

Panasonic
ideas for life

AVCCAM

AG-AF100 series

Memory Card Camera Recorder



A PROFESSIONAL HD CAMERA RECORDER
COMPLIANT WITH MICRO FOUR THIRDS STANDARDS

AWB

M
MICRO
FOURTHIRDS

AVCHD

DOLBY
DIGITAL
STEREO CREATOR

HDMI
HIGH-DEFINITION MULTIMEDIA INTERFACE

SD
XC



AVCCAM 3-Year Warranty Repair Program*

*AG-AF100 series users qualify for a 3-year warranty on repairs.
Visit the website for details: <www.panasonic.biz/sav/pass_e>



* This photo is intended only to show the general image of the product. Panasonic does not guarantee the compatibility or performance of all lenses that are mountable on the AG-AF100 series. Use a support system when mounting a lens weighing more than 1 kg (2.2 lb).

A New Story Is About to Unfold...

AG-AF100 *series*

Micro Four Thirds Mount Professional HD Video Camera Recorder

**The world's first*¹ professional HD camera recorder
with a Micro Four Thirds mount*²
unleashes creativity in motion picture production.**

The imaging area of the new camera recorder is almost the same as that of 35mm cinema film and enables an exquisite film-like shallow depth of field. The short flange back distance of the Micro Four Thirds Mount allows the use of a wide range of lenses, including cinema lenses. In the AG-AF100 series, Panasonic has brought shallow depth of field control to a professional AVCCAM camera recorder. The AG-AF100 series offers a new level of HD motion image quality with extended recording time, the variable frame rate function, and the operating system and system interfaces designed natively for video production. This lets the AG-AF100 series record high-quality images with greater operating ease than even a digital SLR camera can offer. The AG-AF100 series can unleash your creativity.

*1: As of November 2010 (based on a Panasonic survey).

*2: The AG-AF100 series complies with the Micro Four Thirds standards, but compatibility with all Micro Four Thirds standard lenses is not guaranteed.

Samples Recorded with the AG-AF100 series



A single frame captured from an HD video file (1920 x 1080) recorded with the AG-AF100 series.

Beautiful Shallow Depth of Field and CINE-LIKE Gamma



Samples Recorded with the AG-AF100 series.



Samples Recorded with the AG-AF100 series.



A single frame captured from an HD video file (1920 x 1080) recorded with the AG-AF100 series.

Superb Image Quality Free of Aliasing Noise



An example of an image with aliasing noise (from a DSLR camera).



An image without aliasing noise recorded with the AG-AF100 series.

WM™
**MICRO
FOURTHIRDS**



Samples Recorded with the AG-AF100 series.



PL Mount 24mm



PL Mount 10mm

**The Micro Four Thirds System Provides Rich Expression
with a Wealth of Interchangeable Lenses.**

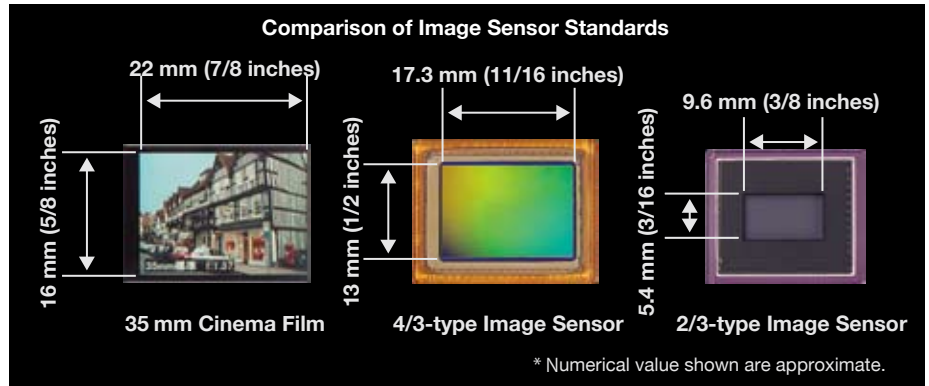
The 4/3-type image sensor has about the same imaging area as that of 35mm cinema film and achieves stunning, film-like images. The short flange back distance enables the use of a wealth of interchangeable lenses, including cinema lenses.*

In addition, the AG-AF100 series features high-performance image processing and correction functions designed exclusively for HD motion images.



* Panasonic does not guarantee the compatibility or performance of all lenses that are mountable on the AG-AF100 series.

The Camera Section Features a Four Thirds Image Sensor and Design Especially for Video Use, Appro



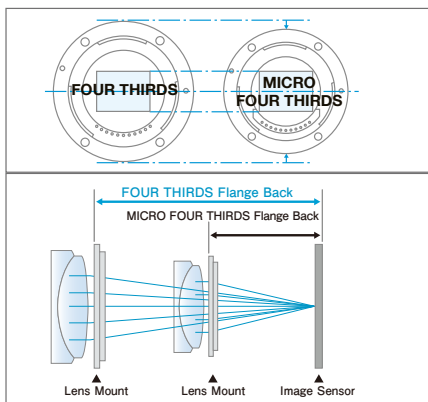
World's First* to Adopt Micro Four Thirds



The AG-AF100 series is the first professional HD camera recorder to adopt the Micro Four Thirds standards. These standards were announced in 2008 as an extension of the Four Thirds standards for DSLR (Digital Single Lens Reflex) cameras. Panasonic and some other manufactures have already released a number of digital cameras and interchangeable lenses based on the Micro Four Thirds standards.

