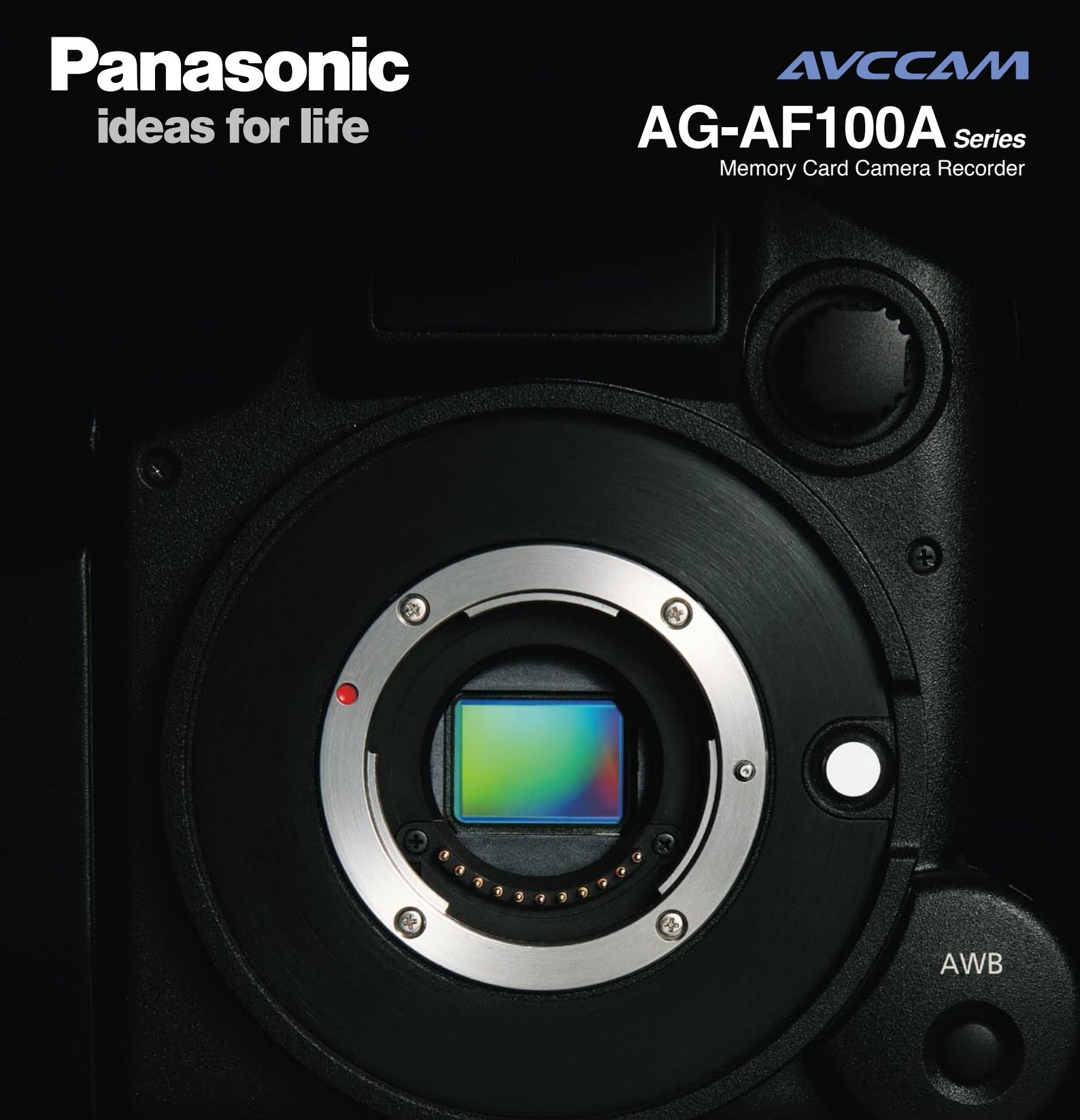
Panasonic
ideas for life

AVCCAM

AG-AF100A *Series*

Memory Card Camera Recorder



A Professional HD Camera Recorder
Compliant with Micro Four Thirds Standards

MICRO FOURTHIRDS™ AVCHD Progressive DOLBY DIGITAL STEREO CREATOR HDMI™ HIGH-DEFINITION MULTIMEDIA INTERFACE SDXC™

AVCCAM 3-Year Warranty Repair Program*

*AG-AF100A 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-AF100A 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-AF100A *series*

Micro Four Thirds Mount Professional HD Video Camera Recorder

The Professional HD camera recorder with a Micro Four Thirds mount* unleashes creativity in motion picture production.

