

THE LASER VIDEO EXPERIENCE

Video Calibration From The Inside

Volume I – Entry Level – Revised 2nd Edition

Michael Chen

2013

Introduction

“Now all I need is your credit card number ...” – Elijah Price – Unbreakable – Touchstone Pictures 2000

It’s the dropping of that other shoe that is always what people are waiting for. How much is this going to cost me? Well, it is not going to cost you any money at all because I have some other plans brewing here in my head. I want to change minds. I’m on a crusade to change the perspective for as many people as I can reach. In time, they will know that I was the one responsible for the creation of the exclamation mark. Ha, ha. The lack of education in this area is just stifling that it can be headache inducing. The public doesn’t understand what this stuff is about and the people purporting to provide the service either don’t understand themselves or are just incapable of explaining this stuff to people.

“If you can't explain it simply, you don't understand it well enough.”

[Albert Einstein](#)

This E-Book is a compilation of updated articles found on my site, [The Laser Video EXPerience.CA](#). Not only is this book free, but you are free to make copies of it and pass it onto anyone you like or want to punish or you think might benefit from these pages. Just please do not alter the content in any way! In this first volume, I have taken all the articles that are easiest to read and placed them all in the same place for the benefit of those that are almost entirely new to the world of **“fine tuning your TV to make it look its best.”** These articles should cover pretty much every last important question people new to the subject matter end up asking me or any other seasoned professional calibration guy out there.

For the first time, all the concepts explained and de-mystified in a way that even teenagers should be able to understand. (I used one of those wordsmith analyzers to look at all my articles and told me so.) No technical jargon to speak of. This stuff isn’t really rocket science at all, so never let anyone convince you that it is. In the end, it’s just television folks.

I am dedicated to making this an interesting read for those that are curious and providing smart ways for the other professionals out there to actually explain this stuff correctly and easily.

This is the first volume in a series of E-Books to come. The subject matter will gain a level of complexity by the time we get to the next volume, but for now, sit back with your laptop or tablet and enjoy the read. Hope you have as much fun reading it as I had writing it.

Contents

Poor TV Picture Quality?.....	3
Why We Calibrate ... Myths.....	6
Why TVs Are Not Calibrated ... Get Over it.....	11
Is Calibration Worth it? ... How Long is a Piece of String.....	15
Picking Your Poison ... Uhhh ... Next TV	20
Hit and Run Calibration ... Drive By Shootings.....	30
Tips For Finding Good Professional Calibrators.....	35
Calibration and Energy Consumption ... I want to be an Energy Star.....	39
Calibration ... Who Died and Made You God.....	42
Top Things Crooked Installers Do To Take Advantage Of Clients	46
YANACFPC ... 1% Versus the 99%	48
Calibration Boneheads	51

Poor TV Picture Quality?

Not happy with the way the pictures on your TV look? Poor TV picture quality?

Do you think the television should look better given what you paid for that TV? Aside from cursing the all mighty, what other options do you really have? And you really do have some options so you don't have to take things lying down.

Your options listed here range from least expensive to most expensive ... in terms of money, but not in terms of your time.

1. Calibration Test Discs

These test discs range in price from “free” to about \$40. The programs will help you to set the user controls on the display like the contrast, brightness, color, tint, sharpness, and overscan. The disc won't do these things for you, as you actually have to follow the instructions. If you understand that stuff well, these controls can be set correctly in less than 5 minutes. Most can't understand this stuff well and end up doing it wrong. Everyone says they completely understand, but more than half will end up doing it wrong.

2. Calibration Software & Hardware

The next step up from just using the test disc is to get calibration software and hardware to do it all yourself. The software can cost anywhere from “free” to \$200-\$300 for the enthusiast versions. The hardware can cost \$150 on up to \$10K and beyond depending on what your budget is. Most DIY'ers end up buying test equipment in the range of \$300 to \$1000. The \$1000 meters are considerably more accurate than the meters at \$300 and under. Again, the software and hardware does not calibrate your display automatically. You now have to take the time to learn how to do this through your own research and practice time. It is estimated that you will spend 100+ hours to research and learn. Most DIY'er spend \$300 to \$500 for these two items. The learning curve is steep in this path since there is always an element of doubt in the learning process since all material is written and has to be interpreted. Did you read it correctly? Did you fully understand what they were writing?

3. Professional Calibration

If you are not up to doing this yourself and you value your time greater than what a professional calibration would cost, then this is the way to go. You can get to the best picture your TV will ever show in one afternoon. This will typically cost you \$300 to \$500, but the work is done relatively fast compared to doing it yourself. Depending on the professional that you find, the process can take as little as 30 minutes to more than four or five hours. Professionals that educate as part of the process take more time and the client appreciates the end result far more. The test equipment that the professional brings to the table is considerably more costly than what the DIY'er is willing to spend and often more accurate. The calibration cost is usually the highest if you go this route as only one display gets set up. Additional TVs in your home will cost more money, albeit at some level of discounting. (You have to go through the angst of figuring out which calibrator is a good one and which ones are bad. There are many more bad ones than good ones.)

4. Calibration Software & Hardware and Training

This is the last reasonable option that has only recently become available to the DIY'er. Live training by THX or ISF is always available and will cost at least \$2000 just for the classes alone, not to mention the added travel and lodging costs. DIY'ers on tight budgets probably do not want to do this. (Although two people actually have done this in the five years that the THX program has been around.)

The hardware and the software costs are still the same as in #2, but the 100+ hours of research and learning is reduced considerably by watching and learning from a professional video training program that can be viewed hundreds of times once purchased. The trade-off here is that the learning curve is considerably easier to manage and there is far less doubt left in the minds of the DIY'er. Video training costs range from \$100-150. The choices might be a bit harder if there were many of these programs to choose from, like a whole bunch of books on how to use one particular Nikon camera. Right now there are two; a 90 minute webinar for \$100 that teaches you how to use one aspect of the Spectracal software package and a six hour video series for \$150 that teaches the fundamentals of the entire calibration process. So if enthusiasts want to do it themselves and also want to have the confidence that they have done it correctly, options are finally available.

5. Buy Another TV

This is the most expensive of all the options. Go buy another TV and purchase your way out of this pain you have. Don't pay for service because you just shouldn't have to (and then you go off to fine tuning your car and don't give that a second thought). Keep buying TVs until you find one that is suitable to your tastes out of the box. :D Good luck with this one. If a good pro calibrator can make a \$400 TV outperform a \$3000 TV ...

Your options listed here range from least amount of time to most time spent.

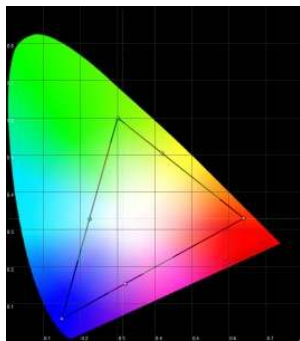
- Professional Calibration – 30 minutes to 5 hours ...
- Calibration Test Disc – 2 – 3 hours
- Professional Video Training Series – 20 – 30 hours to get up to speed. Includes watching the series twice. (12 hours)
- Self-Research and practice. – 100+ hours.

What works best for you? How should I know? You have to figure this part out for yourself.

Why We Calibrate ... Myths

There was a time that I would get this question from prospective clients about what services I offered and what they thought the concept of video calibration was all about. People would start to use these superlatives like "POP" to describe what they wanted out of the TV. (What does that mean, anyway?)

To get a good understanding on what display calibration is all about, it is necessary to address a series of myths about calibration. Think of this as a story about what calibration is not about ... before we get to what it actually is about. I'll be using some images to help with this process. The first image is below



shown with the Rec. 709 color triangle, but more on that in a bit.

Take a look at this image and tell me what the large color wedge represents? I am not talking about the triangle as denoted by the black lines, but rather the "guitar pick" or "shark fin" of color. What does this represent? Well if we look at the area outside the wedge to the immediate right side of the red area, one would find things like infrared light there. Outside the wedge, but below the magenta and blue areas, one

would encounter things like ultraviolet light there. From the perspective of this chart, what do infrared light and ultraviolet light have in common? They are both types of light that the human eye cannot see, so they are not found within the color wedge. By default then, this makes the color wedge contain every color that the human eye **CAN** see. It is the visible light spectrum for humans (and not dogs or cats).

Now bear in mind that the colors you see in this particular image above are not accurate. The computer monitor that you are viewing it on cannot show you every color that the human eye can see. The depiction is merely for representation purposes only. So the wedge is every color that human eyes can see, but now we focus on the triangle as denoted by the black lines in this image. That represents our HDTV system. Every color you have seen and marveled at on both HD broadcasts and Blu ray disc fits into that triangle. The material contains colors that only fit within those confines.

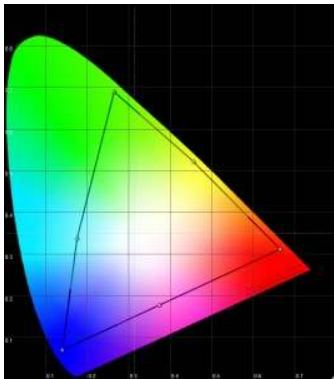
The first observation that one makes should be that the HDTV color palette looks considerably smaller than what the human eyes are capable of seeing. This leads us to our first calibration myth:

The First Myth of Calibration - "*Calibrated images will look real. Calibrated images will look like looking out the window.*"

The last time I looked out the window, the world is not "GREEN" like in the Matrix. The world does not look like the Star Wars world or the world found in the film "300". What do movies have to do with the real world?

Calibrated images will not look real and cannot look real. The display system simply does not have enough colors to represent this ... Deal with it.

If a person somehow promises you some true to life image after a calibration, they are either lying to you or they don't know what calibration is actually about.



So, calibration is not about making things look real ... okay. However, people that consider display calibration also happen to be movie fans or film buffs. I don't know of one person that hired a calibrator and did not care about movies. If one does not care about movies, then calibrating a display becomes rather inconsistent for a person. Mostly everyone else, of course, is in this for movies because this is home theater after all.

So if we cannot make the display look real, perhaps it is possible to make the display look like what we watched in the movie theater. Maybe calibration will make our display look like film as seen in the theater ... perhaps that is a possibility. We've all heard people describe calibrated images as looking film-like (whatever that might mean). Well with all that said, it is time to look at the second image that shows us the color palette for Digital Cinema or DCI (Digital Cinema Initiative).

