LG HDTV Buyers Guide

2010

Contents

LG UK Models for 2010

For full model specifications, including contrast ratios, more detailed audio and picture features check the LG website. Do check the specifications of any TVs of interest, the features I have listed are some of the most important and/or confusing features, most of which have a considerable amount of hype following them, for example the 600Hz subfield. Also check them to make sure I haven't made a mistake! LG have also provided a FAQ section on the owners' forum which covers some other topics such as the digital switch over.

Plasma

HD ready 720p
42/50PJ350 – 2x HDMI, 600Hz subfield
42/50PJ550 – 2x HDMI, 600Hz subfield, divxHD
42/50PJ650 – 2x HDMI, 600Hz subfield, Infinia design, divxHD

1080p Full HD
50PK350 – 2x HDMI, 600Hz subfield, divxHD
50/60PK590 – 4x HDMI, 600Hz subfield, divxHD, FreeviewHD, THX, Bluetooth
50/60PK790 – 4x HDMI, 600Hz subfield, Infinia design, divxHD, FreeviewHD, THX, DLNA, NetCast, Bluetooth
50/60PK990 – 4x HDMI, 600Hz subfield, Infinia design, divxHD, FreeviewHD, THX, DLNA with dongle, NetCast, Trublack filter, Bluetooth
50/60PX990 – 4x HDMI, 3D ready (active, with 2D-3D conversion), 600Hz subfield, Infinia design, divxHD, FreeviewHD, THX, DLNA, NetCast, Trublack filter

LCD

HD ready 720p
19/22/26/32LD350 – 2x HDMI

1080p Full HD
32/37/42/47LD450 – 2x HDMI
32/42/46/52/60LD550 – 3x HDMI, 100Hz Trumotion
32/42/47/55LD690 – 3x HDMI, 100Hz Trumotion, divxHD, FreeviewHD, DLNA, NetCast
32/42/47LD790 – 3x HDMI, 200Hz Trumotion, divxHD, FreeviewHD, DLNA, NetCast
47LD950 – 4x HDMI, 3D ready (passive), 200Hz Trumotion, divxHD

LED (edge)

HD ready 720p
19/22LE3300 – 2x HDMI, divxHD
26LE3300 – 3x HDMI, divxHD
32LE3300 – 4x HDMI, divxHD

1080p Full HD
32/37/42/47/55LE5300 – 4x HDMI, 100Hz Trumotion, divxHD
22LE5500 – 2x HDMI, divxHD
26LE5500 – 3x HDMI, divxHD
32/37/42/47/55LE5900 – 4x HDMI, 100Hz Trumotion, divxHD, FreeviewHD, DLNA, NetCast
32/37/42/47/55LE7900 – 4x HDMI, 100Hz Trumotion, Infinia design, divxHD, FreeviewHD, DLNA, NetCast
42/47LX6900 – 4x HDMI, 3D ready (active), 200Hz Trumotion, divxHD, FreeviewHD, DLNA, NetCast

LED (full back)
1080p Full HD
42/47/55LE8900 – 4x HDMI, 200Hz Trumotion, Infinia design, divxHD, FreeviewHD, DLNA, NetCast
47/55LX9900 – 4x HDMI, 3D ready (active), Trumotion 400Hz, Infinia design, divxHD, FreeviewHD, DLNA, NetCast, Magic Motion

OLED
HD ready 720p
15EL9500 – 1x HDMI, 100Hz Trumotion, divxHD

Features

100Hz

- Plasma
  - 100Hz in plasma technology is primarily to reduce flicker of the screen. Traditionally plasmas (and CRTs) have had a 50Hz refresh rate, this means that the screen will 'flash' 50 images every second, this causes a visible flickering effect, so 100Hz doubles the number of 'flashes' to make this flickering invisible to the naked eye. 100 is the chosen number as it divides equally into 50 (by two) so each frame is simply displayed twice. With 100Hz on plasma you get no motion handling benefit, only the reduced flicker, however, unlike with the true motion system on the LG LCDs, you wont get frame interpolation (inserting generating frames between existing frames) side effects, such as ringing and artefacts, leading to a cleaner picture, the true motion system isn't implemented because plasma technology allows for smoother motion than LCD with minimal blurring. The true motion system will interpolate frames to smooth motion, it will come with the associated side effects (I will explain these below).
- LCD
  - 100Hz systems on LCD screens are different; the true motion feature is added here. With true motion the TVs processing will effectively insert 'made up' frames between the existing frames in the broadcast. It will do this with various processing techniques to create a mathematical guess of what the frame which should appear between two should look like. Unfortunately it doesn't get everything right so you do get some side effects such as ringing around fast moving objects and artefacts in the picture. True motion is only really recommended to be on when watching sports as it will reduce blurring on the football/tennis ball (whatever it may be) so you don't miss the action in the blur. When watching movies it has the potential to make motion smoother, however this will create a more artificial picture (remember every other frame is made up) and will not show you exactly what the director intended.
    The 200HZ feature is the same, but uses backlight scanning (flashing the backlight) to help the issue. The motion smoothness is improved slightly further over 100Hz, but some people can see the flashing, this is only really recommended for sports fans who will be using the TV primarily for watching sports as the difference isn't worth paying a lot more for.
    400Hz Trumotion is a further improvement, this time frame interpolation is used to make a 50Hz source 100Hz, then again to make it 200Hz, then the scanning backlight is used to make it 400Hz, again, some people will see the flashing and interpolation artefacts are increased slightly.With true motion turned 'off', the TV will not interpolate the frames, so you will not experience the side effects, motion blurring will increase however, setting it to 'low' will reduce the effects while still improving motion to an extent.

600Hz sub-field

Don't get caught up in this number, it's not necessarily doing anything important or significant. The LG 600Hz system works with a 50Hz source (which is 50 fields) you get 12 sub fields per field (50x12=600). During this field the pixel can only activate and then deactivate (turn on and turn off) once. The more subfields you have per field the more accurately you can reproduce colour (with more shades) and pixel noise can be reduced in the process as well.

On the whole though, ignore it, it's pretty meaningless, it's just a big number and a 'hype word' (Hz). Since 100Hz, 200Hz and now 400Hz on LCDs is a huge buying point to the general consumer, the plasma manufacturers wanted to beat this with a bigger number, so they can get away with 600Hz. But not only is 600Hz different (which is why they're also labelled as 100Hz), but these things do different things on LCD and plasma anyway! Post number 40 on this page - http://www.avforums.com/forums/plasma-televisions/1007203-600hz-lets-get-sorted-3.html explains it, read if you wish, but as I said, the technical know-how isn't truly necessary, it is a marketing figure and is more associated with colour than motion as it is marketed (particularly by Panasonic). This comes on *all* the plasma models as a standard feature and makes very subtle differences to the picture; it cannot be compared to 100Hz technology as it is not the same.

Picture Wizard

This is a feature implemented by LG in the 2010 range and is very useful for those who have neither the money for professional calibration nor the technical know-how to calibrate the TV themselves. Basically it is a basic calibration tool which will try to assist you in getting the front panel controls right to give you what should be a better image otherwise. Note that this will *not* give you a perfectly calibrated set, but will give you either a good starting point if you plan to go further, or pretty much as good as you can get without calibrating the set. Also note that this doesn't help you with the more advanced settings such as greyscale, gamma and colour points.

THX certification

This is similar to the picture wizard, but already done for you. The THX certification stamp basically means that the TV has a picture preset, named THX, which attempts to get as close to the industry standards for film and TV as possible. So in this mode you have the full white balance, greyscale etc…controls finely tuned. However, again, this will not be perfectly calibrated as sets vary slightly, if you want perfect calibration then a professional is needed, or some equipment for you to do it yourself. This feature provides accurate 'out of the box' settings which will beat most (without THX certification) in terms of accuracy. Contrast and brightness are locked in this preset though, so you can't adjust for the viewing lighting. In the 2010 range LG have included a 'bright room' and 'dark room' preset to suit different lighter environments.

