

1. INTRODUCTION

This guide is intended to be a useful reminder of the operation and functions of the Sony PD 150. Use it as a general refresher if you haven't been out filming for a while, or refer directly to the relevant sections for guidance and help on specific subjects. There are three main sections. This, the first section, will take you on a tour of the camera and guide you through its basic operation. The second section deals with picture functions on the PD 150 and lighting, and the third section is a guide to recording audio successfully. References to camera left and right are looking at the rear of the camera.

Text in **BOLD** is the additional information if you're used to the VX 2000.

2. SAFETY

Safety; both your own and other people's is a very important consideration when you are filming on DV. To go out filming on DV you must have completed suitable relevant safety training. A risk assessment should be completed prior to every shoot. Potential hazards must be identified and dealt with in advance of your shoot. Forward planning and thought about what you are going to do on the shoot is crucial - think carefully about the environment and circumstances you will be filming in. If you are filming in public places be aware of the dangers of people tripping over cables, your tripod and your kit bag. Children are of course particularly unpredictable.

The small size and flexibility of a small DV camera can make it tempting to try things that you otherwise would think too dangerous. Don't film from unguarded roofs, or other high places, be careful near water and moving traffic. It's yours and other people's safety you are putting at risk.

If there are two or more of you on the shoot, divide responsibilities up sensibly between you. If you are operating alone, go to the next section, as there are implications for the type of filming it is safe for you to do.

Think about the handling and transportation of your kit and don't overload yourself. Handheld filming is tiring so make sure you take breaks, or put the camera on a tripod for periods.

There should be at least two of you on the shoot before you can contemplate using mains supply lights. You must be able to prove you can use mains lighting safely. You should not use any mains socket without using a socket tester. Provided your battery charger has been electrically tested and has a sticker to prove it, you can plug it directly into the mains. All other mains equipment and untested chargers should be plugged into the mains via a residual current device or RCD, to avoid shock. Refer to the lighting section of this guide for detailed information about using lights on a DV shoot.

Always make sure that someone at base knows where you are, and that you are contactable on location - ideally by mobile 'phone. Equally you need to know that there is someone at base that you can call if you need to. If circumstances change while you are out filming, make sure you inform your producer before undertaking anything potentially hazardous that you did not previously anticipate.

If you have any safety concerns about your shoot, raise them with your producer, so that you can make sure you are equipped properly and can film safely.

3. SAFETY - LONE OPERATOR

Check for local guidance on lone working. Working alone means that your awareness; both physical and mental is severely reduced, so you must be sensible about what you can achieve by yourself. Because of the potential hazards and problems there are restrictions on what you should do when out filming solo.

Firstly keep your shoot to static general views, and simple pieces to camera or interviews only. You must not operate any mains lighting kit, and you should restrict yourself to basic sound set-ups.

Never track backwards whilst filming on your own - don't do it unless someone can guide you.

While you are filming your eye is at a viewfinder, you are wearing headphones and you are concentrating on what you are filming. So think carefully about your surroundings, and make sure you are in as controlled an environment as possible - perhaps an office or a house. Don't contemplate filming in unpredictable surroundings like very busy public areas or near moving vehicles, and avoid locations where your reduced awareness could cause you, or anyone else to have an accident.

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Bear in mind that you or your camera could attract unwarranted attention - DV cameras are worth money, and you are a member of the dreaded media.

4. THE PD 150 TOUR - INTRODUCTION

This guide starts with a tour of the PD 150, and a reminder of how to get the camera up and running. Refer to the index if you are interested in a specific subject.

For more detailed information on recording pictures and audio successfully you should refer to the picture and lighting section and the audio section of the guide.

5. POWER

The PD 150 can take different battery sizes, from a lightweight one-hour capacity, to a heavier six-hour version. The arrow on top of the battery indicates which end goes in downwards. Slide the battery into the slot at the back of the camera until it clicks. To release, press the catch at the top of the battery compartment. If they're old or you're using them in extreme temperatures they won't last as long as usual.

If you need to power the camera from the mains, remember that if your power supply and lead has been electrically tested and has stickers to prove it, you can plug it directly in. If it has not been tested you **MUST** plug into the mains via an RCD, which prevents any risk of shock. Look at the back of the camera and peel up the rubber cover at the lower left to reveal the DC in socket. Plug the power supply lead in here.

6. TAPE STOCK

You can use any mini-DV or small DV Cam tape in the PD 150. The camera can record in either the DV or the DVCam format, so the length of tape will depend on this. You'll get about 64 minutes in DV, or 43 minutes in DV Cam. If you use a different branded tape than the camera mode, you will not get the length indicated on the tape box. The choice of format is up to you, but with DV Cam you get reliable (but fiddly to use) timecode and in theory a more durable recording. However, many people are happy with the simplicity and low cost of the DV format, so consider this option for your programme.

To insert a blank tape, press down the 'eject' button to the left of the cassette compartment at the camera right hand side, and after it has fully opened insert the tape - with the writing on the tape facing outwards and downwards. Gently push the inner cassette housing in, and then the outer door where indicated, until it clicks shut. It needs a good push to click shut.

7. GETTING READY TO RECORD

To prepare to record, look at the back of the camera, press the little green button, and rotate the power switch to 'camera'. Just in front of the main switch is a little black slider switch. Make sure it's towards you, to stop the power switch going into 'memory mode'. The camera is now ready to record. To record press the red button, and to stop press it again. The front red light will light when recording unless it has been disabled in the 'others' section of the camera menu.

If the camera is on standby for a few minutes it will switch off just the motor, to preserve battery power and reduce wear. This is different from previous handycam machines that switched off the whole camera. This means it will take a little longer to start recording as the motor starts up again, if you've not done any recording for over five minutes or so.

When you press record allow a few seconds run up time before beginning interviews etc.

8. VIEWFINDER AND LCD SCREEN

The PD 150 has the feature of a colour flip-out screen as well as an **LCD black and white viewfinder** and you can use either to monitor your recordings. **The viewfinder does not show more detail or make it easier to focus.** It should be used in bright conditions when the screen is washed out, but of course you won't be able to monitor colour issues. A hood can be bought to shield the screen if it's sunny. The screen has brightness buttons at the lower left. Press these to ensure

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the setting is in the middle. The screen tends to give more 'burnt out' pictures than recorded on tape. Use of the screen for assessing exposure is not recommended. The viewfinder is slightly better in this respect.

