

Beginners Guide to...

Video: White Balance,
Warm and Cool Balance,
Focus and Exposure
and Colour Bars.

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Part I - White Balancing your camera.

What is White Balance?

White Balance is a setting that enables your camera to record images that have a natural looking colour. If we get this setting wrong or just don't do it at all then depending on where and when we are filming we could get images that will have a strange colour cast - usually they will be too red or too blue.

So why does this happen?

All light has a colour temperature - it's called a **colour** temperature because it shows itself as a colour tint. Electric and Tungsten bulbs like these shown here have a reddish tint.



We say they have a **warm** temperature.

The exact colour of red or orange tint depends on the bulb. Some will show more orange or red than others. The less powerful the bulb the more orange they will look. But also the same bulb can have varying temperatures if a dimmer is in use. As it is dimmed the light becomes less powerful and therefore the colour temperature will be hotter and the colour tint more red or orange.

On the other hand, daylight creates what photographers call a COOL image because bright daylight makes everything look more BLUE or cold. And just to complicate things further the Sun's temperature varies throughout the day, or if there's cloud or clear sky.



This is not something you, as a human, do not need to take much notice of in your day to day life because your brain has an "auto" white balance built in to it. So as you look around your environment your brain **automatically** adjusts the illuminated image to make it look more natural for you.

Our camera on the other hand deals with these different temperature lights by adjusting an internal setting called the **White Balance**. This setting can be adjusted automatically by the camera or manually by us - the user.

Full Auto



When your camera is on Full Auto setting it sees the image you're working with and tries to adjust it so that the images looks more natural. Not too red or too blue. But this auto setting can easily be fooled by lighting conditions.

A good example is if you've ever tried

to **film or take pictures in the snow**. You remember the snow was brilliant white, but when you look at your pictures or watch the film it looks almost blue. *What's going on?*

Well this is because your brain made the correct adjustment in real time but the camera couldn't cope. The daylight has a cool blue hue and when it hits the white snow this magnifies the effect and shows to your camera as blue snow

When it's in full auto mode, your camera doesn't know that anything is wrong. So when you take your picture it just records what it sees - **blue snow!**

Presets

Moving on from full auto mode - your camera will also have some PRESETS built in too. So if the auto setting isn't cutting the mustard in some lighting situation you can override the camera logic and stop it trying to work out what the lighting is and just tell it that either it is being used for indoor shooting under electric lighting or that it is being used outdoors in daylight.

In the previous example, if the person who took the picture of the dog had selected the exterior (*or some cameras actually have a "snow" preset*) then they would have got more natural looking colour. The snow would have been more brilliant white and the dog wouldn't have had a blue rinse.

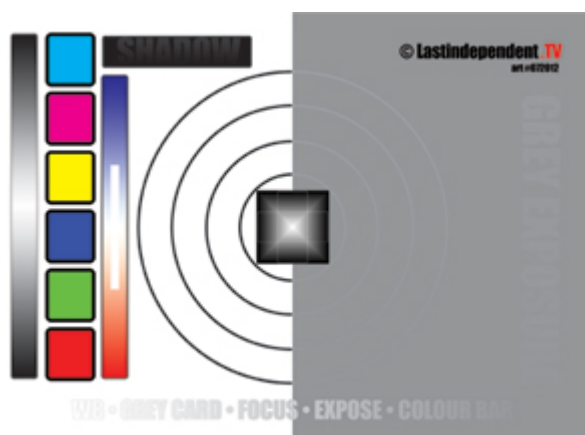
Presets will get you more natural looking colour in most environments but again the margin for error exists because if you tell your camera it is being used outdoors in bright sunlight and you then use it indoors under electric lighting the colour cast will be very wrong indeed. Also if there is more than one different temperature of light source this could confuse the camera too.

So if you want to be sure that you get a true white balance in anything but a highly controlled studio setting using only one light source or in daylight with the sun at its height in a perfectly clear sky you need to override your camera's logic and help it to handle the White Balance.

Manual White Balance

You do this by placing a sample, usually a plain white card, (***but strictly just a card with no tint or colour bias***) into the lighting environment we're working in and fill all or most of the frame with the image of the card.

Then you press a button on the camera (*sometimes named WTB*) to tell the camera what it's seeing now, in the frame, has no colour tint.



When your camera processes this sample it's said to be taking a **White Balance**. What it's actually doing is setting itself internally so that all the colours it reproduces are an offset from this **white**, colourless sample.