Bluetooth
Bluetooth will allow you to connect devices such as Bluetooth enabled mobile phones wirelessly, with this feature you will be able to view images etc…on you mobile phone through the TV without the need of certain cables. While this feature is improving, not all phones are compatible. As well as viewing pictures you can also use it to send music to the TV as well as using it to connect some Bluetooth headphones if you need to keep the noise down.

Divx (HD)
Divx (HD) simply allows you to watch divx files on the TV, there are some limitations however, mainly in size, so be sure to read up on those. The divx HD enabled TVs allow you to watch HD files. Divx files aren't the only files supported; others such as .MKV files are also compatible.

Contrast ratios
Contrast ratios should largely be ignored when comparing between different brands of products, these numbers are in no way a reflection of what you will get in reality and there are several types of contrast ratios which can be quoted. When comparing the LG LCDs alone contrast ratios can be taken into account. Contrast ratios determine the difference between the peak whites and deepest blacks the set can produce, as peak whites are somewhat of an easy thing to do, the contrast ratio effectively determines which TV has the best black levels, which ultimately decides which TVs have the greatest depth of colour and picture.

Plasma TVs will provide superior contrast and black level performance, leading to greater colour depth and an overall more '3D' image which will appear to 'pop' out of the screen. LCDs are somewhat more limited in this area but do catch up to an extent with brightness of colour, the brightness and vibrancy will lead to a greater impression of contrast.

On the whole a plasma TV's contrast performance and black levels will drop off in bright light conditions whereas LCDs are the opposite, I will go into this later.

Viewing TVs 'in store'
Many will argue that this is vital in buying a new TV, however, there are several things to consider when doing so which almost makes any impression a TV in a store makes on you irrelevant, and there are a few reasons for this.

- Stores often have TVs which they want to sell more than others, whether because they have a lot of stock or of they're clearing out that model, these TVs will be set up to be the brightest and most colourful, and therefore the most appealing. The sets which they don't want to sell so much will be in the corner with poorer set-ups.

- Stores usually have the TVs in dynamic mode, this basically adds to the effect they're trying to achieve in the above situation, it will make the TV super bright and super colourful, however, when you get home you will almost definitely take the TV out of this mode because it gives a hideous picture in the average home. When viewing sets in store you really need to have access to the remote controls to edit the settings, getting recommended or even calibrated settings off the internet is a good idea, setting up the TVs you're interested in to match these settings will give you a better idea of how it performs (not perfect still)
- The lighting conditions! The lights in places like Currys or Comet affect the performance of some TVs, this point is particularly important when comparing LCD and plasma TVs. Different TVs perform better in different lighting, LCDs look bright and colourful in store, but black levels and vibrancy will be lost in the home, plasma TVs look poor in stores, however, in dimmer (not dark) lighting colours will become richer and blacks blacker which will result in a huge improvement in picture quality.

Full HD 1080p/HD ready 720p

The obvious choice to go for here is 1080p, as it's the higher number, but this isn't necessarily the case, SD TV often looks better on HD ready sets and you wont necessarily be able to see the improvement in detail on a 1080p set, unless you sit very close to the screen, generally sitting around twice the screen size (in inches) away will give you a decent benefit on the large screen sizes (bigger than 42"). Also remember that there is very little 1080p native material, HD TV is broadcasted in 1080*i* so there is still a certain amount of processing going on even with a 1080p TV. Games consoles are also being marketed as 1080p, but there are very few games which are actually 1080p, it's still pretty much in single figures, the vast majority of games are actually rendered in 720p or even lower. The way the TV scales this material though means that 1080p *can* give you cleaner results. Blu-ray is 1080p native, so 1080p screens are often recommended, but remember to weigh up the advantages of the HD ready screens as well; resolution is a fairly minor factor in picture quality, however, 1080p is becoming standard now.

Pixel Response Time

The pixel response time refers to how long it takes for each pixel to undergo one 'cycle'. This means the time it takes for the pixel to go from inactive, to active, and then inactive again. Plasmas rely on a surge of energy and have much lower response times than LCD TVs, LG's current plasmas offer a response time of 0.001ms, whereas LCDs have a much longer pixel process which results in a pixel response time of around 5ms for 50Hz sets, and 2.5ms for 100Hz sets. The 200Hz and 400Hz sets are further reduced.

Input Lag

Input lag refers to the amount of time it takes for the TV to receive, process and then display an image. The input lag varies between sets but rises in input lag are often down to extra processing being added, 100Hz true motion is an example of a process which will increase input lag. The 'Game Mode' on LG LCD and plasma TVs reduces input lag, usually by reducing the amount of processing involved. Sensitivity to input lag varies from person to person, not everyone notices it, but if you want to avoid noticeable input lag you need the TV with input lag lower than around 30ms.

Interlaced (i) and Progressive (p)

Plasma and LCD displays are progressive displays; this means that each frame contains a whole image, so LCD and plasma TVs must display a progressive picture. Unfortunately television is broadcasted in 576*i* which is an interlaced signal, so the signal must be de-interlaced, I will go into this later. Progressive signals are labelled as 'p' such as 480p, 720p or 1080p.

CRT TVs are interlaced displays; interlaced videos contain two fields known as 'odd' and 'even'. The 'odd' field contains the 1st, 3rd, 5th…vertical pixel columns, and the 'even' field contains the 2nd, 4th, 6th…columns. So each field contains half of the overall image.

De-interlacing

For a progressive display (i.e. an LCD or plasma TV) to display an interlaced image, such as standard (576i) and high definition (1080i) television, the signal needs to be de-interlaced. To do this the video de-interlacer needs to effectively 'fill in' the missing fields in each interlaced frame. So when the TV is de-interlacing the 'odd' field, it needs to add all of the 'even' fields and vice versa when displaying the 'even' field, but to do this it needs to mathematically fill in the gaps. Complex de-interlacing technology will scan fields diagonally in order to try to get the best results.

Note that after de-interlacing a signal the TV may also have to scale it, for example in the case of displaying standard definition TV (de-interlaced to 576p) on a 1080p native screen the de-interlaced signal needs to be upscaled, or in the case of displaying high definition TV (de-interlaced to 1080p) on a 720p native screen the signal needs to be downscaled.

Service Menus

The service menu is a 'hidden' menu within the TV; within it you can access a lot of technical information and features. A popular use of the service menu recently in LG TVs has been to unlock some of the USB features such as divx playback on TVs which aren't advertised as being compatible. This is also where you can find how many hours the TV has been running for, which is useful for those who are 'running in' their plasma TV and don't want to keep records on when they watch it. However, entering the service menu is a potentially dangerous thing to do, it is very possible for the TV to become damaged (internally) or for you to turn off something very important, and it's easy to do so, so I *strongly* recommend staying out of the service menu unless you know exactly what you're doing. Also, if you damage the TV in the service menu the warranty is void, so you can't claim for a repair or replacement. Access to the service menu has also been restricted to certain firmware versions so it isn't always possible for you to enter the service menu unless you have the correct firmware, for more information on which firmware version is needed visit the appropriate 'official thread'.

Registering your TV

Registering your TV isn't a requirement, but can give you access to some nice little things, such as access software/instruction manuals/firmware updates specifically for their product. this will be improved as time goes on which will include updates on their product in terms of features and benefits which they may not know they have *such as expert mode and intelligent sensor*.