In this guide when we talk about information displayed on the screen, you'll see the same information if you choose to use the viewfinder instead. The screen can be rotated and turned to just about any angle. You can turn the screen to face the operator for 'diary' style work, or pack it flat against the side of the camera, which is great for a boom operator. With the screen in this position the viewfinder also works, but the battery life will be reduced.

The screen back light can be changed in the menu, which could be useful in bright filming conditions. Press the menu button, scroll down to 'LCD VF set' and select LCD B.L. to be normal or bright. The bright setting will use more battery power.

The PD 150s viewfinder can be focussed for your own eye - this does not affect the recorded focus. Put the lens cap on. Pull the viewfinder back and up, look into it and adjust the lever underneath until the text is in sharp focus. The viewfinder brightness can also be changed in the menu.

Dust can appear on the viewfinder glass, so before you go filming check the viewfinder and clean it if necessary. Clean the viewfinder glass gently using a puffer or very soft cloth.

9. LCD SCREEN DEFAULT DISPLAY

Flip out the screen by pressing the silver catch at the rear left of the camera. It should be showing the standard default display. At the top left is the estimated time left on the battery. The top right has the timecode, with the remaining tape time under it if you've got a tape in, and tells you whether you are in standby, record or photo mode. **There will also be a DV or DVCam indication.**

Nothing else should be on the display, unless you have selected a manual function. Any function information is generally displayed on the left of the screen. If you press the 'display' button on the left side of the camera, all the on-screen indications go away, just leaving 'STBY'. However, if you've selected a manual function, the display stays.

10. BATTERY INDICATIONS

The PD 150 uses info-lithium batteries, which allow a readout of battery life in minutes. The bars on the battery symbol on the screen will reduce as the battery loses power, as well as the indicated time reducing?. Shortly before the battery fails completely a flashing battery symbol with a line through it appears in the centre of the screen. The red record light will also flash. Keep an eye on battery strength during filming. If there is only one bar left in the battery display and you are about to start filming an interview or long piece, change the battery before you start.

The estimated battery life in minutes should be treated with caution. If the battery was last used on a non info-lithium camera, the indicator may well be wrong. However once you've run it flat on your camera at least once, the reading will be accurate the next time.

There is a little slider on the back of the battery with a little green stripe showing if the battery is charged. However it is very easy to knock this by accident, so its far better to keep charged batteries separate from uncharged in your kit.

11. RECHARGING BATTERIES

Info lithium batteries do not need to be fully discharged before they are recharged. There are several chargers on the market, so their operation can vary slightly, and the time taken will depend on the size of the battery. The smallest will take just over an hour; the largest may take six hours. Generally though, plug the charger through an RCD and into the mains. Line up the arrow on the battery with the corresponding arrow on the charger and slide into place. The charge light should light up and will go out when the battery is fully charged. It is also possible to charge a battery on the camera, by connecting the mains adapter with the camera power off.

12. CHANGING TAPES

A flashing tape symbol will appear when you are 5 minutes from the end of a tape. It will also appear if you have no tape in the camera, or if the tape has its record tab pulled across.

When you have removed a tape and have finished recording on it, make sure you slide the tab to 'save' so that there is no danger of your material being recorded over, and don't forget to label it up. It's best not to eject tapes unless you're at the beginning or end of your recording, as damage can sometimes occur during the eject process. *Don't eject tapes in windy or dusty conditions.*

13. PLAYBACK IN CAMERA

It is not a good idea to routinely review tapes in camera mainly due to the danger of recording over your material, timecode discontinuity, and a very minor potential for tape damage. However if you need to check something you have recorded you can use the camera as a player. At the back of the camera, turn the lever to VTR. All the usual player functions will appear on top of the camera, and you can rewind, play, fast forward, etc.

If you have reviewed your tape, you need to cue up at the end of your last recording. Switch back from VTR to camera mode. On the top of the camera, under the handle, there is an end search button. Press it and the PD 150 will search for the end of your recording, play back the last five seconds, and then sit at the end of your last recording, ready to record. Note that if you have ejected your tape, the end search function will not work. **If you don't use end search, you may get a timecode discontinuity depending on the timecode menu settings.**

For logging, it's best to get a VHS transfer done and log from that to avoid wear on the camera.

14. PLAYBACK THROUGH A TELEVISION

Playback through a television is difficult to generalise about, because of the specifics of TV and video set ups and plugging. However we'll try.

Peel down the rubber cover towards the front of the camera to reveal the video and audio out phono sockets, coloured yellow, white and red. Plug in the leads, and look for the input sockets on your viewing facility, often marked 'line in' or 'AV'. They are most likely to either be phono sockets like those on the camera, or a SCART socket which is long and thin with two rows of tiny input sockets. If the input is a SCART socket you need to put an adapter on your phono leads.

It doesn't matter whether you plug directly into the TV or via the video recorder, but one may be easier to locate than the other, or one may be phono sockets while the other is a SCART. On domestic TV's and video recorders the 'line in' sockets are hopefully under a flap at the front, or less usefully they'll be on the back.

Once you have plugged in, you need to select the correct channel to view. If you've plugged the camera into the video recorder, turn the video recorder on and select the line in, AV or external channel. Then select the video channel on the television, often the AV channel. If you've plugged directly into the television you need to select the input channel which is often a button on the remote with a symbol of a TV screen with an arrow going into it. You should now get picture and sound

15. USING THE CAMERA AS A VIDEO RECORDER

The PD 150 can record from an external video input. This can be useful if you need quality off-air recordings, recordings from external cameras, or from video games. Find the audio and video phono sockets, under the rubber cover on the right hand side of the camera. Plug in lead supplied with the camera, and connect the external source to the phono plugs at the other end of the lead. Note that the mic socket is disabled, so sound has to be input through this lead also. You may need adapters to suit the sockets on the external source. There is also an S-video socket which will result in better quality recordings, but you'll need an S-video lead that isn't standard in the kit.

To record in this way you don't use the red record button. Instead put the camera into VTR mode and use the record button on the player panel on top of the camera.

16. AUDIO

Audio is dealt with in detail in the third section of this guide. The PD 150 comes with its own microphone which is normally fitted on the camera, however it's not brilliant quality and is usually too far from the sound, so other solutions are described later.

17. AUTOMATIC VERSUS MANUAL OPERATION OF THE PD 150

The PD 150 can be operated fully automatically, or you can override some or all of its auto functions and elect to control them manually. The most important function to control manually is focus; the other automatic functions can be adequate in many situations. Using the camera like this is great for quick and easy shooting.