The imaging area of the 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-AF100A Series, Panasonic has brought shallow depth of field control to a professional AVCCAM camera recorder. The AG-AF100A Series offers high image quality, including 1080/60p and 1080/50p, with extended recording time, a variable frame rate function, and an operating system and system interfaces designed natively for video production. This lets the AG-AF100A Series record high-quality images with greater operating ease than even a digital SLR camera can offer. Let the AG-AF100A Series unleash your creativity.

* Panasonic does not guarantee the compatibility or performance of all lenses that are mountable on the AG-AF100A Series.

Samples Recorded with the AG-AF100A Series

A single frame captured from an HD video file (1920 x 1080) recorded with the AG-AF100A Series.

Beautiful Shallow Depth of Field and CINE-LIKE Gamma

Samples Recorded with the AG-AF100A Series.

Samples Recorded with the AG-AF100A Series.

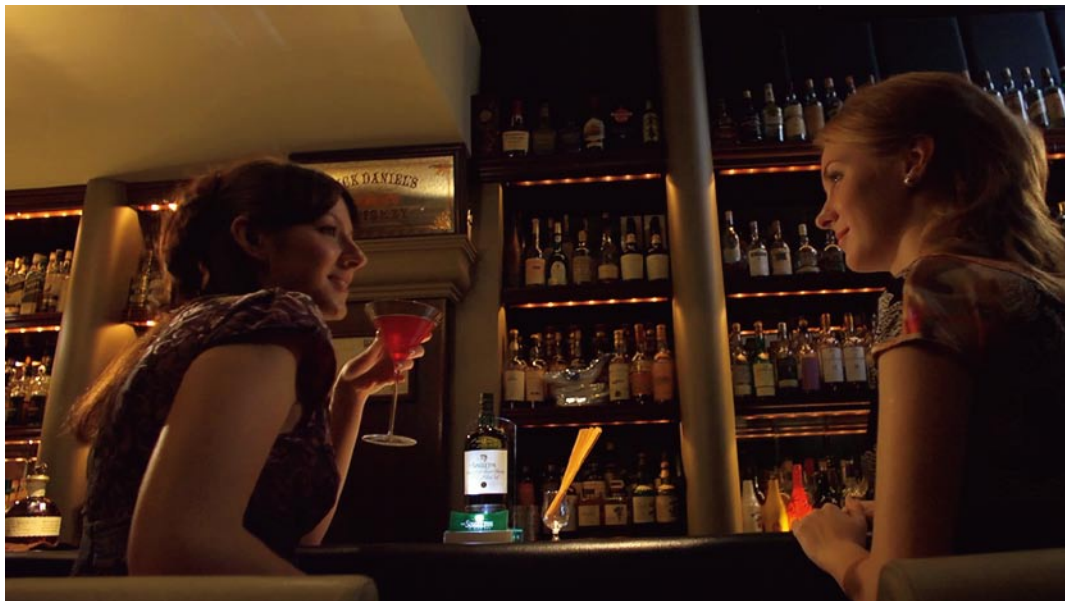
A single frame captured from an HD video file (1920 x 1080) recorded with the AG-AF100A Series.

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-AF100A Series.

MICRO FOURTHIRDS™



Samples Recorded with the AG-AF100A Series.