Image Retention/Burn In

What is it?
Image retention and burn in are essentially the same thing, just in different forms. Image retention is temporary and will fade completely with time, burn in is permanent and won't fade completely. It is a phosphor based technology specific problem, which means it affects plasmas, however it is possible for an LCD to retain an image, but it is rare and is usually down to abuse.

Image retention and burn in are caused by the same thing, static images, but the cause of both is slightly different. If a static image is left on the screen for a prolonged period of time a ghost image will be created, so the image will effectively be visible after it has gone. If the image was white then the image will be a slightly lighter shade of the colour on screen, if the image was coloured then you may find that the negative of that colour is etched into the display.

The reason for this is fairly simple. Plasma technology works using phosphor compounds to create light and colour, these phosphor compounds are lit when they're excited by photons, which are emitted by gas particles colliding due to a charge difference in the panel. The more these compounds are lit up the dimmer they become, the effects of this dimming aren't noticeable in the actual picture as it is so gradual, but if a static image which is brighter than the rest of the screen is on screen long enough then the brighter section will mean that the phosphor compounds in those cells will start to age faster than the rest of the screen, leaving a ghost image as they cannot light up as much as the others. If this image is left on screen for long enough then the process will be irreversible, at least without taking drastic action (which is probably impossible anyway!), resulting in burn in. This is a potential concern for those who plan to use their TV solely for watching movies; movies are usually shot in a 'wider than 16:9' (the regular widescreen TV) aspect ratio such as 2.39:1 or 1.85:1, this creates black bars at the top and bottom of the screen, these bars will age more slowly than the rest of the panel due to the other cells being lit in the movies being watched, resulting in permanent black bars. However, it would take a lot of movies for the black bars to become permanently burnt in, and static images need to be on screen for a very long period of time.

Image retention is more common and isn't as serious, it can be encountered in the same way as the uneven ageing which will eventually become burn in as described above, but more commonly it's due to a build up in charge in certain plasma cells due to a bright image being on screen for a period of time. A charge builds up because plasma technology works by creating opposite charges in the front and back panel. This can be solved and will fade fairly quickly in normal use, as long as the retained image isn't on screen.

Plasma TVs are more prone to image retention when they are brand new, the problem will technically reduce throughout its whole life, but the most noticeable difference will be in the first 200 hours or so of the sets life, so this is when you should be most careful.

Image Retention on LCD TVs

Contrary to popular belief LCDs can still suffer from image retention, however, it is rare and is usually down to either misuse or a faulty/low quality panel. In effect it's caused by the panel and/or processing overdriving the pixels, overdriving was invented to increase grey to grey pixel transition times by increasing voltage and amp levels. If this feature is incorrectly implemented, or if it's used too often, it can result in permanent damage of the panel, usually in the form of image retention, greyscale banding and motion related issues such as smearing. The process which leads to image retention on LCDs is fairly simple, there is a capacitor and a transistor for each pixel, and these govern the position of the crystals. When picture elements are active, they receive power, if you overdrive these elements you add 'stress', which then leads to image retention.

Prevention methods for plasma image retention is usually completely useless, and prevention methods are often useless as well, however, there are a few ways in which it *can* be solved, although if the panel suffers from the issue then it will be likely to happen again. Putting a completely white image on screen can have an effect as it helps the liquid crystals to reset, but a more effective method is simply to turn it off and unplug from the socket for 24 hours or longer if possible.

For the following section note that ‘HD’ means ‘High Definition’ and ‘SD’ means ‘Standard Definition’

Narrowing down the options

As you can see there are a lot of options available to buy which can make the buying process confusing and daunting, all the TVs will seem to have various merits and shortfalls over each other and you will feel like you’re being forced to choose between which shortfalls you’re most happy to live with. This isn’t necessarily the case to the same extent as some people may thing, as a general rule of thumb the higher up the range you go, the better the TV will be, it’s more distinguishing which features you actually need, not want, and matching up the various options when screen size, budget and the uses are considered. This next section will try to guide you through the process to firstly eliminate some, and then narrow down the options to a select few.

1. Budget

Ultimately the budget will decide which TV you buy, if your budget goes beyond that of all LG HD TVs, or if you have no specific budget then skip this section and move on to section 2.

The budget will decide the level of TV you can get, there will still be several options open though due to the smaller sized high end ranges, particularly in the LCD market. When deciding a budget *never* decide on a range, decide on an upper limit and stick to it (for now), this could be £300 or it could be £2000, but never decide on a range and discount any cheaper TVs.

2. Screen Size

Screen size needs to be decided in relation to the budget, I will get into this a bit more afterwards. Screen size on the whole is a very important factor, there is no need to get extra features such as 1080p etc…if you sit too far away to see the impact they have, in these cases it would be more beneficial to spend the same amount of money on a larger, but less feature filled set.

Firstly calculate the ideal screen size for you. The ideal screen size is a controversial subject and there are several calculators on the net, ultimately it depends on the uses of the TV and your priorities of its performance, for example you can sit much closer to the TV if you're watching HD material such as blu-ray, but at short distances standard definition TV can not be very watchable, it can appear grainy, blocky and picture noise or scaling errors/artefacts can be obvious, so smaller TVs are generally recommended. So, list the uses of the TV, with rough percentages. An example could be

50% Standard definition TV (SD TV)
30% Blu-ray/HD movies
10% DVD (it's important to separate DVD and blu-ray, especially if DVD won't be upscaled externally)
10% HD Gaming

Or

40% HD gaming
30% HD TV
10% SD TV
10% Blu-ray
10% PC monitor

Your list may only contain one or two uses, or it may contain several, either way, make a note of what you have written, you will need it later.

You then need to prioritise these uses, the reason being that you want to get the best performance for the thing you want it to do best. Blu-ray or HD viewing may only take a small part of the TVs technical use, but you may want this to be the time where you want to be impressed most by the performance. Taking the above two examples the priority lists could be as follows;

1. Blu-ray/HD movies
2. DVD
3. HD gaming
4. SD TV

(Note how much the priorities can change from use percentages)

Or

1. HD gaming
2. HD TV
3. Blu-ray
4. SD TV
5. PC monitor

Also keep a note of your priority list; this will also become useful later on when you're narrowing down the choices to specific models.

With this priority list you can determine what size screen you want to get. There are two calculations which you will want to do, one to get the lowest viewing distance (for HD), and the other to get the highest viewing distance (for SD). You may also want to consider physics restrictions to size (cabinets etc…) and just whether or not a huge TV is necessary.

To get the minimum viewing distance, which is generally recommend for those who have HD viewing as a priority, is a simple calculation, the ideal screen size should be roughly half the distance you will be viewing from (all in inches). So if your viewing distance is 10 feet, which is 120 inches (12 inches to 1 foot), the ideal sized TV for HD viewing is 60 inches, again, decide whether the room can actually accommodate the TV before making your final decision here! On the whole there is some room for being closer; HD viewing would still be perfectly acceptable at 8 feet for example.

To get the maximum viewing distance, recommended for 'SD TV watchers', you want the screen size to be 4 or 5 times smaller than the viewing distance, even this will give you a very small screen size though, there is more argument that with the newer TVs (like the 2010 range) you can easily have a TV 2 or 3 times smaller than the viewing distance and still have a perfectly acceptable SD picture. I would *not* recommend getting a TV smaller than that calculated by dividing the viewing distance by 4 or 5. For example; for a viewing distance of 10 feet (120 inches) you will want to look at TVs around 40 inches diagonally (which is three times smaller than the viewing distance), in the LG range that would lead to either 37" or 42".