The "Four Thirds" name is derived from the 4/3-type (approx. 17.3 mm x 13 mm/ approx. 0.68 inches x 0.51 inches) image sensor. The size of the image sensor, the standardized lens mount developed for it, and interchangeable lenses designed exclusively for digital cameras form the core of the Four Thirds standards. These standards were established to offer an optimal solution for digital cameras, breaking loose the confines of film camera standards. In establishing the Micro Four Thirds standards, the flange back distance (the distance from the lens mount surface to the image sensor) was reduced by about half and the mount diameter was made about 6 mm (0.24 inches) smaller than that of the Four Thirds mount. The image sensor size is the same as that of the 4/3 type used in the Four Thirds standard. The Micro Four Thirds standards have made it possible to reduce the size and weight of cameras and lenses, and to achieve greater interchangeability of lenses together with video recording capability.

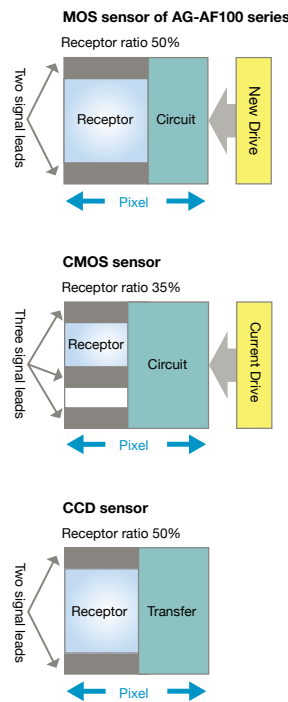
*1: As of November 2010 (based on a Panasonic survey).



4/3-type MOS Image Sensor

The 4/3-type MOS image sensor in the AG-AF100 series has about the same imaging area* as that of 35mm cinema film. The depth of field and the focal range are also close to those of film cameras. With the AG-AF100 series, you can record beautiful, shallow depth of field, film-like images. The MOS sensor has two control lines as compared to the three lines required by a conventional CMOS sensor, thus providing a larger light receiving area. This has achieved a high level of sensitivity rivaling that of a CCD sensor. Extensive noise reduction measures are also employed, such as embedded photodiodes isolated from noise sources and low-voltage operation. By guiding more light to the pixels, the AG-AF100 series achieves a wide dynamic range and detailed gradation with minimal blocked shadows or blown highlights in high-contrast scenes, for true-to-life textures and rich colors.

* The effective imaging area is trimmed to a 16:9 aspect ratio.



A Low-Pass Filter for High-Quality HD Motion Images

The AG-AF100 series' optical low-pass filter is optimized for HD motion images and reduces the aliasing noise that often occurs in motion images captured by an image sensor with a high pixel density. In addition, the MOS image sensor is scanned at a high speed in order to minimize skew distortion.

High-Performance 18-bit DSP

The AG-AF100 series is equipped with a high-performance 18-bit digital signal processor (DSP) for image processing. Optimized for HD video recording, the DSP handles various image rendering processes, such as dynamic range stretch (DRS), gamma, 12-axis



Reaching 35mm Cinematic Expression.



independent color correction and detail enhancement, as well as conversion to HD/SD video formats – all with exceptional precision and high image quality.

Internal Optical ND Filter

The AG-AF100 series has an internal neutral density (ND) filter that is essential for video recording. The dedicated dial on the camera body lets you adjust the setting in three steps (1/4ND, 1/16ND, and 1/64ND) with any type of lenses.

Dynamic Range Stretch Function

DRS recognizes the average brightness of highlight and shadow areas and then automatically adjusts the aperture and uses knee control to suppress blocking in the shadow areas. In scenes with mixed dark and light areas, DRS automatically provides a wider dynamic range with minimal blown highlights and blocked shadows.



An example of an image with aliasing noise (from a DSLR camera).



An image without aliasing noise recorded with the AG-AF100 series.



Image with DRS OFF



Image with DRS ON



Image with VIDEO GAMMA



Image with CINE-LIKE GAMMA

7-Mode Gamma for Richer Gradation

Drawing on technologies developed for the VariCam, Panasonic has equipped the AG-AF100 series with advanced gamma functions that address seven different shooting scenarios and enhance your creative abilities. This includes the cinelike gamma, which produces the characteristic warm tone of film recordings.

AG-AF100 series Gamma Modes

HD NORM:	Suitable for HD recording.
LOW:	Works to flatten out a high contrast scene.
SD NORM:	Normal setting for SD (this was available in the DVX100 series).
HIGH:	Expands the tone of dark parts and makes a brighter image. The contrast softens.
B.PRESS:	Makes the contrast sharper than LOW
CINE-LIKE D:	The Cine-Like mode shifted to prioritize dynamic range.
CINE-LIKE V:	The Cine-Like mode shifted to prioritize contrast.

- Adjustable color temp: 2400K to 9900K (preset 3200K/5600K).
- Knee point settings: Auto, Low, Mid and High.
- Adjustable auto-iris level.

Advanced Image Adjustments

- Color setting with matrix table: Norm 1, Norm 2, Fluo and Cine-Like.
- Adjustable H detail level, V detail level, detail coring and skin detail.
- Adjustable chroma level, chroma phase and master pedestal.



Full-HD (1080p) Variable Frame Rate Recording. An AVCHD Recording for Creative, High-Quality Images



Normal cinematic shooting (at 24 fps, 25 fps or 30 fps) refers to the same rate as used in film cameras. The AG-AF100 series can record in 24 fps, 25 fps and 30 fps are the standard frame rates used in the production of TV commercials, music clips and video software.



Lower-speed shooting (at under 22 fps*) lets you attain a fast-motion effect. This technique can be combined with a warp-speed effect to give special emphasis to flowing water, fast-moving clouds, etc.

* When the standard speed is 24 fps in 59.94 Hz mode. For a standard speed of 25 fps in 50 Hz mode, anything under 24 fps will be undercranked.



Higher-speed shooting (at over 25 fps*) produces slow-motion effects. This is especially effective for high-action scenes like car chases or crashes, or to create a dramatic impact in a scene.