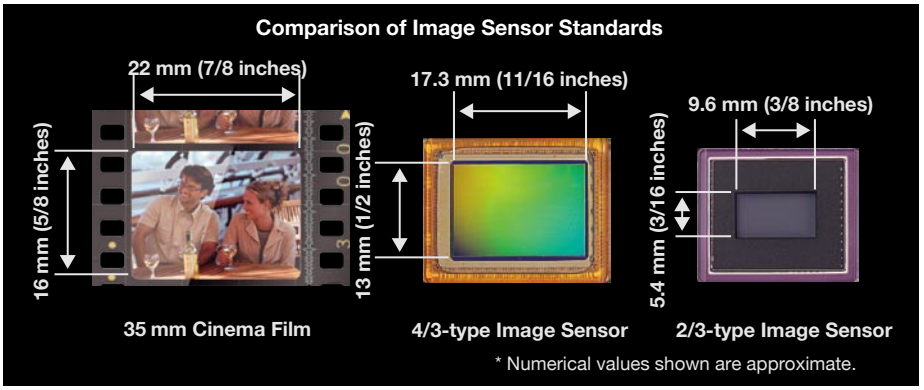
PL Mount 24mm

PL Mount 10mm

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

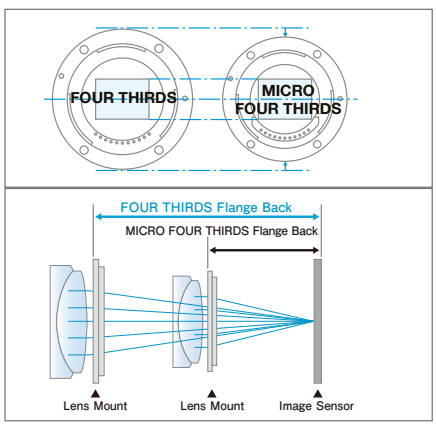
The 4/3-type image sensor has about the same imaging area as that of 35mm cinema film and achieves stunning, film-like images. The short flange back distance enables the use of a wealth of interchangeable lenses, including cinema lenses.*
In addition, the AG-AF100A Series features high-performance image 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-AF100A Series.



Adopt Micro Four Thirds

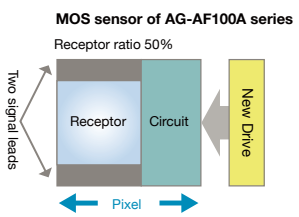
The AG-AF100A Series adopts the Micro Four Thirds standards. These standards were announced in 2008 as an extension of the Four Thirds standards for DSLR (Digital Single Lens Reflex) cameras. Panasonic and some other manufactures have already released a number of digital cameras and interchangeable lenses based on the Micro Fourth 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.

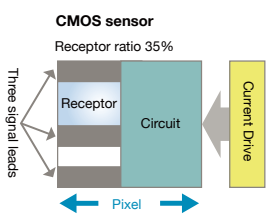


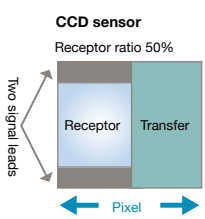
4/3-type MOS Image Sensor

The 4/3-type MOS image sensor in the AG-AF100A 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-AF100A 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-AF100A 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-AF100A 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-AF100A 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

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

*12-axis independent color correction can't be controlled manually by a customer.

Internal Optical ND Filter

The AG-AF100A 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-AF100A 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-AF100A 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-AF100A 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.

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

Normal cinematic shooting (at 24 fps) refers to the same rate as used in film cameras. The AG-AF100A Series can also record 25 fps and 30 fps which 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.

Frame rate and effect (59.94Hz)

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

(50Hz)

Frame Rate	Speed Effect in 30p base
12p	208% Quick
15p	167% Quick
18p	139% Quick
20p	125% Quick
21p	119% Quick
22p	114% Quick
23p	109% Quick
24p	104% Quick
25p	100% (Standard)
26p	96% Slow
27p	93% Slow
28p	89% Slow
30p	83% Slow
32p	78% Slow
34p	74% Slow
37p	68% Slow
42p	60% Slow
45p	56% Slow
48p	52% Slow
50p	50% Slow

AVCHD PS Mode for 1080/60p or 50p Progressive Recording

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 AG-AC100A Series also complies with the AVCHD Ver. 2.0 (AVCHD Progressive) standard in its new PS mode (maximum bit rate: 28 Mbps) for recording, playing and outputting (via HDMI only) Full-HD progressive (1080/59.94p, 1080/50p) images.

