

# Tips For Buying A New TV

Are you considering buying a new high-definition digital TV? Prices have come down dramatically in recent years. Most notably, digital TV pictures are clearer, sharper, brighter, and with more vibrant colors and better contrast than ever. Your TV viewing experience will be *much* better with a digital TV.

What do you need to know to make sure you are getting a high quality set, and not just buying older or less desirable inventory? What specific features should you seek out, and what should you watch out for when you visit a store that sells TVs? Finally, you should ask questions and/or verify the information, preferably by checking for answers on the TV packaging itself or by going to the manufacturer's website.

**#1. New TVs Are “Digital.”** If you are a cable TV subscriber and are replacing an older analog set, call your cable provider. You will likely need a different type of “set-top-box” – or a digital video recorder (DVR) to record and play back programs – which is specifically designed for digital TVs in order to obtain the full benefits of your new digital television.

If you are replacing an older analog TV that uses a digital-to-analog “converter box” and an antenna, your new digital TV will no longer require the converter box. Hook up the antenna directly to the digital TV and you will get a far better picture due to your being able to access the higher resolution of digital TV signals. Also, remember to use your remote to “scan” for channels available to that new TV.

You may also choose not to pay for a cable set-top box for one or more TVs by using a portable antenna (or a rooftop antenna) to bring in local “over-the-air” channels. This antenna should be “amplified” (i.e., it has a wire/plug that goes into an electrical outlet, and the power boosts the signal). A good example of a portable antenna is the RCA 1251 model.

**#2. Important: 720p vs. 1080p.** Digital TV display formats are “720p” or “1080p” (or “4K”: see below). Somewhat confusingly, both 720p and 1080p are labelled as being “high definition” or “HD” or “HDTV”. Therefore when buying a set, you will need to look into the matter further in order to learn exactly what the set's actual resolution is, and to know what you are getting. The resolution number is important.

- An HD **720p** set (1280x720 pixels) has 1.049 million pixels. This is 3½ times the resolution found on an older analog **480i** set (640x480 pixels) in “Standard Resolution” or “SD” with .307 million pixels. The equivalent to a set with 16:9 ratio (720x480 pixels) is .346 million pixels. This gives good picture quality.

- An HD **1080p** set (1920x1080 pixels) has an even better resolution: 2.074 million pixels, giving twice the clarity and sharpness of detail than a 720p set, and 6x the SD resolution found on an older analog set (if figured at a 16:9 ratio). 1080p provides excellent picture quality and is quite noticeable on screens larger than 32”. So budget permitting, it is preferable to choose a 1080p set. Note also: if you use “Blu-ray” discs, 1080p is important because a 720p set will not take advantage of the higher resolution on these discs.

It is important to note that if the TV's packaging simply states the set is “high definition,” “HD,” or “HDTV” – and it does not give a specific format number – it likely is only 720p. Also, if the box simply says “1366x768” resolution (similar to 1280x720 pixels), this actually means that the TV is only 720p.

Look for where the box *clearly* shows it is 1080p. If the store clerk cannot show you where on the box it states 1080p, make note of the brand and model number of the TV, then research the resolution of the TV on the Internet or call the manufacturer's toll-free number. Unfortunately, some clerks may “assume,” or tell you, that the TV is 1080p when it is *not*.

It also is best to avoid TVs with an “i” rather than “p” designation after the number, such as “1080i” vs. “1080p”. The “i” means an “interlaced” display, which is of lower quality than a “p” for a “progressive” display. While 1080i is better than a 780p set, but it is best to pay the small amount extra for a 1080p set.

**#3. 4K or UHD Sets.** The newest additions to TV offerings are the **4K** sets, also known as “Ultra High Def” or “UHD” TVs. They have a resolution of 8.3 million pixels (3840x2160 pixels), which is 4 times the resolution found on a 1080p set. 4K sets have a resolution 8 times that of a 720p set, and over 23 times that of an older analog set (if figured at a 16:9 ratio). Sharpness of detail on 4K sets is quite remarkable.

Currently, there is only a limited amount of “true” 4K programming that can take full advantage of this higher resolution. This will gradually change over time. Netflix has a good number of offerings. But all

programming, even at lower resolution levels, will look better on a 4K set. It can display 720P and 1080p by using its built-in “up-scaling” chip. (Note: you should purchase a new HDMI 2.0 cable to use with a UHD.)