It does not take very long to realize that this color palette is still smaller than what the human eyes can see, but it is significantly larger than Rec. 709, better known as the HDTV color palette. Film has more colors than our TV system and as such, this leads us to:

The Second Myth of Calibration - "*Calibrated images will look like film. Calibrated images will look like what you saw in the movie theater.*"

We've seen other examples in our lives of this as well. A trip to the Caribbean usually drives this home as do a number of other things we see in real life. The plane lands and you get out and lay your eyes on the color of the Caribbean Sea for that first time in your life. It hits you and you stand and stare at the

water because it is a color that you have never seen before. Until seeing the color of the water with your own eyes, seeing the pictures of it on TV and magazine photos never could quite do it justice. You take out your digital camera or your film camera and start to take pictures of this vacation. The flowers, the water, the people are all worth capturing and then you go home. When you develop the photos of this trip, you find yourself flipping through them and then something hits you. As beautiful as the photos are, the color palette in the photos does not look as vivid as you remember. The colors almost look a bit muted and you wonder what happened to your photos.

What you are seeing is that as good as film is at capturing color, it is still not as good as our eyes. But even with the color limitation of film, it is still better than what our televisions are capable of producing.

So calibration is not about film either. We cannot get the presentation to look how it looked in the theater. Our displays do not have that ability.

The interesting part about this is that film makers already know this and have for a long, long time. They know that there is no way the theatrical presentation can be brought to the home and no effort is made to do so. The problem is that there are some film enthusiasts out there that have it in their heads rightly or wrongly that the video presentation must somehow always be as close to the theatrical presentation as possible.

Here is a story from the film world about the making of films that many are not aware of. This story is about the film production company called Merchant Ivory Productions responsible for such films as "A Room With A View," "The Remains of the Day" and "Howard's End. (Originally told by Joe Kane.) When this company shoots their films, it is in the post production stage as they are readying the film for theatrical release, where the company often runs out of money and cannot finish the film the way they want to. When the studio gets word of this, the response would often be that it is sad to hear, but contracts have been signed and commitments have been made. (See you in court ...) So the film makers are now behind the proverbial 8 ball and must deliver a product.

Fortunately for the film company, they are already in post production and simply in the process of putting together the film they want so a rough cut of the film already exists. With no more funding available, the film company hands over one of these rough cuts to the studio and that version gets released to theaters. The theatrical run proves to be profitable and now the film makers have more money in their hands. They can now finish the film the way that they originally intended, however, they also realize that the film cannot be re-released to the theater since in this day and age, the theatrical

value of the film is considered to be over. So the film gets finished within the realm of home video and when you talk to the film makers, they will tell you that the video version is closest to what they had originally intended as opposed to what people saw in the theaters. The theatrical version was merely a work print, a work in progress; something needed to make additional money so that they could finish the film the way they really wanted to.

Just a reminder that what makes it to the theatrical may not always represent a finished product.

Now back to what calibration is actually all about.

Let's take a look at the creation of the blu-ray version of a film like Avatar. In the production studio

The purpose of calibration is to set the display at home to the same standards as the displays in the studios because that is what all the films were mastered on. This is only about making the displays look like the studio grade monitors and nothing more. To see the art the way the artist wanted it to look.

somewhere, James Cameron will sit and supervise the transfer of the original film to blu-ray. They will make adjustments and corrections and other tweaks to the film beyond what was seen in the theater because they know that the color palettes are different and this is further down the road in the

creative process of any film. At some point in this process, James Cameron would stand back and say that he is happy with what he sees and he signs off on the Blu-ray master. They take this "Director approved" version and create 20 million copies of it on Blu-ray. The question is, what was James Cameron looking at when he said that he was happy with what he saw? Was it a black and white image? Was it in color and if so what kind of colors were they?

He is looking at a studio grade monitor displaying his film, his art, and this monitor has been properly set up. How will someone at home be able to see what the filmmaker wanted them to see? They have to set up their TV at home to look the same way as the studio monitor. This is the heart of calibration and this point has been lost on so many people including people who actually calibrate displays.

The purpose of calibration is to set the display at home to the same standards as the displays in the studios because that is what all the films were mastered on.

This is only about making the displays look like the studio grade monitors and nothing more. To see the art the way the artist wanted it to look.

"2+2=4" That is the goal of calibration. The correct answer is "4" ... to make the display look as close to the studio grade monitors as we can. This leads to one of the top questions about calibration by people

considering it, but not sure what it actually is. The question is "Will I like what a calibrated image looks like?" The answer to that question is ... "2+2=4" Is there a like or dislike component to this equation? Can we say that we do not like it at "4" and would like it to be "98" instead? If the answer is yes, then one really isn't interested in the answer to the question at all. They want what they want ... and those people are not candidates for professional calibration. What is the answer to the question of 2+2=? What is the picture supposed to look like? There is no like or dislike component to this. The answer simply is what it is.

Bonus Myth of Calibration - "*Calibrated displays will save energy. Calibrated displays will last longer.*"

The above is completely beside the point. If a person buys a TV and sets it to movie mode himself at home, he will save just as much energy as a calibrated set. If a person buys a TV today and takes it out of the box, it will be preset to some form of factory ECO mode that uses even less energy than any other mode on the TV. If a person leaves his display in this mode, a calibrated display will actually consume more energy, but again, this is all beside the point. Calibration of a display has nothing to do with saving energy. It is about matching the studio grade monitor in performance and standards. To see the art the way the artist wants it to be seen. If calibration as a process consumed double the energy and shortened the life span of the display, we would still do it.

Simple in many ways and yet also amazing that calibration classes have had difficulties explaining this part to their own attendees for many years.

Why TVs Are Not Calibrated ... Get Over it

"The marketing of a tv set has nothing to do with presenting accurate images, it has everything to do with selling more TVs."

If the marketing department of a TV manufacturer that "you" owned, came and told you that they just found out that people will buy more TVs if pictures are green, what would "you," the owner say? ...

"Make the pictures green."

This game is about selling TVs, it is not about accuracy. And the sooner one gets that through their head, the easier life gets. ***Accurate images don't sell to uneducated masses.***

And now for the rest of the story ...

To start off, a brief walk down memory lane as we look at the history of the Television. For us in North America, this begins around the year 1939, when the founding fathers of the TV system (our NTSC system) started to work on the specs for the system. NTSC stands for "Never Twice the Same Color" for fun or National Television System Committee. While we are at this game of alphabet soup, anyone want to guess what the name of our high definition TV system is called? I'll give you a clue, it's not called "HDTV." It is actually called "ATSC" for the "Advanced Television System Committee." So back in 1939, one of those founding fathers was actually quoted as saying "One day this TV system of ours is going to be capable of displaying large screen images ... images as big as ... 19 inches." This line actually says it all and answers that question that many people have when they try to watch standard definition programming on their new 60", or 80" or 120" sets. Why does the standard definition material look so bad?

The Answer - ***"... because it is bigger than 19 inches ..."***

Only the fool or the naive person would believe that a TV is somehow capable of magically creating all new detail out of nothing. If one keeps zooming the image, new detail can continually be found in the signal. Well if one happened to watch "CSI" a lot, then they would believe that this is possible as well as solving all crimes in 42 minutes.

All cable boxes and satellite boxes have TV guides built in. When displayed, these guides always have a picture in picture in the corner of the screen for live television. Even the worst looking channels look

pretty decent here. Compared to the size of the TV, look at the size of this picture in picture ... how big is that?

So black and white television begins in 1939. We now fast forward in time to the 1952-53 time frame. They are working on the specifications of the color TV system at this time. The Gov't comes in and mandates that the color TV system has to be backward compatible with the existing B/W system. Part of the rationale here is that TV stations have just made a large investment in equipment to broadcast B/W tv and asking them to buy more equipment for color TV may be too much of a financial burden for some. God forbid, people at home should not be expected to own two televisions ...

The question then is, how will the backward compatibility work?

The color TV system actually uses the original B/W tv signal that was already out there and it simply overlays color on top of a black and white image. It is like taking color pencils to a black and white image. So think of our color TV system as two distinct parts; one part B/W tv and one part Color TV. You can see this for yourself on any color image by turning the color control down to the bottom end and watching your colors fall out. On most displays, the bottom end is an image devoid of color. It is black and white. This is the original broadcast TV signal. This applies to both SDTV and HDTV because HDTV had to be backward compatible to support SDTV.

So color TV is two parts; one for black and white and the other for color. But the color TV is not a black and white device. It makes its image based on red, green and blue pixels. (sometimes yellow too) So the first part of the TV equation is that it must take this RGB system to create a neutral black and white image. Not a green tinted B/W or a red tinted one or blue tinted ... but a neutral B/W. The TV is more than capable of doing this, but this is where the TV makers deviate from the rules ... the "standard."

Our television companies take a lesson that was learned in the laundry detergent business and they apply it to our displays. "That's right, you too can get your socks whiter than white!"

What the hell is whiter than white!!! I don't know, but that sock is clearly whiter than the other sock ...

Does anyone remember what color liquid laundry detergent is? Blue. The powder stuff was white powder with blue speckles ... as in blue dye.

The laundry detergent industry spent some money looking into the science of how human eyes work and they found out that our eyes are more sensitive to blue than it is to white. Add some blue dye into

the detergent to make the whites blue and our eyes will pick up on that blue. We will see it better. Obviously at some point if one were to put too much blue dye into the mix, we just get a blue sock and that does not fool anyone. There is a fine line where blue dye can be added in and our eyes see it, but the brain still says "It looks white to me..." This is where whiter than white lives.

Need some more proof about how our eyes work?

When you drive around at night, which are the car headlights that you see better? Chances are the Xenon blue white bulbs. We perceive them to be brighter than the normal headlights because of the blue in the light. Of course the brightness of car headlights is something that is regulated by the gov't. One cannot market light bulbs that are so bright that it blinds other drivers causing accidents. We think they are brighter, but they are actually similar to the normal headlights. The blue sensitivity tricks you into thinking that it is brighter.

... 'blue white' sets may catch our eye on the showroom floor, but they won't have the same effect in our meticulously designed - and expensive - Home Theaters. They'll just look bad!

And now we get back to the marketing of television sets. Instead of making the black and white material neutral according to the rules, the TV makers make this part more blue in order to get blue whites. Blue whites attract people's attention especially on a showroom floor. We think it is brighter ... and since brighter is always better, we now have TVs that sell.

Many people have asked me over the years about why TVs simply don't come out of the box looking correct ... or at least as correct as possible. Heck, I used to be there too. When I first got into the industry back in 1999 or so, I figured that display calibration was a fun hobby, but there would come a time when the TV sets simply got good enough that it made the calibration business completely redundant. I expected that I would be "The last great horse carriage tweaker." In 1999, looking toward the future, I figured 5 to 7 years was that time frame, so I would not quit my day job. As the years marched forward, I still maintained it would be 5 to 7 years in 2002. By 2004, I just stopped saying that at all. I quit believing what I was telling others, because I had been in the industry long enough and heard enough stories to have to change that original premise. It was wrong.

