CampusTV
Panasonic AG-AC90A User Guide

CampusTV owns two Panasonic AG-AC90As. These are prosumer camcorders, with small sensors but excellent low light ability. They are great news, sport and show cameras. Although not very cinematic, they perfectly fit the CampusTV requirements and are a brilliant camera to learn with.

This guide will use terms such as aperture and exposure, if these are unfamiliar check out some of our other guides.

Automatic Mode Basics

The AG-AC90A has a brilliant automatic mode with particularly good autofocus, low-light capability and auto tracking white balance.

Guide

1) Slide in a Panasonic battery at the top of the slot, push down until it clicks. The battery's arrow should point down.

2) Lift up the SD card slot and insert an SD card.

3) Press in the small white button, twist down to 'On'.

4) Switch the iA – MANU switch to iA, IntelligentAuto.

Easy! The camera can now record.

5) Slide out the LCD screen.

6/7) Press one of the two big red buttons to record.

The camera has two other important controls:

- The three rings at the front of the camera mostly matter for manual mode. However, the middle ring controls zoom.

- On the top handle (7) and by the hand grip (6) there are red, record buttons and a T – W button. The T zooms in, the W zooms out.

The iA setting also has the manual functions: Zebra, White Balance, Focus Assist and OIS.

Audio is also the same as in manual, see page 5 for setting up audio.

What do the buttons mean?

IRIS A/M – The IRIS button controls whether the 'Gain' and 'Aperture' are manual or automatic. Manual Iris is controlled by the 3rd ring see 'Controlling the Image' for more info.

Focus A/M – controls whether focus is controlled manually (front ring) or automatically.

OIS – turn on or off the Optical Image Stabilization, an advanced way of stabilizing video. This should be on when handheld or on a shoulder mount but off for a tripod.

W.B. – cycle through white balance settings (see the 'controlling the image' page for more info).

Focus Assist – turn on focus peaking, anything traced by a red line is 'in focus' (see the 'handy tools' page for more info).

Zebra – cycle through 'zebra' options, white and black lines that mark the exposure of an object (again: handy tools).

Bars – turn off the image to record a blank bars page for calibration.

Menu – access the menu.

Disp/Mode CHK – cycle through having just the image guides or all the settings & info on screen.

Counter or Reset – control the counter (again: handy tools).

User 1, 2 and 3 can be set to any of the user controlled buttons. (see the 'User Settings' page).

iA..MANU – switch between intelligent auto and manual.

For use of the audio buttons: see the page 'Recording Audio'.

The LCD Screen

Timecode
TC 00:05:18:10

Media (SD card)
Remaining recordable time — R 3h07m

Play / pause indicator
Auto / manual indicator — MNL
Battery indicator

Image stabiliziation (O.I.S.) indicator

Format — PH 1920
White balance mode — ATW

Frame rate — 60 i
Brightness gain — 0dB

Shutter speed — 1/60

Manual / auto focus indicator — MF 9 2

ALC

Zoom factor — ZOO

Microphone levels
Aperture — F9-6

Recording Audio with an external mic

The camera has two key audio connections: the 3-pin XLRs on the side of the top handle (the bottom image, example XLR above) and the headphone jack on the back of the camera's right side.

How to set-up audio

1) Connect an XLR cable to the microphone (if the microphone has a 3.5mm connector, use a converter cable).

2) IF the XLR doesn't split, plug the XLR into _Input 2_. If you are using a stereo microphone (2 channels, so a splitter or two microphones is used), plug the second XLR into _Input 1_ and the first into _Input 2_.

3) On the top handle controls (_1_) Set the _Line – Mic_ switch to _Mic_ for the channels you are using to set-up a preamp.

> _Line_ is used for connected audio equipment with 0 db input gain, _Mic_ for -50 db, the standard external microphone setting.

4) If the microphone is unpowered, switch the _+48V_ switch to '_ON_', this activates phantom power.

5) Move to the side control panel (_2_)

7) If one input is used (input 2), set _CH1_ and _CH2_ to _INPUT 2_.

8) If two inputs are used, set _CH1_ to _INPUT_ 1 and _CH2_ to _INPUT 2_.

9) _INT(L)_ and _INT(R)_ are used for scratch audio using the internal mic.

10) Finally, set the gain for each channel using the small dials. You should aim to have the speaker's average level just above the two lines in the audio levels guide. Also, always monitor the audio through headphones and adjust levels to get the best sound.

User Settings

The camera has a number of useful user settings, the most important are the 7 programmable User Buttons.

- User 1, 2 and 3 are marked by physical buttons at the bottom of the main control panel.