Budget permitting, you may choose to buy a 4K set rather than a 1080p or 720p set. Keep in mind that it is important to buy a 4K set from a “name” quality manufacturer (see #7 below), and not buy a “cheaper” set.

**#4. When Is 720p Enough?** On smaller sets (up to about 32”, measured diagonally), 720p may be sufficient, particularly if this is a secondary set and not the main television that you will be watching. With smaller TVs, the picture is small enough that 720p resolution is OK, and they are less expensive than 1080p. Once the screen size is much larger than 32”, the difference between 720p and 1080p screen resolution can become relatively noticeable to the viewer.

**#5. “High Definition” Channels.** Television stations send programs to your TV via a 720p, a 1080i, or a 1080p signal (Blu-ray discs play in 1080p). An HD 1080p set will display all three types. An HD 720p set will “down-convert” 1080 signals to 720p, because it is not capable of displaying the higher 1080 resolution.

It is important to note that cable providers may provide some programs, other than local broadcast news stations, only in 480i (SD) or 480p (ESD: “Enhanced” SD) resolution. For some channels, you have to pay extra for the HD tier with 720 or 1080 resolution. If you do not subscribe to the HD tier, some programs you watch will be available only in SD or ESD, and you will lose some of the benefits of your HD-capable set.

Golf tournaments, for example, frequently are broadcast on both an SD channel and on a HD channel. Many sports shows are noticeably better in HD. Consult your cable program guide to learn which programs are available in SD and which are in HD (high-def programming is usually on the higher channel numbers).

Finally, some cable and satellite programming is already being sent in 4K and is viewable on a 4K set. Non-4K sets will down-convert the UHD (Ultra High Def) signal to the set’s native resolution: 720 or 1080.

**#6. Important: 60 Hz vs. 120 Hz vs. 240 Hz.** Another important point is the TV set’s “Hertz” (Hz) rating: meaning the rate at which the screen cycles or “refreshes.” Programs having fast-moving objects, such as in sports, can appear somewhat “jerky” on larger screens that have only a 60 Hz refresh rate. Motion appears smoother at 120 Hz and this is clearly preferable on larger sets.

On smaller sets of up to about 32”, 60 Hz may be adequate, especially if watching the news or slower-action programming. Note: if the TV packaging is unclear as to the Hz rate (in such cases, the manufacturer or store does not seek to draw attention to lower-end specs), it is highly probable that the set is only 60 Hz. Many less expensive sets are 60Hz, and often they also have only 720p resolution.

Some higher-end sets have moved to a 240 Hz refresh rate or more. In most TV viewing situations the difference between 240 Hz and 120 Hz is not all that discernible to the human eye. However, 240 Hz will be noticeable on a set equipped to display 3D programming. The illusion of depth if you are watching 3D programming is significantly better at 240 Hz than it is with 120 Hz.

**#7. Problem Terminology.** Watch out for “special labels” that use terms other than the “refresh rate” (measured in “Hz”), as noted in #6 above. Some manufacturers use terms like *Clear Motion Rate* or *Clear Scan Rate*, or the even the more confusing *Effective Refresh Rate*. These companies claim such terms better describe how “smooth” the TV picture and motion will appear on that particular manufacturer’s sets.

However, these terms are *not* the same as the Hz refresh rate. One reviewer calls this “fake refresh rate trickery.” Any statement that the TV has a “120 Hz Clear Motion Rate,” or “120 Hz ClearScan Rate,” or a “120 Hz Effective Refresh Rate,” does not mean you are getting a 120 Hz refresh rate. In actuality, the TV has only a 60 Hz refresh rate. The same goes for 240 Hz “Clear Motion Rate,” etc. where the set really has only a 120 Hz refresh rate. Essentially, just divide the numbers in half to get the real refresh rate in Hz terms.

**#8. Which Brand Names?** A television set from a name brand – such as Samsung, Toshiba, Sony, Vizio, LG, Sharp, or Panasonic – is more likely to be a better bet than less well-known brands. Better quality, better durability, better features and picture characteristics are typically involved with these brands.