Why can't the TVs come out of the box correct? You are witness to the answer. They can, but accurate TVs do not sell. Give the masses what they want ... and it isn't a calibrated image. A calibrated image will lose every time if you put one on the showroom floor.

In a sea of blue looking TV sets, the correct display is the only one that looks yellow.

TVs will continue to be set to nice and bright and blue on the showroom floor. It is the nature of the game and what gets most people to buy the TV in the first place. But TVs no longer come from the factory preset to the vivid or dynamic super bright modes to catch your attention.

Something else happened that changed that. ([See here](#))

Is Calibration Worth it? ... How Long is a Piece of String

The title says it all, is calibration worth it, and this is the age old question that so many ask themselves along with the question of "why are we here?"

While we are at this, let's add a number of other useless entirely subjective questions like:

Is it worth it to go to the moon?

Is it worth it to climb Mt. Everest?

Is it worth it to buy a BMW?

Is it worth it to try snowboarding?

Can I stop now? Mind you, when people ask questions like this, they don't take the time to actually think about what they just asked.

My father, who is both a source of much love and angst, views the world in the following way, distorted as it might be. When he was working as a professional engineer, he was worth every penny of the \$60/hr he charged. Now everyone else's time and efforts are only worth \$4/hr to him. Dentists should only charge him that. Doctors should only charge him that. The people that re-shingled his roof should only charge that ...

Well it turns out that he isn't the only one out there with a distorted view on the world. Apparently, no one else is permitted to make a living except him.

When I have a plumbing disaster at home with water spraying all over, I do not bicker with the plumber about the \$150 emergency house call that he makes. It also does not matter to me if he fixes the problem in 5 minutes or less. I'm paying for a result and his experience and the cost more than justifies me not taking the time to learn how to do this and get the appropriate equipment for the job.

It is probably very human of us to value the cost of our own time as high and the cost of others as low.

Is a lawyer justified in charging what he does?

Is a doctor justified?

Is an engineer justified?

Is a mechanic justified?

Is a carpenter justified?

Is a plumber justified?

It's all relative and dependent on how urgent you need their services. If you are up on murder charges, perhaps you are not thinking about hiring the \$30/hr lawyer versus the \$500/hr lawyer.

Worth is relative. It is tied directly into something called a value judgement. It is entirely subjective rather than objective. Is a BMW vehicle worth it? Well one person will tell you yes, most definitely and another will say they are not. The question to you is ... who is correct here? If you can figure this out, you can figure out the answer to "life, the universe and everything." This is like that other subjective question that people considering calibration always ask themselves too. "Will they see a difference?"

I can't promise anyone anything of the kind, but I will say that the "man with the baseball bat" hated the calibrated picture before he loved it. The calibrated picture never changed. (For more on this, see the article on Hit and Run Calibrations) What really changed was his frame of reference, his perspective.

Calibration is a want ... it is not a need. No one needs to get their TVs calibrated. People's lives do not depend on this in the movie industry ... although an uncalibrated display in the medical field could mean not seeing things like tumors on x-rays. If you want to get the most accurate presentation of programming material on your TV, then you have to go through the "calibration door."

If I want a Porsche, I have to be able to afford one, or I have to be willing to build one myself if I think they are overpriced, but I still want one.

To get the most out of a television set in the only way that is quantifiable and measurable, we need to get the TV to meet the image standards set out by SMPTE. (For more information on this, go read the article on "Why We Calibrate ... Myths"). Remember that 99% of TV owners do not care about this part. It is not a priority in life for them and that is okay. People have different priorities as some love home theater (me) and some love to snowboard (not me) and that is okay. This is what life is all about.

So for those that want to see an accurate image on their TV, they have the following options:

1. Lament and pout about it and how unfair the world is. (See article on Why TVs are not Calibrated)
2. Learn how to do it themselves and buy the hardware and software needed to accomplish this.
3. Hire a professional calibrator if they value their own time more than the cost of a professional.

In all cases, no one holds a gun to your head to say you must do this. I can stand back and lament about how there aren't any top tier Lawyers that charge \$20/hr. One can also lament about why mechanics charge me \$40/hr instead of \$6/hr.

On doing it yourself, you will need to get both hardware and software for doing this as well as spending a lot of time researching how to do it. Lowest cost of reliable hardware is \$400 (Color Munki Spectro) and another \$200 for the software (Calman DIY) to drive it. Now you are in it for \$600. You will also need to spend a lot of time researching this and practicing; possibly 100 hours or more. I read an interesting statement about how people value their time and everyone placed a value of more than \$3/hr for that time. So if we figure \$3/hr times 100 hours to research, then the cost of your time is at least \$300 and now you are in it for \$900. (Most professional calibrations will cost in the order of \$350 to \$450 including travel costs or sometimes not. They will have better gear than the DIY'er and they will likely have way better training and experience ... but this part is debatable.)

An interesting side note here on my experience with the "DIY'er as client" from a professional calibration perspective. In all cases, the client tells me that they completely understood all the material that they researched on how to do things beginning with the basics like the user controls. So 100% of my DIY'er clients tell me they are certain they did everything correctly. I am being generous when I say half of these cases turned out to be mistaken. They may not have gotten every step of the way wrong, but made enough mistakes to make me take notice. The dilemma for me is what to believe when a DIY'er says he did it correctly as there is a 50/50 chance that he is wrong. Everyone says they do it correctly, but half of them end up doing it wrong in some manner that will matter. They just don't realize it themselves.

I liken this to asking everyone out there to rate their skills as a driver and everyone says that they are good drivers. We still have accidents so clearly, some people are lying, or just that everyone's own definition of "good" is different.

So buying both hardware and software is still no guarantee that the end result will be done correctly.

I won't be going easy on the professional side of things either. Just like in the real world where there are good doctors and bad doctors; good lawyers and bad lawyers; good engineers and bad engineers; there are also more bad professional calibrators than good ones out there. The calibration education programs have helped see to that. On the ISF side of things, people going through that program do not really have to demonstrate their proficiency or competence in calibration to anyone after they finish the course. (THX requires that their calibrators submit 10 calibrations to demonstrate competence and requires continuing education as well as many hours of after class training time during the three day program where novice mistakes usually pop up) The problem with not having to demonstrate proficiency outside of the class is that if a person misunderstands a calibration concept (but does not realize it himself) the mistakes get passed onto all the TVs he works on and there is no oversight to the process. They continue to do things wrong, TV after TV. It never gets corrected. Experience in 100 TVs means little if a person did them all incorrectly.

So just like every other profession, it is up to the end user to figure out who is good and who is bad. Get references, talk to others that have used their services. Calibration is not a black art, a good calibrator should be freely willing to share information with you. Just as good doctors and mechanics exist, good calibrators exist too, one just has to look for them. Just be careful if a calibrator promises to you over the telephone or email that "you will see a difference" ... because that is a lie.

You are at home and a friend on the road calls you up and asks for directions to New York City. Now you know where NYC is so you figure that you can help him out. You have to ask him something before you can help. That something is ... "where are you right now?" His answer ... "I don't know, but I think I am close."

Ask yourself how helpful that response is. What does it tell you? What does "close" mean? Close as in he is already in NYC? Close as in he is 20 feet from NYC? Close as in he is on Planet Earth.

A calibrated image is our destination. When one calibrates to that often enough and that is all they see, they get accustomed to the way it looks. They know the destination. The problem with talking with people over the phone is precisely what our cute story is about. The calibrator cannot possibly know what the starting point is.

Still think professional calibrators charge too much? Well this is a relatively free society and everyone is free to compete. Change the system and start to offer your own calibration services for \$50, \$100, \$150 ... and let the market place decide if you are right or wrong. This goes for Doctors and Lawyers and Engineers and Dentists and everyone else out there that offers a service and charge for it.

One could pay a calibrator hourly for his services or as a lump sum with time not a consideration only the end result. There are positives and negatives to both ways. Some televisions can be calibrated in as little as 10 minutes while others can take many hours. It's human nature. A person picks the lump sum fee and then finds out the calibrator finishes the work in 10 minutes. He feels cheated and it is the fault of the calibrator. Or the calibrator finishes the job in four hours with the same result and he does not feel cheated. Same end result, so very human and no one is ever responsible for the consequences of their own actions. Everyone is a victim.

By the way, I don't think a BMW is worth it, but I do not lament about it or try to convince those that do see value in the car to not buy it.

And a piece of string is exactly 13 inches ... :D

" STUPID should either hurt you or cost you ... because that's the only way most people learn" - One of Ray's Theories of Life

Picking Your Poison ... Uhhh ... Next TV

This article is about general issues with display technologies. That's the name of the game ... picking your poison ... and you have your choice of poison from Cup A, Cup B or Cup C. This is actually an element of television shopping that most people in the hunt don't know or don't take the time to think about. It is also one of the most common questions asked of professional calibrators. "What TV do you have?" As if that actually mattered and the answer is a resounding "yes."

There is no Holy Grail for televisions. Each and every TV technology has both strengths and weaknesses and the weaknesses differ from set to set and technology to technology. Add to that, the longer we own and use a particular TV, the more faults we will come to know about that display. Everyone will react differently to the weaknesses of the various displays. Some weaknesses will be no big deal for some people and yet deal breakers for others. A set that works perfectly for one person may be terrible for another.

There is a perfect TV for you just like there is a perfect home for you that your realtor has found for you, after knowing you for all of one day.

This article will focus only on the negatives of each display technology. What about the positives? Well, I will leave that to the salesmen and the various manufacturer websites. I'm sure some positives will creep into this article anyway.

Plasma Display Technology:

There are three players in this category left; Panasonic, then Samsung and lastly LG.

Black Levels - Panasonic generally leads the pack here with sets with the best black levels of the three companies. Their V series is the top end and has black levels that are better than anything else in the Panasonic line up. Their G series is a step behind and has been described as having the black levels of the previous year's V series. For instance, the GT30 would be the same performance as the VT25 ... and so forth. Samsung plasma sets are typically a bit weaker in the black level department than the Panasonic and it has been said that Samsung blacks always lag a year behind Panasonic. Field observations seem to confirm this.

The best Samsung plasma sets of a current year will have black levels at the G series level of Panasonic sets. Samsung has smartly gone with a lighter bezel design that helps to trick your eyes into thinking the black levels are actually blacker than they really are. When the bezel is piano black for instance, it becomes painfully obvious that is the reference for what black is supposed to look like and when the black bars on a widescreen film do not match the blacks of the frame, it distracts us. Without that black reference, the Samsung black levels become the reference and suddenly the set looks so much better.

