clothes and tests two  
models to find out.



**Right:** Jennifer pauses to slip into something more comfortable while chatting on 8x8 Inc.'s VC105 ViaTV phone. **Below:** Tad and Dellamina marvel at the second runner-up of this week's John Lithgow look-alike contest, courtesy of C-Phone Home.



**BY ROB SABIN**

**P**arents. You spend your whole life trying to figure them out, and just when you think you've got 'em pinned down, they say something so remarkable, so profound, so completely out of character, that you have to go back and rewrite the book.

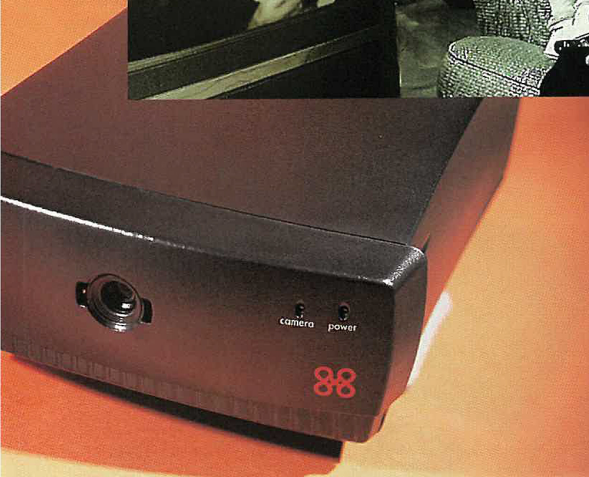
Such was the case with my folks earlier this year. They had just traveled north from their cozy retirement pad in Florida for the birth of my son, their first grandchild, and we were sitting around the hospital ogling at the wonder of it all when my mother uttered something I never expected to hear from her wise lips.

"Maybe we can get one of those videophones," she said.

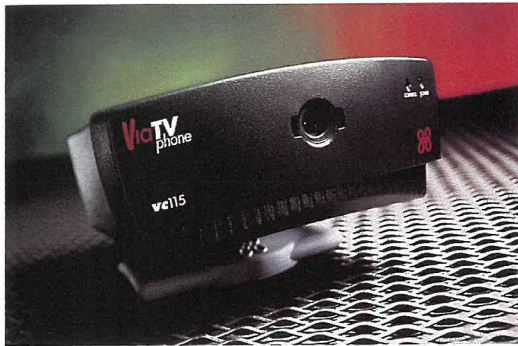
Let me put this in perspective. My parents are wonderful people—wonderful people, I tell you—but they are not the most technically savvy seniors. They don't own a personal computer or even a CD player, preferring to play their Sinatra and Tony Bennett cassettes on a whole-house intercom equipped with an in-wall tape deck. The highest technology in their home is a 900-MHz cordless telephone that my Dad innocently calls "the cell phone," and a hi-fi VCR, the basic operation of which my mother learned only with practice. So as soon as she spoke the "V" word, I figured I was in deep.

I spun around and shot her a look. "Where did you *hear* about that?" I hissed. Seems she'd seen a newspaper article about the new set-top TV videophones and figured it'd be a perfect way to keep tabs on her grandson. I was fraught with fear about asking my parents to set up and operate what amounts to a sophisticated modem, but I had to admit it was a good idea. After all, consumer videophones are for people just like them to stay in touch with people just like us. What better scenario in which to put a couple of these devices to the test—that is, the Janet and Arnold test?

A few weeks later I set about assembling two pairs of black boxes with eyeballs, each capable of turning any standard television into a videophone. I didn't have to go far. The C-Phone Corporation had sent me a pair of



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C-Phone Home units that had been sitting around my office for months. Then Brent Butterworth, chief propeller-head of CFG Labs, dug into his gear closet and pulled out two review samples of the VC105 ViaTV set-top box from 8x8 Inc. I sent one of each type packing south and carried the other two units home to my den.

First at bat: C-Phone Home. At a suggested retail price of \$649 per unit, Homey, as I'll call it for brevity, is a self-contained speakerphone and videophone about the size of a cable box. You get everything you need, including adjustable feet to change the camera angle, a wall-wart-style power transformer, the required video and phone cables, and yet another remote control for your collection. This one is fairly simple, and it lets you answer the phone, dial or enter numbers into the speed-dial menu, access setup screens, and directly control a few commonly used functions.

