
HD2

(Your BLACK BOX recorder)

User manual

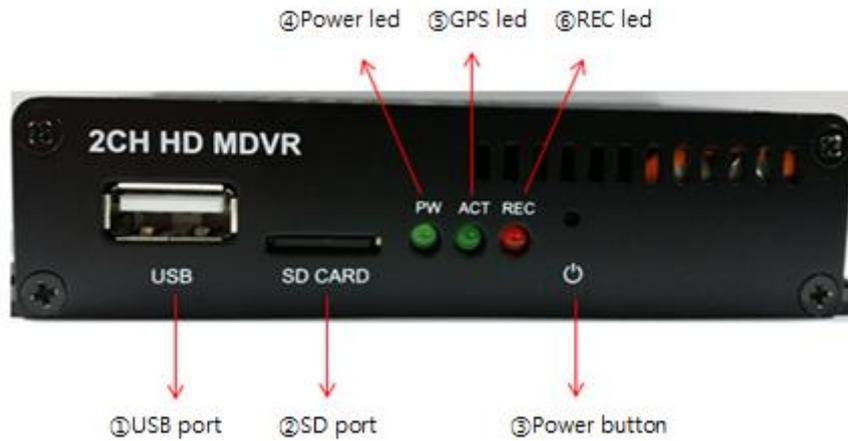
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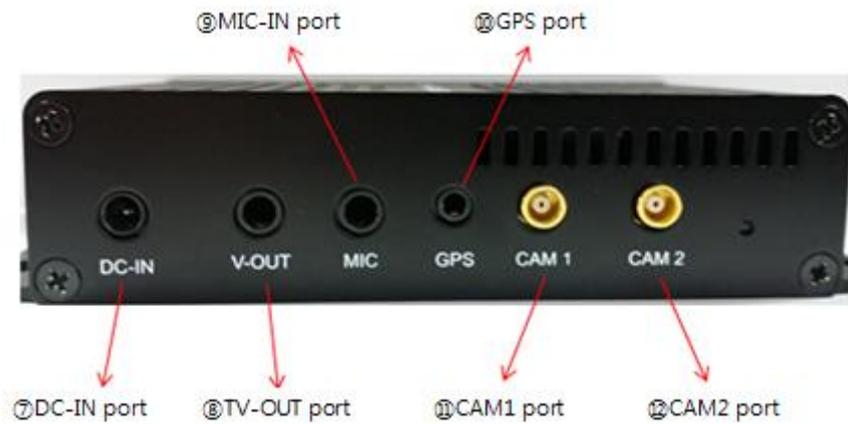
Product

- Front



- ① USB port : Connect USB.(WIFI dongle)
- ② SD port : Insert SD card which stores recorded video.
- ③ Power button : Turn on/off the HD2 recorder
- ④ Power LED : Displays the power status
- ⑤ GPS LED : Displays the GPS status
- ⑥ REC LED : Displays recording & error status

- Rear



- ⑦ DC-IN port : Connect power cable
- ⑧ TV-OUT port : Port for external video output
- ⑨ MIC-IN port : Port for mic input
- ⑩ GPS port : Connect external GPS antenna
- ⑪ CAM1 port : Connect a camera
- ⑫ CAM2 port : Connect a camera

1. System startup

In order to operate the black box connect the wire (VCC) to constant battery and the wire (ACC) is connected to the accessory power circuit such as cigarette lighter or radio/CD player etc. The unit will power on when the vehicle is started or ignition is switched on. After the HD2 has initialized you will hear a short beep indicating ready to go.

2. Recording

When viewing the contents of the SD card you will see three (3) directories or folders, Normal/Event/Parking. (These folders contain the recorded video and can be seen via the PC viewer (D16-Player) or Android (CBXpro) and IOS (CBX) mobile apps.

- Normal
In this folder the continuous recording files in normal driving mode are stored. The HD2 black box takes a short snapshot every 60 seconds of both CAM1 and CAM2 video streams.
- Event
In this folder the event recording files are stored, when the g-sensor senses an abnormal movement such as sudden stop it records uninterrupted video 20 seconds (10 seconds before and after from the event)
- Parking
Stored here are recordings when the g-sensor (Shock) and motion detection circuits detect an event (parking mode). The black box records for 20 seconds (10 seconds before and after from the event).