To select this mode, look at the upper back left of the camera where you will see a silver three-position switch. Move it to the 'autolock' position. This sets exposure, white balance, and shutter speed to auto. Focus is controlled on the lens, and audio level is set separately. How to use the camera effectively in auto sound level is described in the 'audio' section later.

18. MENU SETTINGS

The PD 150 has a large selection of menu settings that control aspects of the camera's operation and picture quality.

The menu options for the PD 150 are accessed via the menu button on the camera left side under where the screen folds in. Press 'menu' and then use the wheel at the back to scroll through the menu. Press the wheel in if you want to enter one of the menu options, then use the wheel to highlight your chosen menu option, and press it in to select. Press menu again to leave.

Some menu functions are essential to correct operation, and must be checked before use of the camera. The most important sections are timecode, camera set and tape set.

If you've set the camera in DV mode, the timecode functions are greyed out, and the timecode behaves as a normal DV camera, i.e. it starts at 00 00 00 00, and counts up. If you're in DV Cam mode, you can play around with the timecode.

The timecode should normally be set for rec run, and preset rather than regen, with the preset value at 01 00 00 00. You can use the second digit for roll numbering, so roll two would start at 02 00 00 00. You have to set this for each new tape. If you review a recording, switch the timecode make setting to regen. The other timecode features can be useful if you want to sync two cameras together. In this case select 'free run', and enter the time of day, finally setting both cameras' timecode running at the same time by pressing buttons simultaneously. You'll be within a couple of frames, and will make your editors life much easier. The camera can't be accurately locked to an external source as there's no socket for timecode. User bit is a part of the time code which can also display time of day, or other information relevant to your production.

In 'camera set', the 'wind' setting should normally be 'off' for both channels unless you want bass cut on your audio.

The tape set menu has audio functions that allow switching between auto and manual level, and whether the soundtracks are ganged or separate. We'll look at these later.

The PD 150 also has a 'Custom Preset' facility, accessed through a button at the back of the handle. Press this in and you'll see the settings on the screen. Normally the 'set' item should be off, making sure the picture parameters are at their default settings. The PD 150 instruction manual gives full details of what the settings do, but normally the only ones worth changing are the sharpness and the AE shift. If Custom Preset is on, 'CP' will appear on the screen.

19. PICTURE AND LIGHTING - INTRODUCTION

This section of the guide will look at the functions on the PD 150 that will help you to record pictures successfully. Refer to the index on the cover if you are interested in a specific subject.

For information about recording audio successfully refer to the audio section of the guide.

20. AUTOMATIC VERSUS MANUAL OPERATION AND SOME RECOMMENDATIONS

The PD 150 has automatic settings for its picture functions like focus, exposure and white balance, some of which are very good in many circumstances, but we do not recommend using the camera fully automatically. Focus should normally be operated manually; in auto focus the PD 150 tends to hunt for new focus points while you are filming, producing amateur looking pictures that you cannot correct in post production.

The decision about which other functions to operate manually and which to leave in automatic mode is not easy to answer as it depends on your level of experience, the complexity of the shoot and the location you are filming in. Basically be sensible; if you are filming on your own, or under pressure then you will almost certainly get better results leaving some functions on their automatic settings than trying to control everything manually. This does not however imply that you should never use the other manual picture functions. Again be sensible, you could leave them automatic until you find yourself in a particular situation where manual is better, for example when your subject is in front of a bright window.

On the left hand side at the top rear is a three-position switch. The top position, 'autolock' sets exposure, white balance and shutter speed all to auto. This means that they will be set and changed by the camera as it reacts to what it sees. The middle position allows manual control of these functions. You can select the manual function you want to control and set your own level. Operation of each is detailed in the next section.

Focus and sound level, however are controlled separately, and are not affected by the 'auto lock' switch.

Once you have set your manual picture functions you can hold those settings by switching to 'hold'. You'll need to switch back to the middle position to access these manual controls again. The camera remembers your manual settings, so you can switch between the two modes without worrying.

21. FOCUS - INTRODUCTION

Focus on the PD 150 is controlled independently of all other camera controls using the focus wheel behind the lens and the sliding switch on the side of the camera which has three positions; auto, manual and infinity. Below is the push auto button that enables you to make use of the camera's auto focussing, while remaining in manual mode.

22. SUGGESTED FOCUS METHODS

What follows are three tried and tested methods of focussing, each of which should produce good results in different circumstances. Shots can sometimes go out of focus through a zoom, so for guaranteed good results zooms are generally best avoided.

23. A QUICK & EASY METHOD FOR INTERVIEWS AND VOX. POPS

A quick & easy method for interviews, vox. pops etc. is to select manual focus, frame the shot and then tilt down to the person's chest area. This avoids any possibility of the camera focussing on the background. Press the push auto button and hold it for three seconds. Let go and return to your desired framing. Do not zoom or move whilst doing this.

24. ALL PURPOSE FOCUS TECHNIQUE FOR HANDHELD FILMING

An all purpose focus technique for handheld filming relies on you going fully wide on the zoom and staying wide throughout. Point the camera at a sharp object about a metre away, select manual focus and press 'push auto' for 3 seconds. Provided you are in reasonable light conditions everything between half a metre and 10 metres will be in focus, but you must not use the zoom.

25. ACTUALITY AND ZOOMING

To hold focus while filming actuality and you or your subject is moving, hold your finger on push auto for the duration of the movement and then let go when things settle down again. You could also try this while zooming.

26. MANUAL FOCUS

Manual focussing using the focus wheel is of course perfectly possible, but it is not easy to get good results on the PD 150 because of the poor resolution of the viewfinder or screen, and the sensitivity of the focus ring. Only use this method if you have plenty of time to fiddle. The wheel has a 'linear' action, so it is possible to repeat a pull focus if you're careful. If you are using the viewfinder, remember to make sure that it is sharply in focus to maximise your chances of success.

27. AUTO FOCUS & INFINITY

Being in autofocus all the time is not recommended because as soon as there is any movement in frame, such as a contributor leaning slightly, the camera might try to adjust its focus, producing a soft image as it does so. Use the camera in manual with the 'push auto' button as described earlier.

You can focus on infinity when in manual focus by sliding the focus switch down to infinity. This really only applies to distances of over 30 metres.

28. WHITE BALANCE - INTRODUCTION & OPERATION

White balance is something that you should think about whenever the light changes. Differences between daylight and artificial light sources are magnified by cameras, and can produce a strong colour caste on your pictures if you don't white balance when you should.