High-Quality, Multi-Format Professional AVCHD PH Mode

The AVCHD PH mode was developed exclusively for professional AVCCAM video production. The PH mode records 1920 x 1080 Full-HD images and supports multiple HD formats, such as 1080/59.94i, 1080/50i, 1080/29.97p, 1080/25p, 1080/23.98p, 720/59.94p and 720/50p. (See the right-hand chart.)

59.94Hz/50Hz Switchable

The AG-AF100A Series lets you select 59.94 Hz or 50 Hz to support HD systems used around the world.

Uncompressed LPCM 2-Channel Recording for High-Quality Sound

The PS/PH modes support 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.

1080/24p, 1080/30p Variable Frame Rate Recording

The AG-AF100A 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-AF100A 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.

* The VFR function can be selected at PH mode only. It doesn't support 1080/60p, 1080/50p playback and 720p mode. Class 6 or higher SDXC/SDHC/SD Memory Card is required.

SDXC Memory Card Supported

The AG-AF100A Series supports the SDXC Memory Card. Thanks to a large 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.
The AG-AF100A 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-AF100A 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-AF100A Series can record up to approx. 12 hours in PH mode or approx. 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.)

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

Comparison of HD Recording Formats

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

HD image format of AG-AF100A Series

Image Format	59.94 Hz	50 Hz
PS Mode	1080/59.94p	1080/50p
PH Mode	1080/59.94i 1080/29.97p 1080/23.98p 720/59.94p 720/29.97p 720/23.98p	1080/50i 1080/25p 720/50p 720/25p
HA Mode	1080/59.94i	1080/50i
HE Mode	1080/59.94i	1080/50i

AVCHD Recording Mode of AG-AF100A Series

Recording Mode	Bit Rate	Image Size	Audio	Max. Recording Time (64GB SDXC Memory Card x 2)
PS Mode	Approx. 25 Mbps (Average), Max 28 Mbps	1920 x 1080	LPCM 2 ch Dolby Digital 2 ch	Approx. 10 hours 40 minutes*
PH Mode	Approx. 21 Mbps (Average), Max 24 Mbps	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-AF100A Series combines superb image quality, including 1080/60p and 1080/50p, extended recording time, a variable frame rate function like the VariCam, and 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-AF100A Series. Use a support system when mounting a lens weighing more than 1 kg (2.2 lb).

FILM CAM Mode for Movie Production

The AG-AF100A 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.

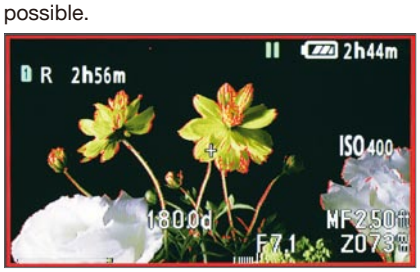
Area Focusing and Area Iris Functions (Compatible lens only)

Using the 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 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.

Versatile Focus Assist Function

The AG-AF100A Series is equipped with HD focus assist functions. The focus bar indicates the focus level, the focus-in-red display shows the focus area, and the expand function enlarges the center of the displayed image. These three 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-AF100A 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-AF100A 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
IN RED:	Displays focus edge in red (on LCD/EVF)
EXPAND:	Enlarges center (on LCD)
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 Output with 24PsF Compatibility

The AG-AF100A Series can output high-quality HD signals, including 1080/24PsF. It also has 10 bit* (enhanced 8 bit smoothing) 4:2:2 via the camera's live output function. Embedded audio is also supported, enabling high-quality recording onto the external devices. The terminal also supports Auto Rec to enable backup recording in link with Rec Start/Stop when a Panasonic recorder equipped with this function, such as the AG-HPD24, is used.

*10 bit signal is generated by smoothing process. It is not a native 10 bit signal.

HDMI Output with 1080/60p (or 50p) Compatibility

The AG-AF100A Series is equipped with a next-generation HDMI (High Definition Multimedia Interface) output terminal. In the PS mode, HDMI supports 1080/60p (or 50p) output.