* When the standard speed is 24 fps in 59.94 Hz mode. For a standard speed of 25 fps in 50 Hz mode, anything over 26 fps will be overcranked.

AVCHD PH Mode for the High Image Quality Required by Professional Applications

The AG-AF100 series uses the AVCHD recording format and also supports the high-image-quality PH mode. AVCHD complies with MPEG-4 AVC/H.264 High Profile, the latest motion picture compression technology. Boasting a compression efficiency that is more than twice that of the MPEG-2 system (such as HDV), this advanced video file format delivers superb image quality and low data rates. The PH mode was developed for AVCCAM by Panasonic exclusively for high-quality professional video production. This mode boasts a maximum AVCHD bit rate of 24 Mbps (average: 21 Mbps) and records 1920 x 1080 full-HD images.

Uncompressed LPCM 2-Channel Recording for High-Quality Sound

The PH mode supports uncompressed 16-bit LPCM 2-channel digital audio recording for high-quality sound in addition to Dolby Digital 2-channel audio. The HA/HE mode employs Dolby Digital 2-channel audio recording only.

Multi HD Format Compatibility

The AVCHD PH mode is compatible with multiple HD formats, such as 1080/60i, 1080/30p, 1080/24p and 720/60p. Additionally, the AG-AF100 series lets you

select 60 Hz or 50 Hz to support HD systems used around the world. (For details, see the video format table on the right page.)

* Actual recording is at 60 Hz = 59.94 Hz, 30 Hz = 29.97 Hz, and 24 Hz = 23.98 Hz, respectively.

1080p Variable Frame Rate Recording

The AG-AF100 series has inherited and further advanced the acclaimed functions of the VariCam that is widely used in producing movies, TV programs and TV commercials. The new Variable Frame Rate (VFR) function* supports full-HD (1920 x 1080) progressive mode. Armed with a 20-step undercrank (lower frame rate)/overcrank (higher frame rate) function, the AG-AF100 series is capable of producing cinematic images such as a 1/2.5x slow-motion effect and 2x fast-motion effect when played in 24p mode.

* Cannot be played in 1080/60p mode. 720p VFR not supported. Class 6 or higher SDXC/SDHC/SD Memory Card is required for VFR recording.

SDXC Memory Card Supported

The AG-AF100 series supports the new SDXC Memory Card. The SDXC Memory Card is a next-generation large-capacity data storage device with upgraded versions of the file system (FAT) and physical specifications of the SDHC Memory Card. Thanks to a large



Frame rate and effect (59.94Hz) (50Hz)

Frame Rate	Speed Effect in 24p base	Speed Effect in 30p base	Frame Rate	Speed Effect in 30p base
12p	200% Quick	250% Quick	12p	208% Quick
15p	160% Quick	200% Quick	15p	167% Quick
18p	133% Quick	167% Quick	18p	139% Quick
20p	120% Quick	150% Quick	20p	125% Quick
21p	114% Quick	143% Quick	21p	119% Quick
22p	109% Quick	136% Quick	22p	114% Quick
24p	100% (Standard)	125% Quick	23p	109% Quick
25p	96% Slow	120% Quick	24p	104% Quick
26p	92% Slow	115% Quick	25p	100% (Standard)
27p	89% Slow	111% Quick	26p	96% Slow
28p	86% Slow	107% Quick	27p	93% Slow
30p	80% Slow	100% (Standard)	28p	89% Slow
32p	75% Slow	94% Slow	30p	83% Slow
34p	71% Slow	88% Slow	32p	78% Slow
36p	67% Slow	83% Slow	34p	74% Slow
40p	60% Slow	75% Slow	37p	68% Slow
44p	55% Slow	68% Slow	42p	60% Slow
48p	50% Slow	63% Slow	45p	56% Slow
54p	44% Slow	56% Slow	48p	52% Slow
60p	40% Slow	50% Slow	50p	50% Slow

storage capacity, which exceeds the 32 GB limit of the SDHC Memory Card, the SDXC Memory Card can handle large data volumes of 48 GB or 64 GB. It also boasts a high maximum data transfer speed of 22 MB/s* and a wide operating temperature range of -25° to 85°C (-13°F to 185°F). The AG-AF100 series can also use the SDHC and SD Memory Cards.

* The data transfer speed varies depending on the operating system of the SD-compatible devices. The indicated rate was measured at a maximum specification point specified by Panasonic.

Two Card Slots for Relay Recording

The AG-AF100 series has two memory card slots. The active slot for recording can be switched, and the internal relay recording function enables continuous recording by automatically changing the recording card media. By using two SDXC Memory Cards, the AG-AF100 series can record up to 12 hours in PH mode or 48 hours in HE mode*. Video clips can be copied between cards mounted in the two slots.



*When two 64-GB SDXC Memory Cards are used. The maximum continuous recording time is 12 hours regardless of the recording mode. A Class 4 or higher SDXC/SDHC/SD Memory Card is required for recording in PH or HA mode. For other recording modes, use a Class 2 or higher SDXC/SDHC/SD Memory Card. (The use of a Panasonic SDXC Memory Card is recommended.)



Comparison of HD Recording Formats

	HDV	AVCHD
Pixel (H x V)	1440 x 1080	1920 x 1080
Compression Method	MPEG-2	MPEG-4 AVC/H.264

Sample comparison: When a flash causes large contrast differences and reduces depth perception, HDV shows considerable block noise, while AVCHD in PH mode minimizes break-up.