Hookup was a breeze. You connect Homey via the TV's RF antenna input using a coax video cable, then set the TV to channel 3 or 4, just like with a VCR or cable box. In fact, your VCR, cable-box, or satellite-receiver output loops right through Homey, so you can use these as you always have. Conventional RCA video and audio outputs allow you to record your conversations with your VCR. Your phone rates, by the way, are exactly the same with both the C-Phone and 8x8 videophones as with a regular telephone.

Activating Homey with a click on the remote revealed a wealth of setup menus. The factory defaults give you little reason to tinker, but the options are impressive. Besides letting you mess with arcane modem parameters, Homey allows you to modify the color, brightness, and shutter speed of the camera image to suit your conditions. The default resolution of the image you see may be set to high or low, and there are three video modes to allow you to compromise between best motion or maximum detail. The speakerphone mic can be optimized for your room size and set for half- or full-duplex operation (the latter allows you and your family to scream at each other simultaneously). During calls you can change resolution or video modes on the fly, select a full- or three-quarter-screen image (things tend to look crisper in three-quarter), and access a picture-in-picture mode that lets you view both yourself and the person you've called.

Ah...time to check in on Arnie. He picked up on his regular telephone. Much to my delight, and to his and C-Phone's credit, my father had followed the manual and hooked the thing up perfectly in about a half-hour's time. We were ready for our close-ups. But before getting to that, a short discussion of videophone technology is in order, lest your expectations outstrip your reality.

Let me be blunt: This ain't TV. If you think you're going to see your old man chatting with you in his living room like Dan Rather on CBS, think again. First, your dad probably won't have a giant map of the world behind

him. More to the point, conventional telephone lines designed for voice lack the capacity to rapidly deliver the large volume of data required for video. This is the harsh reality of what modem junkies call Plain Old Telephone Service, or POTS. In fact, if it weren't for a relatively new data-compression standard called H.324, which both the C-Phone and 8x8 units adhere to, you couldn't build a consumer device for POTS lines with a data rate fast enough to prevent a distant human from looking like a badly mangled Bugs Bunny on tranquilizers.

With videophones, then, it's all about modem speed, which can vary from call to call depending on conditions. Yes, you can improve the lighting in your room, as I ended up doing to keep the shadows off my face and optimize the image quality for my parents. And you can choose a videophone with a decent camera to start with. But it's ultimately the connection that determines a big part of your experience.

The C-Phone and 8x8 units use modems with a maximum connection speed of 33,600 bits per second, or 33.6 kilobits per second. In reality, background noise interferes with the data flow and is likely to limit your speed to 28.8 kbps or less. As I learned later while chatting with C-Phone engineer Stuart Ross, 19.2 kbps is "the knee of the curve." That's about the minimum for a decent picture, though incremental gains above 19.2 yield significant improvements, particularly in motion rendition. The H.324 standard defines high resolution as 350 x 288 pixels—approximately VHS tape quality. But getting a high-speed connection moves the frame rate closer to the maximum of 20 frames per second (as compared with 30 frames per second for regular broadcast TV), particularly in low-res/high-motion mode.

My father and I hung up, and I gathered up my wife, Pam, and son, Matthew, for the big premiere. I redialed from the speed-dial menu, and a few moments later my parents were on the other side of the speakerphone with their voices being broadcast by the TV speakers. Both of our screens had a message that said "Audio Only Call." Since they were the call recipients, only they could activate the video by hitting the Start Call button on their remote. You'll like this feature if you're a work-at-home type who sits in your grubby underwear all day and scratches your armpits while talking to clients. "Okay, hit it," I cued, and suddenly my screen showed a "Connecting Video" message with an animated progress bar. My own image from the camera was visible in the background, to allow me to get myself and the



baby in-frame. The suspense was palpable. Then, a few seconds later, another message came up: "C-Phone Home Connected at...9.6 kbps."

Only 9.6? "Uh-oh," I thought as the number flashed up on my 27-inch TV. Suddenly, there were Jan and Arnie, slowly coming into poor focus as sickening waves of undulating, pixelated video swept down the screen. Sure, these were my parents, but a horribly grotesque and twisted version of them. There was virtually no detail, and any movement caused their images to escape their borders in blob-like fashion, with multicolored ripples following in the wake. Their voices came through clearly, but their hideous and deformed shapes rendered their words meaningless. Come to think of it, it was not unlike the way they appeared to me in high school.

