- Camera should contain a CD containing the instruction manual and ImageBrowser EX software.
- Battery: charging takes 90 minutes (page 237). Battery life 70 minutes.
- Records onto a Micro SD card (SanDisk, Toshiba, or Panasonic recommended)
  - SanDisk 8GB Class 10 ~$12.00
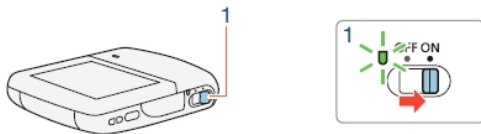 - You must initialize card before first use.

Memory card type:	microSD card
	microSDHC card
	microSDXC card
SD Speed Class*:	CLASS② ** CLASS④ ** CLASS⑥ ** CLASS⑩
Capacity:	128 MB or larger***

Initializing a Memory Card

Initialize memory cards when you use them with this camcorder for the first time. You can also initialize a memory card to permanently delete all the recordings it contains.

Shooting mode   Playback

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1 Make sure the camcorder has sufficient power to complete the operation.

- Insert a fully charged battery pack or use the optional CA-110 Compact Power Adapter.

2 Set the power switch to ON to turn on the camcorder.

- The lens cover will open.

3 Initialize the memory card.

⌂ ▷ [⏐⏐ Other Settings] ▷ ⌐✎⌐ ▷ [Initialize SD] ▷ [Initialize] ▷ [Complete Initialization]¹ ▷ [Yes]² ▷ [OK] ▷ [✗]

¹ Touch this option if you want to physically erase all the data rather than just clear the file allocation table of the memory card.
² If you selected the [Complete Initialization] option, you can touch [Cancel] to cancel the initialization while it is in progress. All recordings will be erased and the memory card can be used without any problem.

❶ • Initializing a memory card will permanently erase all recordings. Lost original recordings cannot be recovered. Make sure you save important recordings in advance (📖 131).

- Recording – recommended to use 4 Mbps for smallest possible file size

Approximate recording times

Memory card	Video quality (Resolution)		
	24 Mbps (1920x1080)	17 Mbps (1920x1080)	4 Mbps (1280x720)
8 GB	40 min.	1 hr.	4 hr. 20 min.
16 GB	1 hr. 25 min.	2 hr. 5 min.	8 hr. 40 min.
32 GB	2 hr. 55 min.	4 hr. 10 min.	17 hr. 20 min.*
64 GB	5 hr. 55 min.	8 hr. 20 min.	34 hr. 45 min.*

* Using the optional CA-110 Compact Power Adapter, a single scene can be recorded continuously for 12 hours. After that, recording will continue as a separate scene.
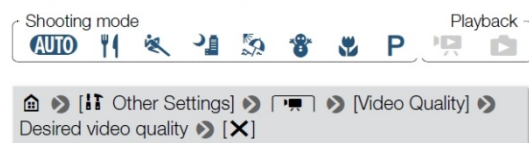
(i)
- Depending on the device used, you may not be able to play back your recordings on other devices.
- The camcorder uses a variable bit rate (VBR) to encode video so the actual recording times will vary depending on the content of the scenes.
- Long scenes, whose video data exceeds 4 GB, will be recognized as multiple files on other devices.

Video Quality and Shooting Modes

Selecting the Video Quality

The camcorder offers three video quality options (bit rates*) for recording movies. Select 24 Mbps for higher video quality; select 4 Mbps for longer recording times or smaller file sizes. The table following the procedure (□ 88) gives approximate recording times.

* Bit rate (measured in Mbps) indicates how much information is recorded in 1 second of video and therefore affects also the recording time available on the memory card.

Shooting mode   Playback

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⌂ ❯❯ [↕↑ Other Settings] ❯❯ [🖵] ❯❯ [Video Quality] ❯❯ Desired video quality ❯❯ [✕]

- Recommended - Camera will default to ultra-wide field of view (page 57).