AVCHD

HD image format of AG-AF100 series

Image Format	59.94 Hz	50 Hz
1080	1080/59.94i	1080/50i
1080 (only PH mode)	1080/29.97p 1080/23.98p	1080/25p
720 (only PH mode)	720/59.94p 720/29.97p 720/23.98p	720/50p 720/25p

AVCHDHD Recording Mode of AG-AF100 series

Recording Mode	Bit Rate	Image Size	Audio	Max. Recording Time (64GB SDXC Memory Card x 2)
PH Mode	Approx. 21 Mbps (Average), Max 24Mbps	1920 x 1080 1280 x 720	LPCM 2 ch Dolby Digital 2 ch	Approx. 12 hours*
HA Mode	Approx. 17 Mbps (Average)	1920 x 1080	Dolby Digital 2 ch	Approx. 16 hours*
HE Mode	Approx. 6 Mbps (Average)	1440 x 1080	Dolby Digital 2 ch	Approx. 48 hours*

* When two 64-GB SDXC Memory Cards are used. The maximum continuous recording time is 12 hours regardless of the recording mode.

SMPTE Time-Code Recording and Synchro Function

The built-in SMPTE time-code generator lets you select the Drop Frame/Non-Drop Frame and Free Run/Rec Run modes and preset. User bits are also provided. Connecting two cameras with a TC preset in/out (video out) connector allows the slave camera, to synchronize with the master camera*.

*After synchronization, each camera's time-code runs separately and not be guaranteed to match precisely.

Still Image Capture (Still Picture)

A frame can be captured from HD video as a still image equivalent to two megapixels (1920 x 1080).

* Still images cannot be captured during motion image recording or in Pre-rec mode.

Camera Metadata Recording

Camera settings for recording operation can be saved as metadata in a clip file. By loading a clip file, the saved settings can be immediately applied.

Diverse Recording Functions

- **Clip thumbnail display:** You can preview a clip and also quickly delete a clip from the thumbnail list displayed on the LCD monitor.
- **Interval Rec:** Records one frame at a time in set intervals (1 sec, 10 sec, 30 sec,

1 min, 2 min). Only in 1080/24p and 25p mode. Audio recording not possible.

- **Pre-rec:** While in standby mode, you can continuously store, and subsequently record, up to approx. 3 seconds. This helps to ensure that you always get the shot you want.
- **Shot mark:** Allows convenient OK or NG marking, and can be added to each clip during or after recording.

- **Index:** Scenes can be marked with up to 100 index flags per clip.
- **Rec check:** You can check the end of the most recently recorded clip with one-touch ease.
- **Last clip delete:** Only the most recently recorded clip is deleted with this one-touch function, adding practical convenience to everyday operation. It can be assigned as a User button function if desired.



AVCCAM



A sample 1080/24p image.



An example of an image recorded in undercrank mode (quick motion effect).



An example of an image recorded in overcrank mode (slow motion effect).

AVCCAM – Functions and Specifications Refined Through Extensive Professional Video Use.

The AVCCAM HD recorder section has been improved and refined through extensive use in broadcasting and movie production. The AG-AF100 series boasts superb image quality, extended recording time, variable frame rate function like the VariCam, the operating ease and mobility that you need for motion image acquisition.



* The photo shows one example of an applicable system. The matte box is sold by Vocas. For details, visit the Vocas website (<http://www.vocas.com/>).

* Panasonic does not guarantee the compatibility or performance of all lenses that are mountable on the AG-AF100 series. Use a support system when mounting a lens weighing more than 1 kg (2.2 lb).

Ideal Controls for Image Production. Unique System Design and a Wealth of Interfaces.

FILM CAM Mode for Movie Production

The AG-AF100 series features switchable FILM CAM and VIDEO CAM modes. In FILM CAM mode, the variable frame rate can be used. In addition, the synchro scan and shutter can be indicated and set with the opening angle, instead of seconds, while the sensitivity can be indicated and set in ISO, instead of dB. This makes operation easier for users who are familiar with film camera operation.



Screen displayed in FILM CAM mode.

New Functions: Area Focusing and Area Iris Functions (Compatible lens only)

Using the newly provided 1,226,000 function knob (cursor key), you can select a desired area in the frame and set it as a target zone for focusing, iris adjustment and YGET (brightness measurement). This new function facilitates the recording of images in which the subject is not in the center of the frame. In addition to the above three modes, there are two other modes: simultaneous focusing/iris adjustment and simultaneous focusing/YGET. You can select and set any of these five modes.



Screen displayed when the area function is in use.

Focus Assist Function

The AG-AF100 series is equipped with an HD focus assist function. The focus bar indicates the focus level and the focus-in-red display shows the focus area. These two display functions help you to focus more smoothly. A face detection function is also provided, and area auto focus and area auto iris are possible.



Focus assist ON

Wide ISO Sensitivity (Gain) Setting Range

The sensitivity can be set between ISO 200 and ISO 3200 (in FILM CAM mode), or the gain can be adjusted between 18 dB and -6 dB (in VIDEO CAM mode). The 3-position (L, M, H) gain switch can be assigned with three desired settings for quick switching. The negative gain (-3 dB, -6 dB) is effective for reducing sensitivity and reducing noise.

Slow/Synchro/High-speed Shutter

The shutter speed can be set from a slow 1/2 sec to a fast 1/2000 sec in VIDEO CAM mode. The AG-AF100 series is also equipped with a synchro scan function to allow setting from 10° to 360° in 0.5° steps (including 172.8°) in FILM CAM mode. When combined with the variable frame rate, this function enables detailed settings for a blurred or time-lapse effect.

Simplified Waveform and Vectorscope Display

The AG-AF100 series has waveform and vectorscope display functions as well. A single touch of the WFM key displays the waveform or vectors of the captured video signal on the LCD monitor.



WAVE

VECTOR

Large Viewfinder and LCD Monitor

The large, high-quality viewfinder (11.43 mm (0.45 inches), approx. 1,226,000-dot equivalent [852 x 480 x 3 (RGB)]) can be tilted up to a 90° angle. The variable angle color monitor features a color LCD panel (87.63 mm (3.45 inches), approx. 921,000 dots [1920 x 480]) with an aspect ratio of 16:9, and facilitates low-angle/high-angle shooting, viewing and menu setting.