It turned out that our Homeys had been sitting around my office so long that their operating software was seriously out of date. And, unlike current versions, they were not upgradable by telephone from the company's customer-support line. Most critically, unbeknownst to us at the time, my parents had a noise problem on their phone line (which I'll say more about later). The bottom line is that we had to wait for a couple of new units to arrive from C-Phone. But at that moment, suspended in that twisted time warp, all hell broke loose. My mother, recognizing that the squiggly loaf of bread in my arms was actually the grandson she hadn't seen in two months, began laughing and shrieking with joy. Over the din, I tried to give my father a modem lesson so he might understand why I looked like a bad Valium trip. Then the baby got frightened and started screaming inconsolably. I peered helplessly off camera at Pam, who was laughing hysterically and shaking her head in pity. She jotted something on the pad I was using to take notes and held it up. It read: "Having fun yet?"

While waiting for our new Homeys to arrive, it seemed like a good time to try out 8x8's VC105. The VC105's compact, stylish cabinet comes with a swiveling rubber base for adjusting the camera angle, but, unlike the C-Phone, it does not contain a telephone. Instead, it uses any touch-tone phone (regular or cordless) to establish the connection, and the keypad of said phone to control its operations. This approach has its pros and cons. On the one hand, it keeps the cost down—the VC105 has a suggested retail of just \$399. On the other hand, unless you're using it with a speakerphone, it necessitates holding the handset to your face while talking (though conversations can be monitored via the TV speakers). And if you use it with a phone that has the keypad on the handset, you'll need to take the handset away from your face to access the menus during calls. The company does sell a nice table-top speakerphone for those who want one (see "Paperweight Pics").

As before, everything you need is here, hookup is straightforward (through the TV's RF antenna or A/V inputs), and the manual is excellent. Surprisingly, there's a cooling fan inside the tiny box that starts whirring noticeably when you turn the power on, so although there's an automatic-answer option, you may not want to keep the VC105 active all the time.

My father and I both found the VC105 very intuitive and easy to use. The main menu is accessed by hitting the # key on your phone. You can elect to see the remote camera view, yourself (for setup), or both with a PIP function. Image size can be small, medium, or large. A nice Quality menu lets you choose any of seven settings between best clarity and fastest motion. And there are pan, tilt, and zoom functions to adjust those parameters on the picture coming in from a remote VC105. So if granny's sitting too far away from the camera or too far off center, you can change the perspective from afar without asking her to lift a cane. And the VC105 has caller ID, so if you subscribe, you'll see the number of the person calling on your screen before picking up. The internal software is upgradable by phone to keep you current.

## Paperweight Pics

Videophones have long been the stuff of science fiction. In that sense, 8x8 Inc.'s new VC150 ViaTV desktop videophone (\$649) would be at home on any movie set, as well as on Page 1 of any self-respecting high-tech magazine (see our cover). Measuring 19.2 x 6.3 x 7.8 inches, the VC150 offers features similar to the VC105 reviewed here, but it also boasts a 4-inch, active-matrix LCD that allows its use anywhere there's a standard touch-tone phone. Or go with the equally cool SP12 speakerphone (\$129), with full-duplex capability and echo cancellation. String 'em together, and you've got a phone even George Jetson would be happy to own—at least until daughter Judy started running up the phone bill.



We gathered up all the participants again and prepared for another ground. My dad dialed me first. Once we made the connection, the units automatically began their mating dance, flashing a wait screen followed by the connection speed. (You can program the Privacy option if you don't care to get caught live.) This time, the results were much better: 24.4 kbps.

Now *this* was more like it. Though the camera's short focal point seemed to deliver the clearest picture when the subject was within three or four feet of the unit, detail was acceptable. And my parents' images were relatively stable, as long as they stayed put and kept the hand-waving to a minimum. The lip movements, though far from synchronized with their voices, were only a second or two behind. At this speed, I could begin to relate to them, and they to Matthew.

"I can't believe it!" my mother exclaimed. "Look how pudgy his legs are! And he's got a really strong head—he's moving it around really well." Most telling was that, after a few minutes, we forgot about the technology and got down to just being family, chatting about the baby's eating patterns and the weather in Florida. Of course, the slow frame rate and picture softness reminded us how primitive these devices still are. At one point, my mom surprised us with the news that they'd gotten "a bulldog," and she leapt up to retrieve it. Her image jumped from sitting to standing to out-of-frame in cartoon-like motion. A few seconds later she reappeared, and we suddenly heard barking as a furry, yapping thing took shape in her lap. It was a stuffed toy with an electronic bark. But who knew? Pam and I looked at each other quizzically. Finally, I had to ask, "Is that a *real* dog, Ma?" All the while, the baby in my lap stared at the screen and drooled on my hands. At that moment, I knew my life had taken a bizarre, irrevocable turn.