For mixed HD and SD viewing you may want to come to a mid point between the two sizes, in the above example I may decide to go for a 47" LCD or 50" plasma to get the best of the standard definition viewing while still keeping the HD 'pop' and making the extra detail worthwhile.

When considering viewing distances, and when considering the uses, remember to plan for the future, you may wish to buy a blu-ray player, or upgrade to an HD TV service such as Freesat, V+ or skyHD, for most this will be a fairly long lasting purchase, if you're planning to keep the TV set for more than a few years, it would be well worth planning for HD material to become a fairly significant use if it isn't already. Also note that most films are shot in aspect ratios wider than 16:9 (the aspect ratio of the TV), so you will get a picture which is smaller when watching movies.

When you have calculated the ideal viewing distances you need to look at the budget and see which models you can afford with your ideal screen size(s). If you have a large choice then discount the models which are either too expensive or too small/large, if the choice is very limited then it is worth looking at the screen size below to see if there are more models available, if so, make a note of them too.

3. Viewing Environment

This is also very important, mainly in considering which technology to go for (LCD or plasma), this may have already been decided in the above step if you have decided that a smaller TV model, where plasmas aren't available, is appropriate, or if you have decided a very large model (60") where LCD isn't available is what is needed. The viewing environment consists of two major points, lighting conditions and viewing angles.

Lighting Conditions

This is particularly important when choosing between LCD and plasma because both operate best in different lighting.

- LCD TVs generally look the best in brightly lit rooms, the screens are less reflective than plasmas and the contrast is held in bright lighting. Black levels will also appear to be much deeper and the brightness also helps in combating reflections from windows etc…However, in dimmer conditions black levels will start to become greyer and the picture will become flatter.
- Plasma TVs are the opposite, due the glass screen and the way light reflects inside the actual plasma cells, colours and contrast are washed out in bright lighting, this results in a very flat picture with little contrast or depth. However, in dimmer (not dark) lighting, typical of evening viewing in most homes, black levels will be noticeably better, this results in deeper colours and greater depth of the overall picture.

When considering the lighting you need to take a similar approach as when prioritising uses. While the TV might be on more during the day than in the evening you might want the TV to perform better in the evening, which is when most of the 'good' TV is on, and when movies are generally watched. For example, if the TV is on for 5 hours in a day, and 3 hours in the evening, and the room is very bright in the daytime, it is the obvious option to get a TV which perform well in bright lighting, but you may not care about the lack of depth in the picture when watching daytime TV (loose women, this morning etc…), however, you will almost definitely be more critical in viewing during the evening, and if this is when the TV you want to watch is on, or if this is when you watch movies, then a TV which performs well in dimmer conditions may be better overall. Remember that both technologies are watchable in their unfavoured lighting conditions in the vast majority of cases.

Viewing Angles

This is a simple consideration; if you view the TV from an angle then different TVs may be more suited. LCDs lose contrast and colours become off hue (weird basically), plasmas don't have this effect. Higher end models have improved viewing angles over the other series' lower in the range, however, quality still drops off when viewed from more extreme angles, plasma's are the only TVs capable of truly holding their picture quality if viewed from angles. It is worth testing the viewing angles on TVs before buying, this is one of the few things you can get an idea for in stores.

4. LCD, LED or Plasma?

It's not necessary to come to a conclusion for whether you will buy an LCD or a plasma TV yet, but it's worth considering the possibilities early, especially if one technology is clearly superior to the other for your case it will help narrow down the options earlier, reducing the difficult decisions later on.

Neither technology is the 'right' technology, both have several merits and shortfalls, and both are improving in their weak, and strong, areas, and the gaps between them are closing quickly, but both should be considered before buying. Different uses and viewing environments will ultimately decide which is best, but there is a degree of personal preference involved, this is where the trip to the 'ideal shop' would be useful, but as I explained above, very little, if anything, can be told from the stores unless the various environment conditions are controlled. I will now go over the various pros and cons of each technology, which will hopefully help to decide which is for you. If you're still unsure at the end then don't rule out either technology. Obviously if you're looking at a TV which is below 42" then plasma is automatically ruled out, if you are considering 37" though, do keep an eye on the 42" plasma models.

Plasma

Pros

- Black Levels
  - Leading to great contrast and superior shadow detail to the LCDs. Black levels don't only determine how dark 'dark' can be though, black levels also enhance the overall picture, deep blacks means that dark shades of colours can be created, so colours appear deeper and not 'blocky'. This means that the overall picture has more depth and jumps out of the screen. However, as I described above, these black levels are lost in brightly lit conditions, therefore the overall depth of picture is also lost. The black level overall puts them at an advantage in overall picture quality, and explains a large part of why plasma is still the enthusiasts' choice.
- Motion Resolution and Response Times
  - Plasma TVs hold higher motion resolutions and lower response times; this means there is less blurring and tearing in the picture when there are fast moving images on screen. To give an example of this a 50Hz LCD TV has a response time of roughly 5ms, with a 100Hz LCD at 2.5ms, LG's plasma TVs have a response time of 0.001ms. This means that they're ideal for watching sports and anything with fast moving images. 100Hz, 200Hz and now 400Hz LCDs are getting much closer in motion; however, they achieve this with processing which creates a slightly artificial picture.
- Natural Image
  - Plasmas are generally considered to have the more natural image when comparing to LCD, this comes with a combination of things, all of which I have listed as pros, black levels and colour are two key components which give them this, but one other key point is that LCDs use a lot of processing, features such as 100Hz are an example of these processing (although others can't be turned off) and this will tamper with the picture, leaving an LCD looking more artificial than a plasma.

- Dimmer Screen
    - Obviously this comes as an advantage to some and a disadvantage to others. The dimmer screen is an advantage to those who are viewing in dimly lit conditions, LCDs are brighter and can become tiring to watch in dim lighting, with the dimmer plasmas your eyes aren't forced to work overtime and aren't constantly dilating etc… (adjusting according to the brightness), so your eyes will not tire (in the literal sense) of watching a plasma TV.
- Strength
    - Believe it or not plasma TVs are actually stronger than LCDs, this is due to their glass screen and is another myth surrounding the technology. The glass screens used are very resistant to knocks and bashes, which isn't the case with the plastic LCD screens.
- Colour
    - Colour on plasma is also generally superior. LG TVs come with extensive calibration controls so you can get technically very accurate colours out of both LCDs and plasmas, however, plasmas can generally produce better colours due to the way they work (creating necessary light instead of manipulating white light). Also, in LCDs there is a degree of 'greyness' about colours as not all white light is blocked, so plasma colours are richer, this is also thanks to the good black levels. Again, as with black levels, this is lost in bright lighting.
- SD performance
    - There isn't really much to say on this subject, LCDs are closing in here, but plasma TVs are still largely better for SD based material.
- Viewing angles
    - Plasmas can be viewed from virtually any angle, whereas LCDs can't. With a plasma if you move to the side the colours and black levels will stay how they are, they won't start to turn a purple-blue colour or start to disappear completely!

<u>Cons</u>

- Dimmer Screen
    - Back to this again! Obviously if you're viewing in bright conditions you want a bright TV to punch through all that light, plasma TVs aren't as bright as LCDs. Combine this with the reflective nature of the glass screens and the way they are washed out in bright lighting and a lot is lost if the lights are up when you're viewing.