2-1 Recording file structure

It is recorded as AVI file for video. AVI video file is classified as continuous mode, g-sensor mode and parking mode.

| Recording mode | Recording time | Description |
|----------------|---|---|
| Normal | 1 minute increments | Continuous recording file while driving |
| Event | pre/post video for 10 seconds (max 20 second totally) | Recording mode by the event from g-sensor while driving |
| Parking | started by recording | Recording mode by the event from g-sensor or motion while parking |

Table 1 – Recording mode

➤ AVI file

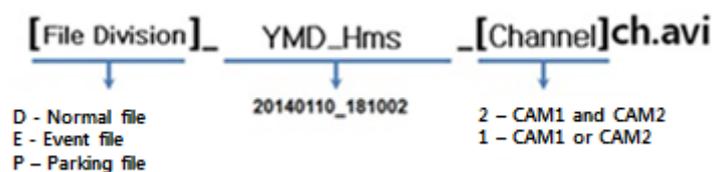


Figure 1 – AVI file

3. TV-OUT Display



Figure 2 – TV-OUT display

3-1 State Information

At the top of the screen, it would be shown the date and time in addition to five state information as shown below.

| Status | Description |
|---------------------|--|
| SSID | - If WIFI is connected shows the SSID. - Blank when WIFI connection is lost. |
| GPS | - Shows the phrase “GPS ON” when GPS is connected. - Shows the phrase “GPS OFF” when GPS is not connected. |
| Recording | - It shows the status of the current record. If the recording is in progress, it shows the phrase “REC” in red text. If the recording has stopped it shows the phrase “NO REC” in white text |
| Temperature Voltage | - Shows the current system temperature and voltage. |
| Setting value | - Shows the current setting value. (S : G-sensor, M : Motion, MIC : MIC on/off, BZ : Buzzer on/off) |
| S/W version | - It shows the current S/W version. |

Table 2 – Description of status

4. Function

- Configuration of the device can be changed in the PC viewer or mobile app.

| Item | Function | Note |
|-------------|--|--|
| Display | - mirroring | |
| Audio | - MIC - Buzzer | The microphone must be connected to an external microphone. |
| Video | - Quality - Frame rate - Camera brightness | |
| System | - F/W update - Factory defaults - WIFI On/Off - Language - System information - Network information | F / W Update Method see section 8.6.1 |
| Time | - Time/Date - Time zone - Summer time | Time zone and Summer time setting is only possible in the PC viewer. |
| SD card | - SD Format - SD Format interval | |
| Sensitivity | - G-sensor - Motion | |
| Operation | - Max temperature - Min voltage - Battery saving | |

Table 3 Function description

5. Buzzer and LED

| Category | Contents | Power led | GPS led | REC led(red) | buzzer | Remark | | |
|---------------------------------|--|-----------|---------------|--------------------------------|---------------------------------------|---------------------------------------|-------------------------------|--|
| SD Card | When you start without SD card | Always ON | Always OFF | Blinking at 1 second intervals | 1 second beep every 5 seconds | When the system off 1 minute duration | | |
| | When you remove the SD card during system operation | | | | | | | |
| | Over a certain space of the SD card when there is a different file | | | | | | | |
| | When an error occurs during recording | | | | | | | |
| | If a failure occurs on the SD card when you start the system. (when it has not been restored to the recovery system) | | | | | | | |
| | When you reach the cycle format | | | | | | | |
| | SD format | | | OFF | Twice briefly | | | |
| When the unsuccessful SD format | Blinking at 1 second intervals | | | 1 second beep every 5 seconds | When the system off 1-minute duration | | | |
| Camera | When you turn on your system without camera (CAM1 and CAM2). | | | Always ON | Always OFF | Blinking at 1 second intervals | 1 second beep every 5 seconds | When the camera is connected to returning to a normal state. When the system off 1-minute duration |
| | Removed the camera during system operation | | | | | | | When the camera is connected to returning to a normal state. |
| | | | | | | | | |
| Recording | Normal Recording | | | Always ON | Always OFF | Always ON | OFF | |
| | Event Recording (event, motion) | | | | | Always ON | Twice briefly | |
| SYSTEM | System is turned on | | | | | Always ON | Always OFF | When the recording ON |
| | When changing driving / parking mode | | | | | | | |
| | System is turned off (power off, min voltage, max temperature) | | | | | | | |
| | Reboot | OFF | Twice briefly | | | | | |
| | When it detects high temperature within 10 seconds from starting system | | | | | | | |
| | Start firmware update | | | | | | | |
| | Firmware update has failed | Always ON | | | | | | |
| GPS connected | Always ON | OFF | OFF | | | | | |