Three User Buttons

Three user buttons are provided for one-touch operation of frequently used functions. Two buttons are located on the control panel, and one button is placed at the upper part of the grip handle. Each button can be assigned with any of the following 14 functions.

Assignable Functions

INH:	No assigned function
REC CHECK:	Recording check
FACE DETECT:	Face detection function
FOCUS ASSIST:	Displays edge in red
CAPTURE:	Records the image as a JPEG file on an SD card
ATW:	ATW (auto-tracking white balance) on/off
ATW Lock:	ATW lock on/off
SHOT MARK:	Adds shot marks to the clip
INDEX:	Scene indexing
LAST CLIP:	Deletes the most recently recorded clip
BACKLIGHT:	Automatic aperture correction for scenes with backlighting
SPOTLIGHT:	Automatic aperture correction for scenes with spotlights
BLACK FADE:	Fade-in/fade-out from and to black
WHITE FADE:	Fade-in/fade-out from and to white

SDI (24Psf) Output and Auto Rec

The HD/SD SDI output terminal can output HD signals, including 1080/24Psf, or down-converted SD video signals (selectable from the menu). The terminal also supports Auto Rec to enable backup recording in link with Rec Start/Stop when a Panasonic recorder equipped with the same function, such as the AG-HPG20, is used. Embedded audio is also supported.

*The 24Psf output recording is only possible on the AJ-HPM200 or other third party recorders which support 24Psf input.

HDMI Digital HD Output Terminal

The AG-AF100 series is equipped with a next-generation HDMI (High Definition Multimedia Interface) output terminal for digital transferring of high-quality HD video and audio signals.

* A separately purchased cable may be required for connecting the AG-AF100 series to a professional monitor via HDMI.

XLR Input for Pro-Quality Audio

In addition to the internal high-performance stereo microphone, the AG-AF100 series comes equipped with two-channel XLR audio input terminals with a 48 V phantom power supply. Each channel can be selected from the internal

microphone, external microphone or line input. Large, easy-to-use level dials are also provided.

Down-Converted SD Video Output

The AG-AF100 series has an internal down-converter so that it can output SD (480/576) signals from SDI, HDMI or VIDEO OUT. The 16:9/4:3 aspect conversion mode can be selected from three types (side crop, letterbox, squeeze).

* Side crop output cannot be selected when an SDI/HDMI output terminal is used.

Marker/Grid Display

The LCD monitor and viewfinder can display a safety zone marker of 90%, 4:3, 14:9, 1.85:1, 2:1 or 2.35:1, or a 3x3 grid similar to the one in a digital SLR camera.

Professional System Design

- **Grip:** The large grip is easy to hold and is also detachable. The grip allows comfortable use in any shooting situation.
- **Handle:** The large handle is designed for professional use. It has a shoe adaptor and threaded holes for mounting various peripheral accessories. The handle is also detachable.

- **Sensor marker/measuring hook:** This makes it easy to measure the distance from the subject.

Functions and Specifications Designed for Professional Use

- **Scene file:** Saves six sets of camera settings and allows for a quick change of settings.
- **Mode check:** Displays a list of the camera settings on the viewfinder and monitor.
- **Zebra:** Select any two levels from among 50% to 105%, in 5% steps.
- **Color bar:** Outputs a color bar signal.
- **Remote terminal:** Enables remote operation of iris, focus, Rec Start/Stop and index functions.
- **USB 2.0:** Type mini-B USB port for connection of a PC in DEVICE mode.
- **Tally lamps:** Provided on the unit's front and rear.