- Image Retention
    - Image retention is where a static image is left on screen for a prolonged period of time, when the image is removed it will remain there afterwards as a ghost image, probably tinted with the negative colour of the image which is being retained. Image retention will fade, and will generally fade quickly, just as long as something else is on screen, unless it's severe retention it won't be visible unless viewed on a solid block of colour either, usually black, or sometimes white. Retention does have the potential to turn into burn in however, this is a permanent form of image retention, and will never fade. In order to burn in a modern plasma set you will need to leave a bright static image on screen for several hours, so it's not a huge issue, but may concern gamers who often have the same image on screen for long periods of time. All retention generally fades within 20 minutes of any other material; most mild retention will fade even quicker, more like 2-3 minutes. Image retention is at its worst when the set is new; there are several methods to help to reduce it which I will go into later.
- Phosphor Trailing
    - Phosphor trailing is a plasma issue which is due to the way plasmas work. The way it happens is that the phosphor used to create the green colour takes longer to decay than the other colours, so it leaves a trail behind a fast moving object on a contrasting background (eg black and white). Don't be put off by this though, many people aren't sensitive to this at all, in fact the only people who are truly affected by the issue are those who are super sensitive and will see it everywhere, this is a very small quantity of people. Like image retention, this is worse when the set is brand new, it calms down dramatically in the first 200-500 hours of use.
- Heat Generation
    - Plasma TVs generate a lot of heat, this isn't an issue for most, but is for some, it's something you need to be aware of, although it won't act as an extra heater!
- Power Consumption
    - Plasma TVs also consume more power than LCD TVs on the whole; however, this isn't as simple as it sounds. Plasma TVs use very little power when displaying a black screen, they use the most power when displaying white, so if you watch a lot of dark movies then the power consumption will be low, but if you view a lot of bright scenes then it will be much higher. The difference in power consumption isn't huge; it will only amount to a fairly small amount of money added on to the electricity bill.
- Weight
    - It is still possible to wall mount plasma TVs, but more research needs to go into the idea as plasmas still weigh a little more than LCDs.

LCD

Pros

- Brightness
  - For bright rooms brightness is good, as I have already mentioned plasmas lose their contrast and black level performance in bright lighting, LCDs *don't* do this, in fact they get better, this is where they thrive! Bright lighting hides many of the LCD technology's faults, black levels being one of the key ones, which means that the overall picture seems to 'pop'.
- Power Consumption
  - Power consumption on LCD screens is generally lower, although it does depend on the backlight setting. If you have it up high it will obviously be higher. However, most people will turn the backlight down quite a lot to a relatively low level, so you do get a fairly low consumption; LG's LCDs have recently been praised for their energy efficiency by some.
- Image Retention
  - Or rather lack of it. It is still possible, but you do need to abuse it. LCDs were pretty much designed for displaying static images (with the PC monitor origins), so you wont get a ghost image after they are displayed for prolonged periods of time, which is a plus for gamers and those using it as a PC monitor for long periods.
- Sharpness
  - This is an odd one, LCDs come with the full 1080p resolutions in the smaller sizes, which is useful for some, but isn't needed at all for many. However, they do have a seemingly 'sharper' appearance, in HD content at least. Don't confuse this with extra detail though, LCDs have sharper edges but sometimes small details are lost in the processing which the TV goes through to get this sharpness or in other processes.

Cons

- Poorer black level
  - The black level and contrast on LCDs aren't as great as with plasma, bright lighting can hide the grey appearance of LCD black levels (and will expose greyness in plasma blacks) but in dimmer lighting more light will start bleeding through the black filter on the screen, making the blacks more grey and losing contrast and shadow detail when comparing to plasma.
- Processing
  - As mentioned above, the excessive processing which goes on behind an LCD TV can interfere with the picture, plasma TVs have processing add-ons as well, but not nearly as many. With LCDs you will find many options such as dynamic contrast, black level enhancers etc…which create a list as long as your arm, but these all reduce picture quality and make an artificial picture. Colours can seem 'off', artefacts can appear and detail can be lost amongst other things

- Motion
    - Motion resolution is a big issue with LCD technology, LCD was initially designed as a PC monitor technology, and so it works well with static images, not moving ones. Resolution is somewhat lost dramatically when an object is moving, and detail within the object will be lost, you will also get some ghosting behind fast moving objects, and even double (or even triple) images. There are methods to reduce this, but they're not perfect. You can also get smearing on LCD TVs; this is where colours will give a smearing effect, particularly in dark areas and black. This issue has been largely removed by all LCD TVs, but some still notice it.
- Brightness
    - Similarly to the dimmer feature of plasmas, the brightness of LCDs has a good and bad side. When viewing in dimmer lighting an LCD can be too bright, they can become tiring to watch because they're making your eyes work too hard to watch them. Turning the backlight down is a way to reduce it, but this *can* directly effect picture quality in some cases.
- Viewing Angles
    - Viewing angles have proved to be very limited with LCD technology; you don't have to move too far off the centre of the TV to start to see changes in the picture, colours will actually appear to change. The LH7000 is improved in this area due to the panel type, but still doesn't match plasma technology.
- 100/200/400Hz Artefacts
    - 100Hz being a motion blurring prevention method, and it does work, doesn't give you perfect motion, not only is there still a degree of blurring but it introduces artefacts into the picture, and fast moving objects will appear to have halos. There are different settings for 100Hz to try and compromise between motion smoothness and these artefacts, and it can be turned off completely, but the issue is there. With the 200Hz system you can also get a slight flickering effect due to the backlight scanning as well as the 100Hz artefacts, and with 400Hz you have the slight flicker and more interpolation artefacts.
- Backlight Uniformity
    - This can include backlight bleed or clouding; it's difficult to explain but basically means that the backlight will give a 'patchy' effect on the screen which will be visible mostly on dark colours and blacks. Visible bleed or clouding only effects a small number of screens, and severe cases are very rare, most users won't notice it.

LED edgelighting and backlighting technology

'LED TV' is one of the new technologies which is being thrown around by all the big companies, in the last year or so LED TV has meant that the TV uses LEDs mounted around the edge of the screen to provide all of the light it needs to display a picture. This technology is still being used and LG have a whole range this year as opposed to just one model last year. This technology follows many of the same advantages and disadvantages as standard LCD technology as only the backlight has changed, however, the size of LED edgelit TVs is significantly smaller than standard LCDs and of course plasma TVs, it can be as slim as just a few millimetres. The energy consumption is also very low, which is good for those who are eco-minded.
Full LED backlighting is the other technology which has a little more hope, this time LEDs are mounted behind the screen in the same way that an LCD TV has the backlight behind the screen. Again the LED backlighting technology has a similar set of pros and cons to standard LCD technology, however the main advantage of full LED backlighting comes in the local dimming function. This attempts to minimise the problem most associated with LCD technology, poor contrast. Standard LCDs can easily produce bright whites, but black levels are often poor. The local dimming feature allows certain areas of the LED backlight to be controlled individually, and more importantly dimmed to improve contrast. There are a lot of dimming zones each of which can be individually dimmed to improve black levels while still retaining the bright whites to give better contrast. Screen uniformity can also be improved here because backlight bleeding is often most visible when the screen is dark, but if the zone is dimmed then it can't be seen. LG have two full LED backlit models, the LX9900 and the LE8900.

OLED technology

This year LG are releasing an OLED TV onto the market, this is a new technology which is being hyped as one of the technologies of the future and this is the largest one available to buy in the current market, 15". OLED (organic light emitting diode) TVs work in a somewhat similar way to plasma TVs in that the 'pixels' emit light when an electric current is passed through them as opposed to using a backlight as LCD and LED TVs do. This way of going things means that black levels can be improved because when nothing is displayed in an area of the screen you can just stop the current going to the pixels in that area (in its most basic terms anyway). The light itself is created using various layers in the OLED cells which, when a charge is passed through, will conduct electrons to certain areas, leaving some areas positively charged and some negatively charged, the electrostatic force between these areas causes them to combine again, which causes a drop in the energy levels of the electrons, this causes radiation of the visible light spectrum to be emitted, giving you light, and a picture when you get all the pixels together.