LG black levels are almost another year behind the Samsung units so figure two years behind Panasonic. They continue to use black frames which make the lesser black performance of the display more apparent. Their emphasis has been on slimmer frame designs the last few years.

It should be noted that the black levels of LED sets with local dimming are better than the Panasonic black levels even on the V series, but there are, of course, other issues associated with that. (More later)

Image Retention - It is still with us after all these years and it is due to uneven wear on the display. Watch a 2.35:1 film for a few hours and seen those ghost images of the black bars on the top and bottom of the image? (The TV area hosting the black bars were unused during the movie you watched. The wear on the TV is uneven, just like uneven wear on a car tire. This will go away over time ... 30 minutes of active material that fills the screen should be more than enough usually. Watching Speedvision channel for many hours straight in one day will give you the same effect. Suddenly you see that Speed logo on other channels you watch. Obviously this applies to any channel that likes to use logos in the corners (pretty much everyone). I've had Samsung plasma sets in the home for more than five years now and I find that a 20 minute sleep timer setting running a photo slide show of pictures uploaded to the TV is more than enough to remove the image retention from watching two 2.35 films in a row. Set the timer before I head off to sleep and it takes care of the issue right then and there.

Samsung plasma sets do seem to be more prone to image retention than on the Panasonic, but it goes away with responsible viewing habits.

Burn In - When people are not responsible with their viewing habits and watch one channel a bit too much, then TV logos will burn into the screen and they will not go away (easily). Permanent image retention is "burn in" and that is not covered by warranty. Just read the manual and it says that. Static images that cause damage are considered to be an abuse of the TV and not covered by warranty. If a salesman tells you otherwise, I suggest you get him to write down that promise on the bill of sale and sign it.

Contrary to what some people say, "burn in" is still very possible if people leave static images on the screen for too long. Watching 4:3 standard definition programming with the black bars on the left and right sides of the TV are bad for plasma TVs. This material needs to be stretched to fill the screen. Sorry, that is life. Now there is some layer of material that needs to burn off the display in the first 200-500 hours and after that happens, the display is actually more robust to "burn in." This does not mean immune to "burn in." It just means that the plasma TV is most prone to permanent "burn in" damage in its first 500 hours of use.

Break in discs are not needed here. Just use the TV responsibly. A tall order, it would seem for some people.

It should be noted that this break in period is not related to whether you can get a new plasma TV calibrated or not. They have nothing to do with each other. A calibrated plasma set out of the box does not change much over the first six months of use versus the second six months of use. The drift in the calibration is about the same in both periods.

I've seen VT25 units from the 2010 model year with burned in TV logos so it still happens as well as on 2012 Model year Samsung plasma units.

Reflections - It's a big sheet of glass and it reflects room light. This is just like every other CRT set that has ever existed in the past 60 years of TV history. And now it becomes a problem? Good light control is always a good idea for every TV, but plasma sets really are no worse than the other flat panel technologies when it comes to reflections. Lots of daylight means compromised viewing in any book. There is no such thing as reference viewing in daylight. The Vivid mode and the Dynamic modes of the plasma sets can easily be re-purposed for these bright rooms.

Light Output - Without a backlight, plasma sets usually cannot be made to be as bright as the LCD/LED sets, but are very capable of holding their own in rooms with sunlight. I wonder if all the flat panels will work in sunlit rooms, whether more light output is even needed or becomes a factor.

LCD Display Technology:

For flat panels, the pure LCD displays that still use CCFL (Cold cathode fluorescent lighting) for lighting up the image now commonly inhabit the bargain displays for all the TV makers. Most of these sets are \$1000 or less. On the front projection end, they inhabit the \$4000 and less range with the Panasonic and Epson units out there among others.

Black Levels - Some of the weakest black levels out there on both the direct view and the FPTV side. The Epsos and Panasonics just seem to have hit a wall on the FPTV end. Epson literally seems to have had to jump technologies to improve their black levels and get out of the LCD end. The LCD blacks on the direct view sets are all worse than even the LG plasma sets. Blacks also tend to look uneven given the fixed location of the CCFL bulbs in the TV. (Add a good backlight and the black level performance will actually improve.)

View Angles - In this area, think IPS screens (In-Plane Switching). The same screen found on the IPAD. LG and Panasonic use them and no one else currently does. Not the literal 180 degrees of viewing like on the plasma end, but still leaps and bounds better than the LCD sets that do not use this screen technology. For the TV makers that do not use this type of screen, the Sony comes out on top followed by the Samsungs and lastly the Sharp units. The viewing angles on some of the Sharp displays have had significant color shifting with even two people sitting in the sweet spot viewing the image. The further off axis a person gets, the black levels rise dramatically and the colors start to change. (Fleshtones start to look brown, for instance.)

If the display is meant for one person to view, then the LCD sets without IPS screens are reasonable choices. Many people sitting well back of the TV ... same reasonable choice.

Motion - Response Time ... Slower than plasma. LCD sets involve the twisting of crystals to allow light to pass through or not. This takes time. Plasma is simply sending current into a gas so is inherently faster and near instantaneous in response time.

Dead/Stuck Pixels - While still an issue, actually less and less of one. I have not seen any sets in recent memory that had dead or stuck pixels in all the units I have played with. While I am sure it still happens, it has not been as noticeable as it was four years ago and longer.

Uniformity (FPTV) - What I have long hated about the Panasonic LCD projectors was their non-uniform images. What is meant by this is that a pattern like an overscan pattern that has a 50% gray level

background is not consistently gray from edge to edge and corner to corner. Even with a proper calibration to get the center area of the image to be neutral gray, the left side is still noticeably a pink tinted gray and the right side is a green tinted gray. The top of the screen is green and the bottom is pink. It should all be devoid of color and yet it isn't. I started to think that this was endemic with all LCD projectors having seen it on unit after unit on the Panasonic side. Then I started to look at Epson units and the uniformity issues were not present. Solid gray patterns looked the same gray through the entire pattern. If one only watches color programming, then the uniformity issues are hard to see. Watch a black and white film and the issue becomes distracting at the very least.

Panel Misalignment - Convergence (FPTV) - When dealing with a technology that involves three color panels that have to precisely align to form an image, there is invariably a chance that one of the three panels will be slightly off and yield slight red shadows on all the elements in the image for instance. This has the effect of slightly softening an image.

Dust Blobs (FPTV) - Somehow on a lot of the LCD projectors ... particularly the Panasonic units, dust was able to get into the optical path and it shows up on screen as green blobs. Not so easy to get rid of and is a recurring event which often requires opening up the unit for a deep cleaning.

Bulbs (FPTV) - Bulbs are consumables and they last anywhere from 2000 hours to 5000 hours these days if we figure they don't fail any time sooner. Depending on usage, these tend to cost in the \$300 to \$400 range these days, and would be a recurring cost once every year or two. This depends on how much you use it. As an addition to this, performance out of a 2000 hour rated bulb starts to severely drop off after 60% of its rated life span. Bulb replacement is a good idea for a 2000 hour bulb when the bulb reaches 1200 - 1400 hours of life.

Motion Resolution - The amount of detail visible in objects drops dramatically when the objects move in the scene. A 1080p image can drop in detail to DVD levels from two million visible pixels of detail to 300-400 thousand pixels of detail. Plasma sets do not have this issue. The 120 hz and 240 hz modes on sets can recover this detail, but they often add their own weird effects to the image that might make things worse. The effect is called the Soap Opera Effect. Movies and anything shot on film begin to look like live stage plays and the stuff of the afternoon soap operas. Some get ill from watching this effect for too long.

LCD-LED Display Technology:

The display types in this area are broken into the two types of LED/LCD based displays that are on the market today. There are the lower grade edge lit sets and the higher grade local dimming sets. Both designs can be thin, but the edge lit ones can be slightly thinner than the local dimming ones.

Edge Lit

Black Levels - The black levels are marginally better here than in the LCD sets, but because the LED bulbs are located along the edge of the display, one can actually see the LED bulbs when standing off axis on some units. Since the bulbs are located on the edge, the blacks on the edge will always appear to be brighter than the black levels in the center of the image.

Cloudy Blacks/Uniformity - The unevenness of the backlighting causes blacks and dark images to appear cloudy as some portions of the image that are supposed to be black are just brighter than other portions. It is not enough to say that just the edges are brighter, but there are patches that are brighter and patches that are darker spread throughout the viewing area. Sometimes pressure on the front screen during shipping or packing will enhance this effect. Distracting to look at especially if a person likes to watch darker films like the Harry Potter films.

Viewing Angles - Same issue with the normal LCD sets. The LG and Panasonic sets use the IPS screen and most other TV makers do not. The Sharp sets have traditionally been the worst with viewing angles while the Sony sets are the best of the non-IPS screen displays. All these sets are categorically worse than the plasma sets.

Reflections - The higher end the displays get in terms of price and performance, the worse the reflections become. LG and Samsung like to put plexiglass type reflective surfaces on the premium displays in their line-up. Reflections somehow make displays look more upscale and more deluxe than a set with a matte finish screen. These sets perform similarly or worse than plasma sets in rooms with no light control. It is a myth that LCD/LED sets always perform better than plasma technology in bright environments. My top of the line LED/LCD LG set from 2010 is worse than my Samsung plasma from 2008 in my well lit room.

Dead/Stuck Pixels - While a concern, this seems to be happening less and less on all the displays I encounter. Keep an eye out for it, but it is a lesser concern these days.

Motion Resolution - The amount of detail visible in objects drops dramatically when the objects move in the scene. A 1080p image can drop in detail to DVD levels from two million visible pixels of detail to 300-400 thousand pixels of detail. Plasma sets do not have this issue. The 120 hz and 240 hz modes on sets can recover this detail, but they often add their own weird effects to the image that might make things worse. The effect is called the Soap Opera Effect. Movies and anything shot on film begin to look like live stage plays and the stuff of the afternoon soap operas. Some get ill from watching this effect for too long.

Local Dimming

Moving Blocks of light black - When a display can just turn off the lighting behind the black bars on a 2.35:1 widescreen film, it completely removes the distraction of the blacks not being as black as the bezel of the TV. Absolute black in the programming material is harder to judge as to what is really black and what is a dark gray. The more independent clusters of LED bulbs on the TV will improve the performance of the local dimming effect. Clusters can also be called zones. The ideal number of zones would be two million small LED bulbs, one for each pixel to light up or darken as needed. Of course that does not happen ... yet. We are still dealing with up to 512 zones. A far cry from two million. This is where the down side of local dimming comes in as a space film with a ship going through space lights up the ship, but also the adjacent black space around the ship as it travels across the screen. Black levels away from the ship are nice and black, but the blacks close to the ship are noticeably brighter and worse. This effect gets worse on some of the local dimming sets that use only 40 zones ...