XLR Audio Input



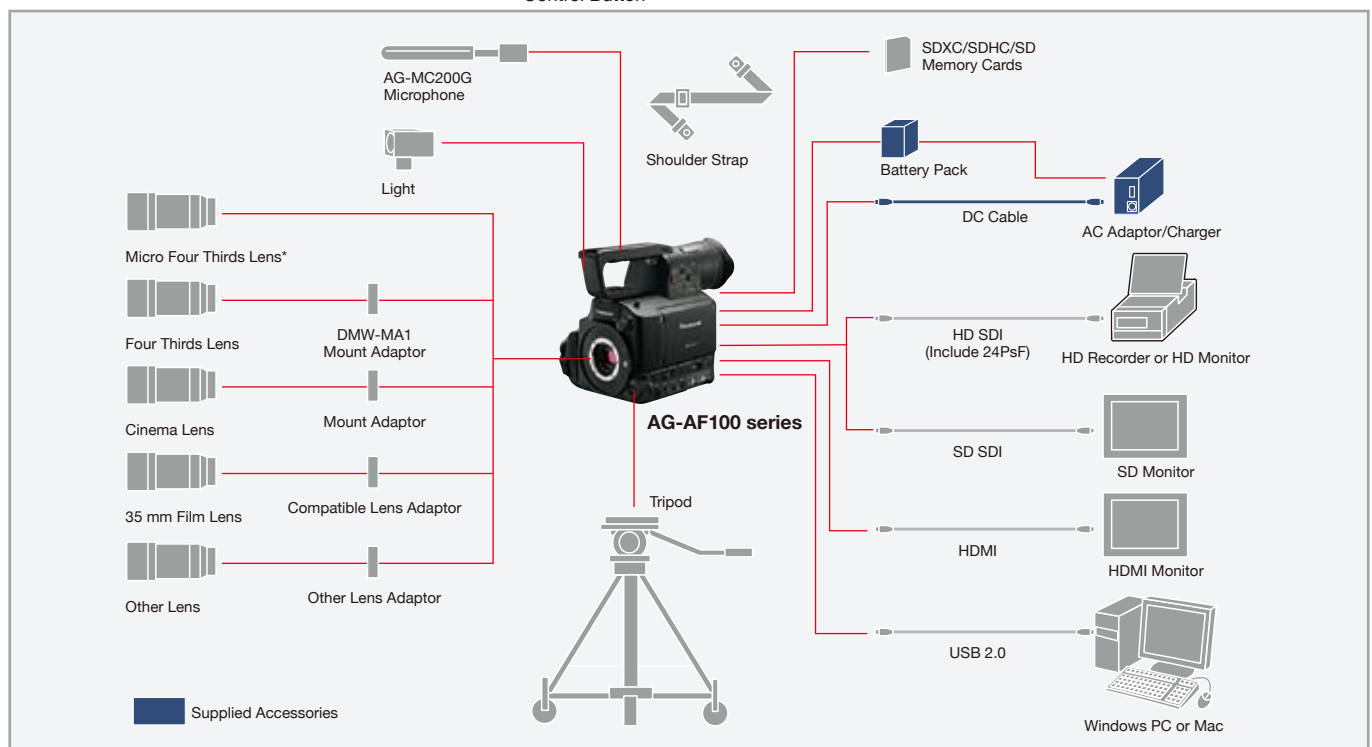
Handle and Upper Control Button



Measuring Hook



Detachable Handle and Grip



* Panasonic does not guarantee the compatibility or performance of all lenses that are mountable on the AG-AF100 series.

AVCCAM Viewer

Viewing Software for AVCHD files

(download free*)

AVCCAM Viewer for Windows® PC/ Mac™2 makes it easy to preview AVCCAM files. Files can be played from an SD Memory Card, Blu-ray Disc, or hard disk, and saved to a PC (hard disk) from an SD Memory Card or Blu-ray Disc. Files can also be copied to an SD Memory Card or Blu-ray Disc™2 or deleted and meta data can be displayed and input.



AVCCAM Viewer System Requirement

[for Windows PC] • CPU: Intel® Core™2 Duo (2.4 GHz or faster) • OS: Microsoft® Windows7 (32bit), Windows Vista® (32bit), Windows XP SP3 (32bit) • RAM: 1GB or more (2GB or more recommended)

[for Mac] • CPU: Intel® Core™2 Duo 2.6 GHz or faster • OS: Mac OS X 10.6 (Snow Leopard), 10.5 (Leopard) or 10.4 (Tiger) • RAM: 1 GB or more (2 GB or more recommended)

*1: AVCCAM Viewer software can be downloaded for free from the following Panasonic website. PASS registration is required. For details, please visit the following website and click on "Support and Downloading Information."

<<https://eww.pavc.panasonic.co.jp/pro-av/support/desk/e/download.htm>>

*2: Copying and playing data on Blu-ray Discs (BD-RE Ver 3.0) are not supported by Mac OS X 10.4 (Tiger). Do not insert a disc [DVD (AVCHD)] produced with the provided HD Writer 2.5E software into a device that does not support the AVCHD standard. If it is inserted into such a device, the disc may not eject. Also, do not play the disc with a device that does not support the AVCHD standard.

AVCCAM Restorer

HD Content File Restore Software

(supplied with CD-ROM*)

AVCCAM Restorer software can also be used to restore files that were damaged, for example, by a power interruption during recording.

AVCCAM Restorer System Requirement

[for Windows PC] • Intel® Core™2 Duo 2.4 GHz or higher CPU is recommended.

• OS: Microsoft Windows7 (32bit), Windows Vista (32bit), Windows XP SP3 (32bit)

• RAM: 1GB or more (2GB or more recommended)

[for Mac] • CPU: Intel® Core™ Duo 2.0 GHz or faster (including compatible CPU)

• OS: Mac OS X 10.6 (Snow Leopard), 10.5 (Leopard) or 10.4 (Tiger) • RAM: 1 GB or more (2 GB or more recommended)

*1: AVCCAM Restorer is included in the supplied CD-ROM. This software can also be downloaded free. For details, please visit the following website and click on "Support and Downloading Information."

<<https://eww.pavc.panasonic.co.jp/pro-av/support/desk/e/download.htm>>

AVCCAM SD Card File Recovery

File Recovery Software

(download free*)

This application recovers accidentally deleted video data on an SD Memory Card recorded by an AVCCAM camera recorder.

AVCCAM SD Card File Recovery System Requirement

[for Windows PC] • Intel® Pentium III 1.0 GHz or higher CPU (PC/AT PC) is recommended. • OS: Microsoft Windows7, Windows Vista, Windows XP SP3

• RAM: 1GB or more (2GB or more recommended)

[for Mac] • CPU: Intel® Core™ Duo 2.0 GHz or faster (including compatible CPU)

• OS: Mac OS X 10.6 (Snow Leopard), 10.5 (Leopard) or 10.4 (Tiger)

• RAM: 1 GB or more (2 GB or more recommended)

*1: AVCCAM SD Card File Recovery can be downloaded for free from the following Panasonic website.

<<https://eww.pavc.panasonic.co.jp/pro-av/support/desk/e/download.htm>>

Optional Accessories

As of November, 2010



Panasonic Micro Four Thirds Lens

Panasonic Four Thirds Lens

H-FS045200

LUMIX G VARIO
45-200mm/F4.0-F5.6/MEGA O.I.S.

H-FS014045

LUMIX G VARIO
14-45mm/F3.5-F5.6 ASPH./MEGA O.I.S.

H-F007014

LUMIX G VARIO
7-14mm/F4.0 ASPH.

H-VS014140

LUMIX G VARIO HD
14-140mm/F4.0-F5.8 ASPH./MEGA O.I.S.

H-H020

LUMIX G
20mm/F1.7 ASPH.

H-F008

LUMIX G
FISHEYE 8mm/F3.5

H-ES045

LEICA DG MACRO-ELMARIT
45mm/F2.8 ASPH./MEGA O.I.S.

