

Sun City Summerlin Computer Club

Seminar

HDTV Basics and Beyond

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Agenda

- **Why Care About HDTV?**
- **Standard Analog TV Overview**
- **HDTV Overview**
- **HDTV Technology Choices**
- ***Bio Break (10 min)***
- **HD Recording Technologies**
- **Where to Get HD Content**
- **Shopping Considerations**
- **HD Video on Your PC**
- **Web Links for Information**

Why Care About HDTV?

- Congress & US FCC mandated all over-the-air broadcast TV be digital by **June, 2009**.
- All TVs sold after March 1, 2007 *have* a DTV tuner.
- After June, 2009, you need a converter box to continue receiving broadcast DTV on analog TV sets.
- More program content is being broadcast in High Definition Widescreen 16 x 9 aspect ratio.
- Movies look and sound better in High Definition 16 x 9 format (minimizes “letterboxing”).
- Costs are finally coming down to match seniors’ budgets.

Standard Analog TV Overview

- **NTSC - National Television Standards Committee**
- **Full picture stream is sent 30 times a second**
 - **4 to 3 (width to height) “aspect ratio”**
 - **525 scan lines (480 visible).**
 - **720 color dots per line (640 up to 704 visible).**
 - **Alternates even lines and odd scan lines (interlaced).**
 - **Tube TV has 3 electron “guns” to illuminate phosphors.**
- **Pictures are subject to snow, ghosting and other types of radio interference.**
- **Various connections to Standard TV**
 - **Coaxial antenna connection (fair to poor)**
 - **S-video connection (good)**
 - **Composite video connection (good)**
 - **Component video connection (best)**

Example HDTVs



Panasonic Viera 50" Plasma TV

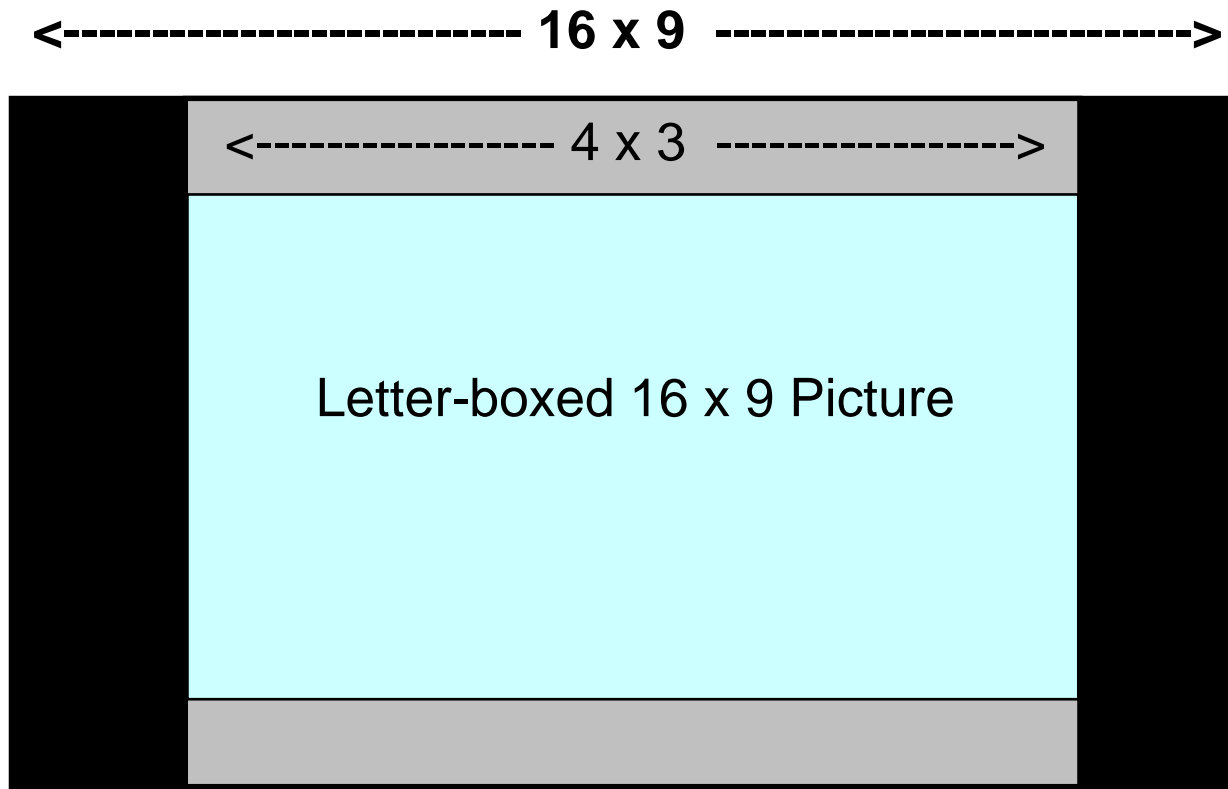


Sharp Aquos 46" LCD HDTV

HDTV Overview

- **ATSC - Advanced Television Systems Committee**
- **Standard Digital Television (SDTV)**
 - **Audio / video signal sent as stream of numbers representing compressed picture and sound.**
 - **Circuits in digital TV receive, decode and display (either 640 x 480 or 704 x 480).**
 - **Sets usually can also accept “analog” signals (dual tuner).**
 - **Digital picture stream not affected by electronic interference; includes error detection & correction.**
 - **Result: “snow free”, crisp broadcast pictures, sound.**
- **High-definition Digital Television (HDTV)**
 - **Adds higher picture quality and widescreen modes.**
 - **Standard (4 x 3) and Widescreen (16 x 9) aspect ratios.**
 - **480p, 720p, 1080i and 1080p horizontal scan line density.**

