

# PH-LS User Manual



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# Index

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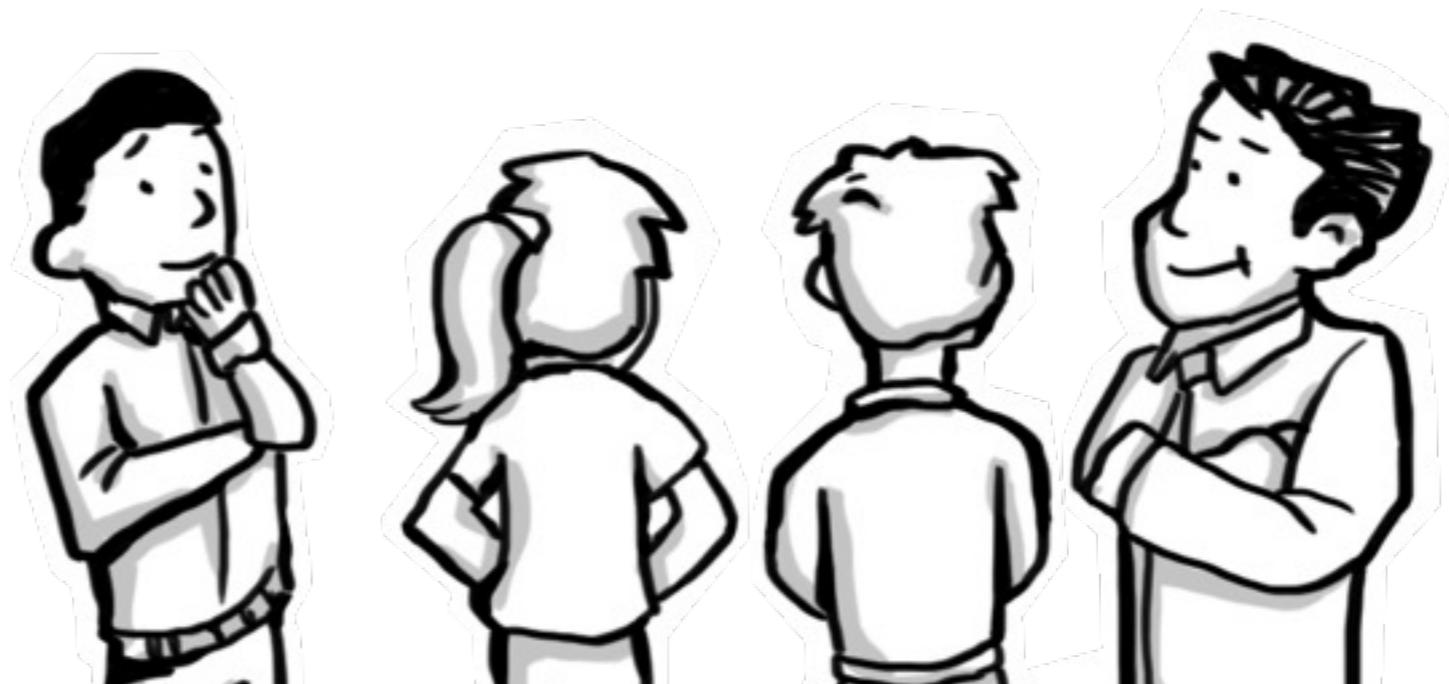
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# Before reading this user manual

Thank you for purchasing this network drive recorder. Please read this user manual carefully before you use the NDR and keep it handy for future reference.



### Important safety information

#### WARNING

Failure to follow these safety instructions could result in fire, electric shock, or other injuries, or damage to product or other property. Read all the safety information below before using product.

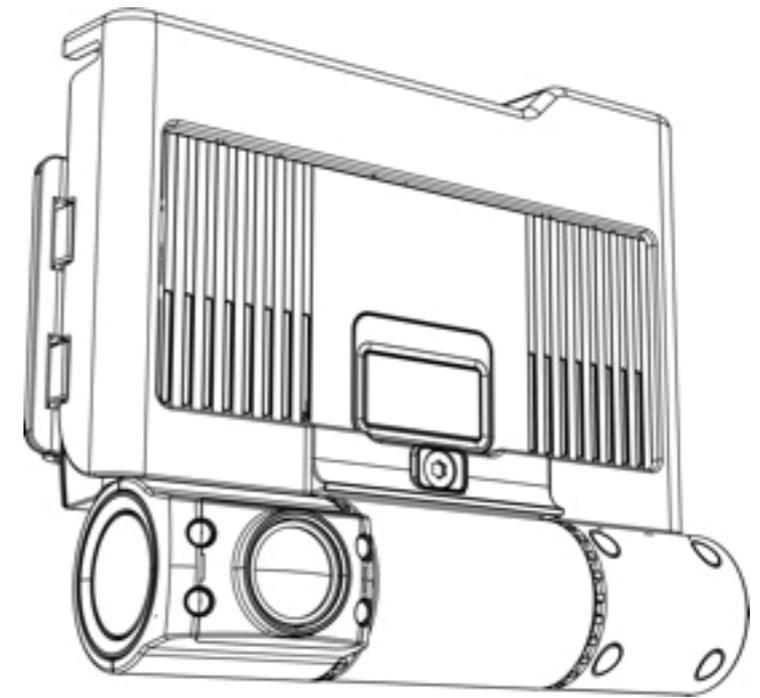
- \* Do not disassemble or modify s product under user's own discretion, or it may cause product failure, electric shock or fire.
- \* When terminal is in malfunction, do not operate terminal.
- \* If foreign matter or water gets into terminal or smoking, stop using and contact service center for A/S.
- \* When other electronic product is installed in vehicle, be careful that terminal power cable is cut or gets damaged, or it may cause product failure or electric shock or fire.
- \* Do not change the terminal installation location without authorization, or there may be blind area in image photography and user shall be liable on this.
- \* Fuse shall be in rated capacity.
- \* Unauthorized installation may cause failure in vehicle or product.

- \* When power is connected, do not remove memory card, cause memory card failure.
- \* Do not touch memory card with oily or wet hand, or it may cause product failure.
- \* Please use only authenticated and recommended memory card, or it may cause data loss.
- \* Do not put foreign material into card insertion slot of the terminal, or card may not be inserted or it may cause product failure.
- \* An improper connection could result in loss of data or memory card defect.
- \* For cleaning, do not use water, benzene or alcohol to product and parts. Please use soft and dry cloth, or it may cause product failure.
- \* Do not apply strong impact to the terminal, or terminal may break by the impact or it may cause product failure.
- \* GPS receiver module requires warming up time for initial start up. It may take several seconds or several minutes after power is turned on according to signal receiving environment.

- 
- \* Metallic coating on front window of vehicle may cause signal trouble in GPS.
  - \* Be careful for In-Cabin camera angle not to be shaded by inside room mirror when the product install.
  - \* Adhere GPS Cradle to windshield after working Air Drier (Air Conditioner) in case of much humidity.
  - \* Do not operate the terminal in driving or it may cause a traffic accident. Park vehicle safely first and then operate the terminal.
  - \* When service is required please contact our service center for A/S.
  - \* Do not touch to camera lens. Finger prints are may cause unclear recorded video quality.

# Getting to know the network drive recorder

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## Section 1

### Unpacking

Your network drive recorder comes with the accessories shown on this page. If any of these items is missing from your box, call customer center.



Main NDR



GPS Module & Cradle



Tamperproof cover



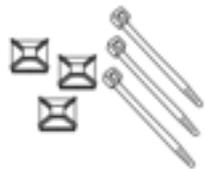
Screw seal



Screw



Screw wrench



Cable Clip & Tie



Uninterrupted power cable



CD

- \* The exact appearance of each item may vary by model.
- \* Micro SDXC memory card are not included.
- \* You can purchase parts and accessories after consulting with your local distributor. Product is not responsible for reduced malfunctions caused by any unauthorized use of accessories such as the power cable etc.,
- \* The exact appearance of each item may vary by model.