Table 4 Buzzer & LED description

6. Parking mode

6-1 Entering Parking mode

- When the black box detects the ignition is turned off it enters into parking mode.
- There is a short delay after ACC is detected as off before the black box changes into parking mode. If ACC is detected as on (ignition on) the black box will change back to driving mode.

6-2 Operation at parking mode

- Refer to Table 2.1 for event recording in parking mode.

System monitors in set intervals the voltage and temperature levels of the black box and will be shut down automatically when it detects abnormal levels (refer section 8.10.1 & 8.10.2).

To prevent a vehicle flat battery, the black box will automatically shut itself down when the voltage level drops below acceptable levels (refer section 8.10.3).

7. Streaming

7-1 Execute Mobile App

Open the app on your phone or tablet.

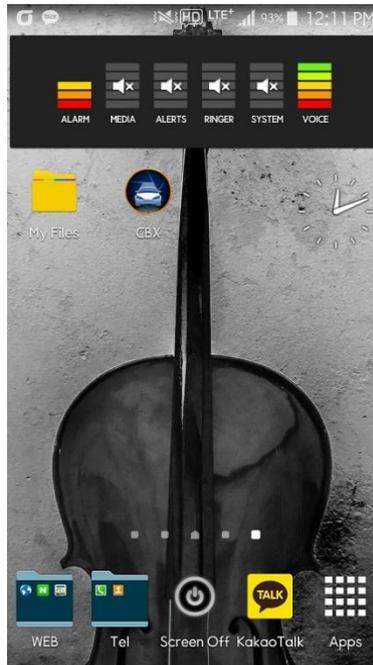


Figure 3 Execute mobile app (Android)

7-2 Search WIFI

Setup WIFI by selecting the "Connection" icon as per Figure 4.



Figure 4 Search WIFI



Figure 5 Search WIFI

7-3 WIFI connection and change SSID/Password

Select the black box SSID in the WIFI list, enter password as Figure 6.(Default password is 1234567890). After success connection, you can change SSID and password as Figure 7 and 8. (Password consists more than 8 characters or numbers).

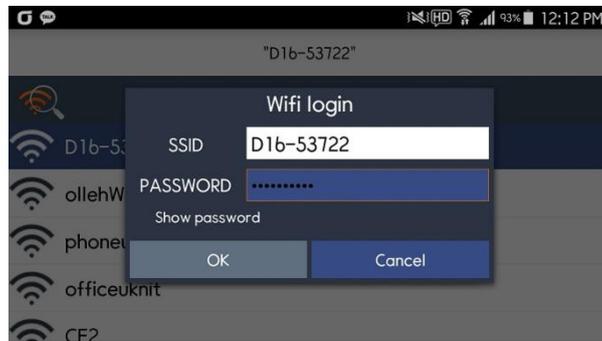


Figure 6 WIFI login



Figure 7 Change WIFI setting



Figure 8 Change SSID and Password

7-4 LIVE streaming

To view live streaming by selecting the "Live" icon as per Figure 9.



Figure 9 Live streaming



Figure 10 Live streaming

7-5 Layout change



You can select layout by touching icon as Figure 11.