Later that week, after several VC105 calls at 24.4 kbps, our new Homeys arrived, and we began comparing the two systems. It quickly became evident, just by selecting the local image for viewing, that the C-Phone had a better camera. As with the VC105, the picture still looked best when I got up close and filled the screen with Matthew's pumpkin-like head. But the Homey seemed to excel at both short and long distances, and generally had better clarity—perhaps a result of its 1/8-inch charge-coupled device (CCD) video pickup, versus the VC105's 1/8-inch imager. Or, it might have been related to the difference in processing chips—C-Phone uses a Lucent Technologies chip, while 8x8 uses proprietary technology. Color rendition was

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also better on the Homey, especially when tweaked from the menu. And I never had the occasional problems with color balance I had with the VC105 in low-light conditions, in which the screen took on a heavy red tint. (Per the VC105 manual, shining a light in the lens or placing a white piece of paper in front of it restored natural color.) It's worth noting, though, that 8x8's attractively priced VC50 set-top box (\$300) comes without a camera and allows the user to hook up a standard camcorder for the video input.

The Homey's great weakness appeared to be on modem speed. Even with the new models, we could only connect consistently at 19.2 kbps, versus the VC105's 24.4-kbps connections under the same conditions. It made for a subtle but noticeable difference in the synching of lips with voices. Neither videophone was really great in that regard, but the delay with the Homeys was a tad longer.

C-Phone suspected trouble and had my dad call their customer-service center, where an amiable rep named Lex first blew his mind by conferring with him in video. Lex monitored my folks' line and found that, sure enough, they had background noise that was affecting all of our videophone calls. It was explained that the cable running from my parents home to the local telephone junction box down the street was probably close to the maximum allowable length. Up to that box, the telco's trunk line is digital. But from the box to their house, it's analog, and thus susceptible to electrical noise on long runs.

One desirable but expensive option would have been to scrap everything and go to an all-ISDN solution (see "Faster Than Sound?"). The other was to convince the phone company to come down and put a filter or an improved interface card on my parents' subscriber line. Yeah, right. C-Phone recommended that my parents—that is, Jan and Arnie—call BellSouth, explain in perfect technospeak that they had a 33.6-kbps modem at their house that

## C-Phone Home

Price: \$649

Communications Standard: H.324

Max. Transmission Speed: 33.6 kbps

Dimensions: 12.5 x 5.5 x 2 in.

## C-Phone Corp.

6714 Netherlands Dr.

Wilmington, NC 28405

910-395-6100

[www.cphone.com](http://www.cphone.com)

## VC105 ViaTV Phone

Price: \$399

Communications Standard: H.324

Max. Transmission Speed: 33.6 kbps

Dimensions: 6.2 x 3.4 x 7.6 in.

## 8x8 Inc.

2445 Mission College Blvd.

Santa Clara, CA 95054

888-VIEW8X8

[www.ViaTV.com](http://www.ViaTV.com)

was failing to connect at a speed higher than 14.4 kbps, and could the phone company please come out and fix things? At which point the phone company would fix things, or maybe just say no, since they don't really guarantee anything over a 9.6-kbps data signal on a POTS line. Or they might insist—incorrectly, I'm told—that the noise was the long-distance carrier's problem. Which they did.

And so much for all that, until I go down to visit and take care of those bureaucratic bimbos myself. Fortunately, I found that when I called C-Phone's customer-support center from New Jersey to talk to Lex or his cohort Ken, I connected up consistently at 28.8 or 24.4 kbps. At either speed the performance was essentially on par with the VC105—which *also* jumped up to a 28.8 connection when I called Alex at 8x8's customer-support line. So, just for evaluation purposes, I phoned tech support a few times just to make sure I knew what these units could do. I'm

sorry guys. I'm done now, and I'll never call again.

So, what's the verdict? Should you buy the C-Phone, the 8x8, or no videophone at all? Are these phones really ready for prime time? Well, yes and no. First, the no: The truth is that many people will probably expect better performance—a little more clarity and much better motion rendition—from devices that carry hefty suggested retails from \$800 to \$1,300 a pair. And there are other avenues worth exploring for video conferencing, including an Internet video link if you own a PC (in which case you can video-conference at similar image quality through your ISP without paying long-distance charges) or, as alluded above, a high-speed ISDN phone. On the other hand, a POTS device is the cheapest and most practical for the majority of people—people like my parents.