The PD 150 will auto white balance your pictures, or you can use the three manual options. They are all controlled from the back of the camera. Make sure the three position 'auto lock' switch is in the middle - the unmarked position. On the rear of the camera, is a column of black buttons. The white balance button is the second one up. Pressing this will take you out of auto white balance, and give a symbol display on the screen. You can use the wheel below the buttons to go through the camera's white balance options - manual, daylight, and artificial. The symbols that appear on the screen are: a square and two triangles for manual; a sun for sunlight; and a light bulb for artificial.

29. AUTO WHITE BALANCE

Auto white balance is selected in 'auto lock', or by pressing the white balance button to remove any white balance information from the screen. The camera's auto white balance mode will give adequate results in many situations, but it may not fully colour correct. It is also slow to adjust to changes in lighting conditions, so you need to wait 15 seconds for the camera to stabilise before you resume filming. Sometimes it doesn't work at all, in which case switch the camera off and on again to reset.

30. DAYLIGHT AND ARTIFICIAL PRE-SETS

The PD 150 has white balance pre-sets for daylight & artificial light, but these are often unreliable and are best avoided, except perhaps as an effect to enhance the quality of a light source. For example you could select the daylight setting to enhance a sunset and the artificial setting to enhance candlelight. Press the white balance button and rotate the wheel until you see the sun symbol for daylight and the light bulb symbol for artificial light.

31. MANUAL WHITE BALANCE

Manual white balance will always give the most accurate results, as it sets true white in a given situation. It can be particularly important in mixed lighting conditions of daylight and artificial light combined, and even more so if there are fluorescent lights. Their colours vary wildly and may be too much for the auto white balance to cope with. To be of any use

you must do your white balance in the specific place you are filming in - this is particularly important in locations with mixed light where the mix of light may be totally different in one corner of the room to another.

Make sure you're in auto exposure. Press the white balance button (if there's no white balance information on the screen) and rotate the wheel until you get the square and two triangles symbol. Point the camera at a piece of white paper in front of the subject you are going to film, and move or zoom in to fill the frame. Press the wheel in, and the symbol in the screen will flash rapidly while the camera sets the white balance. Once it's stopped flashing, your white balance is set.

If you are handheld and moving between different lighting situations you may be better to stay in auto white balance mode where the camera will at least make some adjustments as you move around.

32. EXPOSURE - INTRODUCTION

Exposure control is the process by which the camera is adjusted to produce as natural a picture as possible. If you are filming people, the aim is to expose correctly for the face.

Exposure on the PD 150 is affected by the iris, gain, and shutter speed controls.

The size of the iris affects the amount of light entering the camera and is measured in F numbers. At F11 the iris is closed right down in response to very bright light, at F2 the iris is almost fully open in response to lower light. If the iris is fully open and there is still insufficient light for a correct exposure, gain, measured in dBs can be added to electronically amplify the video signal. Gain will increase the graininess of your image slightly, so it's not a good idea to use more than about 12 dBs of gain for quality pictures. Gain will go up to 18 dBs which may be necessary in low light, but be aware that your image will be slightly more grainy. Shutter speed also affects exposure, with a slow speed being very sensitive to light, and a fast speed being insensitive. There is a 'normal' speed for video use, which is a fiftieth of a second, and should be selected unless there is a good reason not to.

Each of the three controls can either be set to auto or manual, giving a number of different combinations. We recommend setting the shutter speed manually to 50, and the gain to 0dB as a starting point for operating the PD 150 in manual exposure. If there's no indication of shutter speed on the screen, the shutter is in full auto, and will fight against any iris or gain adjustments. Unlike previous cameras, the PD 150 will remember any settings made indefinitely, even if a battery is off the camera for an extended period.

33. AUTOMATIC EXPOSURE

You know when you're in auto exposure if there are no F-numbers, dBs or shutter speeds displayed on the screen. In this mode the camera looks at the average brightness of the whole scene and then adjusts itself accordingly. While useful for shots with fairly balanced light throughout, auto exposure will not be effective in any situation where there are areas of heavy darkness or strong light, such as the light from a window. Unless you change your shot to eliminate the extreme light area, you will need to manually adjust the exposure for your key subject or objects to ensure that they are exposed correctly.

34. MANUAL EXPOSURE

Pressing the iris button on the side of the camera activates manual iris. A vertical bar will appear in the top left side of the screen along with your current F-number. Using the wheel beside the iris button, you can adjust the iris. It can be difficult to be sure that you have set the exposure correctly by simply looking at the PD 150 screen. The viewfinder is slightly better, but if you are in any doubt, it is far better to slightly underexpose than over.

35. SEMI-AUTOMATIC EXPOSURE CONTROL

Semi-automatic iris can be a useful technique if you are filming somewhere with problem areas of light or dark that you cannot eliminate from the shot. While in auto-iris, show the camera the area you want to expose by zooming in, but with any problem areas like bright windows excluded from the shot. Press the iris button in order to switch to manual iris. Check the F-number. If it is showing F2.4 or below then you need to press the gain button twice. You should now have a 'dB' reading on the screen. Hold the camera pointed at your area of interest whilst doing all this. Zoom back out to your original framing. The exposure is now set for the scene minus the extreme light or dark areas. The exposure will not change if you now include the light or dark area in your shot as it has been set to a fixed manual value.

36. EXPOSURE FOR A PERSON

If your scene includes a person your priority is to expose for the person's face, rather than the scene as a whole. One of the first effects of over exposure is detail disappearing in light areas, so manually set the exposure for the lightest side of the face. Move the zebra switch (under the LCD screen) to '70'. This gives you a stripy pattern on areas of the picture that are 70% exposed. This pattern only appears in the screen or viewfinder, and is not recorded on tape. Adjust the iris (or gain if you don't have enough light) to get the pattern on facial skin tone. The brighter parts of the face should now be stripy. The 70% zebra is calibrated for average Caucasian skin, so using this for either very light or dark skin will result in under or over exposed results. Once you have set the exposure using the above method, make the shot slightly darker for dark skin (using the iris) and slightly lighter (using gain or iris) for very light skin.