**#9. Exaggerated Pictures.** In some stores, TVs on display may have “dialed up” colors, “dialed down” brightness, or other changes made to the contrast setting. The sets also may have an “over-amped” setting of “Vibrant” (or the equivalent), done to make nearby sets appear to be less bright or colorful.

If a picture looks overly bright or overly dull or overly-hyped with color, ask some questions. Request the clerk to show you the level of the settings. By using the menu button, usually this will show up as a bar graph on the screen. If the setting is well off the middle or is at an extreme, ask the clerk to re-balance the settings so that you can make a true comparison regarding the quality of that set's picture vs. others nearby.

**#10. How Large a Screen?** A digital screen is wider (16:9 ratio) than an older analog set (4:3 ratio). Therefore, an analog TV with a 25" diagonal screen should be replaced with a 32" digital set just in order to get the same size "height" picture as before.

Experts suggest that your TV screen should fill your range of vision at between a 30% and a 40% angle. You can measure the distance from your eyes to the center of the screen in inches, then multiply by 62% and by 67%. This equals the range of what your diagonal screen size should be in inches. Or use this as a guide:

- If you generally sit only 3-4 feet from your TV, the set should have at least a 28"-32" screen.
- If you sit 4.5-5.5 feet away, it is better to get a 36"-44" screen.
- If you are 6-7+ feet away, a 46"-55" screen is preferable.
- At 7.5-8.5+ feet away, a larger screen is best: 57"-60" or more.
- Sitting 9 feet away, a screen should be 65"-72".

**#11. LCD vs. LED Sets.** Digital TVs first were produced as "LCD" sets. However, LCD sets have been largely phased out. You will want to look for a set that uses "LED" technology instead; sometimes this is labelled as LCD-LED. Just be sure, one way or another, that the packaging states that the TV is LED, not *just* LCD. There are four basic types of LED configurations, and each is a step up from the previous one:

- LED-Edgelit *without* local dimming is the most common type.
- LED-Backlit, sometimes also called "LED Full-Array," *without* local dimming is next step up.
- LED-Edgelit with local dimming to automatically adjust brightness "zones" and black levels, is better.
- LED-Backlit or LED Full-Array" *with* local dimming is best type.

Explore these choices with a knowledgeable clerk, especially if you are purchasing a larger set: 42" or more. Note that it is not essential to choose the highest quality version: just be aware that these differences exist.

**#12. What About Plasma?** The more expensive "plasma" TV screens traditionally provided a sharper, better picture with the best blackness levels. But more recently, LED technologies have come a long way; LED sets now have excellent brightness and color. Many TV manufacturers have stopped producing plasma TVs altogether, and no company is producing 4K plasma screens. Instead, companies are now focusing instead on manufacturing 4K LED sets or OLED (see #22, below).

For rooms with several windows facing the TV, select an LED set because sunlight, glare, or reflections will interfere with plasma displays that have shiny glass-like screens. The same is true of lamps that are used in the room at night; if they face or are directly opposite the screen, you may see the lights or lighted lampshades reflected on the screen. If you have a relatively dark room without windows and bright lighting, plasma sets can be preferable. You can also check on the cost of plasma sets that have an anti-glare coating.

**#13. What Are Smart TVs?** Television usage has entered a new era, given the integration of some Internet functionality – similar to that found in cell phones, iPads, Tablets, and their special "apps" – into the newest digital TVs. These sets are labelled "Smart TVs" because they are able to "stream" movies or other TV programs using an Internet connection in your home.

● Streaming has become extremely popular. Netflix, for example, now accounts for 35% of all Internet traffic (in terms of downloads) to sources such as computers, TVs, mobile devices, and so forth.

● Be sure to explore carefully exactly which Internet features are included, and which are not. Find out if the model of Smart TV you are looking at – in addition to be able to "stream" TV programming – also has the capability to use a "browser," to "surf" or "search" the Internet, and to send and receive emails.

● Some Smart TVs are able to stream, but do not have the other above functionalities. These might be better described as "*dumb Smart TVs*". On the other hand for many people, using the browser on a TV – versus one in a computer, laptop, etc. for these purposes – is unimportant. If there is *little* difference in the prices of the two types of Smart TVs, get the one with full capabilities in case you want to use them later.