L-ES014050

LEICA D VARIO-ELMARIT
14-50mm/F2.8-3.5 ASPH./MEGA O.I.S.

L-RS014050

LEICA D VARIO-ELMAR
14-50mm/F3.8-5.6 ASPH./MEGA O.I.S.

L-RS014150

LEICA D VARIO-ELMAR
14-150mm/F3.5-5.6 ASPH./MEGA O.I.S.

L-X025

LEICA D SUMMILUX
25mm/F1.4 ASPH.

DMW-MA1

Mount adaptor
(for Four Thirds Lens)



DMW-MA1



VW-VBG6
Battery Pack
• 7.2 V, 5,800 mAh



AG-MC200G
XLR Microphone
• Sensitivity: -40 dB ±3.5 dB
(0dB=1V/Pa, at 1kHz)
• Maximum Input level: 127 dB
(1000Hz, Distortion within 1%)
• S/N: More than 69 dB



SDXC/SDHC/SD
Memory Card



BT-LH2550
647.7mm (25.5 inches) Wide
HD/SD LCD monitor



BT-LH1760
431.8 mm (17 inches) Wide
HD/SD LCD monitor



BT-LH1710
431.8 mm (17 inches) Wide
HD/SD LCD monitor



BT-LH900A
213.36 mm (8.4 inches)
HD/SD LCD monitor



BT-LH80WU
200.66 mm (7.9 inches) Wide
HD/SD LCD monitor

Other Manufacturers' Products

ZUIKO DIGITAL ED
14-35mm f2.0 SWD
[OLYMPUS]



*These options are not available in some areas.

[GENERAL]

Power Supply:	DC 7.2 V (when the battery is used) DC 7.3 V (when the AC adaptor is used)
Power Consumption:	12.4 W (when recording)
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (No condensation)
Weight:	Approx. 1.3 kg (Approx. 2.9 lb.) (Excluding the handle, grip, battery and accessories)
Dimensions (W x H x D):	163.4 mm x 195 mm x 290.4 mm (6-7/16 inches x 7-11/16 inches x 11-7/16 inches) (Including the handle and grip)

[CAMERA]

Pick-up Device:	4/3 MOS fixed pickup device, single panel (primary color filter)
Picture Elements:	Effective picture elements: Approx. 12,400,000 pixels Single panel (16:9)
Image Size:	Valid image range: Approx. 17.8 mm (H) x Approx. 10.0 mm (V)
Lens:	Not included
Lens Mount:	Micro Four Thirds system Lens mount
ND Filter:	1/4, 1/16, 1/64
Gain Settings:	[VIDEO CAM mode] -6dB to 18dB (3dB step) [FILM CAM mode] ISO200 to ISO3200
Color Temperature settings:	ATW, ATW LOCK, preset 3200K, preset 5600K, preset VAR, Ach, Bch

Shutter Speed: (Preset)	[59.94 Hz] 60i/p mode: 1/60 sec. 1/100 sec., 1/120 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. 30p mode: 1/30 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. 24p mode: 1/24 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. [50 Hz] 50i/p mode: 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. 25p mode: 1/25 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec.
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Shutter Speed: (Syncro Scan)	[VIDEO CAM mode/ 59.94Hz] 60i/p mode: 1/60.0 sec. to 1/250.6 sec. 30p mode: 1/30.0 sec. to 1/250.6 sec. 24p mode: 1/24.0 sec. to 1/250.6 sec. [VIDEO CAM mode/ 50Hz] 50i/p mode: 1/50.0 sec. to 1/250.0 sec. 25p mode: 1/25.0 sec. to 1/250.0 sec. [FILM CAM mode] 10.0 d to 180.0 d to 360.0 d (0.5 d step)
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Shutter Speed: (Slow)	[59.94Hz] 60i/p mode: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec., 1/30 sec.
VIDEO CAM mode only	30p mode: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec. 24p mode: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec. [50Hz] 50i/p mode: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec., 1/25 sec. 25p mode: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec.

Normal Sensitivity:	F8.0 normal (2000lx, 3200K, 89.9% reflex, 1080 59.94i)
Horizontal Resolution:	800 TV lines (at center standard)

[Video/Recording/Playback]

Recording Format:	AVCHD compliant (MPEG-4 AVC/H.264)
Recording Media*:	SD Memory Card: Up to 512MB, 1 GB, 2 GB (FAT12, FAT16) SDHC Memory Card: 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 32 GB (FAT32) SDXC Memory Card : 48 GB, 64GB (exFAT) *However, above Class4 is supported in PH and HA modes, and above Class6 is supported during VFR recording.
Recording Format:	[59.94Hz] PH mode: 1080/59.94i, 1080/29.97p, 1080/23.98p, 720/59.94p, 720/29.97p, 720/23.98 HA/HE mode: 1080/59.94i [50Hz] PH mode: 1080/50i, 1080/25p, 720/50p, 720/25p, HA/HE mode: 1080/50i

Transmission Rate:	PH mode: Approx. 21 Mbps (VBR) HA mode: Approx. 17 Mbps (VBR) HE mode: Approx. 6 Mbps (VBR)
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Interval Recording:	Off/1 sec./10 sec./30 sec./1 min./2 min. * Recording mode is fixed to PH 1080/24p (59.94 Hz) and PH 1080/25p (50 Hz) and the maximum shooting time is 24 hours.
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Recording Time:	Approx. 12 hours (PH mode 1920 x 1080 or 1280 x 720 with two 64GB SDXC memory cards)
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VFR Recording:	[1080/24p, 30p] 12/15/18/20/21/22/24/25/26/ 27/28/30/32/34/36/40/44/48/54/60 frame/sec. [1080/25p] 12/15/18/20/21/22/23/24/25/26/ 27/28/30/32/34/37/42/45/48/50 frame/sec.
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Maximum Number of Clips:	Continual recording: 900 Clips (SD Memory Card x 1) (Record after memory card is formatted and without removing the SD Memory Card.) Playback: 1000 Clips (up to 1000 clips displayed)
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Still Image Capture Function:	Recording Format: JPEG
Function:	9 thumbnail displays, Clip deletion, Protect, Format