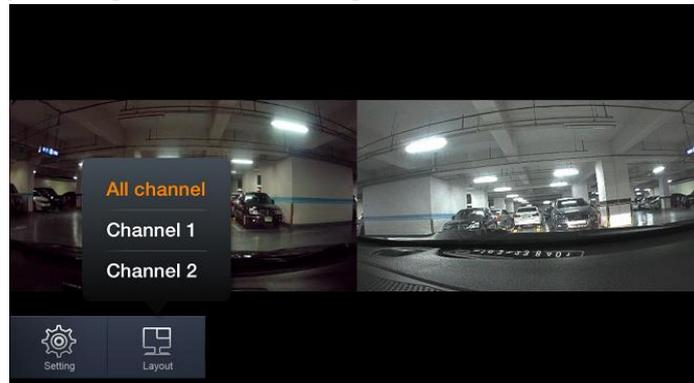


Figure 11 Change layout

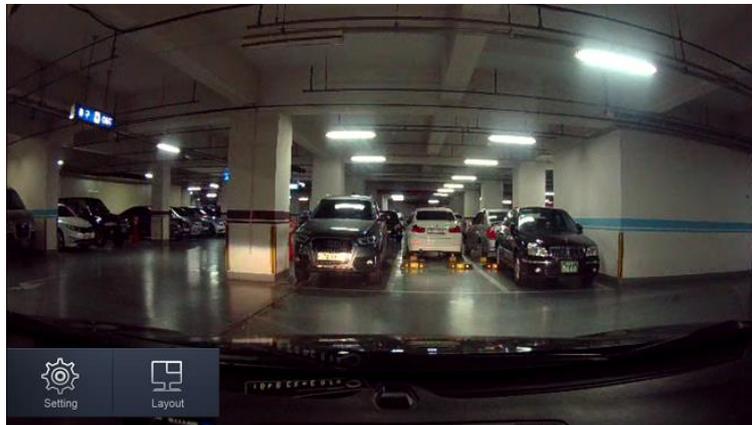


Figure 12 1Ch mode layout

8. Remote setting

You can change the setting of black box and playback the video stored in black box remotely.



Figure 13 Remote setting

8-1 Preference Setting

To view or change settings select the "settings" icon in the playback screen (Figure 13). To return to Live streaming, just click  icon.



Figure 14 Preference setting menu

8-1-1 Setting window

Each item in the preference menu consists of menu item, touch area and control area as shown in the figure below.

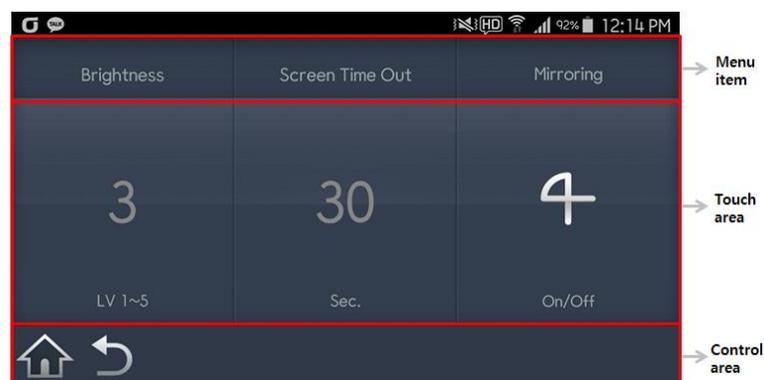


Figure 15 Setting window

8-1-2 Menu item

Select an icon in the menu to enter the sub menu.

8-1-3 Touch area

It is area for setting each item and applying the changes by touching. When the setting items can be set out the selection list.

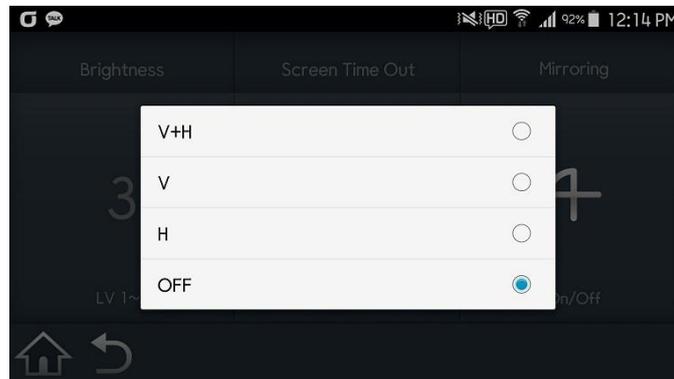


Figure 16 Settings Screen

8-1-4 Control area

| Icon | Description |
|---|--|
|  | Home Button - Return to Live streaming from setting menu or file playback menu |
|  | Return to preference settings menu |
|  | Previous/next menu to change the page when the number of setting value is greater than 3 |

Table 5 Control area

8-2 Playback

Play list will be shown as Figure 18 when you touch Playback icon.



