



## BookMarks

By Mark Bazrod, Editor

### A PRIMER ON HDTV

**Those HDTV sets look fantastic. How, assuming you're willing to spend the money, do you decide what you need or want and what you should buy?** I am as far from an expert on HDTV (High Definition TV) as you can get, but Dale Fletcher, MLMUG's resident expert on anything having to do with multimedia, gave a talk at Macs@PACS in which he punctured many myths about HDTV. This column presents some of the highlights of that presentation. Macs@PACS [pacsnet.org/groupsatpacs/mac/](http://pacsnet.org/groupsatpacs/mac/) is the Macintosh section of the Philadelphia Area Computer Society. It meets the third Saturday of the month between 9 and 11:30 AM at the Giant store just north of Willow Grove. Give them a visit.

If you want to understand HDTV in some depth, the picture (pun intended) is complex and confusing. If you just want minimal understanding, the picture is still complex and confusing. There are 19 different formats of HDTV! For starters, you have to consider screen size, aspect ratio, resolution, display type, connections, cables, room size, TV placement, and furniture placement. If you want to be informed, you have to spend some time figuring things out. Try [digitaltips.org](http://digitaltips.org), [dtvtransition.org](http://dtvtransition.org), [antennaweb.org](http://antennaweb.org), [Wikipedia.org](http://Wikipedia.org), [cnet.org](http://cnet.org), & [electronics.howstuffworks.com](http://electronics.howstuffworks.com).

**There is a consolation prize: The worst HDTV is better than the best standard analog TV.**

Dale suggests that what you want is a 1920x1080p (30) spec. That means the screen is 1920 pixels wide, 1080 pixels high and 30 frames per second.

Standard TVs generally have an aspect ratio of 4:3. That means that the ratio of the horizontal dimension to the vertical dimension is 4:3. Most digital TVs and all HDTVs have a 16:9 aspect ratio, for example 1600 pixels wide and 900 pixels high. The standard dimension for HDTV is 1920 by 1080. That's a 16:9 aspect ratio.

TV definitions are based upon the number of pixels in the vertical dimension and whether the picture is scanned (displayed) on the screen all at once (progressive) or in two passes (interlaced) of odd and even numbered lines. These are abbreviated, respectively as "p" or "i". Progressive scans provide sharper stills, but choppy motion; interlaced provides smoother motion.

**Standard definition** TV is 480i or less; **enhanced definition** TV is 480p and higher; and **high definition** is 720p and higher. Video standards, upon which TV is based, are regional. Europe uses 720p. Is 720p good? Absolutely. Is 1080i better? Absolutely. Is the difference in price worth it? That depends upon your pocketbook and your eye.

For true HDTV you need:

- Excellent quality content (didn't someone talk about a "vast wasteland"?);

- Captured in digital high definition with surround digital sound;

- Edited in digital high definition;

- Saved in digital high definition;

- Transmitted at high definition by air, cable and fiber;

- Received through a high definition, high frequency antenna or modem;

- Direct to a high definition surround sound digital tuner;

- Demultiplexed into a high definition image and high sample rate surround sound signal for display and audio or recorded on a high definition digital device; and

- Converted to analog visuals and video and conveyed to human receptors. We cannot yet see or hear digital 0s and 1s.

The reality is we can't quite do all that yet, but we can buy equipment that is ready to do it, even if it never happens.

So what are the properties of HDTVs that are currently available?

1. Room Size and Screen Size. The industry provides charts to determine the size of the HDTV screen based upon the distance between the screen and the viewer. Dale recommends you scale down the size 30%-50%. He also recommends that the HDTV be placed upon furniture and not wall mounted because of the potential need for flexibility and the cost and hassle of changing in-the-wall cables as equipment and cable needs change.

2. Aspect Ratios. Sets are available in 4:3 and 16:9 aspect ratios.

3. Color. Most have 10-bit of color versus 8-bit color. The former have 1,024 levels of color gradation versus the latter's 256 levels of gradation. That's a big difference and obvious to the eye.

4. Plasma v. LCD. Sets are available in both LCD and plasma models. Dale strongly recommends LCDs. Plasmas are being phased out of production. Plasma is not available for smaller screens, it has burn in issues, it gets hotter, it runs at higher voltages, it uses more electricity, and it has a typical lifespan of 30,000 hours. LCDs have higher resolution for all screen sizes, don't have burn in issues, have caught up with plasma as far as contrast ratios and refresh speeds for viewing motion, and have a lifespan almost twice as long as plasma.

5. Compression. All HDTV content currently has some compression. Uncompressed is not practical with today's technology and even as technology improves and download speeds increase, it is extremely doubtful that technology and economics of the business will ever permit uncompressed images. The only question, dealt with later, is the extent of the compression.

6. Shapes. Complexity now starts. Without going into too much detail, TVs have different shapes which have different grids of displaying pixels. Broadcasters have several different grids. Overlay one grid on another and you can easily get certain mismatches or errors (often euphemistically called artifacts). Consumers need to remember that a larger screen magnifies these compression artifacts and they won't be going away soon. In addition, as we get additional bandwidth, providers will more likely add channels and advertisers rather than improve signal quality, which generates no additional income. Dale showed a chart of 24 display shapes that are currently in use for TV and computers.