● If you buy a Smart TV, determine if there is a remote keyboard available to purchase. The *significantly* more inconvenient and "clunky" method involves using the TV's remote control, where you point to the

letters on a virtual keyboard that appears on the TV screen, clicking to slowly “spell” out words. Without a keyboard of some sort, using the browser to do a search or to send emails can be a somewhat tedious process. (Note that some Smart TVs, such as most Sony models, cannot use a keyboard: wireless or wired, even if the store clerk says differently. Check with the manufacturer’s website to make sure, before you purchase a set.)

●Note that Smart TVs do not utilize software programs such as Microsoft Word. High-end home theatre PCs (called HTPCs) are built around PC components connected to HD TVs; these have greater functionality.

**#14. Make Your TV Smart.** If you already own a digital TV and/or do not want to pay extra for a new “Smart TV,” you can use what is called an “over-the-top” (OTT) device that accesses your home Internet connection. The device is connected either via Wi-Fi or by hard-wiring it to your Internet router, allowing you to “stream” programs from the Internet.

●OTT devices include dedicated boxes like Roku (easy to use and under \$100) or dual-purpose devices like a Blu-ray player, Wii console, Xbox 360, PlayStation 3, or Amazon Fire. These devices access the Internet so the user can stream movies from on-line sources such as NetFlix, Amazon Prime, Hulu, Redbox, etc. These latter sources generally require low monthly subscription or rental fees; still other services, such as YouTube, are available on-line for free.

●Note that most of the above OTT devices do not have a browser. The user cannot “surf” the Web, do Internet searches, or send emails. These devices make your set, as explained above, into a “*dumb Smart TV.*”

●Still another option is to purchase a different type of OTT device that *does* have web-surfing and email capabilities, essentially converting your existing digital TV into a truly “Smart TV.” For example, the OTT “Vizio Co-Star” box (approx. \$80) has a remote that “points” to letters on the TV screen. The “Google TV by Sony” box (approx. \$200) has a book-sized handheld wireless remote control with a built-in backlit keyboard. Still another alternative is the “Logitech Revue with Google TV,” which has a full-size wireless keyboard (\$100) to use for Internet browsing.

**#15. Slingbox Option.** Slingbox is a type of OTT device that is designed to send a TV program over the Internet to another location (i.e., the viewer is not confined to using a particular TV with its attached set-top box or DVR). Slingbox consists of a hardware and app product that allows a subscriber to “place-shift” a program that has been selected to a mobile device, to another Smart TV, to a TV with a Roku box, etc.

**#16. What About 3D?** 3D set prices have dropped substantially, and 3D technology is continuing to evolve. Newer 3D sets have moved to 240 Hz, rather than 120 Hz, providing greater clarity and depth of field. If you are going to buy a 3D set with 240 Hz, you might look for one that also is a “Smart TV.”

In addition, 3D glasses have changed from “active” glasses (which require cords from the glasses to the TV) to the newer “passive” 3D glasses (which utilize small watch batteries and have no cords). 3D sets generally include at least two pairs of special glasses, which are necessary to view a 3D program.

Note that not much 3D programming is currently available over cable; this may or may not change over time. The extent of future 3D programming is uncertain. On the other hand, satellite service via DirecTV does provide some 3D programs. In addition, special 3D Blu-ray players allow the viewer to enjoy 3D discs.

For many people, 3D sets are not used very often; they might be viewed as a marketing approach from two or three years ago. If your new TV comes with 3D at not much additional cost, then the feature is fine.

**#17. Sound and Speakers.** A change manufacturers made several years ago, unfortunately, was to eliminate forward-facing speakers that were built into the sides or the bottom portion of the TV. Doing this resulted in a somewhat smaller overall profile for the TV: the sets did not take up as much space or appear as overwhelming in a room. Thus larger, new models of TVs from manufacturers could be sold more readily.

Nearly all digital TVs now have speakers that face out the back side. As a consequence, the TV speakers project the sound “backwards” to the wall behind the TV. The sound then bounces forward, towards the viewer. This may result in a slightly muffled effect, impacting the programs’ special sound effects and the quality of music. This may be particularly pronounced if there are curtains, drapes, blinds, or other surfaces that are not hard and flat behind the TV, from which the sound is initially projected.