Ultimately, the performance of these units was quite similar, though we found ourselves leaning toward the C-Phone Home for its built-in speakerphone, more extensive setup options, and remote control. But we were also impressed with the VC105's apparently robust connections and the wide-range Quality control that allowed us to fine tune the best medium between motion and clarity. The 8x8's lower price speaks loudly for it as well.

Whichever one we used, though, we found that pictures—even slightly fuzzy, out-of-synch pictures—really do speak a thousand words. Sure, these phones are frustrating at times; my mom calls them "a tease" where Matthew is concerned, and they can't replace home videos. But my parents' joy at being able to see their grandson in real-time is something I've grown to appreciate, as is the knowledge that my son will grow up knowing them through more than their voices—that he will, someday, recognize them at the airport and run to their waiting arms.

These are things you can't put a price on. And if the image is soft and looks like a dub on an old Japanese monster flick, so what? Hey, this is cutting-edge stuff. Sometimes, when you walk ahead, you walk a little crooked. ☐

*Rob Sabin, editor of DHE, lets his fingers do the walking whenever possible.*

## Faster Than Sound?

The videophones auditioned here work with analog modems on Plain Old Telephone Service (POTS) phone lines. But some models connect to high-speed Integrated Services Digital Network (ISDN) lines, allowing data-transfer rates up to 128 kbps, for greatly improved picture quality. With ISDN, the line coming into your home is low-noise digital, and an interface box allows you to connect analog telephones or modems as well as digital modems. And though ISDN costs more to install and maintain than a regular phone line, your monthly package includes two independent telephone numbers, often making it a wash against two standard lines.

Most intriguing of the new breed of ISDN V-phones is C-Phone's DS-324 (\$1,000), which looks and acts like C-Phone Home but is said to be the first dual-standard videophone that communicates by either the H.324 analog POTS standard or by the H.320 ISDN standard. While evaluating C-Phone Home, I got a demonstration (in controlled conditions) of the DS-324 operating at 128 kbps on a real long-distance call. While video resolution was equal to the C-Phone Home in high-res mode, the DS-324's ability to impart motion was dramatically better—the lip-synching and head movement were nearly perfect, making for a much more natural experience. Frankly, this is probably what most people expect when they think videophone. And for the hearing impaired, the 30-frames-per-second rate makes this a truly useful device for lip-reading and signing. It's worth calling your telco to check ISDN availability and pricing before going the all-POTS route.—RS



# DIGITAL TV FOR DIMWITS

So you wanna buy a high-definition TV? No sweat.  
Just do your homework. And bring your bank book.

BY ROB SABIN

**T**his fall, millions of consumers—okay, at least two—will spend the equivalent of a down payment on a modest home to be among the first to own digital televisions capable of receiving thousands of—okay, at least two—sparkling-clear high-definition TV broadcasts. If you plan to be one of them, you'd better know your multicasting from your interlacing. By studying the answers to the following questions, you will amaze your friends, stupefy your HDTV salesperson, and bore the hell out of your date. Don't say we didn't warn you. Hey, Darlene! Wait! Come back!



## What is digital TV?

Digital TV, or DTV, refers to the new nationwide television broadcast system approved in December 1996 by the Federal Communications Commission. Because it was developed over a 10-year period under the aegis of the FCC's Advanced Television Systems Committee, it is known as the ATSC standard. It will eventually supplant the National Television Systems Committee (NTSC) analog TV standard we use today in North America.

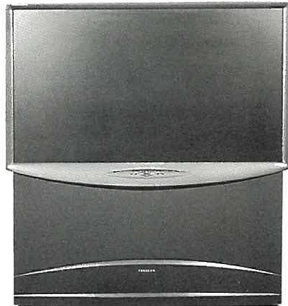
## Who invented the DTV system?

The ATSC standard is the work of many volunteer representatives from the consumer electronics, broadcasting, cable TV, and computer industries. But the basic work was done by the Grand Alliance, a consortium that includes AT&T, General Instrument, the Massachusetts Institute of Technology, the David Sarnoff Research Center, Thomson Consumer Electronics, Philips Consumer Electronics, and Zenith.

## Why is digital TV better?

Several reasons. First, the precise nature of a digital signal makes it immune to the ghosting and video noise that afflict analog broadcasts. In theory, the picture quality of a digital broadcast is the same whether you're a half mile or 50 miles from the tower, the latter being the estimated maximum range of a digital transmission. (In practice, however, DTV field tests are revealing that terrain and other factors may sometimes interfere with reception.)