- User 4, 5, 6 and 7 are revealed when the LCD screen is tapped, at the left hand side.

Icon	Item	Function
[P.AF]	[PUSH AF]	In manual focus mode, whilst pressed it autofocusses then goes back to manual.
[B.Light]	[BACKLIGHT]	Backlight Compensation sets the iris control such that a subject in-front of a bright light would be exposed correctly rather than exposing for the bright background.
[S.Light]	[SPOTLIGHT]	Spotlight is used to set the iris for a very bright subject in a dark environment.
[B.FD]	[BLACK FADE]	Black Fade out/in.
[W.FD]	[WHITE FADE]	White Fade out/in.
[ATW]	[ATW]	Set white balance to Auto Tracking White Balance
[ATW.L]	[ATW LOCK]	Lock white balance to the current temperature.
[D.ZM]	[D.ZOOM]	Digital Zoom
[HIST]	[HISTOGRAM]	Bring up the histogram
[REC.C]	[REC CHECK]	Recording Check shows you the first 5 seconds of the last scene recorded.
[LstDel]	[LAST SCN DEL]	Last Scene Delete
[MENU]	[MENU]	Menu

Controlling the image – manual mode.

Creating a quality image is about balancing a number of factors to ensure you get a well exposed, sharp video with the correct shutter speed and frame rate for your project. Before recording, it is possible to select different resolutions and frame rates, but the camera should default to a standard, useful format.

A note on resolution:

Resolutions are quoted by their height (typically the smaller value). The most common are:

1080: 1920 x 1080
720: 1280 x 720
4K: 4096 x 2160

They are usually quoted as 1080i or 720p describing how the pixels are scanned by the sensor.

i – Interlaced, the sensor scans all the odd lines of pixels then the even pixels and a display plays the frame twice, this creates a smaller file size and is effectively lower quality. This is the choice of broadcast video.

p – Progressive, the sensor records all the pixels in lines creating full quality. This is the choice of cinemas and the internet.

TL;dr: record in p for higher quality.

Iris A/M – the iris refers to the amount of light hitting the sensor. Iris controls mean both aperture from f11 (a very small hole to let only a little light onto to the sensor) to f1.5 (fully open) and then through to 30db gain (increasing the sensitivity of the sensor to increase the light but negatively increase the noise). Once switched to manual, twisting the *3rd ring* from the front adjusts the iris. (Page 9 for how to use *Zebra* and *Histogram* to monitor exposure).

Frame Rate – is the number of images played per second to create your video. Typically higher frame rates look more realistic but less cinematic. As a rough guide: 24 = cinema, 30 = TV, 60 = sport or slow motion (as 60 at ½ speed = 30). Frame Rate is selected from the resolutions panel in *MENU*

Shutter Speed – often confused with frame rate, shutter speed is the actual time each frame is exposed for. A higher shutter speed will make movement appear sharper and a lower shutter speed will increase the motion blur. As a rule of thumb use 2x your frame rate but be creative – eg a war film may have a higher shutter speed to make action appear more visceral and jerky. Shutter speed is measured in seconds but typically as a fraction. 1/60th of a second is written just as 60, while 60 seconds is 60". Shutter speed is controlled by pressing the LCD once and selecting *SHTR*.

Focus – focus is controlled by the *front ring* on the camera. Ensure focus is always on your main subject. (See handy tools for a tip on focus!)

Zoom – Zoom is controlled by the *middle ring*. The camera has up to 12x optical zoom. Digital zoom compromises quality so avoid this.

Controlling the image – White Balance

_W.B_ – white balance refers to how the camera interprets the colour in the image as affected by the lighting of the space. Simply: an indoor incandescent lamp would cause a red t-shirt to look different to the camera compared to in daylight – the white balance settings correct this. There are a few different ways to perform this in-camera correction.

Setting	Effect
ATW	Auto tracking white balance – the same as your standard 'auto' white balance, the camera calculates what lighting the scene is and adjusts accordingly. However it is 'tracking', it continually adjusts throughout recording.
ATW LOCK	The white balance is initially set via ATW then locked – it does not track.
3.2k	Preset for normal indoor halogen lamps
5.6k	Preset for normal outdoor
Ach or Bch	A manual mode that white balances to a specific colour (see below).

Using the Ach or Bch function:
This method of white balance is the most common on pro cameras.
1) Fill the lens with a white piece of paper/a white balance card
2) Navigate to the Ach option
3) Press and hold the _W.B_ button, the screen should go momentarily black and display the message '_WB SET OK_' upon returning.
The camera has been set to the specific colour correction for the light environment by using an object of known colour.