**#18. Improving the Sound.** For those who want better sound – particularly for sets with larger screens of 42” and above – there are several basic options available.

- The least expensive approach is to connect external speakers that a person already owns, using wires with RCA jacks, which are plugged into the back of the digital TV (assuming the connections are available).
- For improved sound effects, one can purchase a “sound bar” (24”-40” long and 4”-5” high). This bar is placed just below and in front of the screen, connected to the audio outputs of the TV. The simplest sound bars cost \$100. But better versions include a “sub-woofer” for much improved sound including bass. These cost \$160-\$275 and generally are quite sufficient. More expensive units, at \$300-\$500, are also available.
- Sound bars can be easily hooked up later, after purchasing a new digital TV, especially if one finds that the sound quality from the TV is not as good as desired.
- Finally, there are multi-speaker, home-theatre and surround-sound systems that run from as little as \$350 (from the very basic) to \$600 or significantly more for excellent systems. These may require the store to assist with installation and to balance the sound system properly.

**#19. Use HDMI Connections.** Any new digital TV should have at least two HDMI connections – be sure to double-check for this in the store, prior to purchase – and preferably three or more. In addition to a set-top box or DVR, you will need these additional HDMI ports if you have a Blu-ray player, a Wii console, a sound bar, or other devices that you want to hook up to the digital TV.

Call your cable provider and ask if your new cable set-top box or DVR should use an HDMI cable (almost certainly, the answer is “yes”). It is important to use an HDMI connection rather than other types of connections – such as a standard, round “coax” cable – in order to obtain the best video and audio results.

HDMI cables are available for purchase over the Internet; a six-foot cable will cost \$7-10 from such sources as Amazon. Watch out for attempts by some salespeople to sell you a so-called high-quality HDMI cable for \$40-80; experts agree that this is unnecessary. Note that this is contrary to what historically was recommended for the purchase of coax cables, where the quality (= price) of the cable was quite important.

For 4K sets, you will want to purchase the newer HDMI 2.0 version.

**#20. Surge Protection.** For your TV and any other devices hooked to it, get a 4-6 or more outlet “surge protector” that is rated at a minimum of 3,500 to 4,400+ joules. These cost only \$20-40 over the Internet, such as through Amazon. Surge protectors can cost substantially more in retail stores.

Stores often sell surge protectors that have a rating of 300-1000 joules or less. These offer little or no real protection. Multi-plug outlet extensions – essentially, merely an extension cord with plugs – have no surge protection at all. Check to see if the device is labelled as a surge protector and shows the rating in joules. Otherwise, you are exposing your expensive new TV to being “fried” in the event of a power surge.

**#21. DVDs and Blu-rays.** DVDs played on *regular* DVD players have an analog-level resolution of only 480: 480i resolution for a standard DVD player or 480p resolution for a progressive-scan DVD player. DVD players should be connected with at least red-blue-green connectors, not lower quality connectors.

- The next level up is a DVD player that has *up-scaling* capability.
- However, DVD players are not as good as the up-conversion accomplished by Blu-ray players. These show DVDs at an “apparent” higher resolution level as found on your hi-res digital TV: 720 or 1080. (Note: Blu-ray players are relatively inexpensive now, and the new models should use only an HDMI connection.)
- Blu-ray discs themselves will play at their true 1080p resolution on a Blu-ray player.
- Finally, if you own a 4K set, some Blu-ray players – if specially selected at the store for your 4K set – will up-scale a Blu-ray disc to an apparent 4K resolution.

**#22. Can a VCR Be Used?** It is possible to play older VHS tapes, using a VCR, on a new digital TV. However, these tapes will be seen at a significantly lower resolution (240) than your digital TV is capable of.

● To use a VCR, connect the red-white-yellow cables from the VCR to the digital TV, assuming your TV has these types of connections. To view the videos, you will need to use the TV’s remote to go to “Menu” and then “toggle” or switch between the two video inputs: selecting the VCR as the input source, or the cable / satellite input source. Refer to the TV’s instruction manual for further information.