XLR Input for Pro-Quality Audio

In addition to the internal high-performance stereo microphone, the AG-AF100A 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-AF100A Series has an internal down-converter so it can output SD (480/576) signals from SDI,*1 HDMI or VIDEO OUT. The 16:9/4:3 aspect conversion mode can be selected from three types (side crop,*2 letterbox, squeeze).

*1: SDI output is 8 bit for down-converted signals.
*2: Side crop output cannot be selected when an SDI or HDMI output terminal is used.

Marker/Grid Display

The LCD monitor and viewfinder can display a safety zone marker of seven modes (90%, 4:3, 14:9, 1.85:1, 2:1, 2.35:1 or 2.39:1) or a 3x3 grid.

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

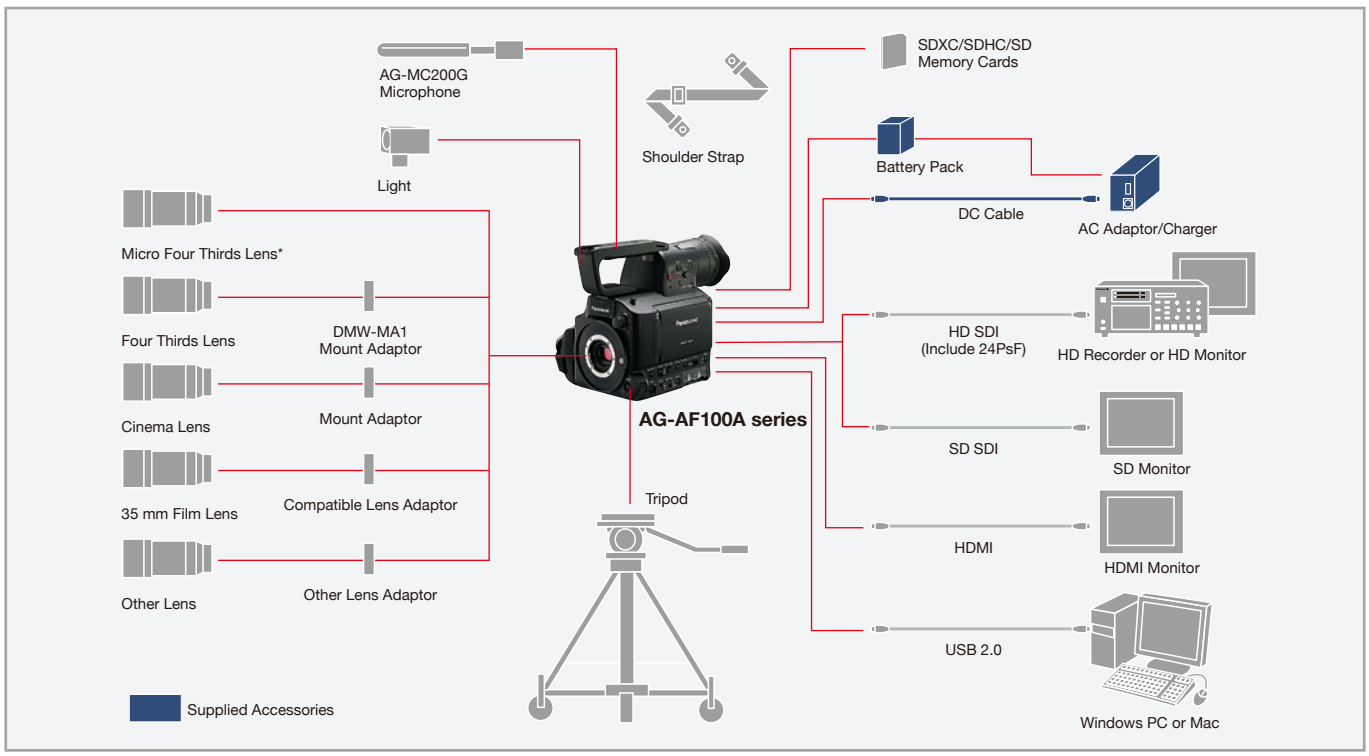
- **Scene file:** Saves six sets of camera settings and allows for a quick change of settings.
- **Mode check:** Displays a list of the camera settings on the viewfinder and monitor.
- **Zebra:** Select any two levels from among 50% to 105%, in 5% steps.
- **Color bar:** Outputs a color bar signal.
- **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-AF100A series.