37. NEUTRAL DENSITY FILTERS

Think of the Neutral Density or ND filters as the camera's sunglasses, which should be used in bright conditions. They are in-built filters that cut down light into the camera. If you are in auto lock, or auto iris, 'ND 1', 'ND 2' or 'ND off' will flash on the screen if the camera thinks it's got the wrong filter selected. Follow the instruction, and the ND indication will stop flashing. You will get better quality however if you check the iris setting before making a decision about the ND's. If the iris is at F9.6 or 11, you should put on the next level of ND, or if it is showing OPEN, go down a level. If you just follow the camera instructions, you may get a 'strobey' picture as the camera puts in up to a 150th second shutter before warning you about the ND's. This is the case only if you have 'auto shutter' selected in the menu. If auto shutter is off, and you forget to put in the ND, the pictures will look out of focus. We recommend auto shutter on, and for you to check the iris setting as above for each new set up.

Be aware that switching the ND filter in or out causes a sudden change in exposure, and a visible wipe across the picture. So if you are following a contributor and the camera advises you to switch the ND filter off or on, you would be better to ignore the instruction until you reach a cut point in your filming.

If you are fully zoomed out, and in bright conditions, any dirt or marks on the lens will be more visible, This is even worse when you're using a wide-angle adapter or the anamorphic lens. A screw on ND filter can be useful to stop this happening.

38. SHUTTER SPEEDS

Although not a physical shutter that opens and closes, video cameras have an electronic shutter that in normal operation gathers pictures at 50 times a second.

This shutter rate can be varied, so that the shutter opens more or less often per second.

Fast shutter speeds need a lot of light and motion will look jerky and strobey, not smooth. If you are in very bright conditions and the ND filter is not sufficient you can increase the shutter speed slightly, to effectively cut down the light into the camera. It can also be used to follow fast action that will be used to extract stills or slow-mo sequences. Unless a special effect is wanted it looks very unnatural on anything else, so use it with caution.

One exception to this is filming or in countries that use 60 Hertz lighting, such as the USA. The 1/60th second shutter speed should be used to eliminate flicker when you're shooting under these conditions.

To remove flicker from computer monitors, make sure you have 'auto shutter on' selected in the menu. Set up a light near the monitor, pointing at the camera. Vary the amount of light by panning or zooming until the flickering disappears. At this moment, press the shutter speed button to 'lock' the auto shutter. It will give a readout of the nearest shutter speed, but is in fact set to a precise speed to match the monitor. Now remove the light and adjust the iris for a normal exposure.

A slow shutter speed of a third of a second is another way to capture pictures from a computer screen with minimum flicker, but there shouldn't be anything moving in the shot. It can also be used to give a really blurry effect to shots.

Make sure the auto shutter is on in the menu. If this is not done, the pictures can look very 'soft' in bright conditions. This protects you if you've not followed the ND instructions, or if you'd like to move from indoors to out without seeing the ND kick in. The auto shutter only works if the light is too bright, you're in auto exposure, and if the iris is being asked to close more than F9.6.

To access the variable shutter speeds on the PD 150 make sure the autolock button is set to the middle position. Press the shutter speed button at the rear of the camera. Use the control wheel to change the shutter speed. For the slow shutter speeds, put an ND filter on, even if you're indoors, and do your focussing before switching the shutter on.

39. STILL PICTURE SHOOTING

The PD 150 has a much-improved system for grabbing stills, called 'progressive scan'. This maintains full resolution and avoids the need to 'de-interlace' in computer software. You can record on tape, or onto a memory stick. Use whatever system is compatible with your computer.

It may be a useful emergency facility for publicity stills on shoots where a photographer cannot be present, however the quality is not comparable to a camera using film.

To get the best quality, select 'progressive scan' in the menu.

If you're recording stills onto tape, just press the photo button behind the zoom lever half way down to grab a still picture, then all the way down to record 7 seconds on to the tape

If you're on the memory stick, you have to go into 'memory mode'. There is a tiny switch on the main power control that stops it going into memory mode normally. Move the switch, then push the power switch to 'memory'. Use the 'photo' button as described earlier. To return to normal recording, simply turn the switch back to standby. Refer to the PD 150 manual for detailed information about memory mode.

40. SHOOTING FOR WIDESCREEN

The PD150 16:9 mode is considered 'just acceptable' for widescreen shooting, but there are ways to get better quality such as using a high quality ARC in post production. ARCing in a computer based post production tool is unlikely to give better results than the camera 16:9 mode, so consider this before shooting.

If you're shooting for a widescreen programme you may have an anamorphic lens, a graticule (guidelines on the screen) fitted, or preferably both.

You should know the 'shoot and protect' requirement for the programme. This is usually shoot 16:9, and protect for 14:9. Very simply, this means not having things at the extreme left & right that are important to the viewer. A wide 2 shot would be a problem, as would a side shot of say a sausage dog. The analogue 14:9 viewer (still in the majority) would miss the poor animals' head & tail!

If you're doing a shoot that is fairly relaxed, and you don't need the tight end of the zoom, you'll get great quality with the anamorphic lens. It's important to make sure the lens is fitted correctly. Looking into the lens, you should see a tall, thin oval, looking into the viewfinder/screen you should see a tall thin image. The anamorphic lens will not focus if you zoom in more than two thirds of the way, so use the zoom indicator on the screen to gauge this. Also don't use the extreme wide end of the zoom as this may cause darkening of the corners of the picture. Good uses for the lens would be interviews, cut-aways, sequences you can control, and handheld work. You can frame full height, but watch out for extreme left & right due to the 14:9 protect area. Ignore the top & bottom lines on the graticule, if fitted.

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If you're doing a fast paced shoot, needing the full lens performance, use the graticule and NOT the anamorphic lens.. Examples are 'fly on the wall', actuality, and documentaries. Frame within the graticule height, and again watch out for extreme left & right due to the 14:9 protect area.

If you mix lens and graticule on you shoot, make a note either on location or when logging as to when this happens. The material shot with the graticule will need to be ARC'ed in post production.

41. LIGHTING - INTRODUCTION

Light in a picture gives contrast; it creates dark and light, and at its simplest creates well-balanced pictures with detail where you want it. Don't think of lighting at its extreme; it is as relevant to a simple interview of one person in their kitchen as it is on a drama shoot. Whether you are using available light only or have a truck load of hired in lights, (not very likely on a DV shoot), the basic aims are the same - to control contrast and light a scene to your best advantage.

There are established safety guidelines relating to lighting, so if you are filming on your own you must not use any mains supply lighting kit. If in a team of two or more, you can use mains lighting but only if you can prove competence. Even if you have the crew and the kit to light, consider its appropriateness for the shoot. Don't forget that setting lights takes time, they must be treated with care, and without experience you can cause yourself more problems than you solve. You may well get better results being creative with the available lights than trying to completely re-light the location.