Second, and more important, the use of digital compression in the ATSC standard means that broadcasters can take a channel that's the same size (that is, the same "bandwidth") they now use for a single analog program and send much more information down the pipeline. That extra real estate allows them to deliver crisp high-definition pictures with about six times the spatial resolution of today's NTSC video in a widescreen, 16:9 aspect ratio image that's more akin to the screen at your local cinema. Or, broadcasters can take the same channel and use it for "multicasting"—splitting it into as many as six simultaneous "standard-definition" digital video channels with picture quality that's about equal to today's excellent direct-broadcast satellite systems (see chart on page 36). Furthermore, compression allows either six-channel Dolby Digital surround sound or conventional two-channel stereo audio to accompany video programs.



**Got seven Gs burning a hole? Look into ProScan's 61-inch PS61000 HDTV projector. *Prior page:* Zenith's 64-inch model will set you back a minimum of \$10,000.**

## In theory, the picture quality of a digital broadcast is the same whether you're a half mile or 50 miles from the tower.

Finally, the ATSC standard allows for the transmission of any other type of digital data along with pictures and sound—stock quotes, sports statistics, Web pages, or whatever broadcasters care to piggyback on their signals. Combine this capability with telephone or cable modems

that would allow viewers to respond to what's on their screen, and you've got a fully interactive TV system that permits video gaming, shopping, banking, and other services.

## When and where will DTV programming be available?

The first DTV programs will be offered by over-the-air broadcasters (on a separate channel from their conventional NTSC signals) according to a schedule worked out with the FCC. Some 24 major network-affiliated stations (tied to ABC, CBS, NBC, or Fox) have volunteered to begin digital broadcasting this

November in the top 10 TV markets, with all network-affiliated stations in those markets to follow by May 1999 (see map on page 38). By November 1999, major network-affiliated broadcasters in the next 20 largest markets will come on board, for a minimum of 120 stations nationwide.



**Sony will offer a direct-view HDTV, but no pricing has been announced.**

## What types of programs will be broadcast?

At this writing, most of the major networks are expected to use their digital channels for standard-definition digital simulcasting of their analog channels, highlighted by several

hours per week of prime-time serials and sports delivered in HDTV. Multicasting is not expected to be utilized initially, although PBS has expressed interest in this capability.

## Will I be able to get ATSC-digital and high-definition TV signals from my cable-television company?

Some cable TV networks, including HBO and the Discovery Channel, will send out HDTV signals early on. But it'll be up to your local cable operator to decide when they're willing to upgrade their equipment and issue digital set-top boxes to pass that signal along to consumers. Don't count on it happening quickly, as many operators may wait until there's a large installed base of DTVs in their customers' homes before making these investments. Furthermore, even if your cable operator promises digital cable, don't take for granted that they'll be passing along high-definition programming or any form of ATSC digital. Some present-day digital cable systems are not compatible.

## Will digital satellite TV providers be delivering high-definition digital programs?

Direct TV, which can be received on DSS-format dishes, has said it will offer at least two channels of HDTV programming (including HBO), which will be viewable on the new HDTV receivers around the same time the sets turn up in stores (though in a format that will have slightly less resolution than an over-the-air HDTV broadcast). EchoStar's Dish Network has also promised to pass along two channels—HBO and Discovery Channel—in

# Digital TV for Dimwits

HDTV. And a newcomer to the field, Unity Broadcasting, will soon offer packages that include a Ku-band dish/receiver and a display for viewing the 12 HD and standard-definition channels it plans to turn on by year's end.

## What's the difference between the digital picture from a satellite dish and the picture from a new digital TV?

Frankly, there's not much difference in quality between a standard-definition picture coming off a digital satellite dish as it's displayed on one of today's analog NTSC TVs and a digital SD picture received over the air and displayed on a new ATSC digital TV. However, most NTSC TVs lack the resolution (and the wide, movie-like screen) required to display true ATSC HD images. Also, you'll eventually need an ATSC-compatible digital TV or set-top tuner to access multicast programming or data services. And in any case, local network affiliates aren't usually available by satellite, so if you want to watch a digital signal from a local station, you'll probably need a digital off-air receiver or set-top box.



**Zenith's \$5,995 set-top tuner turns the company's \$12,600 Pro900X front projector into an HDTV.**

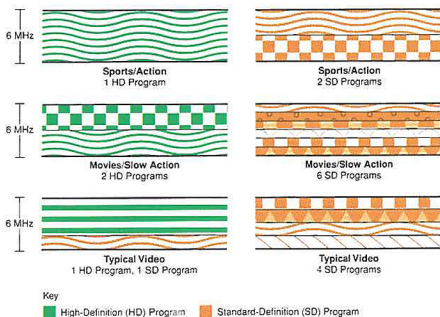
## What about high-definition home video?