## Section 2

### Optional Accessories



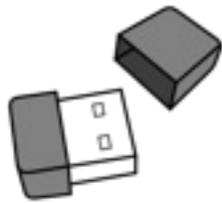
**RCAM-D16M**  
3rd Camera(In door)

- \* 720x480p
- \* 6 meters cable
- \* Reverse gear signal wire port
- \* DC 5V power use from NDR
- \* Korea origin



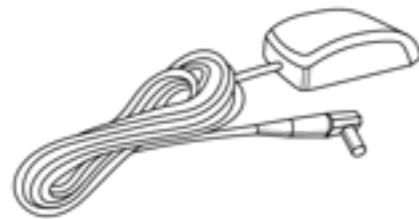
**RCAM-9990IR**  
3rd Camera(Out door)

- \* 720x480p / IP67 / Waterproof
- \* 160(D) wide angle / IR LED
- \* 23 meters cable
- \* Reverse gear signal wire port
- \* DC 5V power use from NDR



**WF-700RA**  
Wireless LAN USB Adaptor

- \* IEEE 802.11 b/g/n
- \* 2.4GHz frequency bands
- \* OFDM, Peak rate 150Mbps
- \* Peak throughput 90Mbps.
- \* 64/128 WEP,WPA,WPA2,TKIP,AES



**GPSA-6000**  
External GPS Antenna for  
metal film coating vehicle.

- \* IP67 / Waterproof
- \* 6 meters cable length
- \* Magnetic type
- \* MCX connector



**VOC-300**  
Video-out Cable

- \* 2.5mm EarPhone jack to RCA
- \* 3 meter cable length
- \* UL approved



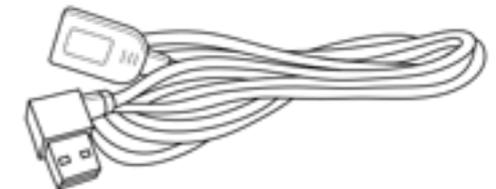
**YCB-100**  
Y-Type Cable

- \* 2.5mm EarPhone jack type
- \* 1 male to 2 female jack use
- \* This part is may need to use video-out cable and panic button use at once



**FS-5M**  
Panic Foot Switch

- \* IP54 / Metal type
- \* 5 meters cable length
- \* 10A/250VAC
- \* This part is able to connect to Video-out port from NDR