42. LIGHTING PRINCIPLES

There are principles about light, firstly defining its quality and secondly relating to its use, that apply regardless of whether light is available on location or brought in, natural or artificial.

Light falls into two categories; hard or soft. A hard light is from a small source and produces a contained area of light. It is fairly easy to control and will create detail and hard shadows. Soft light comes from a large source and produces a larger and less contained area of light. Not as easy to control, soft light tends to smooth out detail and the resulting shadows will be soft.

Regardless of the size and complexity of a shoot there is a basic methodology behind all lighting, and an understanding of the three main elements will make a great difference to what you can achieve, whether with available light or a basic lighting kit.

The key light is the main source of illumination. It is usually a hard light source that creates shadow and interest and reveals detail. When you are lighting a contributor or interviewee the best angle for a key light is between about 30 and 45 degrees from head on. The light source should ideally be above the eye line, which will provide a natural looking catch-light for the eyes.

The fill light is positioned on the opposite side and controls the contrast between light and dark areas, thereby setting the mood of the picture. It is usually a soft light, and dimmer than the key light.

Finally the back light separates the subject from the background, introducing depth into the picture. Back light is usually hard.

On most DV shoots simple is better is likely to be the maxim, so we'll consider some ideas about making the best of available light, and then offer some advice about using a lighting kit.

43. USING AVAILABLE LIGHT

Use of just available light on location can enhance your pictures no end. When you arrive at your location look at the light sources available; are they hard or soft? and what would be the best position for you, with camera and your contributor to make best use of the available light?

Following the lighting principles explained in the previous section, a window would be the most obvious available source for a key light. Position your contributor facing the window, not head on but at about a 30 degree angle. This will throw light onto the contributor's face, give some detail otherwise known as modelling to the features and it should throw some light into

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the contributor's eyes. If the dark side of the face is too dark you need to reduce the contrast. This is the function of the fill light, and it could be a simple reflector like a white card or Lastolite collapsible reflector. The final light, the back light, can further enhance your shot. It should be placed behind your contributor and could be a battery light. It is the least important of the lights if you have limited resources, but if used will create depth to the shot and help separate your contributor from the background.

Once you are happy with the lighting, don't forget to white balance manually if you are in mixed lighting conditions like those we have described.

Lighting with overhead lights only is far from ideal, particularly if they are fluorescent. They throw light directly down onto the contributor and do not provide modelling or catchlights for the eyes. You could try bouncing light back into the eyes using a lastolite reflector or large piece of white card. If there are other lamps available try using them with or instead of the overhead light. It's OK to ask for available lights to be switched on and off, but don't move or touch them as it could be a safety issue.

If you have unwanted shadows in your shot, remember that you will never eliminate them by switching on more lights. You will need to reposition your contributor instead.

When filming outside, your light source is likely to be the sun, even when it is overcast. Position your contributor so that the light is thrown onto their face, providing modelling and catch-light. If there is too much contrast between the sides of the face, use a reflector.

44. USING A BASIC LIGHTING KIT

The principles for setting lights are outlined in the 'lighting principles' section of this guide, and you should also refer to the previous section on making the most of available light. Using a lighting kit instantly raises a set of safety issues that you must consider - lights are potentially very dangerous.

Safety is of paramount importance when using lights, there are many potential hazards to avoid; firstly the danger of electrical shock.

Test any suspect mains supply by plugging a 'mains' socket tester into the socket. Lights should then be plugged into the mains via a residual current device or RCD, to avoid shock.

Position lamps carefully, away from entrances and exits and passageways. They become hot with use so make sure they are not positioned so that heat could cause danger or start a fire. Cables should be carefully laid, avoiding traffic areas and if necessary taped down. Excess cable should be coiled up and out of the way.

Light stands are not particularly stable, particularly if they are fully extended, so be careful where you erect them and don't leave your lamps unattended. If you're in a domestic situation consider the unpredictability of children and pets, who like nothing more than going where they shouldn't.

Lamps take a while to cool down after they've been switched off. Should a light be knocked over, turn it off, wait for it to cool down and don't use it again before it's checked.

Bear in mind that using mains lights will increase the amount of time you need to spend at the location, both to set up and take down after a reasonable cooling period. It also means extra equipment to carry, make sure you can carry everything safely between you, or get help.

For anything more than a basic lighting set up for an interview you really should get an experienced lighting person to help. Lighting is easier to get wrong than right if you don't have the necessary experience, and someone who knows what they're doing could cut down the time you have to spend dramatically and improve your chances of success no end.

45. BATTERY LIGHTS

There are a number of battery lights on the market, which you may find useful on a DV shoot. They can offer the opportunity to enhance your pictures without the potential problems of a lighting kit. The most useful is perhaps the one

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made by Sony that takes the same batteries as the camera, lasting between 40 minutes and two hours depending on the battery.

Use the light as a key or back light, it's not really powerful enough to use as a soft. You can improvise with mounting it, such as putting it on a table or bookshelf. It can be mounted on the camera, but it's quite heavy, and you may have a mic. on the camera anyway. It will mount on to a tripod, so you could use a cheap domestic tripod as a lighting stand.

Use half blue gel for daylight correction. Cut it into a small piece, and use gaffa to stick it over the front of the light. Softening gel ('hamberg frost' or 'trace') is also useful for making the light more even.

46. AUDIO INTRODUCTION

This part of the guide deals with audio recording on the PD 150.

47. CAPTURING AUDIO ON LOCATION

When you have a lot of things to think about on a DV shoot it is easy to relegate sound to second place, but beautiful pictures without usable sound aren't worth much.

When you arrive at a location, listen. You should aim to reduce background noise as much as possible. Eliminate unnecessary background noises - close windows and doors, turn radios and fans off and make sure mobile phones are fully turned off - they can produce interference on your recordings, as well as unwelcome interruptions. Consider the acoustic qualities of your location as the quality of recorded sound is considerably reduced in reverberant locations. If you have a choice go somewhere else, if not try to position your microphone as close as possible to the sound source. Record wildtracks separately once you have completed your main recording and have the flexibility of using them as suits you best. For information and tips about selecting and using microphones, go to the microphone section of this guide.

48. RECORDING AUDIO ON THE PD 150

The PD 150s own audio set up is very comprehensive, and completely different from most other cameras. There is no need for a Beach or Glensound box as the XLR connectors are built in to the camera. The sound functions are split between the switches at the front of the handle, and the menu system. There are two independent sound tracks, called ch1 and ch2. These can be individually set for various functions such as auto or manual level.