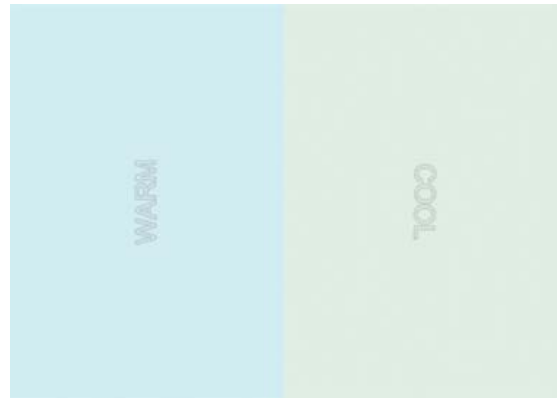
Part II - WARM or COOL Cards

Now we understand what is happening, we can trick the camera and show it a card that does have a slight colour tint but we tell the camera that under these lighting conditions this is what white looks like. The camera will then adjust itself so that the colour range starts from our sample and not actually true white.

We can now use this process to be more creative. We can make the camera push the white balance one way or the other just by varying the sample we give it. So if we use our COOL card, which has a subtle green tint and we tell the camera that actually this is what white looks like, the camera will move its colour pallet away from the green towards the blue until this green tint actually looks white through the viewfinder.

This has the great effect that now our images will all have a cooler look.

Note: The Cool card is sometimes called a Minus Green Card, because it has the effect of removing any slight green tint from the scene.



Equally, if we use the WARM card which has a subtle blue shade and we say this is white, the camera will move its pallet away from blue towards red, which has the effect of making the images appear warmer or slightly more red. This can be quite flattering to shots of people giving them a more healthy look.

Part III - Manual Grey Balance

Remember that we need to show the camera a sample that has no colour. We can use white card for this but equally, if we have one, we can use a grey card. This also has no colour tint so will perform exactly the same function.

Using grey, the results are the same or even better. It's down to personal choice what to use. Some people say using grey is actually more accurate because white is more subject to reflection and there can be various shades of white. Whereas grey can be made exactly midway and is less affected by light reflections.

So using a grey card that is exactly midway between white and black is a great way to **White Balance** your camera. Don't get confused - the grey image still shows up as grey. White still shows as white - this is not the same as using a Warm or Cool card. It is just the lack of actual colour in the image that has given the camera what it needed to make an accurate decision about colour balancing. So you decide which to use, white or grey.

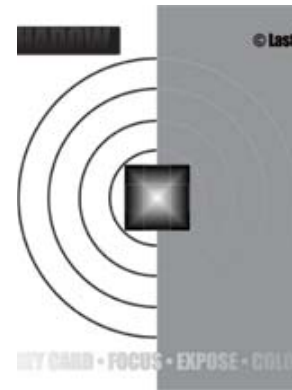
Tip: Another reason people use Grey is that this same grey card comes in to its own later when we set our exposure so we'll return to this function later.

Part IV - Focus

Getting sharp focus is a must for good images. All cameras these days have auto focus but what are they focusing on? They could focus on something in the

background or more in the foreground giving you a soft focus on what you're actually trying to shoot.

That's why as people become more experienced they move to manual focus and if you're using a manual focus for precise video work using this image (*shown right*) gives you immediate visual confirmation that the image is in focus rather than focusing on someone's face for instance.



So - couldn't be simpler - place the card in front of what you are filming.....

Note: The image is specially designed to be camera friendly. It has lots of straight lines and concentric rings that you wouldn't find naturally in many scenes - the camera loves these it makes the job of focusing really easy.

..... zoom in on the image.....flick the camera in to auto focus....allow it to lock on.... and then flick back to manual focus.

Now your focus is locked at that distance.

If you move your camera or the subject matter moves - then you will need to repeat this process to keep your images pin point sharp. If you're too far away just get your subject to hold the card for you - and you can do your white balance, focusing and exposure all in one go.

Part V - Exposure

Exposure is how much light we allow in to the camera.

The more light we allow the brighter the image, the less light the darker the image.

We adjust the amount of light by opening or closing a small window inside the camera called an *iris*. This is how the human eye works too - the iris opens in the dark, allowing more light through the pupil and closes in bright light which means less light enters the pupil.

Closing the iris is reducing the exposure - opening the iris is increasing exposure.



Now for any setup or scene we're filming or photographing there will be an optimum amount of light that will give us the best image. So when we adjust exposure it is this optimum we're searching for. If we have a lot of external light in a scene we may have to reduce the camera's exposure or parts of the image will be too bright. If we don't have much light we will need to increase exposure or parts of the image will be too dark.