Figure 17 Playback icon



Figure 18 Playback list

8-2-2 Playback

Channel selection menu will appear if you touch  icon as Figure 19. When you select channel, the file you have chosen will be downloaded and stored on your smart device and played as Figure 20 & Figure 21.



Figure 19 select channel

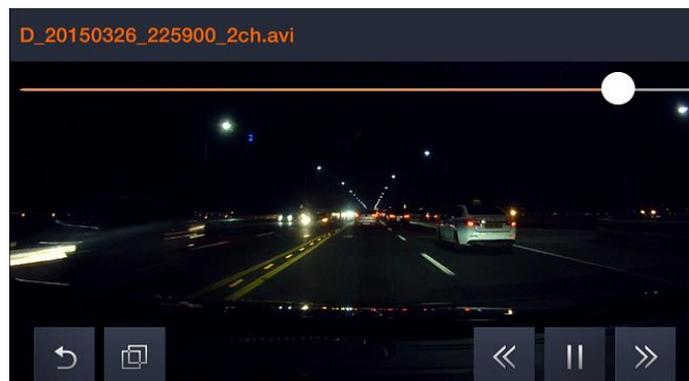


Figure 20 playback window



Figure 21 Save icon display

8-2-3 Channel2 play

To playback "Channel 2" after finishing the playback "Channel 1", select "Channel 2" icon.



Figure 22 2 channel play

8-3 Display

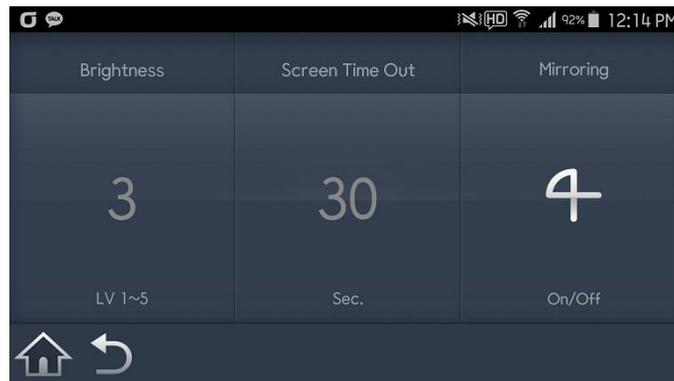


Figure 23 display setting

8-3-1 Rear camera mirroring

If you want the rear camera mirrored on the main display screen, select the location on the screen where you want it to appear. (by default mirroring is OFF)

| Icon | Description |
|------|---------------------------------------|
| OFF | Off mirroring |
| H | Mirror left and right |
| V | Mirror top and bottom |
| V+H | Mirror left and right, top and bottom |

Table 6 Mirroring

8-4 Audio



Figure 24 Audio setting

8-4-1 MIC

This sub menu item allows you to turn the MIC on or off.

8-4-2 Buzzer

This sub menu item allows you to turn the BUZZER on or off.

8-5 Quality

The sub menu is for setting video quality and camera brightness. The user can set the video quality for normal driving mode and parking mode separately. And, includes parameters of video quality and frame rate. The default values are HIGH/30frames for driving mode and HIGH/15 frames for parking mode

(* After change setting, all recording processes will stop and restart and record as per new values)



Figure 25 Quality and Camera brightness



Figure 26 Quality Driving & Parking select



Figure 27 Quality setting

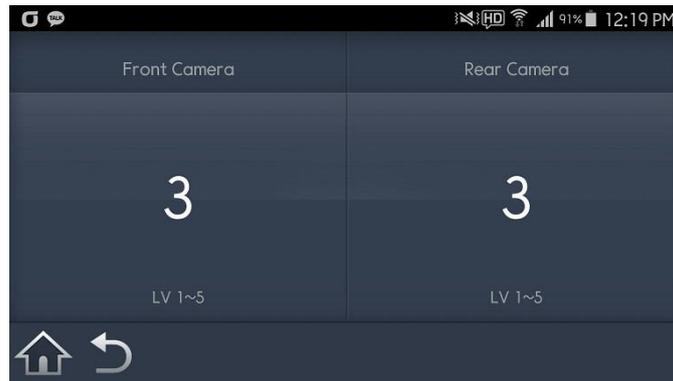


Figure 28 Camera brightness setting

8-5-1 Quality

There are 3 levels of video quality settings highest/high/normal. The higher value provides better quality but it consumes more storage space.