49. AUTOMATIC OR MANUAL SOUND

Recording audio automatically means that your audio is less likely to distort, because if the sound gets too loud, it will try to reduce the level and keep it within the cameras capabilities. The PD 150 has a very limited range of auto level adjustment, and you can get distortion or low level sound even if you have selected auto. The system has essentially a fixed level with a limiter. As long as the sound you're gathering is just under the point at which the auto kicks in, you get the best sound using auto level. To achieve this, the mic output level and the sound have to be within the correct range. A typical clip mic with a normal speaking voice is fine, or the Sennhieser ME66 gun mic with a 10dB in line attenuator also. Most radio mics have a level adjustment so they can be made to give out the right level. Micron radio mics generally need a 10dB attenuator unless a line level cable is used.

The default mode is with both tracks in auto. The PD 150 refers to auto level as 'AGC'. Manual control on the PD 150 increases the hiss, whatever the level is set to. We do not recommend manual level, unless the recordings cannot be adjusted in post production. Here's the procedure if you have to adjust level:

To activate manual audio control, you need to enter the cameras menu system. Press the menu button on the side of the camera. Use the wheel at the rear to scroll down to tape set, and enter 'audio set'. Go into mic. level and select 'AGC off' for

the track you want. Press the menu button to clear the screen. Press the 'audio level' button at the back of the camera, and use the wheel to select and adjust the relevant track to peak to about -10 on the meters.

Let's assume however that 'AGC on' has been selected. Press the 'audio level' button at the back of the camera to show the sound meters. On-screen level meters that respond to the sound coming in to the camera on each track will appear. Check that the sound meter is bouncing around the -12 region. If it's too high, use an external 10dB attenuator, or if it's really high use the 'atten' switch on the front of the camera. If it's too low, use a more sensitive mic (such as the ME66 gun), move the mic nearer the sound, adjust the radio mic level, or get the person to talk a little louder. Press the audio level button to clear the display.

If you're using a mixer, simply switch to 'line' on the front of camera box, and keep in auto level. This assumes the mixer is producing the standard professional level (0dBu). Tone should read at -20 . You will not get any 'pumping' or other auto level problems, but have the significant advantage of the lower hiss in auto level.

It is vital to use good quality headphones to constantly monitor the quality of sound. Also, as the PD 150 can produce dangerous levels of sound, you must use limited headphones. Plug them into the green socket on the panel at the front right of the camera. Use the headphone volume control on the lower left corner of the LCD screen to set a sensible level, usually about three quarters. You get each track in each ear of the headphones, so take an ear off if you don't want to hear that sound. You should be listening for a whole range of things such as distortion, hiss, rustling and crackling, to name but a few. Bear in mind that monitoring on headphones can sound more hissy than the same sound through a loudspeaker.

50. FRONT OF CAMERA SOUND SWITCHES

On each track you can select 'mic', 'line', or 'mic atten'. The 'mic atten' position is quite a severe reduction in mic level, and would suit loud sounds like a rock concert or an explosion. The idea of this switch is that the sound is reduced right at the input to the camera, so as not to cause distortion in the input circuits. It's quite possible to have the level meter reading OK but still to have distortion caused at the input. This also applies if you're in auto level (AGC on). Watch out if the level scale (not to be confused with the level meter) is below about a quarter, and you're getting high levels on the meter. If you're expecting loud sounds, switch to mic atten. Some mics naturally have a high output, such as the Sennhieser ME66 gun mic in common use. You might find that even moderately loud sounds will distort the input with this mic. The mic atten puts in about 20dB reduction of sound, which is quite a lot. An external 10dB XLR attenuator can be useful to give the best quality in average situations with this mic.

The 'line' setting is for mixers or other external equipment with a 'line' (or very high level) output. These include p.a. systems, sound desks, press conference feeds etc. It is worth mentioning that hired in radio mic kits sometimes have mic and line level leads - they should be marked. It doesn't matter which you use, but make sure you have set the line/mic switch accordingly.

There is a switch for 48V on/off, which means that if set to on, you don't need batteries in some mics. The gun mic for instance will work whether switched on or off ! It's best to switch the 48V off if you're using radio mics, or mics not designed to accept power, such as a reporters stick mic.

The other switch is useful if you want to send one mic to both tracks. In this case, input socket 1 is sent to the processing for both tracks. This means you can set a different level on each track for the same sound, or have one track in auto and one in manual, giving protection against distortion if you're only using one mic.

51. CAMERA SOUND MENU SETTINGS

You can set the tracks to auto or manual level here, and also select whether the tracks are 'ganged'. This means that the level adjustment for track one will also apply exactly to track 2. The idea of this is for using true stereo mics, which are not used typically for DV location sound. Also a mic NR setting is in the menu. It can reduce motor

buzz & handling noise when using a mic physically attached to the camera. Normally leave it off, but if you hear the hum or buzz from the camera, you could try switching it on.

There is a wind noise reducer setting in the 'Camera set' menu which reduces bass and is best left switched off unless you're in a car with a low humming engine, or in very windy conditions.

52. CHECKING LEVEL

When checking level make sure you are in circumstances as close to the real situation as possible, with the mics in their operational positions and people speaking as they will for the take. You will not be able to see the meters whilst filming (assuming AGC on) so it's essential to monitor all the time on headphones.

53. MICROPHONES

The camera's supplied mic is not very good quality, and has a low output. Ideally use a better external microphone.

As the camera supplies power to many mics, you don't need batteries in them. Radio mics are the exception.

Positioning of microphones is very important, and can make the difference between a quality recording and an unusable one. Generally speaking the closer the microphone to the source sound the better the final recording, as sound falls off very quickly with distance. If the distance between a sound source and a microphone is doubled, then the sound level picked up by the microphone is only a quarter of the original. At three times the distance the sound will be a ninth of the original and so on.

There are three types of microphone most commonly used for DV filming, each of which has different qualities and is best suited to different situations. It is important to select the right microphone, or combination of microphones for the job in hand. The following sections give information on each type of microphone and their use.

54. STICK MICROPHONES

Stick microphones are the type commonly used by reporters. They are omni-directional, meaning that they collect sound from all directions into the top of the microphone and so rely on being close to the source sound. This normally means that they have to be in shot. They are usually dynamic microphones which means they do not require batteries or power of their own. They are robust and therefore useful emergency standbys, they are commonly able to record high sound levels without breaking up and are fairly resistant to wind noise, though a foam windshield can be added if needed. Be careful to avoid handling noise and noise transmitted up the cable.