● It is not easy to “record” digital programs on your VCR; it would be better to get a digital DVR (digital video recorder). If you wish to record on a VCR, the Internet has some information on wiring diagrams that you could use.

- If you are using an older analog TV with a digital-to-analog converter box and an over-the-air antenna, you can continue to play and to record programs on your VHS. Wiring diagrams are available on-line at: [http://www.diyaudioandvideo.com/TV/Wiring/Diagram.aspx?D=Cable\\_Box\\_To\\_VCR\\_To\\_TV\\_Using\\_Composite](http://www.diyaudioandvideo.com/TV/Wiring/Diagram.aspx?D=Cable_Box_To_VCR_To_TV_Using_Composite)

**#23. What Else Is New?** Newer technologies for digital TVs are constantly being developed; these include items such as the following.

- TVs that include a built-in Webcam where the user places a call over the Internet and sees and hears others – including distant family / friends – who are similarly hooked up, such as through the use of Skype. Note that some privacy concerns have been raised over TVs with built-in webcams vs. webcams that have been separately-purchased and which can be disconnected when not in use.

- “Voice control” – using spoken commands – to operate a Smart TV. Again, note that some privacy concerns have been raised about several manufacturers’ use of this functionality.

- “Gesture control” – using hand movements, similar to those with a Wii game – to manage various TV functions, supplementing or replacing the use of buttons on a TV’s remote control.

- Newest breakthroughs include: curved rather than flat screens; screens that will utilize 8K resolution; and flexible, extra-thin OLED (organic light-emitting diode) displays. These are all relatively expensive.

**#24. Taking a TV Home; Disposing of an Old One.** Digital TVs have flat screens, take up much less space depth-wise, and are relatively light. Smaller sets weigh 8-20 pounds, once out of the box. Mid-size sets generally weigh 25-30 pounds. Larger sets (42” or over) may require two people to put the box into your vehicle and to set it up at home.

If you plan on bringing the new TV home yourself, be careful not to let it bounce around in the trunk of the car; place some type of padding beneath the packaging. Smaller TVs can be placed in the back seat, braced from tipping or sliding forward via tie-downs or a seat belt. “Safety first” is key.

If you need to dispose of an older TV, you can learn how to recycle it via information is available over the Internet at: [http://www.fairfaxcounty.gov/cable/dtv\\_transition\\_pages/dtv\\_10.htm](http://www.fairfaxcounty.gov/cable/dtv_transition_pages/dtv_10.htm)

**#25. Delivery and Set-up.** Digital TVs are relatively simple to set up: they are “plug and play” and use either the cable company’s digital set-top box or DVR, or they are connected to an antenna. For larger TVs, check if the store offers delivery, set-up, hooking-up a set-top box or DVR using an HDMI connection. They may also connect at least one other component, such as a DVD or VHS player, or a sound bar. The store may even be willing to negotiate its standard price for this, typically \$50 to \$100. Be sure to clarify what will be included with, or added to the cost of, the purchase. Find out the cost of HDMI cable (see #19).

**#26. Several Final Tips.** You have evaluated TV sets and are ready to make a purchase. Before and immediately after your purchase, remember these tips:

- Warranties. Find out what the store warranty is, and what type of manufacturer’s warranty is included.

- Credit cards. Some credit card companies will *double* the length of a manufacturer’s warranty at no additional cost if you make purchases using their card. Call the customer service number on the back of your card, in advance, to see if this applies to electronic purchases such as a TV and if there are any special conditions. Then decide if you want to use that particular credit card to buy the product: it may save money vs. buying an in-store extended warranty.

- Sales Receipts and Warranties. Be sure to keep the original sales receipt, credit card transaction slip, store’s warranty paperwork and manufacturer’s warranty, in case you ever have to make a warranty claim.

- Box and Packaging Contents. Keep the original packaging for at least several weeks in the event you return the TV set. Determine what the store’s policy is for short-term returns and refunds or replacements.

## Questions? We Have Answers.

If you have any questions about this information, call the **TV Help Line at 703-324-5902** to speak to a staff member. This is a service of Fairfax County Government’s Department of Cable and Consumer Services – Communications Policy and Regulation Division, 12000 Government Center Parkway, Fairfax VA 22035.