8-5-2 Frame rate

There are 4 levels of frame rate as 30 frames/sec, 20frames/sec, 15 frames/sec and 10 frames/sec. The higher frame rate provides more natural motion but it consumes more storage space.

8-5-3 Camera brightness

The user can set the brightness of CAM1 and CAM2 separately. It supports 5 levels of brightness for each camera and the higher value means brighter picture recorded.

8-6 System



Figure 29 System setting 1

8-6-1 F/W update

Not support in Mobile app. – to update firmware.

- Copy the update file to the SD card.
- Insert the SD Card in to the black box and turn on the black box.
- The black box will update firmware automatically.

8-6-2 Factory default

All the system configuration is refreshed with the default values. After factory defaults, system is automatically restarted.

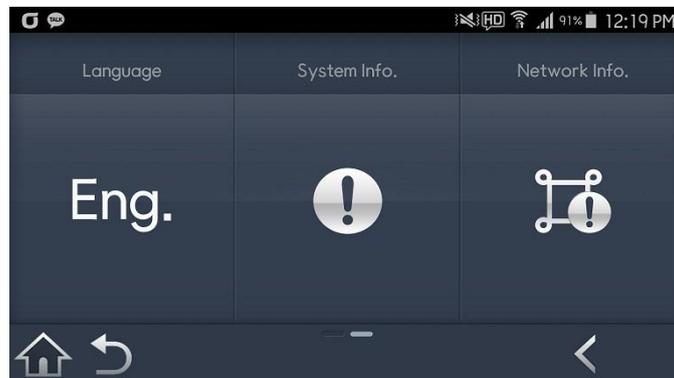


Figure 30 System setting 2

8-6-3 Language

Language conversion is possible. Currently, English and Korean are supported.

8-6-4 System information

It shows system information including hardware, software, product name and model name.

8-6-5 Network information

You can check SSID, password and IP information of Wifi module. You can modify the SSID configuration by remote access of mobile devices. (Android/iOS)

8-7 Time

It consists of Year/Month/Day and Hour/Minute/Second and the user can set each item separately Modified time is stored by clicking back or home icon.

- Modified time is only applied to new recordings, all recordings prior to time change remain the same.
- In case of GPS connected, it synchronizes time automatically between GPS and System at system startup or changing time from parking mode to driving mode.
- If you set time any earlier than 2014, it will default to 12:00:00 January 1, 2014 value.