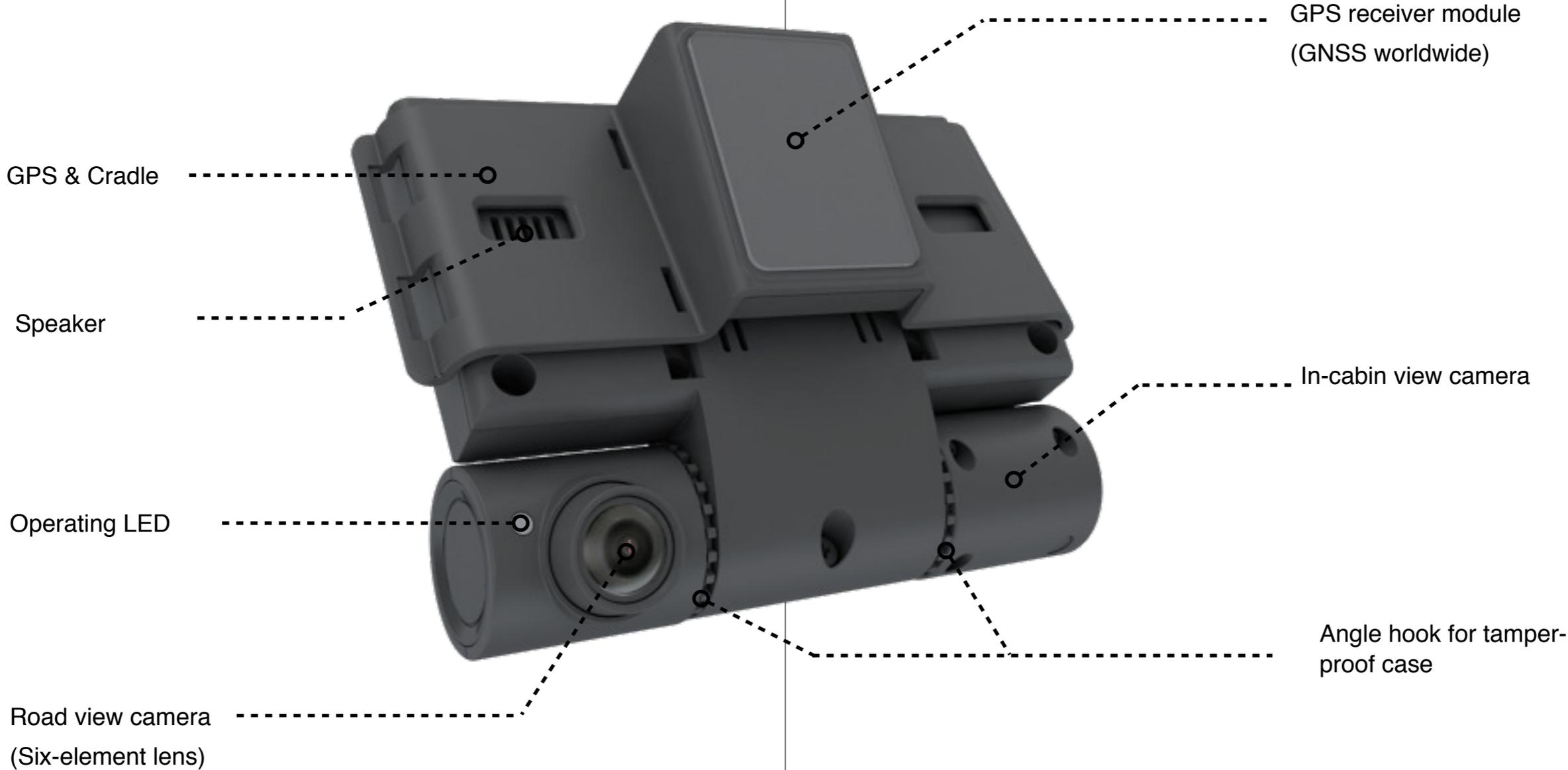


**USB-200**  
USB 2.0 Cable

- \* L-angle male to right angle female
- \* Use for external flash memory

# Part & Names

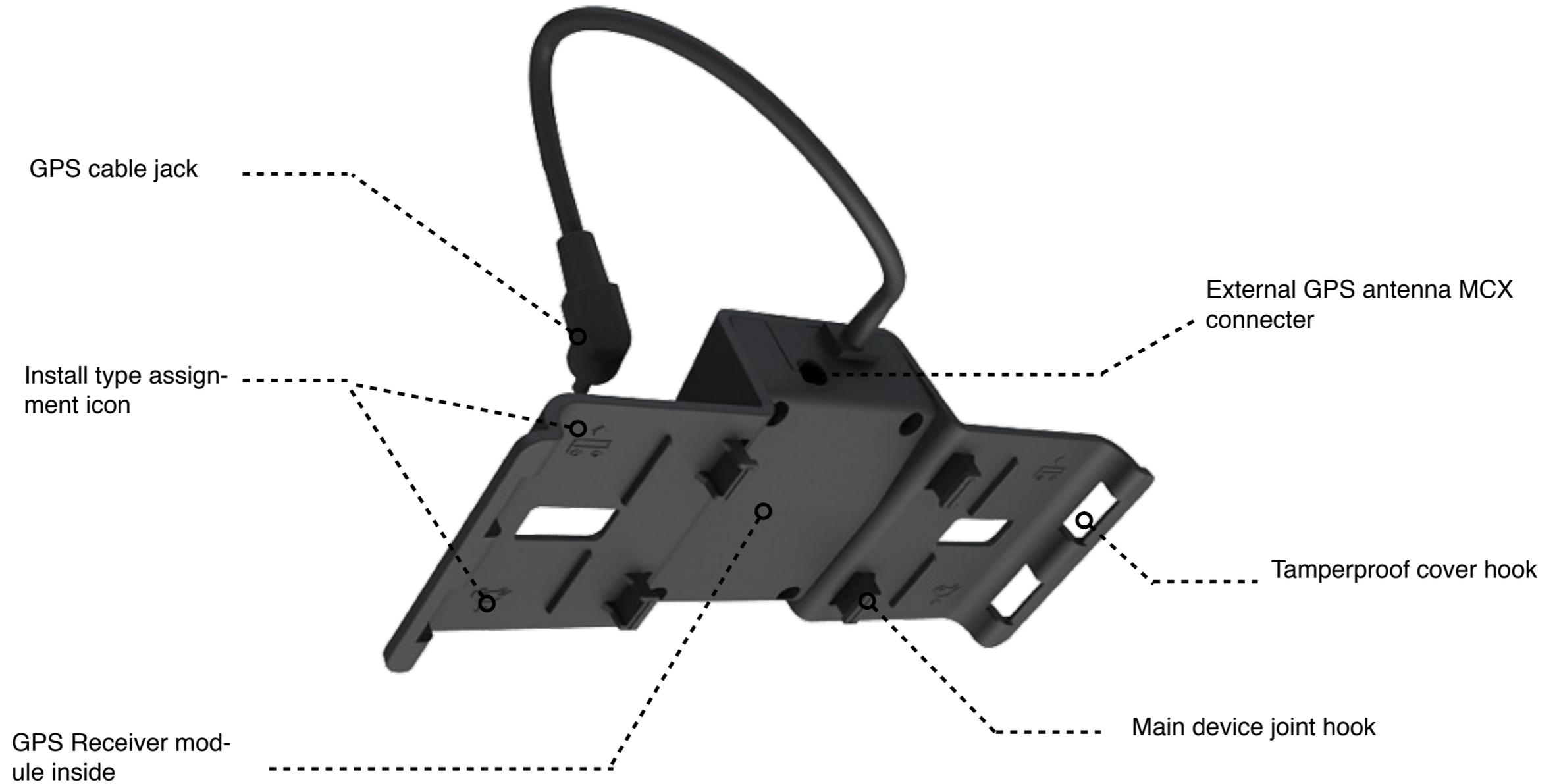
Read this section to learn about the NDR features, how to use the controls, and more.



# In Cabin view

Main device-InCabin side view





# Tamperproof cover

Tamperproof cover

\* option

Star shape

Hexagon shape



Screw Wrench



Main device joint hook

GPS Cradle joint hook

Lock screw joint hole

# Terminal ports

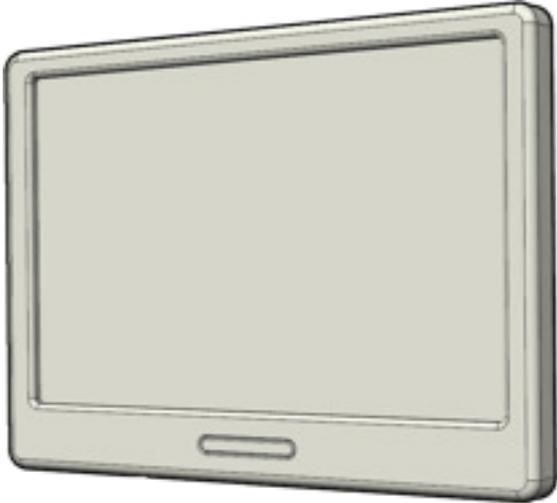
## GPS IN

The 'GPS IN' port is use to receiving GPS signal from GPS module receiver.

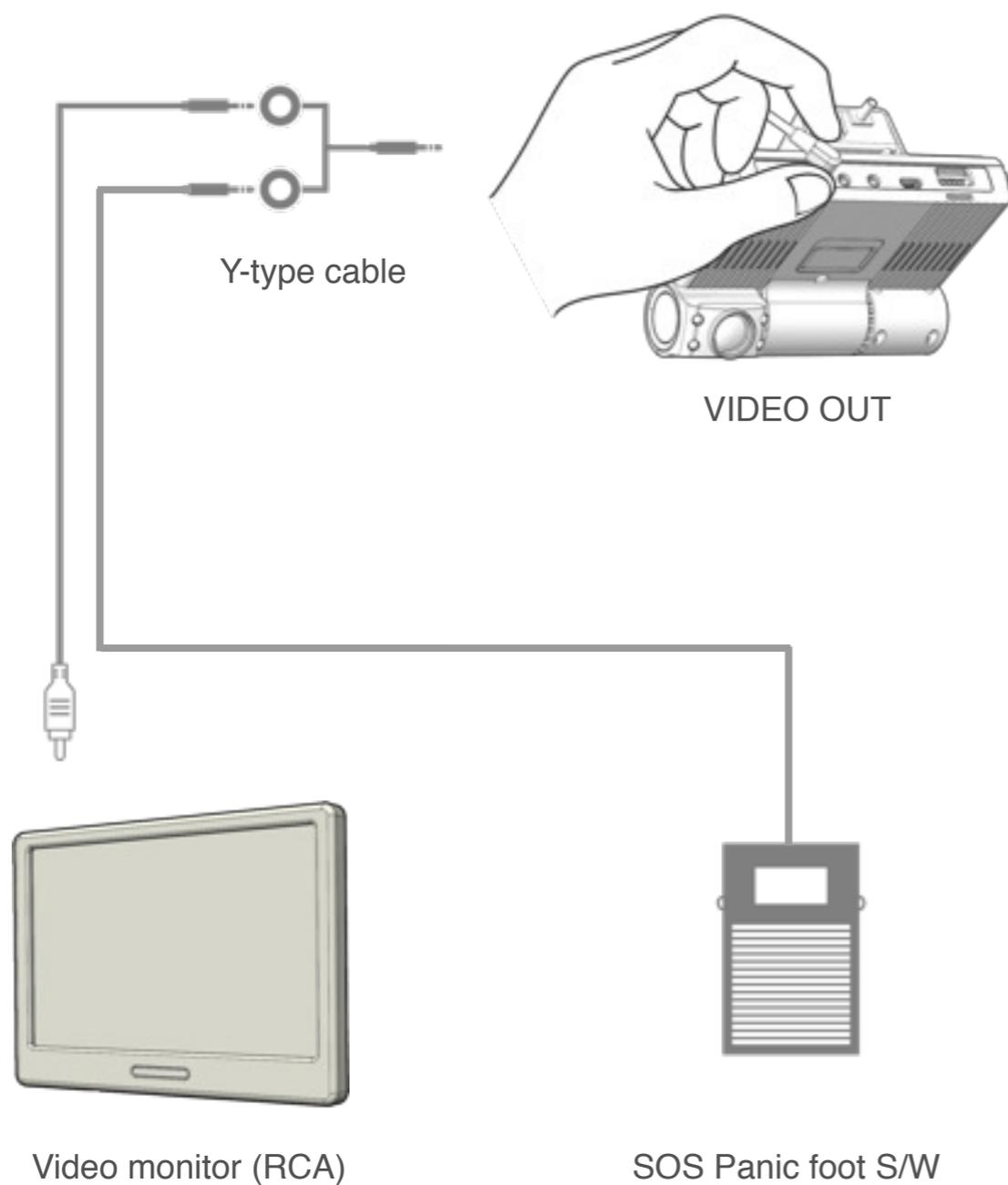


## VIDEO OUT

The 'VIDEO OUT' port is use to out put video signal by live streaming to video monitor. It is need to connect to 'Video out cable' if use the 'Video out' function to monitoring cargo inside or backward view.