Viewing Angles - Once again, the sets using the IPS screens have better viewing angles than those that do not. LG uses IPS on their local dimming sets. Samsung and Sharp and Sony do not. It should be noted that on IPS screens, the images become cloudy when off axis more than 45 degrees. The colors appear to remain stable.

Reflections - The Sharp and LG and Samsung local dimming sets all employ reflective screens making these sets no better than plasma sets as a choice for rooms with a lot of ambient room lighting. Sony still uses a more matte finish on their XBR line.

Dead/Stuck Pixels - Again, while still a consideration, it seems to be a lesser one these days.

DLP Display Technology (FPTV):

Rainbows - By its nature, a single chip DLP projector uses a color wheel to produce colors. The DLP chip with all the micro mirrors has no color to it, just a bunch of mirrors that pivot on and off to reflect light. In the early days of the technology, the color wheel did not spin as fast as it does today on most units and some people's eyes would subconsciously synchronize with this spinning color wheel and when that occurred, people could see a brief flash of red/green/blue ... a rainbow, as it were. This effect of synchronizing with something rotating really fast is similar to seeing the spokes on a bicycle or the design of a hub cap on a wheel of a moving car.

These days with the wheel going at 4X to 6X the original speed, fewer and fewer people see the rainbow effect. It is estimated that about 20% of the population will be able to see this effect which lasts for a split second. About 2% of the population will get a headache as a result of seeing this over the course of a two hour film. For myself, I am one of these people that can easily see the rainbow effect and I see it about once every 5 minutes when watching a film. Distracting, yes, but I see issues with LCD projectors far more often than I see rainbows.

It should be noted that the 3D technology as discussed in a separate article on this site affects 20-25% of the population in a similar way. That large number of people will also get headaches and nausea and dizziness when watching 3D programming. This has not stopped the TV makers from selling this product to the public. 2% for DLP is nothing compared to this number.

Dead/Stuck Mirrors - When there are two million mirrors pivoting on and off, sometimes these mirrors will fail. Now unlike LCD where we can see a red dot or a green dot or blue dot on the screen, a bad mirror would manifest itself on the screen as a "water stain" that cannot be removed. Think of this as a person walking up to the projection screen and sneezing on the screen. (As disgusting as that might be) The water droplets make it to the screen and dry up on the screen.

Moving Parts - Color wheel failure - A color wheel spins very fast and often. In time this mechanical device can and will fail. It is a potential and I have had a few clients out of many that tell me it happened to them. Likely a rare occurrence given how often people swap out their projectors these days. Something to consider when buying used.

Bulbs - Same as on the LCD projector side. Bulbs are consumables and they last anywhere from 2000 hours to 5000 hours these days if we figure they don't fail any time sooner. Depending on usage, these

tend to cost in the \$300 to \$400 range these days, and would be a recurring cost once a year or two. This depends on how much you use it. As an addition to this, performance out of a 2000 hour rated bulb starts to severely drop off after 60% of its rated life span. Bulb replacement is a good idea for a 2000 hour bulb when the bulb reaches 1200 - 1400 hours of life.

LED bulbed DLP projectors are starting to appear on the market. The rated life is up to 20,000 hours so effectively no bulb ever needs to be replaced here. Problem is, the LED bulbs shift in color considerably faster than the traditional UHD bulbs. I visit a certain local store front that sells high end Runco projectors. They have two rooms with projectors. One projector runs with a normal UHD lamp and the other with an LED lamp and both operate for 8 to 10 hours a day, six days a week. A return visit after 6 months found little change in the calibrated performance of the UHD projector, but significant color shifting on the LED bulbed projector.

Convergence - A possibility on 3 chip DLP units when the three colors are not properly aligned. There may not be a user control to adjust this.

LCOS/DILA/LCD-R Display Technology (FPTV):

Convergence - Similar to the LCD projectors, when there are three chips involved, sometimes they are not aligned as perfectly as we might like. A number of these projectors have pixel shifting features that can correct this. Some only correct based on things being a whole pixel off which can be an issue if the alignment is off by only half a pixel.

Another type of convergence error is harder to fix if not impossible. An apparent pixel misalignment, which only affects part of the image and not the entirety of the image. My JVC RS-2 has a convergence issue affecting only the left 1/3 of the image. A pixel shift correction actually shifts the problem to the other 2/3 of the screen. After talking with JVC engineers, they tell me this is not a pixel shifting issue, but a prism issue. The projectors use prisms to channel the light from the bulb through the lens. The glass prisms are ground to a certain specification, but have a tolerance of plus or minus.

Uniformity -Much like on some LCD projectors, some of the projectors using this technology will also have this issue. Some are overly red on one side of the image or in the corners. Certain Sony projectors have a color correction mode to address this, but it takes a long time to do.

OLED Display Technology:

These are observations based on an analysis and testing of the first generation Sony 11" OLED model.

Light output Drop - The further off axis the viewer goes, the light output drops to about 50% by 45 degrees. At the time, the set had a contrast ratio of 20,000:1 (Real) and dropped to 10,000:1 at 45 degrees. Actually not that big a deal if you read these numbers correctly.

Longevity - The original Sony unit touted something like a 30,000 life span for the display. Actual field data found the number to be more like half that. How this affects the new stuff coming from Samsung and LG is uncertain. If they can get more than six years of normal usage out of the units, then the issue may be moot since most people start to change out their TVs after 5 to 6 years.

Burn In - A consideration since the original Sony OLED could suffer from image retention issues depending on what material it was displaying.

Reflections - Just like on plasma sets and LED/LCD displays.

Hit and Run Calibration ... Drive By Shootings

A calibrator comes to your home in the day time, regardless of lighting conditions or even if you are home or not. His wife or housekeeper lets him in and he only has 80 minutes to work on your TV before he has to be on his way to the next home. Unpacking and set up of his gear and break down of the gear will take about 20 to 30 minutes. All told, he has 50 to 60 minutes of real time to actually do the calibration on your TV.

He doesn't have time to survey how your gear is connected to the display and out comes your HDMI plug on the TV and in goes his signal generator. He is off to the races and the TV is calibrated for grayscale. Time to head off to the next appointment.

He never gets to see programming material or talk to anyone about what he did to the display or explain why. He's out of the house and on his way to the next job - the TV is calibrated. When you get home, someone tells you that the TV guy was here and you turn on the TV. It looks different than it looked yesterday. More yellow ... and dimmer too. The image actually looks softer as well ... possibly more blurry ...

You pick up the remote and look at TV picture modes and select Dynamic ... the bright picture you had yesterday is back ... now you wonder why you paid that money for a "calibration." This result is clearly worse than what you had. You will chalk it up to a hard lesson learned ... or you will go back to the box store and tell them you want a refund on the service.

A few of your friends ask you how that "calibration" thing turned out. Not surprisingly, you say that it was a complete waste of your money and the results were worse than when you started. Your friends will now be weary of calibration too. It's a scam after all.

In a perfect world, you pay for a service, it gets performed to the desired result and you are happy. It doesn't matter if it takes five minutes to achieve that result or five hours. You are paying for a person's experience and not how long he spends in your home. Unfortunately, we don't live in that perfect world ...

In the above described scenario, which is repeated many times on a daily basis around the country, even the best calibrator in the world, doing a world class job would end up with this same result. Something is missing from this formula. Clearly, just delivering a competent calibration job is not enough here.

This leads to the following statement ...

"The answer is 4!!"

Does someone want to venture an opinion about what this statement means? This gets asked at every THX Video Calibration class and no one even comes close (they don't ask this in ISF classes... for other reasons).

What more do you want? I've given you the answer. That is all that you need. Calibration of a display provides answers. God ordains that once you have an answer, you will automatically love it ... well, er ... knowing what the question is might help ...

This leads to another story that happened sometime in the 2004/2005 time frame. I had a client with a 65" Hitachi RPTV that was both ugly looking in terms of colors and needed geometry and focus work. Coming in and seeing the state of his television, I figured that this was going to be a six hour job. Lots of physical things to do to the TV and also talk with the client. As I do my set up, the client informs me that he has tickets to a local car show and he will not be around for the calibration. But that is okay with him so he leaves the money on the table and tells me to just lock the door on my way out.

At this point in time, I would always try to educate my clients, but for those that simply could not sit through it, I figured that it was their loss and would continue with the calibration itself. With the client gone and the house empty, the six hour calibration job is reduced to 2.5 hours. There is no one to talk to except the wall and so the TV gets calibrated. I am happy with the results as my reference material looks exactly the way I expect it to look and it is time to go home.

The nightmare scenario begins when the client gets home later that day. It turns out that he has two other TVs in his home and he did not ask me to calibrate those sets. I don't even know that those displays exist in his home. It doesn't take the person long to realize that the main display, the 65" RPTV, now looks very different than his two other TVs. His two other displays are not calibrated and are still at factory default settings like sports mode and vivid mode (modes that are also lovingly referred to as "Torch" modes). He has come to the conclusion that I have actually ruined his TV set and he feels that I have to buy him a new one.

It gets worse ... the man is also a heavy drinker.

It is 12:30 AM Sunday morning, and there is a message on my answering machine (the client was 220 miles away). It is the client and he is drunk and mad as hell. He tells me how I have wrecked his TV and how I now owe him a new one. He also then talks about having a "baseball bat" and how he will take care of me to make sure I cannot pull this scam, this con job on anyone else ever again. Hopefully sober people do not leave threatening messages on answering machines...it's called evidence.

I try to contact the client the following week in an attempt to sort this out. He is still very angry and he will not hear anything that I have to say short of ... "Yes sir, I will buy you a new TV set." Since I don't have a clear picture as to what is happening, I am not about to say that to the client yet. He gets abusive over the telephone and I hang up. In the following week, I contact his friend, who originally recommended my services to him, and ask him what is happening. Why has his friend gone psycho? He is at a loss for words. This is a part of that person's personality that he has never seen before. By the second week, I contact the client again and this time he has calmed down. We make an appointment to take a look at the TV and when I get back there, the TV looks exactly the way I left it; not broken and not ruined.

I sit the client down and show him a test pattern. This is a pattern for setting brightness on the TV and explain to him how we do it and why it gets set this way. I do the same with a pattern for doing contrast...and then color and tint...etc. I then show him my calibration equipment and how it works.