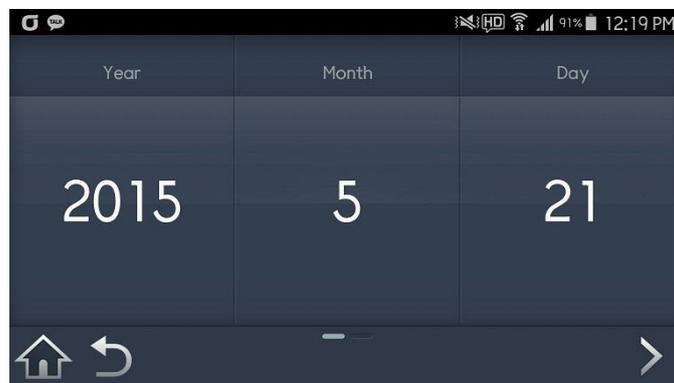


Figure 31 Year/Month/Day setting

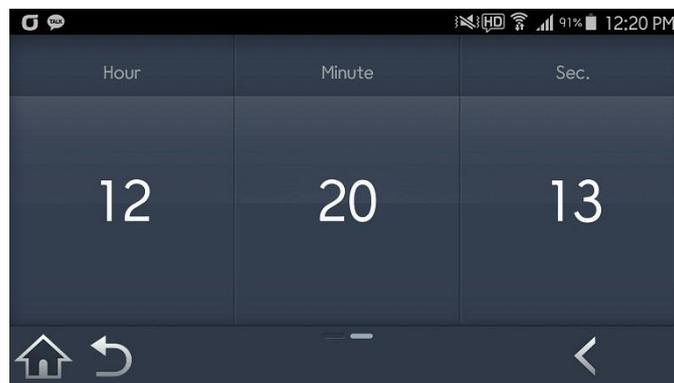


Figure 32 Hour/Minute/Sec. setting

8-8 SD card



Figure 33 SD card setting

8-8-1 SD Format

Format SD card. The system will restart after FORMATTING has finished.

8-8-2 SD Format interval

The format interval can be set to Off, 2 weeks, 4 weeks or 8 weeks for more reliable recording. When the black box reaches the format time, the system will warn via the REC LED (see page 4).

- OFF is not recommended for reliable recording.
- When it reaches format time, you can format SD card or change the format interval.

8-9 Sensitivity

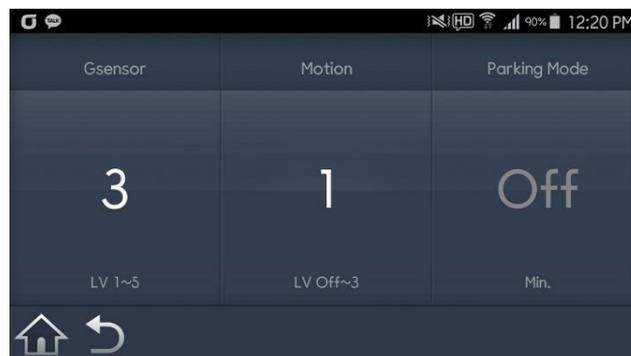


Figure 34 Sensitivity setting

8-9-1 G-sensor

It provides 5 levels of the sensitivity of G-sensor and G-sensor detects the impact of vehicle. The higher value means more sensitive level.

- To avoid frequent "False Alarm", please set appropriate "Level of Sensitivity".

8-9-2 Motion

It adjusts motion sensitivity. The higher value means more sensitive level.

- High level sensitivity may cause frequent motion event at night.

8-10 Operation configuration



Figure 35 Operation setting

8-10-1 Max temperature

In order to ensure the normal operation of the Black Box Recorder, the system will stop operation and turn off when temperature is reached at the setting value. Setting values are 80, 85, 90, 95, 100 ° C. Current temperature is shown at the top of the setting area with an orange colour.

8-10-2 Min voltage

In order to protect the battery of the vehicle, the Black Box recorder will stop operation finalize recording and turn off when voltage is lower than the setting value.

8-10-2 Battery saving

After setting time from entering parking mode, System will stop operation and turn off.

9. Specification

| | |
|--------------------------|---|
| Camera | <ul style="list-style-type: none">- CAM1,CAM2: HD sensor -> lens angle of view : 127°(Diagonal)- CAM1,Cam2 30fps recording (Max) |
| Resolution | <ul style="list-style-type: none">- HD(1280x720) 2Ch |
| Storage | <ul style="list-style-type: none">- Micro-SD (16GB/32GB/64GB) |
| Recording | <ul style="list-style-type: none">- Continuous- Event- Parking |
| Recording time | <ul style="list-style-type: none">- 110minutes (16GB SD card, default setting, continuous recording) |
| Network | <ul style="list-style-type: none">- USB type WiFi dongle (option) |
| Streaming | <ul style="list-style-type: none">- CAM1, CAM2 2channel streaming |
| G Sensor | <ul style="list-style-type: none">- 3D G-sensor |
| GPS | <ul style="list-style-type: none">- external GPS (optional) |
| Power | <ul style="list-style-type: none">- Input: DC 10 ~ 30V- Power consumption – 5W (2ch@30fps mean)=> LCD off except GPS, network- Super cap |
| Interface | <ul style="list-style-type: none">- Video-out port- Micro SD slot- GPS input port- MIC input port |
| Video & Audio | <ul style="list-style-type: none">- Video: AVI (H.264)- Audio: PCM (g.711) |
| ETC | <ul style="list-style-type: none">- external MIC- Buzzer- Status LED- Operation temperature: 0°C ~ 60°C- Store temperature: - 20°C ~ 80°C |