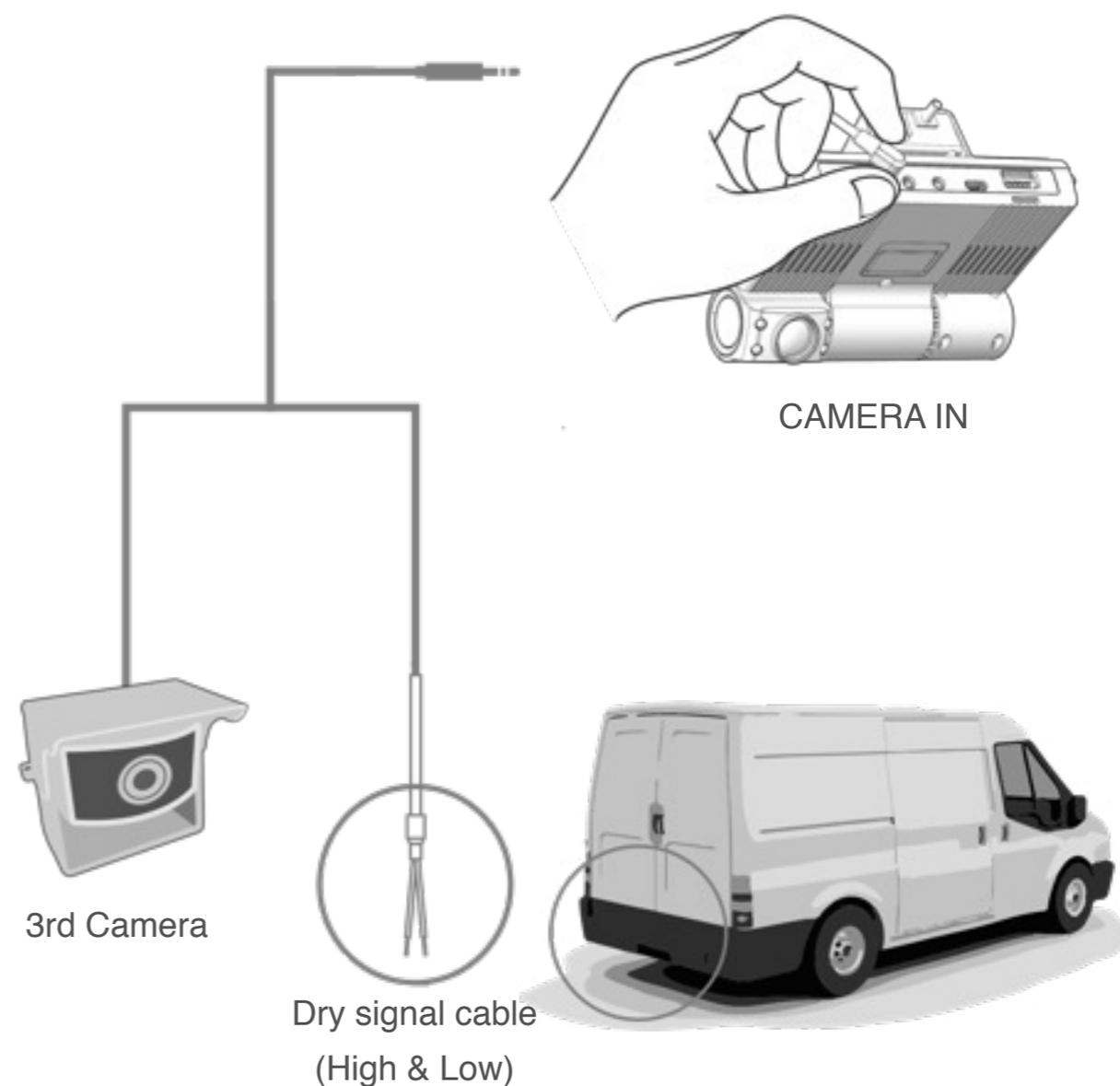


The 'VIDEO OUT' port is able to connect to use panic button switch. And If need to use for video out and panic button switch at once then it is able to connect by Y-type cable use.(Extra)



## CAMERA IN

The 'CAMERA IN' port is able to connect external 3rd camera for 3 Channel video recording. The 'CAMERA IN' port is supply power DC 5v to 3rd camera and able to receive analog signal for reverse gear detection or electronic dry signal from 3rd party's device as like GPS tracker.

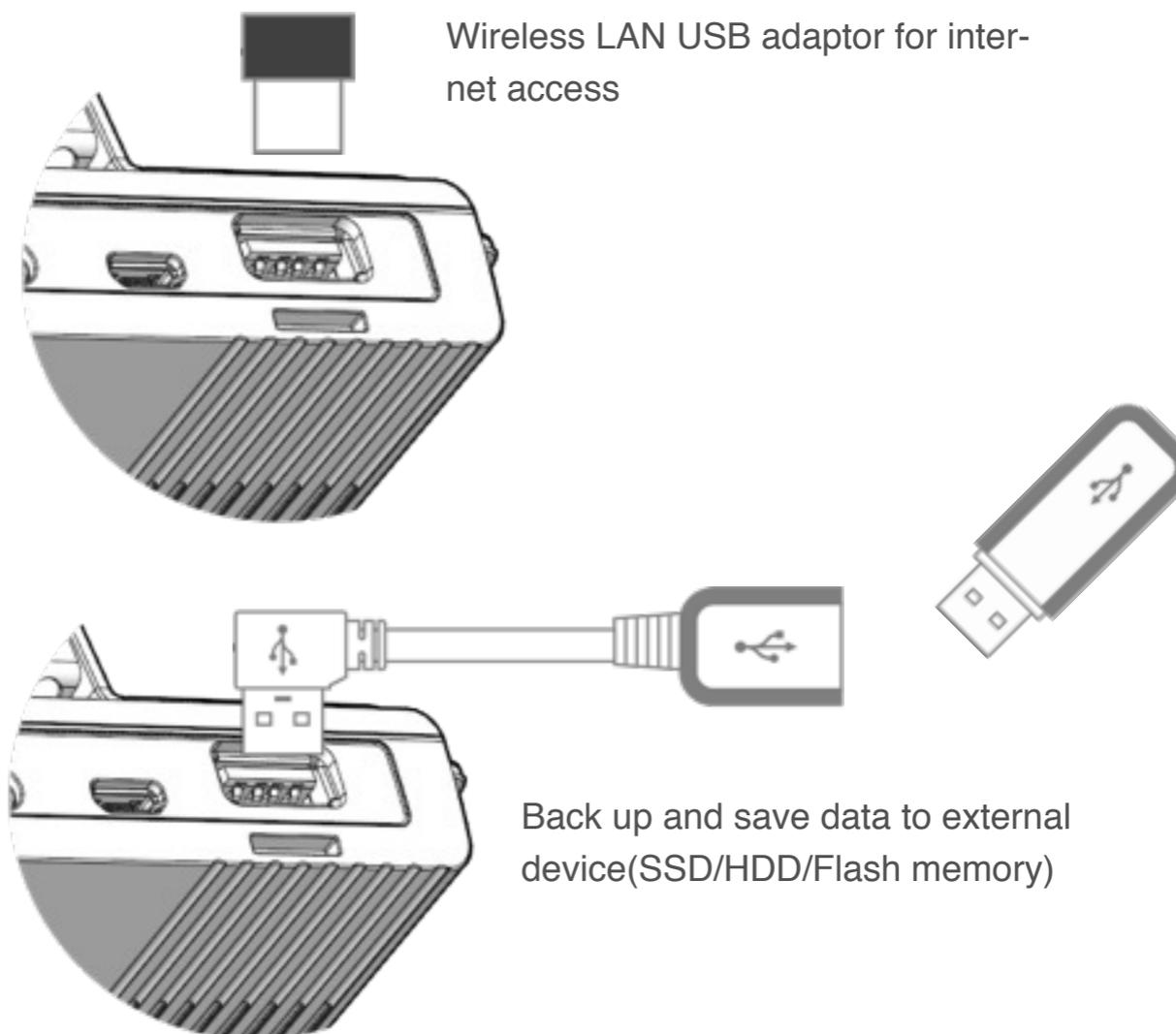


## MicroUSB

The 'micro USB' port is able to use communication with other devices for record and save to external hard drive(SSD/HDD) or charging battery for smart phone or pocket Wi-Fi modem use for a long time etc. The port is supplying DV 5v power to connected device. (Host mode)