Two and a half hours later of education, the client is happy. He is also very apologetic at this point because he realizes how badly he had behaved. The picture on the TV has not changed at all. It is still the same calibrated image that he was left with before. **And people are always asking me whether I think they will like a calibrated image or not and whether they will see a difference. Well here was a shining example of a person that starts out hating the image and then mere hours later, loves the image despite the fact that the picture never changed.**

This was my epiphany moment in calibration. It got me to realize that answers without the accompanying understanding portion meant nothing. Answers have no meaning or value if you do not understand the why part. For this client, the wrong answers that represented his two other TVs were deemed to be more correct than the correct answer was. Clearly, giving people a calibrated display and not educating them was not enough and accomplished little to nothing.

Two lessons were learned on that day.

- 1. Answers without understanding are answers without meaning or value.**
- 2. This will not happen to me again.**

After this incident, I altered the way that I do calibrations for good. Education became mandatory and no clients were permitted to opt out of this part. When someone wanted to opt out, I would decline the calibration job. I would not put myself (or my clients) in that position again and no job is worth that type of aggravation. Life is too short to have to deal with people like this. I'm happy to say that I have not had any client incident remotely like that since then.

A nice side benefit out of this which I had not foreseen at the time was that educated clients also talk to their friends. They can also speak intelligently about the process and they become advocates of the process and generate very positive word of mouth. They also become your recurring clients.

The typical response about what a calibrated TV looks like from someone that did not get an education is that "It looks kinda dark ..." Will people be lined up to get your calibration services after a comment like that? Educated clients never say such things. It is like saying that " $2+2=4$ " gives an answer that is a rather small number. "98" is much bigger ... so maybe that is a better answer.

I tell my clients up front that my calibration sessions will last from 4 to 6 hours ... sometimes longer. They know there is an education session as part of this and most look forward to it. There is no comparison between what I offer and what a big box store can offer. If a person still opts for the box store guys simply because they are cheaper, then it tells me that this person is willing to pay for something that they will not understand simply because it is cheaper. It's a test of rational thinking and I don't want irrational clients.

From a calibration perspective, those looking for the services of a professional calibrator need to ask themselves what they want out of the process.

The big box stores offer the hit and run service. A lot of independent calibrators offer a similar hit and run service because they simply don't know any better and haven't figured it out. THX Video Calibrators are taught that education of the client is paramount in the process. But will those same THX calibrators practice what was taught? Some do, and some don't. I know of a small handful of calibrators that do this. ISF calibrators are definitely not taught this aspect of calibration at all. I wish I could be more

helpful to those looking for a qualified professional. If I were to proffer one piece of advice, it would be to ask questions. If the prospective calibrator says that the calibration session will come in under 3 hours ... then someone is lying.

Tips For Finding Good Professional Calibrators

Here are some tips for finding good professional calibrators. The problem is that everyone says that they can do the job. ***No one will ever just announce to you that they are a bad doctor or a bad mechanic and yet such things exists so someone is either lying or they are just oblivious to the fact. We are all good drivers, after all.*** So it just makes things harder for you, the consumer, as you will need to do some homework and this article will try to make it much easier to sort out the good calibrators from the bad ones and the mediocre ones.

Here is a list of things to look for and consider when you decide to get your TV professionally calibrated and start to look for someone in your area to provide professional calibration services. It could be an independent or the Best Buy Geek Squad/Connect Pro people or some other permutation.

- **Training** - First up, this is definitely important, but not always in the ways people might think. I'm not saying that the professional calibrator has to be THX Video Certified or ISF certified, but they need to have proper training. Note that the term proper training does not have to mean formal training. It is very possible to be self-trained in this field as well especially if you have the enthusiasm and drive to learn it all yourself; it just takes a lot longer and there is more trial and error. I taught myself how to do this stuff before I went to get my ISF papers way back in 2000. I was an enthusiast for 20 years prior to turning professional. Proper training could also mean watching a series of [training videos](#); something that never even existed when I first got into this. I did it the hard way, and I ended up teaching the stuff for THX and ISF.

Lightning rarely strikes twice in this age of big box stores sending people out to do “ISF calibrations” with poorly trained staff that have never even set foot in an ISF class ... it can be pretty bad indeed. And just because someone has their ISF/THX piece of paper, does not mean they know what they are doing. ISF provides minimal real training to their people in their classes and even though THX provides triple the training time, coming out of the program still does not mean a person is immediately ready. There have been some instances (although rare) of attendees just wandering around class doing nothing because they figured they knew it all already. A number of BB guys did just that in one of our THX classes back in 2010. And a person just last year at one of the THX classes left promptly at the end of each day skipping out on all

the afterhours practice time and then proclaiming to others that both the ISF and THX provided the same amount of practice time.

Is a calibrator's knowledge up to snuff? Have them go take my [Calibration Challenge](#). The quiz is 45 questions that a seasoned calibrator should have no problems with. Set the bar at 80% or better for them. If they score lower, you need to be careful. (An ISF guy from France took this challenge and he scored 100% on it, despite English not being his language, so I know there is no problem with the wording of the quiz.) You can see how they do on the leaderboard after they complete the quiz and enter their name and email. If they refuse to take the quiz, be even more careful.

- **Equipment** - Hardware matters. But just like buying a professional grade camera does not make you shoot pictures like the pros, good gear in the hands of idiots does not mean very much at all. That said, a professional photographer can do some amazing things with even a point and shoot camera, but give them a disposable camera and that might even test them. That said, there is a minimum level of calibration hardware that you should look for and expect from your calibrator.

First thing is to make sure they have a spectrometer of some kind. It can be an entry level piece like the [X-Rite ColorMunki Photo](#) to an [X-Rite i1 Pro 2 or 1](#) to the more Cadillac pieces like the Jeti 1211 units or the Minolta CS200 or the Photo Research 655 or 670 units. If they use these with a colorimeter like a C6 or [X-Rite i1Display Pro](#) or Hubble or Klein K10, it is all good. But if you see them pull out only a colorimeter like the Chroma 5 or Hubble or C6 or Klein or D3, then there is a problem. If a colorimeter is used, it must be properly profiled to a spectrometer on your TV. None of this calibration table stuff.

And even if they don't profile the meter, it is still acceptable so long as they demonstrate to you that the end result is similar to that of a spectrometer. If they don't at least demonstrate this, then they are trying to pull a fast one on you. You should never just take their word on this because it has been shown too many times that colorimeters can be very wrong. Without profiling, a budget spectro device like the \$400 [X-Rite ColorMunki Photo](#) has been shown time and time again to be more accurate than a \$6000 Klein K-10 colorimeter that only relies on calibration tables.

Something is terribly wrong if they can't afford a \$400 spectro.

- **Experience** - Experience matters, but people have to learn how to do this stuff somewhere. This is where testimonials and referrals come in. It really isn't necessary that they have exact experience in your particular TV. The major brands of TVs really haven't changed all that much in the past five years when it comes to the calibration part. Sure they got thinner and added more widgets, but the calibration part stayed the same.

You might like to think that your TV is special, but it really isn't. It is not unlike learning the fundamentals of doing an oil change on a car. You know there is a filter, oil and a drain plug somewhere under the car. With this basic knowledge, you can do pretty much every car out there. It's really like that for TV calibration too. Of course no one likes to hear that they are not so special after all. If the controls work correctly on a TV, then even novice calibrators should not have an issue.

The experience counts when things don't work as expected and some measure of compromise has to be implemented. Of course experience also counts when you ask the calibrator a question about what he might be doing. You'd expect some reasonable answer versus a shrug of the shoulder. That really instills confidence in what he is doing.

- **People skills** - Now this can be a real problem because as a client, you might actually be curious about what the calibrator is doing and why he makes the choices that he makes. If you ask, things go much better and are far more enjoyable when you are included as part of the session. Even the best calibrated image can become problematic if the calibrator cannot get his client to understand some of the basic concepts in the calibration process. Correct answers don't mean much if the client doesn't understand the answer or why it is so. You can bet that if a professional calibrator talks to you about education, he will have pretty decent people skills.

- **References** - Don't forget to ask for some if the person is a real unknown to you. But realize as well that references don't mean very much if it comes from people that don't have an idea what a good image actually is or a way to compare and contrast the service they were provided. Consider that there are many people who have used the calibration services from the big box stores and will tell you that they are pleased with the results. However, when you get a chance to scrutinize this same work that resulted in a "pleasing result," you find out item after item that was actually done incorrectly or omitted completely. Once you relay this information to the client, his opinion of the original calibration service evolves rather quickly from being happy to now being angry. Chalk it down to the following statement. "You don't know what you don't know."

Out of all this, I am reminded of a story I heard about an industry fellow of some influence that owned websites and internet HT publications (amongst many things, no doubt) who would often like to drop names about who "calibrated" his displays. It soon became apparent that the name dropping of those major industry calibrators were more important than the quality of the work they actually provided this person. But because he didn't know any better, what these industry calibrators showed him about calibration became his only reference for what professional calibration was actually about.

And then one day he found out about what happens when a real calibrator that cares about what he is doing actually did. The big name industry calibrators had essentially pulled one over on this guy either intentionally or they were being lazy. They just used a test disc and didn't even bother with any instrumentation and they passed that off as real calibration. Let's just say that this fellow was mightily ticked off when he found out what he was really missing. And here was a case of **"you don't know what you don't know."**

So armed with these tips, it should be a bit easier to screen potential calibrators and figure out who actually is up to snuff and who the pretenders are. You are back in the drivers seat again and you have that [nifty quiz](#) of a tool at your disposal. I'm not asking you to be able to pass this quiz with flying colors, but you are certainly welcome to look at the questions that will be asked. ***And I am not like people in some industries that refuse to talk objectively or critically about their industry for fear of making the entire industry look bad, regardless if the customer is the one made to suffer.***

Calibration and Energy Consumption ... I want to be an Energy Star

Here is a selling point for TV calibration. Calibration and energy consumption. They are like best of friends, or are they? The image below and those like it started to show up on the TVs in 2011 and are pretty prominent on all the TVs in the Best Buy stores and other brick and mortar stores these days. Can you trust what they say?

Where did this stuff come from?

Up until 2011, TVs came out of the box looking a certain way. For a refresher on why they looked that way, read the article on why TVs are not calibrated from the factory found elsewhere on this site. ([click here](#)) So TVs routinely came out of the box set in a picture mode commonly referred to as the "Torch" mode. The one mode in the TV that produced the most light output. This was effective at catching people's attention in stores and since people associate brighter images as better images, this was a good thing. The manufacturers in TV land were happy and God smiled upon them.