The picture produced by an OLED TV itself can bring several advantages over current technologies. Contrast ratios are far superior to LCDs in particular, but also outstretch the other technologies as well. Due to the TV emitting light the viewing angles will also be on the same scale as plasma. The response time is also greater than LCD, and even plasma technology. LGs OLED TV is also splash proof, so is ideal for a luxury bathroom. However there are some downsides due to current limitations; the lifespan is currently limited so the screen won't last as long as an LCD or plasma, this is fast improving though. Screen burn and image retention is also a potential issue. The main problem facing the technology at the moment is price and size.

Myths about LCD and Plasma Technology

- A Plasma TV will burn out in a year or two and needs to be replaced!
    - LG plasma TVs have a life expectancy of 100,000 hours, to put that into proportion if you watched the TV for 10 hours a day, every day, it would take over 27 years for it to reach half its original brightness. LCD and plasma TVs last as long as each other.
- Plasma TVs are more expensive.
    - This is also incorrect, plasma and LCD TVs cost roughly the same, there are more LCD TVs available, and more 'cheap and cheerful' models are produced for the highly budget concerned buyers.
- Plasma TVs don't need to be calibrated, they're perfect out of the box.
    - Also wrong, both LCD and plasma TVs need to be fully calibrated to get the best picture, default settings are often too bright and very inaccurate; it's the same with all brands and technologies.
- Plasma TVs have better pictures than LCD TVs (and vice versa)
    - LCD and plasma TVs both have various merits and shortfalls, different viewing environments, different uses and even personal preference determine which technology is best
- You need to 'refill' a plasma TV every few years
    - This just simply isn't true.
- It's not possible to wall mount plasmas, and they're hard to install
    - Untrue, plasma TVs are heavier than LCDs, but you can still wall mount them, but it is advised to research how you will do so and make sure you know which type of wall mount to use.
- Plasma TVs easily burn in
    - This used to be true, but is no longer the case, it will take several hours for a static image to become permanently burnt in, be sure to take the necessary precautions in the early life of a plasma TV though, they're not needed for many, but if static images are on screen it is recommended, a plasma TV is more susceptible to burn in during the first 200 hours or so of its life. Lowering the settings to around 50% (contrast and colour) and then adjust brightness to suit is the recommended thing to do.

5. Uses and Priorities

One of the key things in which TV is right for you is your uses; your uses will determine which features are needed, and which will hinder you, it will also help to establish whether LCD or plasma is better for you.

Uses

So, first of all, go back to your list you made earlier of the uses of the TV, with percentages, my example being;

50% Standard definition TV (SD TV)
30% Blu-ray/HD movies
10% DVD
10% HD Gaming

Or

40% HD gaming
30% HD TV
10% SD TV
10% Blu-ray
10% PC monitor

And then, probably more importantly, you need to go back to the priority list, my example being;

1. Blu-ray/HD movies
2. DVD
3. HD gaming
4. SD TV

Or

1. HD gaming
2. HD TV
3. Blu-ray
4. SD TV
5. PC monitor

So the uses, but more importantly your priorities will determine what you want your TV to so here you need to look at what each use demands and what merits individual models and the different technologies offer, I've listed the merits of the two technologies, and I've listed the meanings of the main features found on both the LCD and plasma TVs, so you should be able to identify which TV does what, you just need to go over what your uses demand. Going back to the LG buyers guide on the net (http://uk.lge.com/ext/tvguide/) when you get to step 2 the main uses will be listed, and I'll stick to those and go over which features and abilities are useful for the listed uses, remember to watch the info videos for more information.

- Sports
    - For sports you want good motion handling, this is ultimately determined by response time. Plasma TVs have the lowest response time; this is basically how quickly the TV can refresh the image on screen. An LG plasma TV will have a response time of 0.001ms, an LCD with 100Hz will be 2.5ms, and a 50Hz LCD will be 5ms. So in terms of the motion handling plasmas are better suited, but be wary if the TV is being used for a lot of sport, the scoreboards or channel logos of the sports channels can cause image retention on the screen, if these are going to be on screen for very long periods of time then you may have image retention issues with a plasma, in which case a 100Hz, 200Hz or 400Hz LCD may be preferred. If sport viewing is balanced with even just a bit of general TV viewing then you shouldn't have any issues.
- Movies
    - With movies you want a natural image and good contrast, most people will also dim the lights so you want the TV to perform well in dimmer conditions, looking at the various merits of LCD and plasma TV this suits plasmas on the whole. If blu-ray or upscaled DVD is your source of movie then 1080p may also be useful, however, don't be drawn in by this number as you probably won't see the difference unless you are sat very close to the screen. Motion handling and pixel response time is also a useful feature, again, favouring plasma, this will mean that fast paced action scenes aren't blurred, also, the 100Hz true motion feature on LCDs may give you a slightly artificial picture, so you may need to choose between smoother motion with an artificial picture, or more blurring but with a more natural image.
- Gaming
    - Gaming is now in HD with the Xbox 360 and PS3, these consoles don't output many games in 1080p, the vast majority are 720p, so 1080p isn't a necessity, however it may be preferred. Features that are useful gaming are contrast and black levels and pixel response time, which favour plasmas, but gamers may have issues with image retention on plasma TVs due to the heads up displays on most games, and phosphor trailing on plasma TVs is often most prominent while gaming, so LCDs are a popular choice. Also, while 1080p isn't a necessity, it *can* provide a better picture than in some of the 720p models, and LCDs offer this in smaller screen sizes. As pixel response time is also a key feature, 100Hz, 200Hz or 400Hz LCDs are recommended for gamers, although these features can add to input lag.

- General Use
    - General use is a wide area, this generally covers SD TV and some movie use, so natural images are generally preferred to give a more realistic picture, contrast levels are less important in regular TV use, as is pixel response time, but they are nice to have. Higher resolutions also aren't needed, but remember that there is a fairly strong likelihood that HD TV such as Freesat will be widely available (with more HD channels in the next couple of years, so if you plan to keep the TV for a long period of time it might be worth considering that. The main thing to consider with general viewing is the lighting conditions, bright lighting favouring LCD, dimmer lighting favouring plasma. LCD TVs are also available in smaller screen sizes, which are often preferred for SD viewing. FreeviewHD should be available soon for most of the country, LG have freeviewHD built into several 2010 models.
- PC Monitor
    - All LG TVs come with the required inputs to connect a laptop or PC. When considering TVs to use as a PC monitor you want a high resolution and, generally, people sit closer so smaller screen sizes are popular, making LCD an obvious choice due to the full 1080p resolution in sizes 22" and above. LCDs also don't have issues with image retention; so long browsing sessions are possible without having to worry about anything. Plasmas can be used as PC monitors though, so if the PC is a secondary use then plasma is still well worth considering.

When you have considered the uses of your TV you then want to decide which features, and which technology merits, are desirable. So if we go back to the examples and add in the useful features and various technology merits we come to this;

1. Blu-ray/HD movies – black levels/contrast, natural image, resolution, response time, THX, big screen
2. DVD – SD performance (unless scaled externally), black levels/contrast, natural image, response time, THX
3. HD gaming – response time, black levels, image retention resistance, resolution
4. SD TV – SD performance, natural image, freeviewHD could also come in here

Or

1. HD gaming - response time, black levels, image retention resistance, resolution
2. HD TV – natural image, resolution (not a big requirement)
3. Blu-ray - black levels/contrast, natural image, resolution, response time, THX, big screen
4. SD TV – SD performance, natural image, freeviewHD
5. PC monitor – resolution, image retention resistance

With that you can then weigh up which technology and which TV you think would suit your needs. In a general case for the first example a plasma TV would probably be preferred, black levels, response time and a natural image are needed in most of the uses, very few of the LCD merits suit those uses. In the second example an LCD may be preferred as high resolution and possibly a smaller screen size would be desired.