## USB

The 'USB' port is able to use wireless LAN USB adaptor or 3G/LTE USB modem for telematics server transmission and the port is support to record and save at external removable flash memory back up automatically or charge to battery for smart phone or pocket Wi-Fi modem use for a long time etc. The port is supplying DV 5v power to connected device. (Host mode)



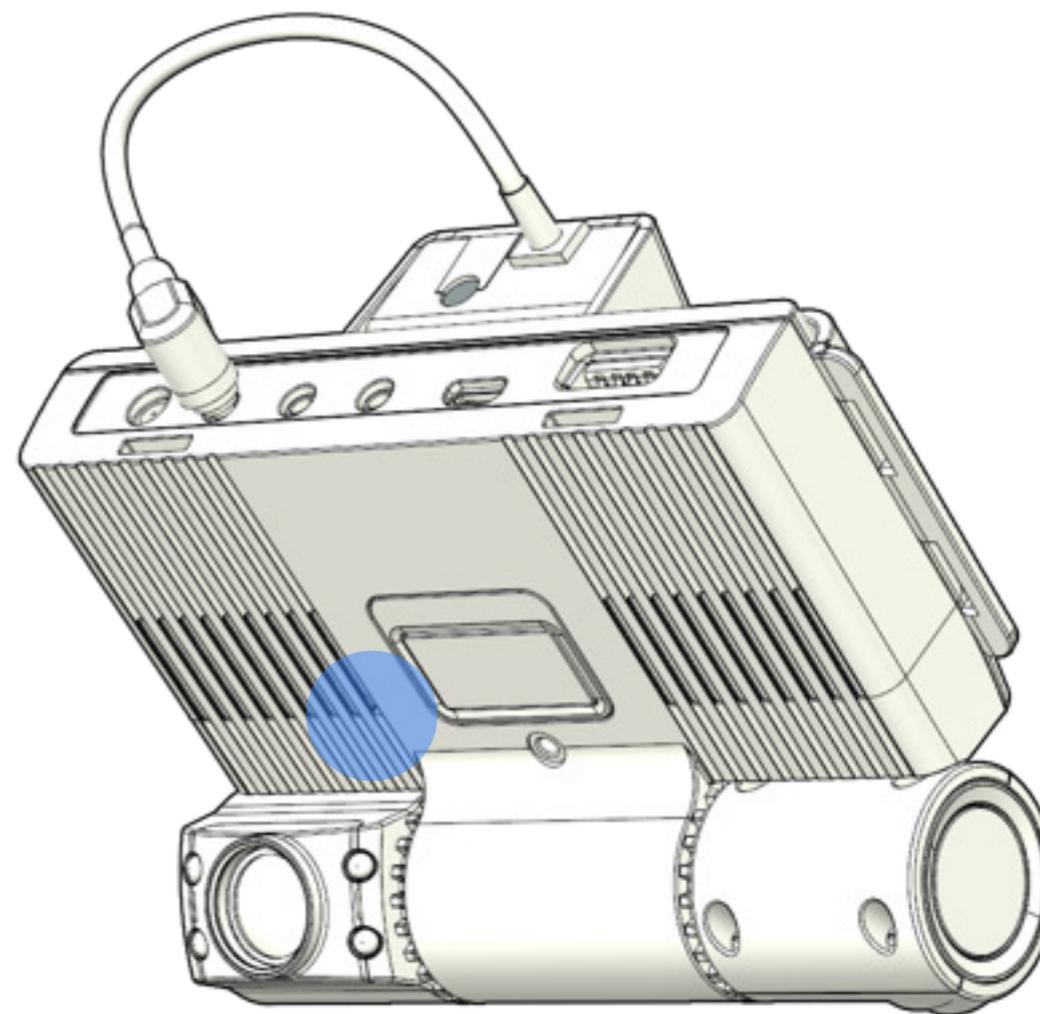
## Reset button

When the NDR is freezes or hold operating then makes reset power by push reset button.

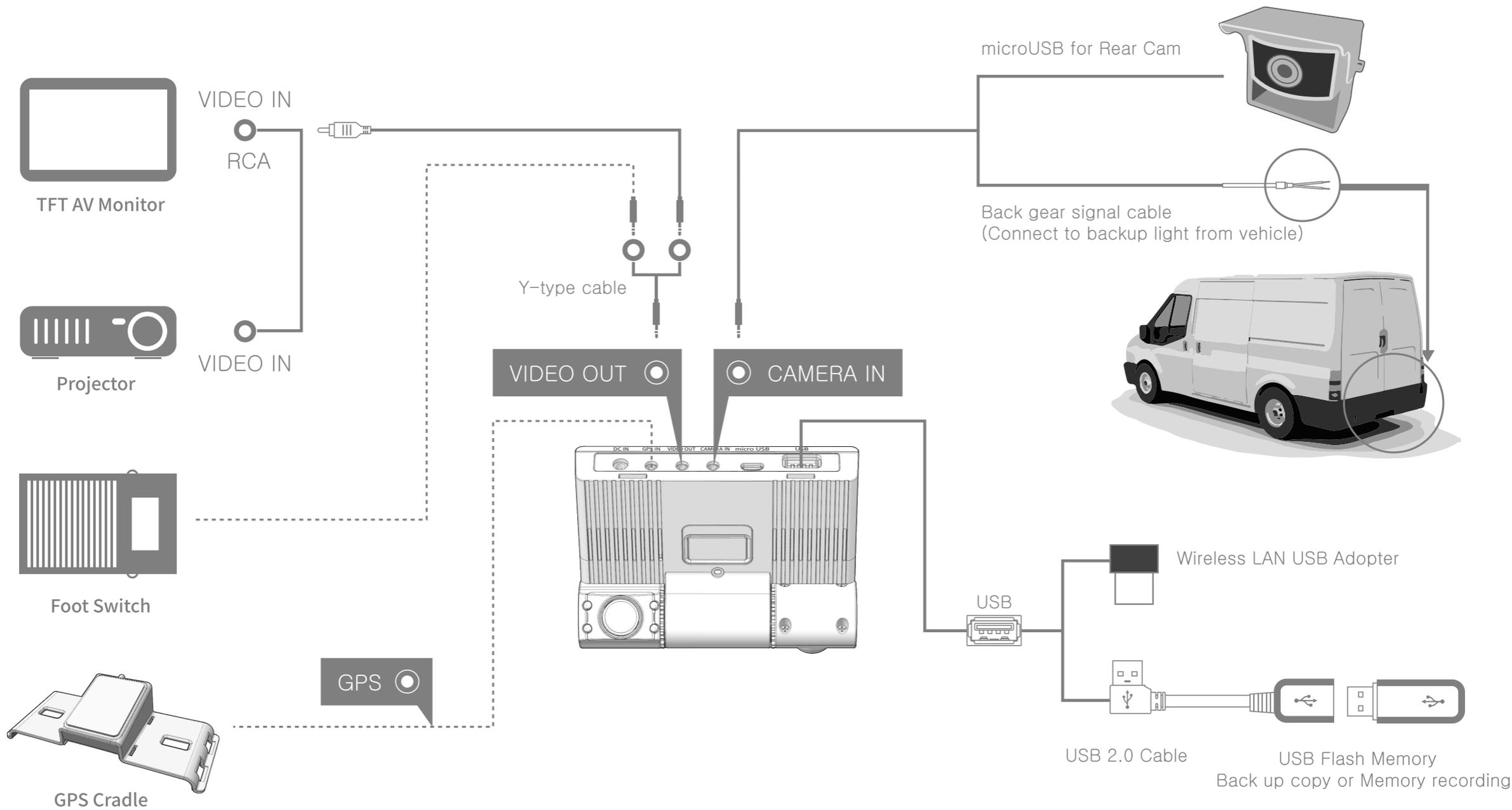


## Microphone(MIC)

Microphone is located beside of reset button hole.