AVCCAM Viewer
Viewing Software for AVCHD files
(download free*1)

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*3 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. <https://eww.pavc.panasonic.co.jp/pro-av/support/desk/e/download.htm> and click on "Support and Downloading Information.
" Please note that AVCCAM Viewer software doesn't support PS mode.
*2: Copying and playing data on Blu-ray Discs (BD-RE Ver 3.0) are not supported by Mac OS X 10.4 (Tiger).
*3: 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 Importer
QuickTime Plug-In Component
(download free*1)

AVCCAM Importer is a software for Apple Final Cut Pro to enable direct editing of AVCHD*2 ".mts" file without conversion. Since AVCCAM Importer is a plug-in component for Apple QuickTime, QuickTime Player can play AVCHD ".mts" file and other software based on QuickTime Framework can also handle AVCHD ".mts" file directly after installation of AVCCAM Importer on a Mac.

*1: AVCCAM Importer can be downloaded for free from the following Panasonic website. PASS registration is required. <https://eww.pavc.panasonic.co.jp/pro-av/support/desk/e/download.htm>
*2: AVCCAM Importer supports the AVCHD files produced by AVCCAM products only.

AVCCAM Restorer
HD Content File Restore Software
(supplied with CD-ROM*1)

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)

* 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, 2012

Panasonic Micro Four Thirds Lens

H-FS045200
LUMIX G VARIO
45-200mm/F4.0-F5.6/MEGA O.I.S.

H-FS014042
LUMIX G VARIO
14-42mm/F3.5-5.6 ASPH./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.

H-PS14042
LUMIX G X VARIO PZ
14-42mm/F3.5-5.6 ASPH./
POWER O.I.S.

H-PS45175 HD MovieSupport
LUMIX G X VARIO PZ
45-175mm/F4.0-5.6 ASPH./
POWER O.I.S.

H-FS100300 HD MovieSupport
LUMIX G VARIO
100-300mm/F4.0-F5.6/MEGA
O.I.S.

H-H014 HD MovieSupport
LUMIX G
14mm/F2.5 ASPH.

H-X025LEICA DG SUMMILUX

H-X025
LEICA DG SUMMILUX
25mm/F1.4 ASPH.

Panasonic Four Thirds Lens

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

DMW-MA1
Mount Adaptor
(for Four Thirds Lens)

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

VW-VBG6
Battery Pack
• 7.2V, 5800 mAh/5400 mAh (typ./min.)

SDXC/SDHC/SD
Memory Card

Other Manufacturers' Products

Micro Four Thirds Lens

M.ZUIKO DIGITAL ED
12mm F2.0
[OLYMPUS]

M.ZUIKO DIGITAL
45mm F1.8
[OLYMPUS]

Four Thirds Lens

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

*These options are not available in some areas.

Specifications

As of November, 2012

[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 × 195 mm × 290.4 mm (6-7/16 inches × 7-11/16 inches × 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) × Approx. 10.0 mm (V)
Lens:	Not included
Lens Mount:	Micro Four Thirds system Lens mount
ND Filter:	Clear, 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.
Shutter Speed: (Syncro Scan)	[VIDEO CAM mode/ 59.94 Hz] 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/ 50 Hz] 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)
Shutter Speed: (Slow) VIDEO CAM mode only	[59.94 Hz] 60i/p mode:1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec., 1/30 sec. 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. [50 Hz] 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 ver.2.0 (MPEG-4 AVC/H.264/AVCHD Progressive)
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 at VFR recording and in PS mode.
Recording Format:	[59.94 Hz] PS mode: 1080/59.94p, PH mode: 1080/59.94i, 1080/29.97p, 1080/23.98p, 720/59.94p, 720/29.97p, 720/23.98p HA/HE mode: 1080/59.94i [50 Hz] PS mode: 1080/50p, PH mode: 1080/50i, 1080/25p, 720/50p, 720/25p, HA/HE mode: 1080/50i
Transmission Rate:	PS mode: Approx. 25 Mbps (VBR) PH mode: Approx. 21 Mbps (VBR) HA mode: Approx. 17 Mbps (VBR) HE mode: Approx. 6 Mbps (VBR)
Recording Time:	Approx. 12 hours (PH mode 1920 x 1080 or 1280 x 720 with two 64GB SDXC memory cards)
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.
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.