[Video Output]

SDI (HD/SD):	BNC x 1, 0.8 V [p-p], 75Ω [59.94Hz] 1080/60i, 1080/24psF, 720/60p, 480/60i [50Hz] 1080/50i, 720/50p, 576/50i
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HDMI:	HDMI x 1, (HDMI TypeA terminal), VIERA Link not supported [59.94Hz] 1080/60i, 720/60p, 480/60p [50Hz] 1080/50i, 720/50p, 576/50p
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VIDEO:	RCA pin jack, 1.0 V [p-p], 75Ω [59.94Hz] 480/60i [50Hz] 576/50i
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[Audio recording playback]

Recording Format:	PH mode: Dolby Digital/2ch, linear PCM digital/2ch switch HA/HE mode: Dolby Digital/2ch
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Sampling Frequency:	48 kHz
Encoding:	16 bit
Compressed Bit Rate:	Dolby Digital: PH mode: 384 kbpsHA, HE mode: 256 kbps

[Audio Input/Output]

Built-in Microphone:	Stereo microphone
Audio Input:	XLR (3 pin) x 2 (INPUT 1, INPUT 2), LINE/MIC selectable, high impedance LINE: 0 dBu, MIC: -50 dBu/-60 dBu (menu selectable)
AUDIO Output:	RCA pin jack x 2 (CH1, CH2), 316 mV, 600 Ω
SDI Output:	2ch (linear PCM)
HDMI Output:	2ch (linear PCM)/5.1ch (Dolby Digital)
Headphone:	3.5mm diameter, stereo mini jack x 1
Speaker:	20 mm (round) x 1

[Other Connectors]

Camera Remote:	Super mini jack (2.5 mm diameter) (S/S) Mini jack (3.5 mm diameter) (FOCUS, IRIS)
INDEX Remote:	Super mini jack (2.5mm diameter)
TC PRESET IN/OUT :	IN: 1.0 V to 4.0 V [p-p], 10 kΩ (also used for VIDEO OUT) OUT: 2.0 V ±0.5 V [p-p], low impedance
USB:	Card reader function (no copyright protection support) Type mini B connector (compliant with USB ver. 2.0)

[Monitor]

LCD Monitor:	3.45 type, wide LCD color monitor (Approx. 920,000 dots)
Viewfinder	wide 0.45 type LCD color monitor (Approx. 1,226,000 dots equivalent)

[Standard Accessories]

Battery, AC adaptor/Battery charger, AC power supply cable/DC cable,
Wireless remote control and battery, Eye cup, Microphone holder,
Microphone holder screws, Microphone holder adaptor, Cable clamper.
Screws for cable clamper, Manuals, CD-ROM

Weight and dimensions shown are approximate. Specifications are subject to change without notice.

SD Memory Card Recorder: Lower Operating Costs, Better for the Environment

SD Reduces Total Cost of Ownership

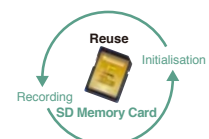
- (1) Faster, easier editing because digitization is not necessary
- (2) Lower media costs because memory cards are reusable
- (3) Lower maintenance costs because there is no moving mechanism

By reducing editing, media and maintenance costs, AVCCAM can help improve your bottom line. Users can also take advantage of a special 3-year free-repair service program that Panasonic offers for AVCCAM equipment.



The SD Memory Card Helps Preserve the Environment with Its Reusability and Low Power Consumption

The SDHC/SD Memory Card media for the AVCCAM camcorder is totally free from abrasion and dropout. There is no drive mechanism required, as there is for tape and disc-based recorders, so power consumption is low and size and weight are reduced. Malfunctions are less likely to occur, and there is no need to replace heads or transport components. This translates into lower costs and easier maintenance, greater energy savings, and less waste when the unit is eventually disposed of. All of these features help to conserve the environment.



P2 Asset Support System The member's service program

Providing valuable information when you need it

P2 Asset Support System assists your AVCCAM use by providing extended warranty repair & various technical information (update notices, operation guides, etc.) upon registration.

Free registration, no membership fees

■ 3-year extended warranty repair program

Exclusive offer for AVCCAM!

Maximum 3-year extended warranty repair is applied for AVCCAM models after registration. Several other services are also provided to members.



1st year	2nd year	3rd year
Basic warranty*1	AVCCAM Extended warranty repair*2	

■ Latest news only for you

In the member's website, information is selected and presented for your models. To be alerted to new firmware information and other releases, an email newsletter can be subscribed to.

■ Document library

You can browse through and find various technical information (operation guides, technical descriptions, etc.) quickly from the library.

■ Manage your equipment

You can easily know the update status and past service history of each unit, and can leave comments in free text as memos about your equipment.

* Not all models are eligible for extended warranty coverage.

* Please note that this extended warranty is not available in some countries/regions. See the website below for details.

*1: The basic warranty period may vary depending on the country/region. See the enclosed warranty card for warranty coverage.

*2: Not all repair work is covered by this extended warranty. See the enclosed warranty card for warranty coverage. The maximum warranty period may be adjusted depending on the number of hours the device has been used.

Details and user registration: http://panasonic.biz/sav/pass_e

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Please refer to the latest Non-linear Compatibility Information, AVCHD Support and Download and Service Information, etc. at panasonic web site.



<http://pro-av.panasonic.net/>

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JQA-0443



Factories of Systems Business Group have received ISO14001:2004-the Environmental Management System certification. (Except for 3rd party's peripherals.)