# Port Wiring Guide



All the devices are must be connected to each port before supply the power to main NDR.

# Getting ready to start recording

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Please read this chapter for basic operation of NDR.



## Section 1

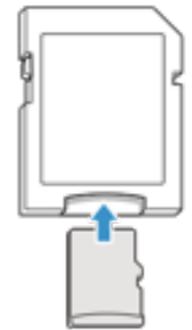
### Selecting a suitable memory card

- \* You can use micro SDHC, and SDXC cards with this network drive recorder. We recommend you use an micro SDHC, SDXC card. This drive recorder supports SDHC, SDXC cards up to 128GB. We cannot guarantee normal operation with SDHC cards bigger than 128GB.
- \* MMC (Multi Media Card) and MMC Plus are not supported.
- \* Compatible memory card capacity:
  - SDHC: 4GB ~ 32GB
  - SDXC: ~ up to 128GB
- \* When you use unauthorized memory cards, the driving recorder can not record videos correctly and your recordings may be lost.
- \* The memory cards released after this drive recorder was released may not be compatible with the network drive recorder.
- \* To ensure stable recording and playback, use writing speed 40MB/s (Class 10) or higher memory cards. (MLC/Multi Level Cell) Type memory card is recommended)

- \* SDHC/SDXC cards are a higher version of micro SD memory cards and support higher capacities than micro SD memory cards.

#### Using the memory card adaptor

To use a micro memory card with a computer or card reader you must attach it to or insert it into an adaptor.



### Handling a memory cards

- Damaged data may not be recoverable. We recommend you make a back-up of important data separately on the hard disk of your PC.
- Turning the power off or removing a memory card during an operation such as formatting, deleting, recording, and playback may cause data loss.
- If you modify the name of a file or folder stored in the memory card with your PC, your NDR may not recognize the modified file.
- The memory card does not support any data recovery mode. Therefore, care should be taken to prevent the memory card from being damaged while recording.
- A memory card has a certain life span. If you cannot record new data, you have to purchase a new memory card.
- Do not bend, drop, or subject the card to strong impacts.
- Do not place foreign substances on the memory card terminals. Use a soft dry cloth to clean the terminals if required.
- Do not paste anything other than the label provided with the card on the label pasting area of the card.

- Do not use a damaged memory card.
- Be careful to keep the memory card out of the reach of children, who might swallow it.
- We are not responsible for data loss due to misuse, including loss caused by any PC virus.
- We recommend using a memory card case to avoid data loss that can be caused by moving the card or by static electricity.
- After a period of use, the memory card may get warm. This is normal and is not a malfunction.

**The NDR supports micro SDHC, and SDXC memory cards, giving you a wider choice of cards!**

The data storage speed of cards may differ, depending on the manufacturer and production system.

- MLC (multi level cell) system: faster write speed enabled.
- TLC (Triple level cell) system: only lower write speed is supported.

For best results, we recommend using a memory card that supports a faster write speed 40MB/s or higher.

Using a lower write speed memory card for recording video may cause difficulties when storing.

## Section 3

### Format memory cards

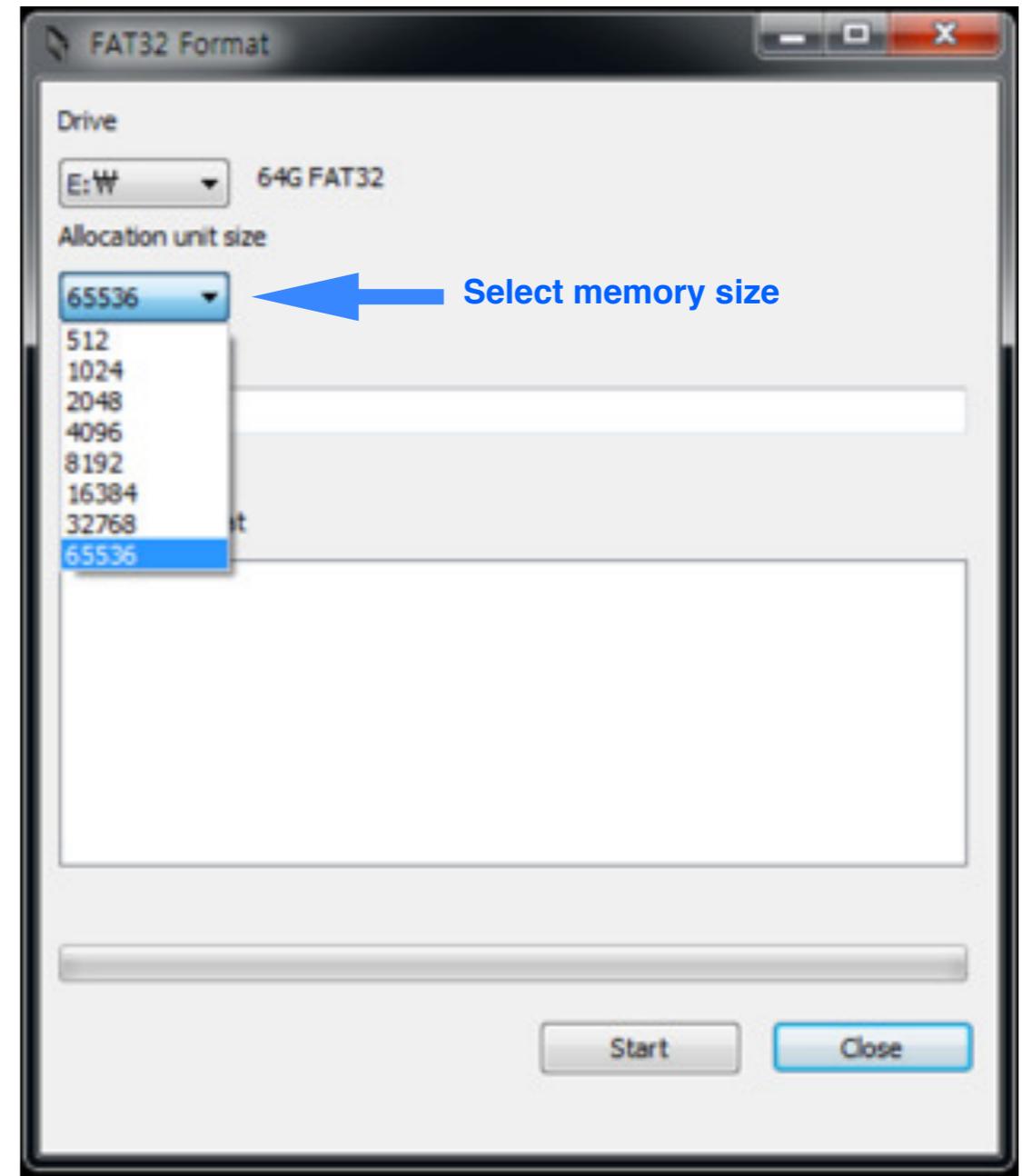
- Please format FAT32 before copy the firmware to micro SD card when you need firmware update.
- Firmware version over 1.6.2.1 is able to use ExFAT format for more higher speed then FAT32.