TV Aspect Ratios



2009 HDTV Technology Choices

- **HDTV Metrics – Detailed**
- **HDTV Connections**
- **LCD Flat Panel**
- **Plasma Flat Panel**
- **DLP Projection (LED lamps)**

HDTV Metrics - Detailed

- **Standard Digital TV (4 x 3) aspect ratio**
 - 640 x 480 (704 x 480) pixels (Interlaced or Progressive)
- **Widescreen (16 x 9) aspect ratios.**
 - 720p (1280 x 720 or 1366 x 768 pixels)
 - 1080i and 1080p (1920 x 1080 = 2.073 Megapixels)
 - 1 minute of *uncompressed* 1080i requires 11.2 GB to represent
- **Caution:**
 - Many older 42" Plasma displays are 1024 x 768 pixels
 - Not quite true high definition wide screen.
 - Pixels not square (stretched horizontally).

HDTV Connections

- **High Definition Media Interface (HDMI)**
 - Best (all digital)
 - Combines video & sound in one signal cable
 - Can be passed through newer stereo receivers
 - Most HDTVs now have two to four HDMI connections
 - Cheap cables work fine!
- **Component Video (red, green, blue wires)**
 - Supports HD & widescreen (1080i only?)
 - Need separate cable (digital or analog) for audio
- **S-Video**
 - Analog standard definition signal (e.g. from VHS deck)
 - Need separate RCA audio cables
- **Composite Video**
 - Analog standard definition (e.g. from VHS deck)
 - Need separate RCA audio cables

HDTV Technology – LCD Flat Panel

- Comes in widescreen 16 x 9 aspect ratio.
- Vertical scan resolution
 - 720p (often listed as 1366 x 768) on small sets
 - 1080p (newest – 1920 x 1080)
- Screen sizes (diagonal) 19” up to 55”.
- Excellent brightness, good contrast.
- Relatively light.
- Low power consumption.
- Backlight life: 60,000 hours.
- Low to moderate cost, lots of deals.

LCD Flat Panel – What's New?

- **Screen sizes (diagonal) now up to 55".**
- **Scan rates: 120 Hz, 240 Hz**
 - **More expensive, 240 is overkill**
- **Dynamic contrast ratios**
 - **50,000, 100,000, 200,000, ...**
 - **Overstated – can't really see the difference.**
- **Response Times: 6 ms, 4 ms**
 - **Claim to reduce motion blur**
- **LED backlighting**
 - **More expensive**
 - **Claim better picture, higher contrast**
- **Cinema Modes (24 frames per second)**
 - **Better for watching movies**

HDTV Technology – Plasma Flat Panel

- Comes in widescreen 16 x 9 aspect ratio.
- Horizontal scan density
 - Up to 1080p on larger sets (42 inches and up).
 - 720p available at lower cost up to 42”.
- Screen size (diagonal) up to 58”.
 - Some 42 inch widescreen sets still 1024 x 768 pixels.
 - 42, 47, 50 and 58 inch sets now in 1080p.
- Excellent brightness and contrast.
- Medium heavy. Higher power consumption.
- Some risk of “burn-in”; may fade over time.
- Prices have come way down!
- New coatings reduce screen glare.

HDTV Technology – DLP Projection

- Comes in widescreen 16 x 9 aspect ratio.
- Horizontal scan density
 - Up to 1080p (newest & most expensive)
 - 720p no longer common.
- Screen size (diagonal) up to 72” (or larger).
- Excellent resolution, brightness and contrast.
- Moderately bulky, heavy.
- Incandescent lamp life: as low as 1500 to 2000 hours.
 - 200 days at 10 hours per day.
 - Last longer on “night” settings.
 - \$200 to \$550 for replacement lamp.
- Color wheel also prone to fail (bearings).
- New LED lamps last 20,000 hours, no color wheel.
- Moderate initial cost, lots of deals.
- “Screen door” effect in picture

Major HDTV Manufacturers

- **Samsung – LCD, Plasma**
- **Sharp - LCD**
- **Sony - LCD**
- **Panasonic – LCD, Plasma**
- **LG – LCD, Plasma**
- **Mitsubishi – DLP**
- **Toshiba – LCD, DLP**
- **Vizio - LCD**

Bio Break

10 Minutes

HD Video and Data Recording (1)

- **Blu-Ray Disc**
 - Plays (and records) with a blue / violet laser.
 - 25 GB single layer, 50GB dual layer.
 - Drives also *read* (not burn) CDs and DVDs.
 - Most BD players “upconvert” standard DVDs to 1080p.
 - Market providing players, recorders, PC disk drives.
 - Spec Supports “Mandatory Managed Copy”.
 - Fall 2009 street price for a BD player: \$175!
 - Early price for disc media: BD-R \$10, BD-RE \$15.
 - Blu-Ray movies – many older priced at \$10-\$15.
 - New players have Internet connections.
- **HD-DVD lost the format war – no longer in use.**

Where to Get HD Programming?