You can also decide which model specifically you think would suit your needs, this means looking at the features on each individual model, so looking at contrast ratios to try to determine black levels (although this is a slightly risky thing to do), look at pixel response time and features such as 100Hz, 1080p, 600Hz subfield as well as other possible uses such as divx HD. Also note down how many HDMI inputs you need, try and keep at least one spare to allow room for another HD source to be included.

Making the Final Decision

Hopefully you're now in a position where you have narrowed down your options to just one or two TVs. Now is a good time to go back to look at your budget and screen size, it might be possible for you to get either a smaller but better featured TV or a larger, but lesser featured TV for a similar price. It's worth looking at both the size below and size above to see if there is anything which may suit your uses better. When looking at smaller sets though, ensure that you're not getting a TV which is too small; it may lead to you feeling as if you could have a bigger TV and being disappointed with the TV.

Hopefully you can now weigh up the various pros and cons of the TVs you have decided to look at more closely, keep your priorities noted so you can decide whether you really *need* a feature which may appear on one TV, but not another. In your final decision process you may also want to consider things such as design which shouldn't be considered as such a high priority earlier in the process. Also remember sound quality, if you are hooking up an external system then sound quality is not important, but if you need the sound to be of good quality, then remember to keep that in mind.

After Buying

How to Reduce the Risk of Image Retention and Burn In

There are a few simple steps you can take to try and prevent image retention and burn in from occurring, or more likely, to reduce the effects of image retention, all of which are very easy to do and won't necessarily affect your viewing pleasure.

The simplest way is to simply turn the picture settings down; contrast and colour are the ones which will cause the most problems. This is something plasma users may want to do in the first 200 hours of the TVs life while it is most prone to the issue, turning the contrast and colour down to 50% is the general guideline, brightness should be adjusted to suit your viewing environment, it may end up higher, but this will *not* increase the risk of burn in, I'll explain this later. This is known as running in or breaking in.

If you don't want to run in the set you can take a simpler step to try to reduce image retention. Putting the picture mode into cinema, with the colour temperature on warm will give you a fairly accurate picture, the colour temperature on warm will prevent the whites to be too bright, this is actually the recommended setting anyway as it comes closer to the industry standards, but the more 'muddy' appearance often puts users off. Anyway, the reduction in brightness of whites and more balanced colour (less excess of blue for example) will mean that bright cells wont be overdriven, leading to a reduction of image retention, and the ageing process wont be uneven on scenes with a mixture of white and black, therefore preventing burn in. Note that you should always stay out of picture modes such as vivid, dynamic or game for normal viewing, these modes have over saturated colours and excessive contrast, which will result in image retention being very common, and burn in being more of a risk. These modes can be used at times, for example the game mode reduces input lag so is good for gaming, but it is recommended that the contrast and colour settings are turned down.

You can also use the 'ISM method' function in the options of the TV to try and prevent image retention. There are a few different methods listed here; normal, orbiter, inversion, colour wash and white wash.

- Normal does nothing
- The orbiter moves the picture by 2 pixels every 2 minutes (by default), this can be changed by going into the service menu, but it is advised that you don't do this unless you know what you're doing. Anyway, the idea behind the orbiter is that it changes what the pixels are displaying to try and prevent image retention, but as it only moves 2 pixels it isn't a noticeable change. You will occasionally see the screen shift when the set is new, but when you adjust to it you will stop noticing. The orbiter doesn't make a huge difference in most cases, but can help with things such as channel logos.
- The inversion feature will invert the picture to display the negative version of the image, so the colours will be negative (black is white etc…), this is most useful if the TV has a memory of a colour, as the negative will be visible, using the inversion function will basically reverse the effects.
- White wash is a feature which will display a white screen on full brightness etc…This is only recommended for severe image retention as it does reduce panel life slowly, but it helps with all forms of image retention.

- Colour wash is another useful feature which has been introduced in the 2009 range, it will try to reset the built up charge in plasma cells which I described above. It does this by flashing coloured, random checkerboard patterns on the screen.

Another simple way to reduce retention for gamers is to take regular breaks during long gaming sessions. For example simply taking a break for 10-15 minutes every hour is a safe option, during this time put the TV onto a freeview signal, or an untuned analogue signal (snow) and the image retention should fade fairly quickly. This precaution doesn't necessarily need to be taken unless you're going to be spending several hours gaming in a single session.

Why Can High Brightness be a Good Thing?

As I said above, when running in your plasma set you want to turn contrast and colour settings down to around 50%, and then adjust brightness to suit your viewing conditions, that way you wont get a picture which is too dark. Brightness will often be higher in this situation, maybe around 60-70% as opposed to the usual 40-50% but this isn't necessarily a bad thing and once you know what these things mean it becomes fairly obvious.

Basically contrast and brightness are, to put it bluntly, wrongly labelled by all manufacturers. Contrast determines where the white level starts (and where the peak white is), so high contrast increases the amount of white in the picture, and low contrast decreases it. Brightness actually determines where the black level starts, so low brightness means black levels will be darker (but will also sacrifice shadow detail). As I described above image retention and burn in is pretty much caused by a big difference between black and white, so to reduce the risk of burn in the most you want the black level to start high (so high brightness) and the white level to be cut off short (so low contrast), so technically the best thing to do is to have contrast at 0% and brightness as 100%, but that's unnecessary! The worst thing to do is to put contrast at 100& and brightness at 0%. As contrast is usually ideally placed around 60-75%, lowering it to 50% means you're lowering the white level, and ultimately getting a darker picture.

Take the following pictures as examples, the images are taken from an explanation from the AV Forum member 'gizlaroc' on this thread, post 263 - http://www.avforums.com/forums/plasma-televisions/1012302-panasonic-g10-owners-thread-part-2-a-18.html#post9772849

Image 1 is with the contrast set at 50% and the brightness at 100%....

Image 2 is with them both at 50%.....

Image 3 is with the contrast at 50% and brightness at 40%...

Image 4 is with the brightness at 25% and contrast at 100%....

As you can see the images with the biggest difference between black and white (i.e. image 4) will create the most image retention, the ones with high brightness, and therefore less difference between black and white (i.e. image 1) will create less image retention.

High brightness will also introduce more white into the picture, which will ‘mask’ colours to an extent, this will effectively mean that the colours in a coloured static image will use a more balanced range of the phosphors used to create colour as white is a combination of them all, therefore more white in the image means that more of each of the phosphors are used as opposed to a purely blue image (for example) only using one phosphor compound. This will reduce the possibility of the ‘colour memory’ due to one of the phosphor compounds ageing faster than another.

What Should I do if I See Image Retention?

The first thing to do is not to panic! If you are new to plasma technology it may come as a bit of a shock as technically CRTs should suffer from the same issue, but they don't seem to, but don't panic.

If you see image retention the first thing to do is to keep the image which caused the retention off the screen. Get as much other material going over the screen (that patch in particular) to try and correct the charge build up which would have caused it. Simply putting on a freeview channel is a perfectly effective way of doing this as the TV will display all colours here which. If the image retention doesn't disappear, or at least fade a lot, over 20-30 minutes, then you may want to try using the colour wash or white wash ISM methods under the options menu, but it is recommended that you wait for longer, sometimes a night of being turned off will allow the charge build up to be corrected.