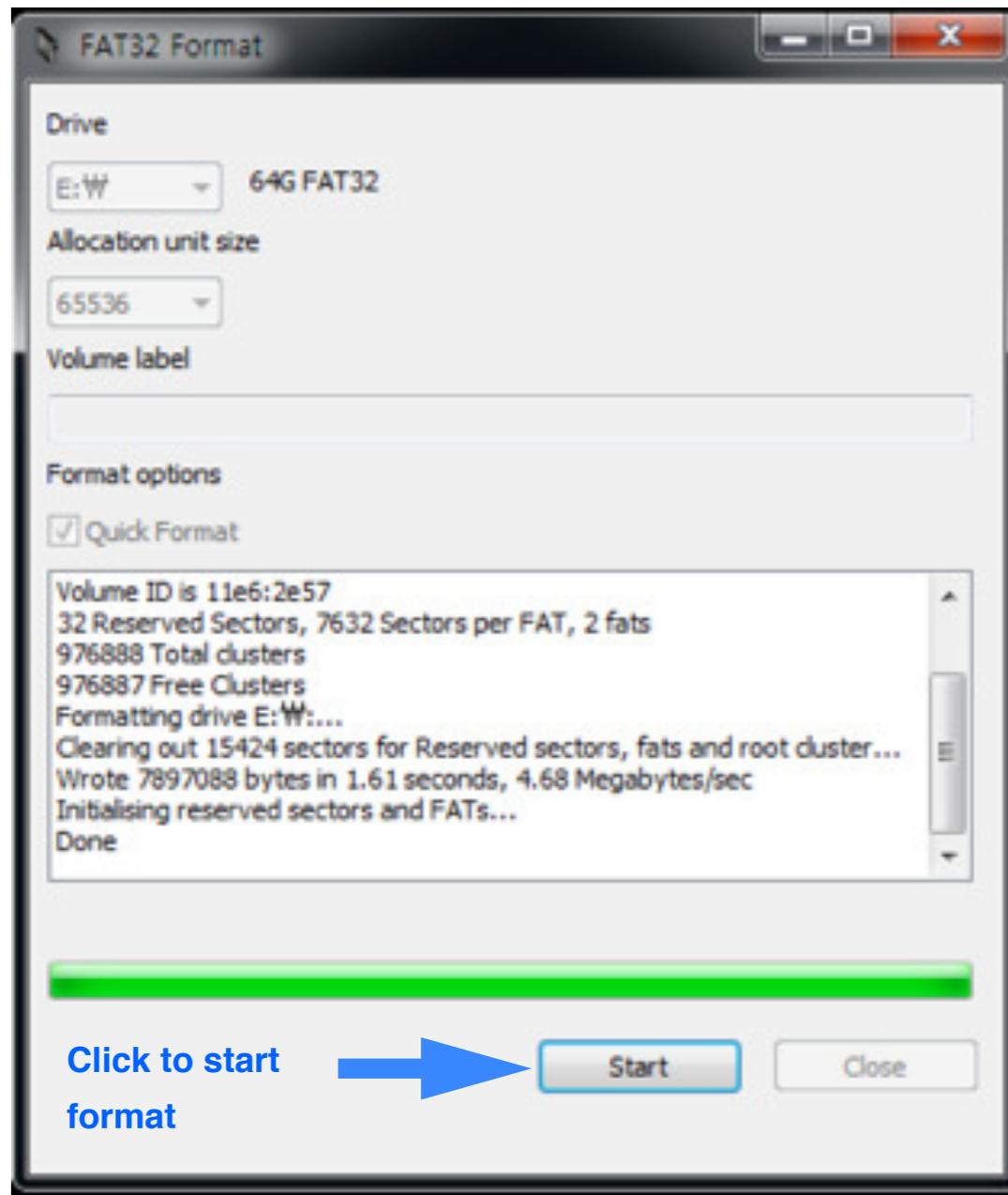
#### A. Window PC User.

1. Connect removable memory card(micro SDXC card) to PC first.
2. Unzip 'FAT32format.zip' file and running FAT32format.exe.



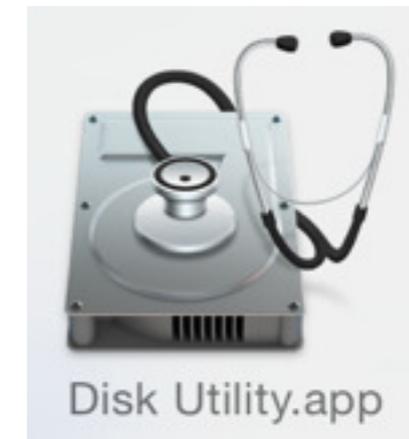
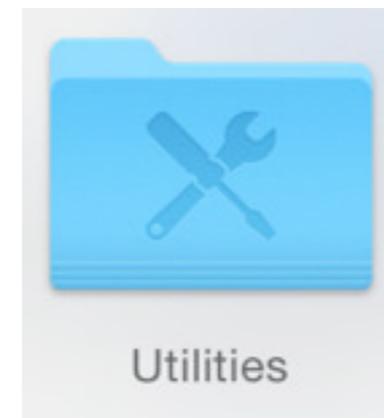
3. Select memory card unit size(Allocate unit size);  
(Ex. 32GB -> 32768 / 64GB-> 65536)



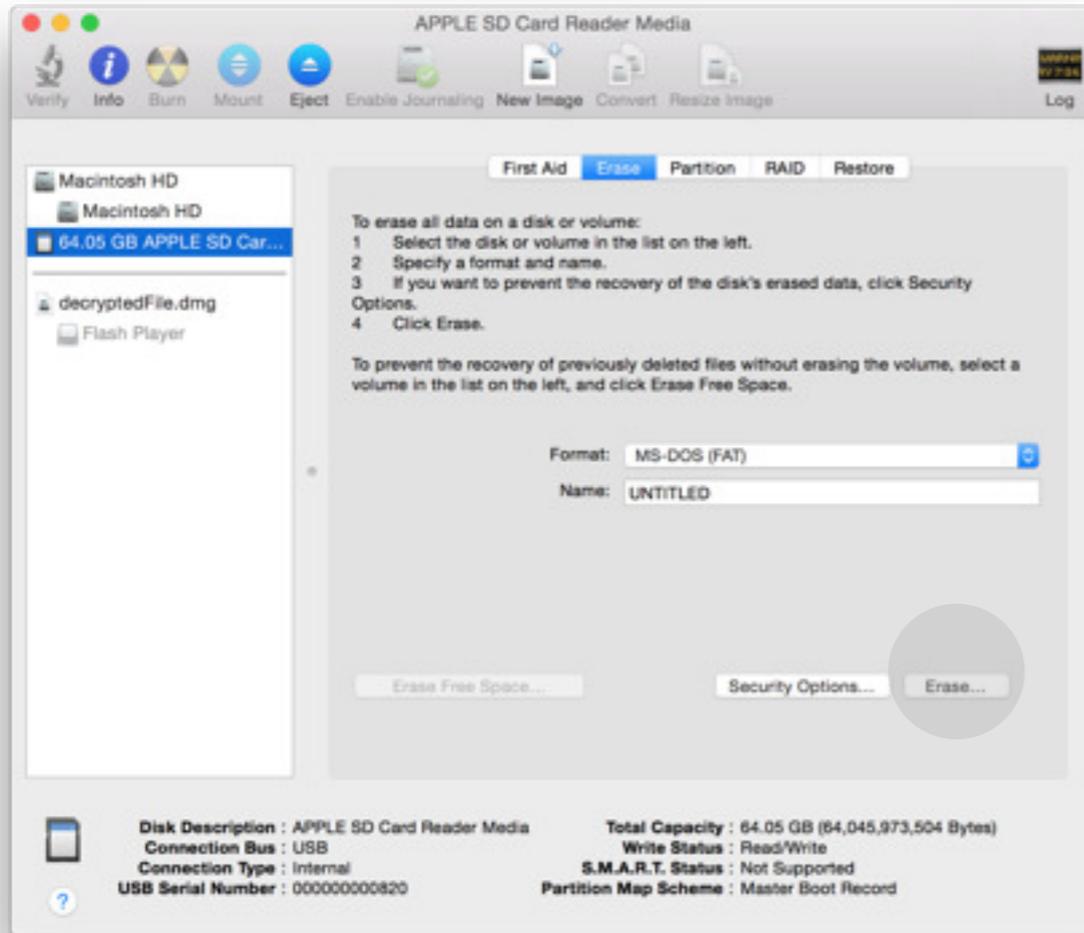


## B. MAC OS X PC User.

1. Connect removable memory card(micro SDXC card) to MAC.
2. Running 'Disk Utility.app'  
(Application > Utility > Disk Utility.app )