Parking mode under the connection of car battery power

1. If you need long-term parking (more than 3 days), recommends a long-term parking after the power of Black Box recorder is OFF.
2. The battery capacity is subject to the regulations of the car manufacturer. Despite the power management for preventing discharging, it can discharge depending on the age and battery state of the car.
3. The basic object of the Black Box recorder is dedicated to record the vital video footage of an event or emergency that may occur while driving. For this reason, sincerely hope that you use Black Box recorder while driving.
4. The battery capacity varies depending on the battery model, size (capacity), vehicle age and conditions. So there are no guarantee's expressed or implied on how long the battery will stay charged or last.
5. We are not responsible for all the video recording error, data loss and battery discharge that can occur in a variety of environmental factors especially in the parking mode.

Cautions – We recommend you use a trained professional to install the HD2 Black Box recorder. We will not be liable, accountable or responsible for any damage such as fire, burnt wiring due to poor installation practices, modifying the wiring or devices supplied with your new HD2 Black Box recorder.

1. Disconnect the vehicle battery cable prior to installation, if you do not know how disconnect the battery, please ask your local shop for advice due to the possible sensitivity of the connection and vehicle on-board ECU. (The location of the fuse box power varies by various car manufacturers. Before installation, please be sure to check the manual of the vehicle.)
2. Please do not modify the included power cable. It can cause catastrophic failure due to voltage differences. Poor installation practices can lead fire.
3. The connection voltage to car battery power is 12V ~ 24V free volts. It is set to 24V automatically when connected to 24V. For 24V car, because it is sufficient battery capacity, [Low Voltage] function does not work.
4. [Low voltage] function built into HD2 Black Box recorder is executed automatically when you connect to car battery using our power cable.
5. Parking mode time and low voltage protection may vary depending on the vehicle battery capacity.
6. The warranty is void if the failure of the HD2 Black Box recorder is due to misuse or incorrect installation.
8. Our systems are tested 3 times during manufacture and shipping so pre delivery failures are unlikely. We will honour D.O.A claims but product will not be exchanged or refunded after the opening of any accessory.

Awareness of "Parking mode".

(1) Shorten the life of the memory card

- Memory card is a consumable product. The deletion and creation of files when used repeatedly will cause reduced life of the memory card. (The life of SD card varies SD card manufacturer. The recommended usage limit is 10000 times (delete/create files) and should replace the SD card after 6-8 months)

(2) The risk of car battery discharge

- Despite preventing discharge of the vehicle (see section 8.10.2), long-term parking can cause discharge of the vehicle battery due to Vehicle ECU and other devices other than the HD2 Black Box recorder discharging vehicle battery. In vehicles over 3 years there is a great chance of battery discharge due to the age of the battery. Cold weather can reduce the battery capacity as much as 70% especially in long term parking situations.

(3) Cannot record after executing [Low Voltage] function at parking mode

- In long-term parking, low voltage protection will be shut the HD2 Black Box recorder prevent fully discharging of the vehicle battery. When the HD2 Black Box recorder detects a low voltage it will automatically turn itself off and prevent any further recording.

- Average the life of the car battery is 3 years. Constant use of the HD2 Black Box recorder may reduce the life of the vehicle battery especially in Parking mode.

(4) Creation a lot of bad tracks on an SD.

- The HD2 may reboot due repeated deletion/creation of files causing possible bad tracks, it is recommended that a good quality named brand of SD card be used minimum "CLASS 10".

(5) The higher error possibility from high temperature in summer

- The max temperature for using SD card is about 70°C. In summer and under high temperature (over 70°C), continuous use of the HD2 Black Box recorder can produce SD Card errors thus recording failures.

(6) Weakness for external environmental factors

- The high temperature of the vehicle in summer can affect the operation condition of HD2 Black Box recorder and can cause errors in recordings and/or other functions.

The low temperatures such as winter can affect the performance and life of the vehicle battery and possible shortening the recording times.

- The repeated deletion/creation of files can increase the number of bad tracks on the SD card causing re-boots.