To finely adjust the colour:
Menu → Camera Setup → Color Temp Ach or Color Temp Bch (for Ach or Bch white balance)
Use the arrows to finely tune the colour temperature.

Handy Tools

The Panasonic AG-AC90A has some pro tools used to assist you when recording.

Zebra – this is used to mark your exposure, an over exposed image loses information and looks 'blown out', an under exposed image is too dark. By pressing the *Zebra* button you can cycle through settings. '*100%*' or '*70%*' is used for marking anything exposed above these values with a pattern of white and black lines. '*Marker ON*' gives you an exposure reading for where the marker is placed. My rough suggestion is that your main subject should be between 66% and 75%, as a guide the highlights of a white face should about 70%.

Focus Peaking – this marks anything in focus with a red line. Use it to work out precisely what is in focus when in manual mode.

Histogram – this displays the precise graph of recorded light. From the left hand side (0% exposure – black) through to the right hand side (100% exposure – white), a perfectly exposed image would have a bell curve shape. In the above example the image is possibly under exposed, the graph skewed to the left hand side. Use the gain to adjust and expose correctly.

Counter – used to mark time recorded or use the *UB* (*Used Bit*) setting to control clip naming.
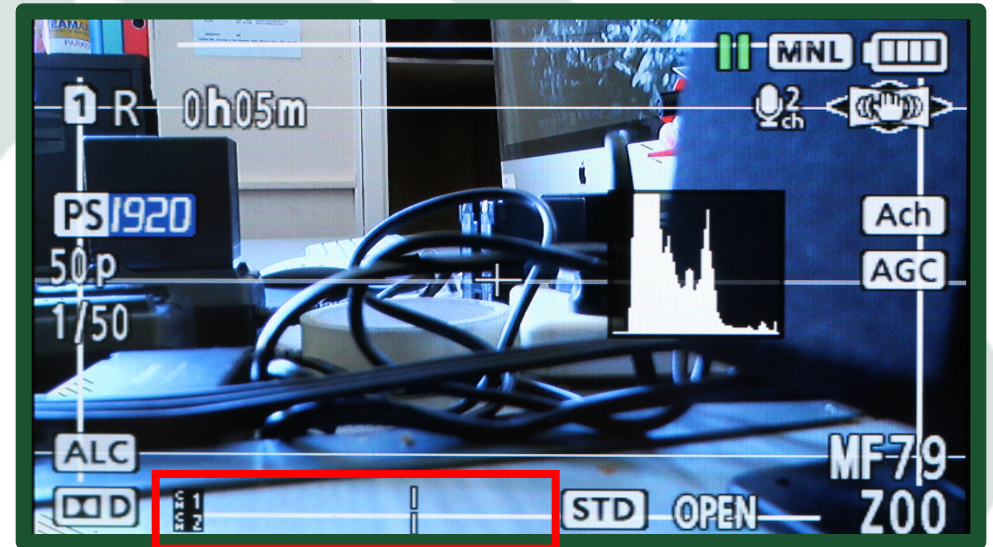
Audio Metering – when audio is recorded, the audio levels (highlighted by the red box) can be monitored to get good quality audio. Too loud and it will 'clip', too quiet and it is useless and hard to edit later. The channels are independently controllable and monitored separately.

- The average speaking level for your subject should be set to around just above the 2/3 line.
- The top of your levels should not be regularly turning red at the far right of the above box.

If constant control is hard, as a rule of thumb: louder is easier to edit while quieter audio will have more distracting noise so just set it to loud and leave.

Key Technical Specifications

Sensor

3 x MOS 1/4.7in sensors

Each has 2.19 Megapixels for a 6.57 maximum

Minimum illuminaton 3 lux

Lens

Focal length of 2.84 to 34.1mm

12x optical zoom, 25x i.zoom

Aperture of f/1.5 to f/2.8

5-axis hybrid OIS

3 control rings (aperture, focus, zoom)

Recording Specifics (Standards)

AVCHD version 2.0 Codec with NTSC (60Hz) system

PS Mode: 1920x1080 59.94p

PH Mode: 1920x1080 59.94i/29.97p/23.98p

HA Mode: 1920x1080 59.94i

Shutter speed from 1/30 to 1/2000.

2 Audio channels

Interface

Recording Media: 2 x SD/SDHC/SDXC ports

1 x HDMI output

1 x AV Multi output

1 x USB 2.0

1 x 2.5mm remote terminal for zoom and REC START/STOP

1 x 3.5mm remote terminal for iris and focus

2 x XLR audio input (MIC/LINE/+48V selectable)

Other Specs

3.5in touchscreen LCD

DC 12V AC adapter and 7.2V battery

3.9lb