Basic Recording

■ Changing the Field of View

The camcorder features a ultra wide angle lens so you can capture a vast field of view (about 160° for video, about 170° for photos), for example to include a large group in a fisheye-like image. Alternatively, you can enlarge the center of the screen for a closer view.

Touch [[⊕]] to enlarge the center of the screen (close-up).
Touch [[⊖]] to return to the default field of view (ultra wide).

[⊖] (ultra wide)   [⊕] (close up)

o Recommended – use Noise Suppression Audio Scene (page 110).

⌂ ▶ [Audio Scene] ▶ Desired audio scene ▶ [OK]

Options (✦ Default value)

[♫STD Standard]✦
To record most general situations. The camcorder records with standard settings.

[♫ Music]
To vibrantly record music performances and singing indoors.

[♫ Speech]
Best for recording human voices and dialog.

[♫ Forest and Birds]
To record birds and scenes in forests. The camcorder clearly captures sound as it spreads.

[♫ Noise Suppression]
To record scenes while reducing noise from wind, passing vehicles and similar ambient sound. Ideal for recording at the beach or in places with a lot of noise.

- Editing: you can "trim" scenes directly on camera (page 79).

Trimming Scenes

You can trim scenes by removing everything up to a certain point or everything after a certain point. By doing so, you leave only memorable moments to keep for posterity.

Shooting mode   Playback
(AUTO) ¶ ✿ ⌂ ⌂ ☃ ♣ P   ▶☰ ◻

1 Play back the scene you want to trim (◻ 65).

2 At the point where you want to trim the scene, open the scene trimming screen.

Touch the screen to display the playback controls ▶ [❚❚]
▶ [Edit] ▶ [Trim]

3 Bring the scene to a precise point, if necessary.
- The point at which is movie will be trimmed is indicated by the ▼ marker.

4 Trim the scene.

[Trim] ▶ [Trim Before Marker] or [Trim After Marker] ▶
[Save as New] or [Overwrite]

- You can select whether to trim the part before or after the ▼ marker and whether to save the remaining part of the video as a new scene (keeping the original scene) or to overwrite the original scene.
- Touch [Stop] to interrupt the operation while it is in progress.

(i) - You may not be able to correctly trim scenes that were recorded on or copied onto a memory card using another device.
- Interval scenes with the ⟳ icon cannot be trimmed.

- You can convert and resize movies to obtain smaller file sizes (page 128).

Converting and Resizing Movies

You can convert scenes to a lower video quality (down-conversion) to obtain smaller file sizes. This is convenient, for example, when you want to upload videos to the Web, as smaller video files will upload faster. Additionally, when you convert a scene, you can apply unique cinema-look filters and decorations to the converted copy.

The converted movies are saved as new scenes so you always keep your original movies.

Shooting mode   Playback

1   Open the [🎥] or [▦] index screen (📖 65).

2   Open the screen for selecting scenes to convert.

> [Edit] ❯ [Convert to MP4] ❯ [OK] ❯ Desired video quality of converted movies*

> * Before selecting the video quality, touch [Join Scenes] to join the converted movies into a single scene.

3   Touch the individual scenes you want to convert.

- A checkmark ✓ will appear on the scenes you touch. The total number of selected scenes will appear next to the ☑ icon.
- Touch a selected scene to remove the checkmark. To remove all checkmarks at once, touch [Remove All] ❯ [Yes].

4   After selecting all the desired scenes, touch [OK] and then touch [Next].

5   Touch [START] to convert the scene.
- Touch [STOP] to interrupt the operation while it is in progress.

6   Touch [OK].

- Saving recordings on a computer.
  - o Make sure to save your recordings on a computer on a regular basis.
    - Connecting the camcorder to a computer (pg 134-136).
      - ImageBrowser EX software
        - o "Import Images from camera" and select your image(s).
        - o Videos can be found in a dated folder in the "Pictures Library".\
    - **Or ….. Use SD adapter**