- **Over the air broadcast (local channels)**
 - Use an indoor rabbit ears or attic mount antenna.
 - Reception a bit spotty in SCS (towers in Henderson)
- **Cox cable (has Digital TV and HDTV options)**
- **DirecTV (satellite)**
 - Option for HD (~150 channels).
 - Option for local channels in HD.
- **Dish Network (satellite)**
 - Option for HD.
 - Option for local channels.

Other HD Content Options

- **Standard DVD movies**
 - Best if played on an up-converting (to 1080p) DVD or BD player.
- **Blu-Ray DVD movies**
 - True 1080p output from player to HDTV.
 - Need a Blu-Ray player.
- **Streaming HD Video from Internet**
 - Need a HDMI output from your PC or BD player to the HDTV. Some TVs have an Ethernet connection.
 - NetFlix and Blockbuster moving to this.
 - Hulu, Vudu, Roku, You-Tube
 - Many TV network websites.

Shopping for a HDTV (1)

- **Best deals and selection on the Internet**
 - Read buyers' reviews
 - Concern about shipping costs, damage.
 - Concern about warranty support.
- **Local Retailers**
 - Fry's, Best Buy, RC-Willey's, Ultimate, Costco, Sam's Club, Sears, Wal-Mart, K-Mart
- **Major vs lesser brands**
 - Sony, Toshiba, Panasonic, LG, Mitsubishi, Samsung, ...
 - Maxent, Vizio, Syntax-Olevia, Polaroid,
 - Lesser brands often *much* cheaper.
 - Lesser brands' quality often very good – but check reviews.
 - Lesser brands *may* have more support risk.

Shopping for a HDTV (2)

- **Color Temperature.**
- **Brightness (Candles per square meter)**
 - **Higher number is better.**
- **Contrast ratio (higher number is better).**
- **Response time (smaller is better).**
- **Refresh rate (240 hz vs 120 hz vs 60 hz).**
- **Actual pixels on screen**
 - **1280 x 720, 1366 x 768, 1920 x 1080**
- **Connectors (the more the better)**
 - **HDMI, DVI, Component, S-Video, Composite**

Shopping for a HDTV (3)

- **What Widescreen Size To Buy?**
 - 37” views well up to about 5 feet
 - 42” views well up to about 8 feet
 - 50” views well up to about 12 feet
 - A 42” 16 x 9 screen shows a 4 x 3 picture = a 32” set.
- **Get the Extended Warranty!**
 - Plan on 15% to 20% of purchase price.
 - Covers one or two lamps on DLP.
- **Have the store deliver and set up the set.**
 - Unless they *absolutely* guarantee to take back damaged goods.
- **Store staff are seldom much help!**
 - Do your own research.
 - Go in knowing exactly what you want.
- **Most stores will match others’ prices on the identical model.**

Configuring a HDTV

- **Read ALL the manuals – TWICE!**
 - Cable or satellite receiver.
 - Broadcast antenna hook-up (optional).
 - Blu-Ray / DVD / VCR player / recorder.
 - Digital video recorder (e.g. TIVO or built-in).
 - Stereo system – analog and digital sound cables.
 - Computer – wired or wireless ethernet.
- **Draw out a connection plan.**
 - What cables go to what jacks.
 - What types & lengths of cables needed for each.
- **Considerations for wall mounts.**
 - Expensive, tricky to mount yourself.
 - What to do with wall mount when you sell your home?
 - Still have to deal with cables.

HD Video On Your PC

- **HD Video Tuner / Capture / Display**
 - PCI or PCI Express cards
 - USB 2.0 External Decoders
 - Some also output a HD signal (DVI or HDMI)
 - Most also record HDTV signal to hard drive
- **HD Player / Editing software**
 - Play HDTV on your PC monitor (4x3 or 16x9)
 - Many HD cards include software
 - Sonic / Roxio MyDVD Cineplayer
 - Pinnacle Studio 12 Pro HDTV editor
 - <http://www.pcmag.com/article2/0,2817,2327934,00.asp>

Helpful Web Links

<http://shopper-zdnet.com.com/>

<http://electronics.howstuffworks.com/hdtv.htm>

<http://electronics.howstuffworks.com/dtv.htm>

<http://www.alltv lamps.com/>

<http://www.cnet.com/>

<http://www.google.com>

<http://www.blu-ray.com/info/>

<http://en.wikipedia.org/wiki/HD-DVD>

<http://www.hdtvauthority.com/index.htm>

<http://www.frys.com> <http://www.outpost.com>

<http://www.bestbuy.com>

<http://www.costco.com>

<http://www.walmart.com>

<http://www.cox.com/lasvegas/>

<http://www.directv.com>

<http://www.dishnetwork.com>

Questions and Answers