Two existing digital videocassette formats—D-VHS (which we report on in our review of the JVC HM-DSR100U satellite recorder on page 40) and DV digital video—could potentially be adapted to accommodate ATSC HD programming. But manufacturers are focused on getting out the first digital TV sets and don't appear interested in engaging Hollywood just yet in the usual battle over digital copying. There's also a wideband analog VHS format, called W-VHS, that can record in HD resolution. JVC has promised a W-VHS consumer deck, and other manufacturers may follow.

As for HD-compatible video discs, current-day DVDs can't really store enough information to make HDTV videos practical.

## What types of digital TVs will be available and when?

The first digital sets are expected to hit the stores in time for Christmas, with others to appear in early 1999. Virtually all of the major TV



Source: CEMA

**Follow the squiggly lines, and you'll see that the capacity of a 6-MHz digital channel depends in part on the type of program material being sent. Sports or other high-action programs require the transmission of more data, which restricts capacity. Film-based or slow-action material leaves more room for additional programs or data to be sent simultaneously.**

brands will be represented. The early offerings will consist mostly of widescreen, high-definition rear projectors with display sizes ranging from 61 to 73 inches diagonal—and price tags from \$7,000 to \$10,000 or more. Some TV makers also expect to offer 16:9 widescreen direct-view TVs with tubes in the 30-to-38-inch range (price estimates were not announced at press time).

In addition, several manufacturers will offer, or are already selling, HDTV-ready televisions and projectors. These units will display ATSC-standard or HD pictures with the addition of a standalone set-top tuner/decoder box. Front projectors starting at around \$12,000 from Runco, Zenith, Ampro, and others are HDTV-ready, as are rear projectors from Faroudja Labs that begin around \$23,000. Some SVGA-compatible direct-view TVs are promoted as “digital-ready” but may lack the resolution and wide screen required for HDTV.

## What features should I look for in a digital TV?

**ATSC Compliance.** To give broadcasters some flexibility, a total of 18 signal formats have been approved in conjunction with the DTV standard, and there's no rule that says a DTV must receive all of them. To assure buyers, the Consumer Electronics Manufacturers Association (CEMA), in conjunction with the ATSC, has developed a certification program. Sets carrying their DTV logo (shown at right) are guaranteed not to go black as long as your local broadcaster or other service provider is transmitting one of the ATSC-approved signals.



**HDTV Compatibility.** Just because a DTV carries the ATSC logo doesn't mean it will display the very best level of detail. For that, you'll want a TV that's also designated a high-definition television, as defined by CEMA. In addition to full ATSC compliance, such sets will display pictures in either the 1080i or 720p formats (or both). The 1080i format uses 1,080 horizontal scanning lines in an interlaced configuration that paints half the lines, then follows quickly with the other half to complete a frame of video. The 720p “progressive” format uses 720 scan lines that are painted on the screen in a single continuous sweep, resulting in a similar level of overall detail to 1080i. Sets designated as HDTVs must also offer a 16:9 widescreen display and the ability to reproduce or output a Dolby Digital six-channel surround sound signal. All other DTV sets that meet ATSC compliance will be designated “standard definition” and will down-convert high-def signals for display in a lower-resolution format, perhaps the 480i and 480p formats that, along with 1080i and 720p, are expected to be favored by major broadcasters.

**Standard-Definition/Analog Picture Enhancement.** Since you'll be spending a lot of time watching regular analog NTSC pictures and standard-definition digital pictures on any new HDTV, many sets will have some enhancement circuitry, such as an automatic line doubler, that kicks in to make those images look more like HD.



**Philips' 64-inch HDTV (about \$8,000) hits stores in October.**

# Digital TV for Dimwits

**Data Ports/Upgradable Memory.** Much of the ATSC standard as it relates to the handling of ancillary data services is still being developed. Make sure the set you're considering has a data port that will allow you to attach adapters and set-top boxes that may emerge to accommodate new data services. And investigate whether it contains upgradable operating software that the manufacturer can manipulate via modem.