Cables

Cable quality is important in some cases, however, it does vary between cable types, for example analogue technology cables such as SCART vary in quality more than digital technology cables such as HDMI. The reason for this is that a digital signal can't experience interference *to the same extent* as an analogue signal, the theory that a digital signal 'is either there or it's not' is true, however, there are more things to consider. When buying some of the cables where quality doesn't necessarily matter, I would recommend spending enough to escape the ones which will be poorly built and/or will be faulty (for example randomly drop signal), this usually means spending between £5 and £10.

- SCART
  - Cable quality matters a lot here, you need to make sure that you have a SCART cable which has good shielding, ideally both externally and internally.
- VGA
  - Cable quality doesn't really matter, there's no need to spend more than around £10-£15
- Component
  - Cable quality does matter to an extent here, so don't lunge at the cheapest option, take length into consideration as well, if you're looking for a long cable, go for a higher quality one.
- DVI
  - Again, consider cable length, but quality doesn't matter too much, so don't spend more than £10-£15, also be aware of single/dual link.
- HDMI
  - Quality doesn't matter here, but can become important if you're looking for a cable over 10 metres long, for most there's no need to spend more than £10 for a 1-2 metre cable.

Calibration

Calibration is the process whereby you try to get the TV set as close to the industry standards as you possibly can, this is where the expert controls on the LG LCD and plasma TVs become useful. There are several methods of calibration, which I have listed below, all varying in accuracy, cost and ease of use, but ultimately they all try to get as close to the standards for film and TV as possible. The THX presets on some models aims to get as close to these standards as possible, however, as these TVs are susceptible to individual changes, it's not perfect. This also explains why someone else's calibrated settings won't provide perfectly calibrated settings for your own set, although they do generally provide a good starting point.

However there are many ways you can get more than the THX presets give you if you want, these are;

- ISF Calibration
    - ISF calibration is the best thing you can do to get your TV as close to the standards as possible. Basically it entails you hiring a professional calibrator to come and do it for you; it can cost between £250 and £350, but is the way to get the best picture possible.
- DIY using some equipment
    - The next best way is to get some equipment and do it yourself, you can pick up a probe and various other pieces of kit which can help you in calibrating your set, there are several things available for free on the internet as well. As a process this may set you back as little as £50, or as much as £150-£200 (you could spend more). To do this you will also need to learn the standards.
- DIY using a disc calibrator/THX optimizer
    - THX certified DVDs/Blu-ray discs come with a THX optimizer, this is a 'cheap and cheerful' way to get your TV in the right area for calibration, however, sometimes it can vary and will give you the best picture for that DVD, but not necessarily for everything else (although they should all follow the same standards). You can also buy or download other discs which help to calibrate your set, these can vary in quality and price, there are some available for free, or you can spend £20 or so.

Blu-ray and HDTV

If this is your first move into the world of high definition TVs then you would have no doubt stumbled across the terms HDTV and blu-ray, these are effectively two fairly new introductions into the TV world (of the UK) which allow you to make the most of your HD LCD or plasma TV. All LG HD TVs are capable of displaying both blu-ray and HDTV, as long as you have the required boxes etc…

Blu-ray

Blu-ray is effectively the replacement of the DVD, the HD DVD (high definition DVD) was the original idea, but blu-ray has a superior storage capacity and eventually won the battle. Blu-ray is a 1080p native source, so 1080p TVs are ideal here.

Blu-ray discs work in the same way as standard DVDs, using a laser which reads 'tracks' off the disc as it spins. But blu-ray is superior due to the type of laser it uses. DVD uses a red laser, which has a wavelength of 650nm, with this laser you can create a double side disc capable of storing around 8.5GB of data, which is plenty for a standard quality film and all the extras which come on DVDs, however, high definition films are of higher quality, and need more space, and blu-ray offers that.

The laser used to read blu-ray discs is, unsurprisingly, blue (or blue-violet), which has a much shorter wavelength than the red laser used for standard DVDs. This means that the laser can be focused more precisely and therefore more data can be stored, in fact up to five times more, a dual layered blu-ray disc can store up to 50GB of data.

To play a blu-ray disc you need a blu-ray player, these blu-ray players will play your standard DVDs, and even upscale them to HD, so there's no need to replace your whole collection, but this will still ultimately not give you the same quality as a blu-ray disc, so you might want to upgrade some of your favourites. Despite blu-ray players being backwards compatible though, standard DVD players *wont* play a blu-ray disc at all, luckily the prices for blu-ray players have gone down from the astronomical prices they were once at, you can pick up one of LG's blu-ray players for no more than a couple of hundred pounds. When buying a TV, make sure it supports 24p; this is a vital feature for blu-ray playback.

HDTV

HDTV is slowly replacing standard definition TV, currently in the UK there aren't many high definition TV channels, however, most services offer some kind of high definition service (SkyHD, V+, Freesat etc…). Currently sky offer the most HD TV channels as many of these channels are American where HDTV is more common, Freesat HD and V+ only offer a few high definition channels (big ones being BBC HD and ITV HD).

FreeviewHD is now also appearing and should be available to around 50% of the country in time for the 2010 world cup, LG have prepared for this by including FreeviewHD tuners on many of their new models, this will unlock some HD channels, but not as many as Sky+HD for example, however as time goes on more channels will become available. LG aren't releasing a freesat HD TV in 2010 due to cost and possible demand issues.

3D TV

3D TV is starting to emerge on the consumer market and LG have released a 3D TV, the LX9900, available in 47" and 55", as well as using LGs full LED backlighting technology. LG have no also released the PX990 in 50" and 60" sizes, which is the first THX certified 3D TV.

3D TV can come in two forms, active or passive, both require glasses, and LG will be releasing TVs with each technology.

Active

This uses alternative frame sequencing where the 'film' is shot from two cameras, the two sets of film are then put together and played in alternating order. One image will be shot from the point of view of the left eye, and one from the right eye and the glasses are needed here to show the correct eye the correct image. Usually film is shown at 24 frames per second, but a 3D film will be shown at 48 frames per second in order to give a full picture to each eye. The glasses are a type of LCD shutter glasses designed specifically for this purpose, the lenses can open and close at a very rapid speed and this is how the 3D effect is created. The glasses contain receivers which communicate with the display, which effectively tells the glasses which lens should be open and which should be closed, the lenses will open and close in order to match up with the frames which are being shown (left eye or right).

The main advantage of active technology is that you get a full 1080p image in each eye, however as things are at the moment a pair of glasses will cost as much as £100. LG supply two pairs with the LX9900, but plenty of people will need to buy more for family/friends to use. The glasses also need to be kept charged up, this is done through the TV (a lead which connects them to the glasses).

Passive

Passive technology is what is currently being used in the cinemas to show 3D films such as Avatar, this technology uses polarised light and polarised glasses which are worn by the user. One frame will effectively contain two points of view, designed as one from the left eye and one from the right, as opposed to getting the full 1080p picture in each eye here, each eye will see a 1080i picture. From here it's a simple case of the left hand point of view being polarised with the left lens in the glasses, and the right hand point of view being polarised with the right lens. The right hand point of view will be cut off from the left lens and vice versa, giving you a 3D image.

This mainly differs from active technology because it only gives a 1080i image to each eye (although this would technically increase if the TV resolution increased), however the glasses are much cheaper, costing no more than a couple of pounds, so they will be easy and cheap to replace, meaning that you can get the whole family round to enjoy it. LG will also provide 4 pairs with the LD950.

2D – 3D conversion

LGs PX990 has the ability to convert 2D material to 3D, this adds a little more to what the TV can do but doesn't give the same 3D effect as 3D native material and will probably largely be left alone for most viewers.

Hopefully this has been of some help and you can now make an informed choice on what to buy, good luck in your search and hopefully you will be happy with whatever TV you buy.