From a calibration perspective, the fact that the displays came out of the box consuming so much more energy was another positive for getting a TV calibrated. It would actually save a noticeable amount of electricity when calibrated. The arguments and sales pitches were altered to emphasize the \$\$ savings on electricity in addition to having the TV last longer. Or so the argument went, anyway. If accurate images were not enough, maybe a green angle to calibration would help.

The truth of it was that the energy savings were real, but the same energy savings could also be realized if the user merely changed the picture mode himself to Movie mode or Cinema mode. If they did that, then a professional calibration would not really end up saving energy at all, nor do anything for prolonging the life of the TV.

Well, some time in 2008/2009 time frame, something happened in the State of California. They went and passed a law requiring that the TV makers reduce the power consumption of their TVs by 1/3 or so and it applied to TVs less than 65 inches. I distinctly remember at the time that we joked in our THX class that the TV industry was really not going to do much to meet this demand for energy savings. I'm sure the legislators thought that the TVs would somehow be redesigned to make things more green and that they were doing a positive thing for the industry.

We figured that all the TV manufacturers had to do was to ship their TVs out of the factory in Cinema mode rather than the usual Dynamic modes and the energy issue would be addressed in one easy stroke. This move would essentially cost them no money at all to do it. Well the TV manufacturers did take this route and they did it one better. They decided to completely retune one of the modes of their TV ... notably the Standard mode and turned it into the poster child for the Energy guide.

The mode that the TVs now ship from the factory in, has been preset to present an image that is significantly dimmer than even the Cinema modes on their TVs. The image is essentially unusable and no rational person would find this image remotely pleasing given that it is just too dim. Most people would grab the remote control immediately and start to cycle through the various picture modes until they found one of the brighter modes if not the brightest mode. And since we all know that brighter images are better images, settling on that dynamic image setting is where most end up.

This leaves them with the same energy consumption as if the energy law never existed. TV performance before energy law and after the law stayed about the same. So where does that yellow sticker fit into this picture? Well, the TVs are tested based on that mode that the TV uses out of the box. (Remember, this is the mode that is so dim that no one in their right mind would deem watchable.) And so a number like "\$22" is concocted for the expected energy costs over the year for the TV in question.

Some people will actually shop for their TVs based on these energy consumption numbers believing that these will be their actual costs. They will not associate picking the Dynamic mode of the TV as something that would drive up the cost of energy over the course of a year. No, they firmly believe that the yellow sticker actually applies to them.

The Energy Guide stickers and the numbers on them have become like the old days when people picked TVs based on the resolution of the TV ... 400 lines ... 500 line ... 700 lines... It didn't matter that the cable TV they had was the weak link restricted to 320 lines. History just loves to repeat itself again and again.

The next time you are in the store looking at TVs, have a good laugh with that Energy Guide sticker. It means absolutely nothing at all.

Now from a calibration perspective, we can no longer tout that calibration will save anyone more energy since the TVs come out of the box consuming even less energy than on a calibrated TV. Today, a calibration will actually end up increasing energy costs on all new TVs shipped from the factory.

But beyond all of this, the goals of calibration actually have nothing to do with energy savings at all. Calibration is about seeing the art the way the filmmakers intended and nothing more. If this actually consumed more energy and shortened the life of the TV, we would still do it.

The best way to save energy with our TVs is to turn them off and not use them. Go ride a bicycle. "Estimated Yearly Energy Cost" = \$0

Calibration ... Who Died and Made You God

Thanks to Ray for suggesting that I write this one about calibration, although after we talked, he realized that I would not be approaching this from an angle that he had in mind. He came to regret asking me, but it's too late, the idea is out there now. :p Told him he has to kill me to make me stop.

The discussion (or argument) goes as follows; does a calibration with only a test disc like Digital Video Essentials or the Disney WOW disc constitute a calibration? If one listens to some of the professional calibrators on some of the forums, you'd start to believe what they say, which is that it is not calibration. At least that is what they want the consumer to believe. But just because I want someone to believe something doesn't mean they will and doesn't make it the one and only truth. There is more than one point of view here with one side saying it is not calibration. Here is the counter point to this.

There are a set number of steps in the calibration process and this is usually the order of how things progress once the best mode on the display is chosen. Typically the Movie mode or Cinema mode or Custom mode.

1. Black Level
2. Contrast (Then recheck black level)
3. Sharpness (can be done anytime actually ... not order critical)
4. Color
5. Tint
6. Overscan (again not order critical)
7. Grayscale/White Balance
8. Color Management System
9. Black Level (recheck)
10. View Reference Material

There. A ten step process to a full calibration which is simple and straight forward *if* everything in the TV works right. Of course, that is a big *if* these days because lots of the so called advanced features on many TV sets do not work as advertised. They don't just do what you think they do or, they do other weird things to the picture which makes them useless. More steps get thrown in if people want 3D or to do anamorphic lenses and stuff.

It is generally agreed upon by the TV industry experts that if one just sets the user controls correctly and nothing else, they will have achieved about 60 to 70% of all the improvements that the TV is capable of in terms of us visually seeing it and appreciating that difference. Okay 60-70% with just a disc. That is nothing to sneeze at. White balance/Grayscale calibration will take that number up to about 95% of all possible improvements. Additional color management work takes things from 95% to 99% ... but not 100% because no TV is perfect and no test instrument is perfect. We can get to 95% without a color management system because most TVs color and tint controls get things pretty close already short of the controls being broken. Some of the 2010 and 2011 Sharp sets fit this exception of the controls not working right, but everybody else can conceivably attain this 95% mark.

Of course without a reliable instrument, you could never know how much higher than 70% your tv could get, but that is beside the point. Let's get back to the 60-70% number that can be achieved with only the user controls. Sure 70% is not 95% or 99%, but it is certainly better than 0% or 20%. A 60-70% improvement in display performance is nothing to sneeze at and quite an accomplishment for a \$20 test disc (or in some cases a \$0.20 test disc ... downloaded and burned to a DVD). There are caveats to this, to be sure. The base assumption of all this is that people can follow instructions and can actually set those user controls correctly with the test disc. These numbers are frighteningly lower than you might think. Either people can't read or simply refuse to follow instructions correctly.

100% of the portion of my clients that tell me they used a test disc like Digital Video Essentials or AVIA or the Spears and Munsil disc or even the Disney WOW test disc, all say they did it correctly. Problem was, it turned out that at least half of them, 50%, ended up doing some of the key calibration elements wrong, which had me scratching my head wondering which part of the visual instruction did they not understand. So when one messes up key elements like brightness and contrast, there goes the 70% improvement they could have achieved. So 100% of them tell me they did it right and less than half of them actually did it right. I can't believe any of my clients then since half of them are inadvertently lying to me.

But let me be kind and say that people can read and follow instructions and that they are able to correctly perform all the necessary changes on the user side, then they really are that 60-70% of the way there. Now some professional calibrator comes along and proclaims that what the enthusiast did was not calibration at all because calibration is only done with instruments.

This sounds like some zero sum game as it is called; either all the way or nothing else counts. Who gave them the right to squat on that word and only define it the way they want?

To be fair to everyone, let's just break this whole process down into two pieces, the basic calibration and the full calibration. Both are calibrations.

Does doing seven or eight of the ten steps still does not amount to calibration? It may not be a full one, but it is a partial one and it has achieved tangible results because the TV is 60-70% of the way there already.

A journey of 100 miles and 60-70 miles is already covered.

Let's talk oil changes and tune ups for cars now. The typical lube shop does the oil and filter change but they also do these 20 point inspections and top off fluids and so forth. The shop that does the full tune up to the car will still do all these things in addition to other elements. An oil change is a partial tune up for the car. The things that get done here are merely a subset of the full tune up service that usually costs much more.

And here we come back to calibration. The proper setting of the user controls is a vital subset of the full calibration service. I joked with a calibrator friend that if setting the user controls did not count as calibration at all, what would his end result look like in his calibration that only used instruments? He is not permitted to touch the user controls because that is not calibration. So he can only do grayscale and the color management system if the TV has one. How would that "calibration" stack up to just doing the user controls? His "calibration" would only deliver the last 29-39% of image improvement where the "NOT" calibration gets 60-70% of the way there.

What if our car shop omitted all the elements of the oil and filter change in their tune up service? Would that be okay? Would the tune up be a full tune up?

Of course one has to do both the user controls and use instruments to get the full calibration experience, but the idea of a partial calibration is still very possible and real.

I further joke with my friend about the "equipment or death" thinking. I stack him up with his experience to only do the user controls and anything else by eye ... versus a novice using a \$200 cheap colorimeter. I ask him who will most likely do a better job here. The novice would have done the full calibration with his very error prone gear and my friend would have done his "NOT" calibration and the end result would be that his TV image would look superior and more accurate than the person that really did the calibration with gear. If we brought in good test gear, we'd find the improvements on the "NOT" calibration to yield a improved number closer to 100% than what the novice could accomplish with his test gear.

Full calibrations exist.

Basic calibrations can also exist and the two can peacefully co-exist with each other.

So with only a test disc in hand, it is still very possible to achieve real improvements to the image and don't let any snootie professional calibrator convince you otherwise. Just remember though, that the onus is still on you to actually follow the instructions correctly to get these real improvements. So many people have failed here ... and they don't even know it.

Top Things Crooked Installers Do To Take Advantage Of Clients

Here is a list of some of the top things that ethically challenged installation companies often pull on their clients without the clients even knowing or having any say in the matter.

1. Projector selection - This is often a case where they sell you only what they normally stock, even if it is not the best fit for the room. The higher the price tag, the better here. I have even seen installers put in business grade projectors that have no place in a home theater environment, but was the most expensive projector they had with the largest mark up so in it went. Too loud and too much heat and a compromised image to boot.
2. Video Equipment selection - Not all Blu-ray players are made the same and some products will do significant harm to the video signal before the display can even see it. I have seen budget players in the \$150 to \$250 range that outperform some of the high end units. And speaking of high end units, they often have the guts of a \$600 reference player, but have been marked up four fold or five fold in price. Same performance, but what a price penalty. And don't forget adding additional control boxes that serve no purpose aside from being an additional thing to sell.
3. Improper installation of projector - A lazy installation can result in the projector displaying only half the detail that it should. Those expensive \$30,000+ 1080p projectors so often become those expensive 720p projectors. Same price and half the resolution.
4. Improper wiring of speakers - The speakers are wired and sound that should come out the front somehow comes out of the back speakers. Or worse yet, no sound comes out of the back speakers because they weren't even wired into the system. The client will never know as the sound is set to all channel stereo successfully masking an incompetent job.
5. Improper audio set up - Something that in this day and age, only takes five to ten minutes to improve audio leaps and bounds beyond what comes out of the box, and it is skipped. The client will never notice.
6. The invisible video calibration - The professional video calibration that is supposed to make your images the best they can be, is not performed at all. The client is simply told that the job was done,

but nothing ever happened. Why bother paying a calibrator to come and perform the service when all the fees can be kept to themselves. The client will never notice.