[Video Output]

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

[Audio recording playback]

Recording Format:	PS/PH mode: Dolby Digital/2ch, linear PCM digital/2ch switch HA/HE mode: Dolby Digital/2ch
Sampling Frequency:	48 kHz
Encoding:	16 bit
Compressed Bit Rate:	Dolby Digital: PS/PH mode: 384 kbps, HA/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 × 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 × 1
Speaker:	20 mm (round) × 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 : (also used for VIDEO OUT)	IN: 1.0 V to 4.0 V [p-p], 10 kΩ 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

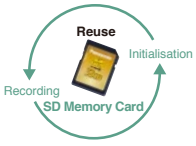
SD Reduces Total Cost of Ownership

(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.



PASS
Global Concierge for the Lifetime

P2 Asset Support System

The free member's service program for P2HD/AVCCAM

Extensive information for video professionals

Thirsty for Knowledge?

No purchase necessary
Information services for members

- The latest technical information
- FAQs, user's voices
- Tool download

Always the best performance

Additional content with product registration

- Firmware, utility downloads
- Quick inspection, service history
- Newsletters

Contact us through PASS

Direct answers to your inquiries. Sign up now (no purchase necessary)

http://panasonic.biz/sav/pass_e

AVCCAM

3 year extended warranty program

1st year Basic Warranty
2nd year
3rd year with the warranty program

Extended for free upon registration

* Availability of this extended service program and service content may depend on country/region and model.
* Not all repair work is covered by this extended warranty program.
* AG-HCK10G optional AVCCAM camera-head is out of coverage of this service program.

Informative product-related content also available with equipment registration.

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

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

Panasonic

Panasonic Corporation
Professional AV Business Unit
2-15 Matsuba-cho, Kadoma, Osaka 571-8503
Japan
http://pro-av.panasonic.net/

[Countries and Regions]

Argentina	+54 1 308 1610	Kuwait	+96 522431385	Taiwan	+886 2 2227 6214
Australia	+61 (0) 2 9491 7400	Lebanon	+96 11665557	Thailand	+66 2 731 8888
Bahrain	+973 252292	Malaysia	+60 3 7809 7888	Turkey	+90 216 578 3700
Belgium	+32 (0) 2 481 04 57	Mexico	+52 55 5488 1000	U.A.E. (for All Middle East)	
Brazil	+55 11 3889 4035	Netherlands	+31 73 64 02 577		+971 4 8862142
Canada	+1 905 624 5010	New Zealand	+64 9 272 0100	Ukraine	+380 44 4903437
China	+86 10 6515 8828	Norway	+47 67 91 78 00	U.K.	+44(0)1344 70 69 13
Hong Kong	+852 2313 0888	Pakistan	+92 5370320 (SNT)	U.S.A.	+1 877 803 8492
Czech Republic	+420 236 032 552/511	Palestine	+972 2 2988750	Vietnam	+848 38370280
Denmark	+45 43 20 08 57	Panama	+507 229 2955		
Egypt	+20 2 23938151	Peru	+51 1 614 0000		
Finland, Latvia, Lithuania, Estonia		Philippines	+63 2 633 6163		
	+358 (9) 521 52 53	Poland	+48 (22) 338 1100		
France	+33 (0) 1 47 91 64 00	Portugal	+351 21 425 77 04		
Germany, Austria, Switzerland		Puerto Rico	+1 787 750 4300		
	+49 (0) 611 235 459	Romania	+40 21 211 4855		
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India	+91 120 247 1000	Singapore	+65 6270 0110		
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Korea	+82 2 2106 6641	Syria	+963 11 2318422/4		

ISO 9001
JQA-0443

ISO 14001
EC98J2010

UKAS ENVIRONMENTAL MANAGEMENT
051

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

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