All cameras have an auto exposure to deal with this, so why not just use it?

Well - what the camera does for an "auto" exposure is quite simplistic and won't always give you great results. The auto process can also easily be fooled.

Auto exposure plays safe and simply takes a look at the light that is falling onto

the whole of the scene and then closes the iris - or reduces the exposure - until the brightest part of the image is exposed around 50%.

That doesn't sound too bad - but if the brightest part of the image is a window, a background light or a bright sky behind the person you're focusing on, this will mean the window, light or sky is correctly exposed but your subject could be very dark or even a complete silhouette.

We can overcome this problem with our EXPOSURE function of our card.

We can use this two ways - either to just fool our camera's auto exposure into working better or by taking complete control and using it as a calibration tool to show us when we have correct exposure.

So first - let's use it with auto exposure.

This will vary slightly depending on stills or video and make and model of your camera.

- Place the card in the scene under the lighting conditions you will be using.
- Zoom in on the grey part of the card so it fills the screen and then tell your camera to auto expose.

So on a stills camera that is usually part pressing the shoot button, on a video camera there is usually a switch between auto and manual iris.

But what we're doing is using the camera auto exposure on a scene that is artificially **MID WAY**. Remember our Grey card is 50% between black and white so when the camera applies its internal exposure logic on this image and adjusts exposure to around 50% - in this instance it's actually bang on correct.

Now -

- Move the card out of the frame and the actual image is now also correctly **auto exposed**.

So with these simple steps we have improved our camera's built in features dramatically.

The next stage is to take full control and use the card as a calibration tool for exposure.

For this we need to place our camera in to manual exposure mode.

On this camera it's just a switch where shown in the picture.

So we've focused as discussed previously. We've set our white balance again as discussed previously.

Now we have full control over our image's exposure. We can open or close the camera's iris (which is usually a wheel control) to allow more or less light in to make the picture lighter or darker.



You'd think it would now be just a case of playing with the setting until the image

looks OK through the view finder or LCD. But the problem is the size of the image you're trying to monitor makes this quite difficult. Plus the image in the view finder or LCD can be backlit and actually look quite good. Until you later upload your footage to the edit and you realise it's a bit dark or too light.

This is where our Multi function card scores. On the card there are some subtle designs that will help you to see when the image is correctly exposed.



There are several spread around the card but for example, hidden in the grey card is some writing. If we over expose the image we can't see all of the writing.



In this black box we have some black writing - if our image is under exposed we can't see this clearly.

In the centre we have The GEM - this is a complex design that will glow differently at different exposures. As you open the iris (increase exposure) more of the detail will be revealed and then if you continue to open the iris more of the detail will be lost as the image becomes over exposed.



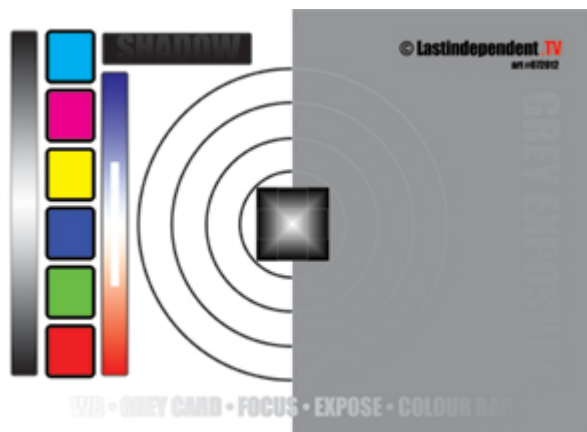
With some experimentation you will be able to calibrate your camera visually and achieve correct exposure every time by ensuring that in the viewfinder you can see the hidden details of the card. When you can you know that your camera is recording even the most subtle shadow and highlight areas under your prevailing lighting conditions.

Part VI - Colour Bars

Colour Bars are very useful as a calibration tool, both at the time of filming and also in Post Production. If you're using a preview monitor you can place the card in scene and then adjust the monitor so that you can accurately see the correct colour representations as seen on the card.

Equally if you collect footage of the card before you film your scene (under the same lighting conditions) you can then adjust the footage in post if necessary so match the footage against the card (in your hand).

The other great use for them is when filming a multi-camera shoot.



Just place a card in the scene so it is visible to all the cameras and record some footage from each camera.

Now in post you will easily be able to adjust the colours for the footage of secondary cameras to match the primary camera.

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