7. Automation - The surprise for the client is usually in the real cost of automation. There are costs much greater than the physical devices and the labor needed to install them into the home. Programming costs can often be many times more than what the hardware costs. It is good to know up front what you are getting into.

I just got back from a trip out east where I visited many homes of multi-millionaires to provide them with calibration services. When you see the quality of the work, you really start to shake your head at this industry. I swear, 4 out of 5 installers that I come upon are crooked or just really morally challenged. It is a market where they try to squeeze as much money out of the client as they can, because they will not get a second chance. The challenge is to find the good ones because there are some out there.

Does your installer/integrator have your best interests at heart or their own. Granted that this is a business and businesses would like to be successful, then how about your best interests being at least on the same level as their interests. You'd be lucky if you even got this.

Little wonder why so many of my clients tell me that they wished they knew someone like me before they started their renovation project.

[YANACFPC ... 1% Versus the 99%](#)

YANACFPC ... or in an expanded format of "***You Are Not A Candidate For Professional Calibration.***"

(This is an article in search of a point ...)

Let's get some things crystal clear. Of the many things in life, display calibration is not a "NEED" at all. Food and water are needs. Shelter is a need. Display calibration is no such thing ... unless lives depend on it like in the medical field and some insurance companies are actually starting to require hospitals to take care of that aspect.

And then there is the other side of calibration called Home Theater Consulting that looks at everything else in the room that can interact with the display and how well things are set up on that end. Is the TV hooked up right? Is the BD player set up right? Is the receiver set up right for video? Is it set up right for audio as well?

Years ago, I purchased a sound analyzer for \$1900 after one of those Sencore sales people just hounded me and hounded me. At the time, I figured that I had to convince myself that this device could make a difference in the set up process before I could offer it up as a service to others. If it didn't make a difference, then I could always unload it on Ebay to someone that had more use for it. So I followed some instructions and started to analyze the audio on my own audio 7.1 system.

I had been somewhat disappointed in my own system's performance as I always felt the rear channels were dead or certainly not as active as it should have been. The Radio Shack meter always said that the levels were right. And when I started this audio check process, I found to my own surprise and shock that the right surround speaker was actually out of phase. With that corrected, the sound that I knew I was missing came back in full force. I was a happy camper.

This process did get me thinking about audio. I was so sure I set things up right. A little too smug, too arrogant. And I found out I was wrong. Then I started to think about how many others out there were also so sure that their audio and video was set up correctly and they would be wrong, just as I was wrong. Set up might be simple, but we still mess up. In the 50 systems I looked at since, there was something wrong with each and every set up. No one was immune to messing up some aspect. In the very worst case, a person's 7.1 audio system that he had paid good money for and audio speaker plugs

from the wall outlets with no wiring to the speakers at all. Speakers were physically in the ceiling, but no wires were ever run to them.

Ask yourself what it is that you think you want to achieve out of hiring a professional THX calibrator like myself.

How you answer the following question will tell me as the calibrator a lot about how you think and where your priorities in life are. You go to a museum to look at the paintings. Before you can go see those paintings, you are met by a man at the door. He asks you a question. **"Which of these colored sunglasses would you like to wear to see those paintings with?"** Would you like the blue tinted ones, the green ones, the pink ones, or the ones with polka dots?

If you choose any of these glasses, then **"YANACFPC."** The right answer is none of the glasses at all. You want to see the paintings the way they are supposed to look. The way the artist intended. And much like paintings in a gallery, movies are simply moving art. Are you evil for choosing one of the glasses? Of course you aren't, but it does tell me that you do not care about image quality. People have different priorities in life so welcome to the human race.

Some people happen to like to put ketchup on all their food; that is life. A friend serves you up their best soup and the first thing you do before you even taste it is to reach for the salt and put it in. You are less concerned about the taste of the soup and simply more concerned about what you like. Will you then tell that friend that the soup does not taste very good; are you in any position to say that anymore?

Every so often, there are certain words that come out of people's mouths that immediately raise red flags. When people contact me about calibration and start to talk about needing an image that "pops," I start to wonder. Not sure where they read such things and how that becomes a misguided expectation of the process. The TVs have plenty of modes that "pop" without my services. What the heck does "pop" mean anyway? A soft drink of course. :) The descriptor is usually associated with very bright contrast driven images that fatigue eyes and kill detail. The uneducated have been led to believe that brighter images are always better images hence the "Pop" reference. Images pop just fine without professional calibration so I start to probe what these people are saying and end up turning half of them away. I ask them what it is that they think calibration is all about.

The last thing I want to do is take money from people that should not be using my services at all. It is no fun doing calibration work for people that don't seem to care about what or why things get done. It just

leaves me wide open for the despair that comes later when I can't meet their own false and unrealistic expectations. Would people think to blame themselves for stuff like this; nope, it is always my fault.

Calibration is not about making the images look like real life. That just isn't possible. (For more why we actually calibrate read that [article](#) elsewhere on the site.) And it isn't about making the images look like looking out the window either. Only if our world was black and white could I make the images look like this. If you want this, you will only be disappointed by any calibration.

If what made you buy a particular TV in a store showroom was the way it looked there, and it invariably is for most people, just watch the image in the Dynamic mode or Sports Mode or Vivid modes and be done with it. 99% of the people out there are perfectly fine with the performance of their TV. Sure it's wrong, but stuff like this just isn't important to them and that is life. Life is far too short for me to even make an effort to try to convert anyone. I'd rather deal with people that come to me knowing that there must be something better and the cost of my services is less than the cost of them learning how to do this themselves. (Cost in time and buying software and hardware)

There is nothing like giving a calibration session to people that really don't care about the process at all. It saps the energy right out of me and the process when the audience is flat. Give me an enthusiast any day. The energy levels rise and the calibration and the "colour" commentary becomes rapid fire and everyone just enjoys the process so much more. I don't really expect that people who don't care about the calibration process to come to such a site to read something like this. It takes at least two people to make the calibration session work and I feed off the energy of the client to make the process as memorable as possible.

It's all a matter of priorities for people. Some spend many 10's of thousands of dollars on their system and simply refuse to pay for someone to come in and make sure that everything is set up right and they are getting the most out of their system. As a result, since they refuse to do it themselves as well, they end up with exactly what they get. But they will continue to drop large sums of money on hardware and the cycle continues. By the will of God, they will buy their way out of this.

Calibration Boneheads

So what are Calibration Boneheads and is this disease isolated to only this hobby? This is the stuff that gnaws at you slowly as you see it again and again. Death by 10,000 cuts. A slow painful death. I'm sure more than just me dies a little bit inside every time we encounter this. (And of course this stuff isn't restricted to our little neck of the woods either.)

My background is in civil engineering and I've done that for 24 years. My area is in the transportation planning and operations area. Over the years with the many interchanges that get put into the roadway system, each interchange project almost always had some public open house event tied to it. The residents in the area would be invited to come and view the plans for the interchange as well as the staging for such a large structure. These things don't get built in a day. Usually up to two years or more from the planning stage to opening day.

As one of the engineers, we are there to answer questions from the public about the project and how it would impact their daily commute to work. So one resident comes up and points out the property where he lives and we show how he might now exit the community with the completed project. There is a small line up of people ... and when he is done, the next in line asks the same questions and he lives in the property right next to the first guy! Then another person after them and he is two houses down ... oh come on people!!! Doesn't anyone listen anymore?

Now specifically in the engineering industry, transportation engineering firms would buy these traffic engineering software packages for \$4,000 per license. The software helps us to figure out how the traffic will flow on an interchange ... for instance. No one expects that the software has some responsibility to teach people how to be traffic engineers first. No one even remotely gets mad at the software creators for not providing that. The notion is absurd. A specific tool for a specific purpose and priced at where professional level software is priced. Software training for the program is provided once or twice a year at various venues in North America and the world. The training is not cheap either, nor is the cost to get the people there to take it. The software training only focuses on all the features and nuances of the software package itself. But companies do this because time is money and it is still cheaper to get their employees up to speed on the software and being productive rather than fumbling their way through the program (and of course chewing up valuable project resources and budget along the way).

This is on the professional end of things. Let's also not forget that books on brain surgery do not have a section that teach people to be doctors first. It is not seen as a problem with such publications. There are certain per-requisites that are expected out of people that use such tools.

Now as we proceed down this ladder to the other end, we encounter my friend, the hammer. I really like him and I can pick him up at any hardware store. It's most interesting that no one ever accuses the maker of hammers of failing to provide information on how I can build a house. Like it was the hammer's responsibility to do that too when we bought it. The hammer has many functions from building things to tearing things down to smashing in skulls to ... ooops ... should not have said that.

And now we tie it all back into the world of calibration. For some reason, when some people buy the enthusiast versions of professional calibration software for \$150 - \$300, they have this strange expectation that it is the software's responsibility to teach them how to calibrate TVs period and not only TVs, but theirs in particular. (Linear thinking)

The professionals that buy the calibration software at 5 to 10 times the cost level of the enthusiast never have these weird expectations. Good documentation that details every feature and what it does is always appreciated, of course. Just like those Adobe Photoshop programs that have like a bazillion features and a textbook on what each thing does. Of course that program does not teach people to be a photographer though.

What is a realistic expectation out of the calibration software that we buy? That it provides explanations of all its features and how and when they might be used. Don't forget about some hardware documentation for every piece of hardware that the software supports. "Do this to get the software to recognize such and such hardware."

The role that the calibration software really needs to play in a calibration process can be fairly small, although important. Now when you consider the typical 10 step process of calibration (after you figure out what TV picture mode you should start in):

1. Brightness
2. Contrast
3. Sharpness
4. Color/Tint

5. Overscan
6. **Gamma**
7. **Grayscale**
8. **Color Management Systems**
9. Environment
10. Reference Material

The calibration program doesn't need to come into play except for steps 6, 7 & 8; which is all of 30% of the process. Although the software needs to get its data based on test patterns of some sort, the user is needed for that just like hammers don't tell us that they need nails, nor are they magically supplied. It is just funny in a sad way that some project the entire process of calibration onto the shoulders of the calibration software and feel cheated when unrealistic expectations are not met. Or when they fail at the other steps of the calibration process well beyond the role of the software, and they blame the software for the poor results.

I don't follow instructions ... things don't go well ... it is a failure caused by someone else ... I am never responsible. My 13 year old daughter is kind of like that. I expect that type of behavior from children, but not adults. Obviously, I am wrong.