55. PERSONAL MICS

Personal mics which are also known as clip mics or tie mics, are cabled microphones designed to be clipped to a contributor's clothing. They are omni-directional so rely on proximity to the source sound.

Personal mics are sensitive to wind noise; some come with a metal mesh cover, otherwise always use a foam cover on the microphone head.

Your contributor's clothing will greatly affect the positioning of a clip mic and therefore the sound quality achievable. Attaching a personal mic to a T-shirt collar will always result in a slightly muffled sound and there is the danger of picking up internal sounds from your contributor, so be careful that the mic doesn't rest on the contributor's vocal cords. The best position is at chest height or slightly above, so that the mic is close, but not so close that the contributor's head movements affect it. If you are going to place the mic off centre, perhaps on a jacket lapel or on one of two people in a conversation make sure you clip the microphone on the side the speaker will favour, not the side the speaker will turn away from. It may be advantageous to point the microphone head downwards, so as to reduce the affect of air movement down the chest and if the cable can be secured in the back of the clip this will help to prevent cable borne noise reaching the mic. Take care to ensure that the microphone does not rub against other items of clothing or jewellery. Spend some time concealing the cable, not only for aesthetic reasons, but also to ensure that your contributor does not play with the cable during filming. Don't be tempted to shove the cable into a pocket or waistband - if the cable is crushed or twisted your recording may be affected.

56. GUN MIC

Gun mics are directional mics that pick up sound only from in front of the microphone. Imagine a cone shaped pick up area, about 50 degrees across. **They have an on/off switch but with the PD 150 it will work even when switched off, as long as the 48V switch is on at the camera.** Gun mics can fix to the mount on the top of the camera via a clip, or they can be attached to a boom pole. They are sensitive to handling and wind noise, so a foam or furry windshield should always be used.

Because of their directional nature, sound will quickly drop away if you move and don't directly face your audio source, so camera positioning and moves while filming should be considered carefully.

The gun mic's directional nature could be useful if you are in a situation such as an interview with a specific background noise source that you cannot eliminate. Position yourself no more than a metre from your contributor and with the unwanted sound behind you. The background noise may well be less audible than using an omni-directional mic like a stick or personal mic.

57. OTHER MICROPHONE OPTIONS

There are two other options for recording audio, both of which can be very useful, but you should be aware of their limitations unless you have the experience to use them properly. The first of these is boom operation...

58. BOOM OPERATION

Operated properly a gun mic on a boom pole produces excellent audio recordings and will allow you to cover group interviews and action situations well. However success is dependent upon prior knowledge and practise.

Boom swinging is a skilled job; the camera operator and boom operator need to understand how each other works, and be able to communicate things like shot sizes, or you'll end up with lots of booms in shot. Bear in mind the light sources in your location as well to avoid unwanted mic shadows in shot.

It will be impossible to capture audio properly unless the boom operator can monitor the sound through headphones. To give the boom operator the flexibility to move where necessary the headphones will need to have a long lead or extension. For health and safety reasons avoid having two separate leads swinging around by carefully taping the headphone extension and mic cables together. A better solution is a combined mic and headphone cable.

Careful positioning and handling of the boom is crucial. Because the mic is directional you will need to turn it to face whoever is talking. Roll the pole lightly in your open palm to avoid handling noise from the boom pole. And bear in mind that boom operation is tiring on the arms after any length of time.

The PD 150's screen can fold right back onto the side of the camera, giving the boom swinger a guide to the shot. This should help to avoid the dangers of booms in shot

59. RADIO MICS

Once mastered, radio mics can be a real asset to your DV kit. If you are filming a lot of actuality, not being cabled to your contributor offers freedom and flexibility. However they are complex pieces of kit - you have a transmitter and a receiver to consider as well as an unpredictable radio link. Their performance and operation is fraught with potential problems.

Don't contemplate using radio mics on a shoot unless you have familiarised yourself with their operation carefully beforehand. Assuming you are a two person crew, we advise that one of you takes sole control of the radio mics; their care and operation. If you are filming on your own try not to use them - you have enough other things to think about. Because of the potential difficulties we do not recommend using them to film unrepeatable scenes. There are many radio mics available from very cheap to very expensive. We strongly advise you not to use any radio mics other than top of the range hired in models, ideally Micron radio mics which are robust, have in built limiters and a good range.

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A cabled microphone is plugged into a transmitter, and the audio is transmitted via a radio link to a receiver that plugs into the camera. The transmitter has sockets for the mic and for the aerial. The receiver will have one or two fixed aerials and a socket for the cable that runs to camera. Hired in radio mics are sometimes supplied with both line and mic level leads - it doesn't matter which you use but make sure you set the Beach or Glensound box input switch accordingly.

Radio mics are delicate pieces of equipment and need to be looked after. When plugging up, line up sockets and inputs carefully, there are often dots indicating the right way round - under no circumstances try to force leads into place. Likewise when unplugging be firm but careful, and don't disconnect by pulling at the leads. Store radio mics carefully - they will not fare well thrown into a pocket of your kit bag. Best would be to keep them in the hire company's box, with the spare aerials, batteries, and optional clips etc.

Radio mics need batteries in both the receiver and the transmitter, often of different types. They lose power far faster than other mics, and although there is a battery checker we suggest that you change the batteries in both the receiver and the transmitter before filming an interview or sequence to ensure that one or other element does not fail at a vital moment. All the time the microphone is plugged into the transmitter it is using battery power, so should be unplugged when not in use, as should the lead from the receiver to the camera.

The audio signal is transmitted on a pre-set frequency and more expensive radio mics have a choice of two channels, so make sure that transmitter and receiver are both switched to the same channel. The frequencies will be different for each radio mic set, so make sure that you are using the transmitter and receiver that belong to each other - the pair usually have the same number stickered to each, or you can check that their frequencies match on the factory stickers.

The signal range of radio mics varies greatly and is affected by buildings and other obstacles that can cause the radio link to break up. On expensive models there are lights on the receiver indicating signal strength, and some, known as diversity radio mics will automatically take the strongest signal from one of two aerials, thereby reducing the chance of break up. It is possible to cause or be affected by interference, in which case try switching both the transmitter and receiver to the other channel, and as with all radio equipment be aware that radio mics should not be used in locations like hospitals and aeroplanes without consulting the appropriate authorities.

You may have noticed a small level control that looks like a plastic screw head on the top of the transmitter. This can be adjusted using the small screwdriver you will have in the kit, but it should already have been set to a reasonable level - about half way.