**Other Enhancements.** Some of the early HDTV prototypes shown at trade shows had built-in modems (for future interactive services and system upgrades) or even integrated DSS satellite receivers. Others had Dolby Digital decoders with elaborate built-in audio systems. Some of the key features expected to turn up later may not appear in the first-generation HDTV sets. One that could be missing is an interface for getting digital video and audio signals in and out of the set—such as an IEEE 1394 Firewire connector. Manufacturers have vowed not to include these facilities until broadcasters, program owners, and CE manufacturers have settled their usual arguments over copyright protection. Likewise, the first sets may also be missing circuitry to decode data that will eventually be sent by broadcasters to facilitate their onscreen channel guides. Ask before you buy.

**What ancillary equipment will I need to enjoy digital TV?** A component-quality Dolby Digital surround sound system is highly recommended to accompany HD pictures. And you may need an off-air antenna to receive DTV broadcasts. If you're solidly within range

of the transmitter, just about any set-top antenna should do the trick. In fringe areas, an outdoor antenna may be required.

## If I opt to wait for DTV and buy a big-screen NTSC TV instead, will it become obsolete before its time?

The FCC has declared the year 2006 as the target date for shutting down the broadcasters' analog NTSC channels. But Congress has legislated a number of conditions that will probably keep NTSC simulcasting alive for several years longer. In any event, long before then you'll be able to purchase a set-top adapter that will allow you to receive digital broadcasts and display them on your NTSC set, albeit at lower resolution than HDTV. So all of your NTSC sets should be operational until they die of old age (or from a brick you might toss through the screen).

## Given the impending launch of digital TV, what factors should I consider when buying a regular NTSC set?

First, look at your options for a digital-ready TV. Consider an existing HDTV-ready front or rear projector. And by the time you read this, manufacturers may have announced new widescreen TVs or projectors with the appropriate inputs, scanning capabilities, aspect ratio, and even the resolution to adapt easily to DTV or HDTV through future set-top converters.

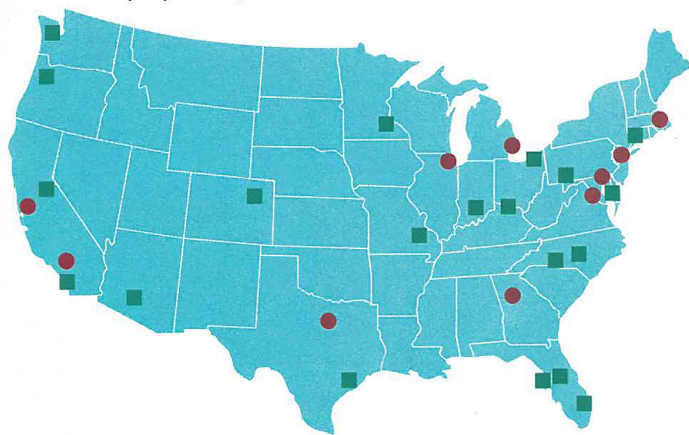
If that's not an option, consider the size of the NTSC set you're about to purchase and whether it will function well as a secondary TV in another room should you decide

a few years from now that you want a true DTV or HDTV. It could happen—no one really knows yet what types of desirable programming or services will be offered on digital. Will you be able to take the 60-inch NTSC rear projector you purchase today and move it into a master bedroom or basement to make room for a new HDTV? Or are you willing to junk it and start fresh?

Finally, consider price. Just as you might not want to buy a set today that is too big, you might not want to spend \$3,000 to \$5,000 on a large NTSC projector, only to find that the same money will buy a similarly large, state-of-the-art HDTV a few short years from now. This doesn't mean you shouldn't buy that giant NTSC TV you've had your heart set on—only that you should look ahead before spending a king's ransom in today's market. Of course, in the end it's your dime to spend. And if you're one of the lucky ones, you carry much heavier dimes. ☐

## DTV Broadcast Rollout Schedule

(as specified by the Federal Communications Commission)



### Top 10 Markets

30% U.S. TV Households by May 1999

- New York
- Los Angeles
- Chicago
- Philadelphia
- San Francisco
- Boston
- Washington, DC
- Dallas/Ft. Worth
- Detroit
- Atlanta

\*All other commercial stations (markets 31-211) must construct digital facilities by May 2002.

Source: CEMA

### Top 30 Markets\*

50% U.S. TV Households by November 1999

- Houston
- Cleveland
- Minneapolis/St. Paul
- Miami/Ft. Lauderdale
- Phoenix
- Tampa/St. Petersburg/Sarasota
- Denver
- Pittsburgh
- St. Louis
- San Diego
- Raleigh/Durham
- Hartford/New Haven
- Orlando/Daytona/Beach/Melbourne
- Charlotte
- Baltimore
- Portland
- Cincinnati
- Indianapolis
- Sacramento/Stockton/Modesto