I suspect that we may see additional artifacts as we attempt to watch high definition broadcasting on our computers which have totally different aspect ratios than our TV monitors. The good news for Mac users is that the standard aspect ratio for Mac notebooks is 1440x900, a 16:10 aspect ratio. That's close to a 16:9 ratio so there is only a slight band of black top and bottom.

7. High Definition Video.

True Hi Def is 1920x1080p (60 or 30 or 24). It is available now only on Blue-ray.

The next best is 1920x1080i which is now available.

European 2008 standard is 1280x720p (25).

US version is 1280x720p (24) which is quite acceptable to most of us and is now available on cable.

8. Hi Def Audio. Audio at this point is far beyond what most people can comprehend and distinguish.

True Hi Def is DTS-HD Master Audio.

The next best is Dolby TrueHD.

Dolby Digital is quite acceptable to most of us.

9. File Size. Now for some mind blowing math. A standard definition camera at 640x480 consumes 1.6 GB/minute. A high definition camera taking pictures at 1920x1080 with 24-bit color and 30 frames per second consumes 10.8 GB per minute. This means that a 300 GB disk could store only about 25 minutes of uncompressed high definition. They don't make movies that short. The result is that providers compress the video. If they use 10-bit color, rather than 16 or 24, the file size is roughly 0.5 GB/minute for progressive and 1 GB/minute for interlaced. The latter is about 60 GB/hour or 120 GB for a two hour movie.

Cable Compression. Currently accepted commercial data compression algorithms make it impossible to predict actual file sizes unless you are the one setting the compression

factors. A 27 Mbps digital TV channel coming from your cable provider may be split into four channels to the consumer - one 14 Mbps HD channel, a 6 Mbps HD Channel and two 3.6 Mbps HD channels.

Disc compression. HDTV is already heavily compressed to 1 GB/minute. Blue-ray discs require an additional 8:1 to fit a two hour movie onto a 25 GB Blue-ray disk. A more extreme example relates to an 8 GB SDHC Class 4 video Secure Digital card. It requires additional compression rates of about 30:1 to get two hours onto this chip.

So what do the providers do? They take a perfectly wonderful signal [Corvette] and compress it [Smorvette].

Take an image like this



and transform it into this



**Why?** Since the capacity of cable is limited, the cable providers have to severely compress the signal to show HDTV pictures to us and we see the artifacts (pixelation, missing lines, and I don't know what else) on our TV sets. Fiber-optic connections require less compression, but by getting several TV channels out of one digital channel, we may see the same result.

**Dale thinks that Internet TV will require major changes in the cable business as subscribers move off cable and obtain their TV off the Internet (the subject of possible future presentations and columns).** The movement will be led by Apple, Netflix, Time Warner, NBC Universal and News Corp's Hulu, and Amazon's Video on Demand and Unbox.

Dale and I hope the presentation and this column will give you an opening insight into understanding HDTV. You'll still have to put in some time to get a better understanding, but at least you've got enough information to begin to eliminate a fair amount of the misinformation in this area.

**MACINTOSH ODDS AND ENDS**

**Apple March Quarter Results.** Apple sold 2.2 million Macs, 11.0 million iPods, and 3.8 million iPhones. Mac sales were \$2.9 billion and iPod/iPhone sales were \$3.2 billion. Total sales were \$8.2 billion and earnings were \$1.2 billion. That's the best "non-holiday quarter" ever. Apple has \$29 billion in cash and securities. Looks like Apple can fund new products for a while. P.S. Microsoft sales were down for the quarter, first time ever.

**Apple Netbook.** Much speculation and rumors about an Apple Netbook. Great little things for \$300 - \$400. Underpowered, etc., but handy to carry around if all you need to do is surf the Web and read email. Rumors of big orders by Apple for 10" screens. My guess is that Apple will release a somewhat larger iPhone within 12 months that will run rings around the current netbooks. Or maybe not.

**NoodleMac.com.** Check out Ron McElfresh's site, [NoodleMac.com](http://NoodleMac.com), where he reviews software he likes and uses and thinks others will like. He states the site "is a resource for only the best of Mac software complete with links to the latest updates, reviews, how-to, and experienced commentary".

**Pat Fauquet.** We've got a "twofer" this month from Pat Fauquet's blog, [macmousecalls.com](http://macmousecalls.com). The April 18th blog shows you how to use CosmoPod, a \$10 software package, to capture videos from YouTube, Google Video and other sites. Looks easy for you video mavens. The April 29th blog gives some useful tips to preserve your Mac notebook's battery life, particularly screen dimming and suspending Time Machine.

**Office 2004 for Mac.** Microsoft announced that official support (including security updates) ends in October. The [ars technica](http://ars.technica) site indicates Microsoft has a policy of retiring support 5¼ years after introduction. I never heard that before.

**Safari 4 Beta.** I've been using Safari 4 for about 4 weeks and the more I use it, the more I like it. The Top Sites feature has been extremely useful.

**MeterRead.** This \$2.99 iPhone/iPod app by Zerogate helps you read your electric meter, records the reading, projects your usage for the next 30 days, and should help you monitor and change your electric usage.

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