### 3. Select removable memory card erase by MS-MOS(FAT)



4. Click to Erase button.

5. Format completed.

## Section 4

# How to update firmware

### A) Ready to update

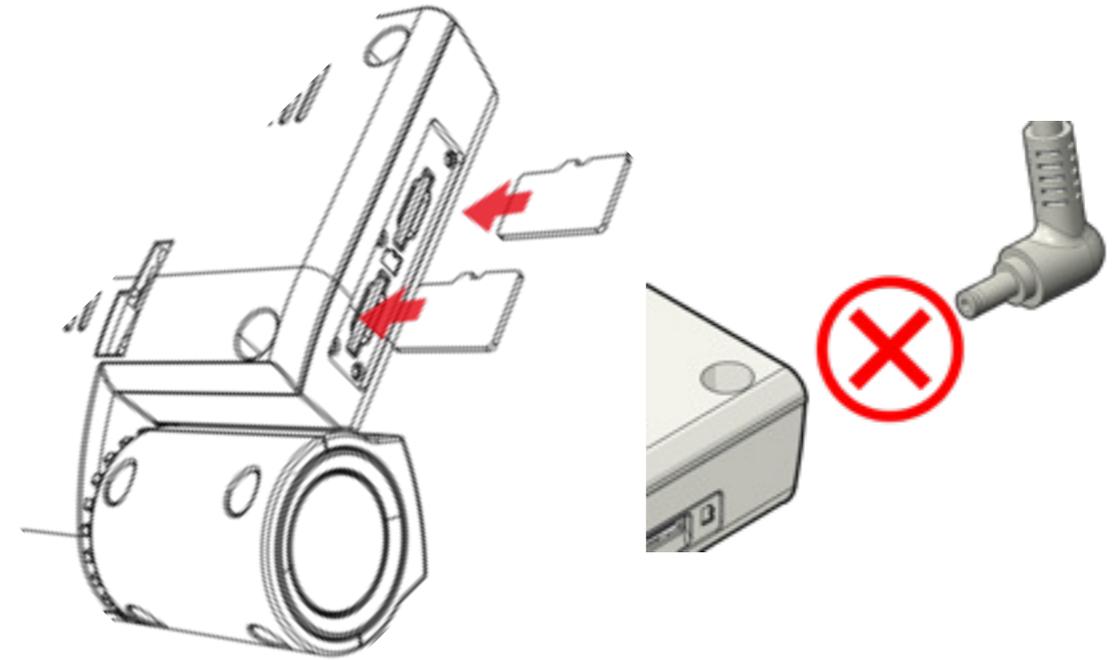
- 1) Format micro SD card before firmware upgrade.(▶page 22)
- 2) Unzip the firmware file as attached this file folder. After unzipped then it can be found “update” folder.

### B) Upgrading firmware

- 1) Connect micro SD card to PC.
- 2) Copy or move whole ‘update’ folder to micro SD card.(Root directory / the update file folder has contained two type of items that ‘**ACA\_FS.img**’ and ‘**ACA\_ulmage.bin**’ file.)



- 3) Remove micro SD card from the PC and insert SD card to NDR. ( ⚠ Please make sure that NDR power is must turn off state when insert micro SD card.)

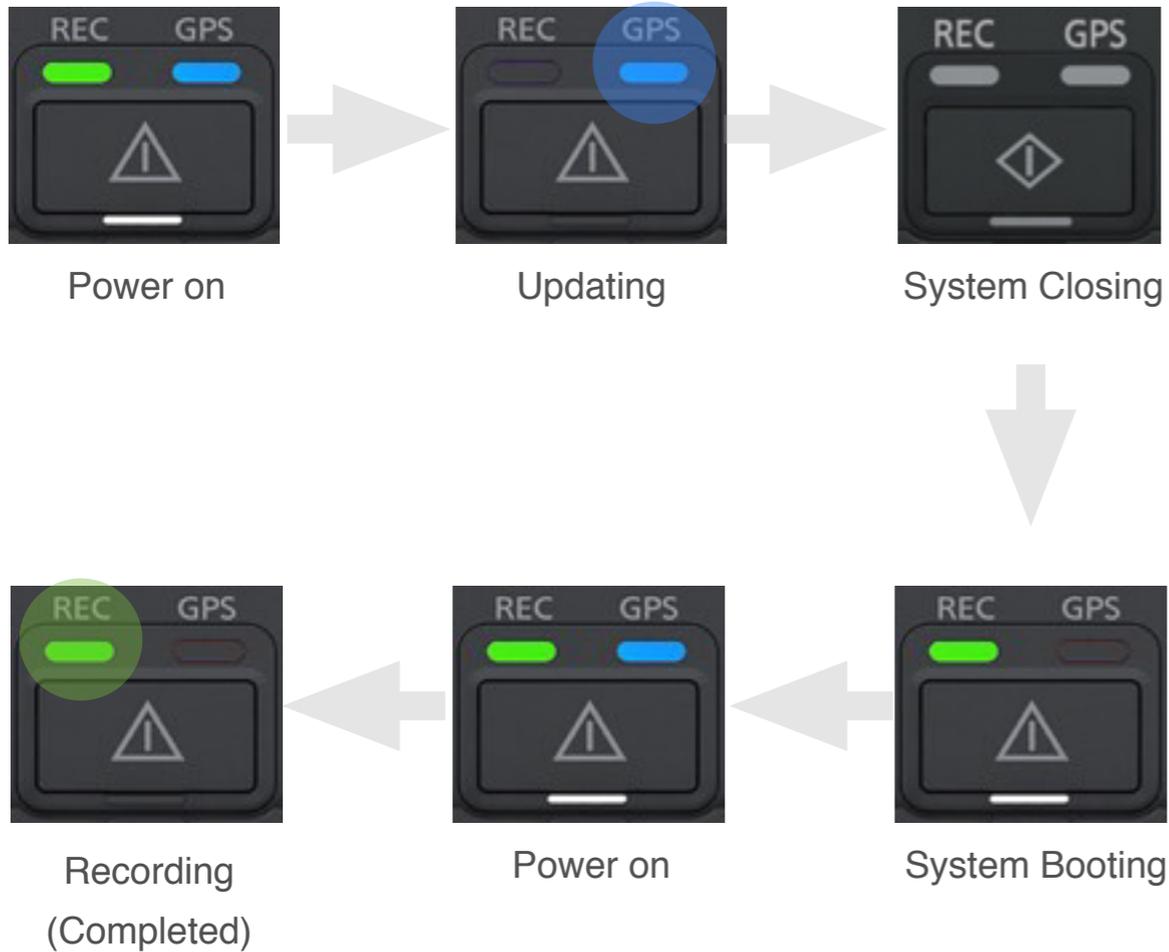
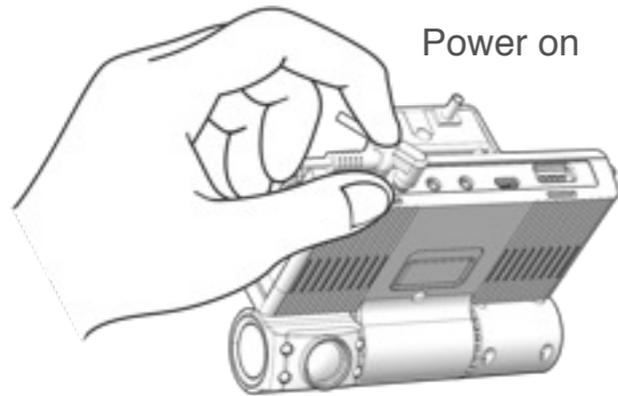


- 4) Do not remove ‘micro SD card’ and ‘power cable’ before completed upgrade.

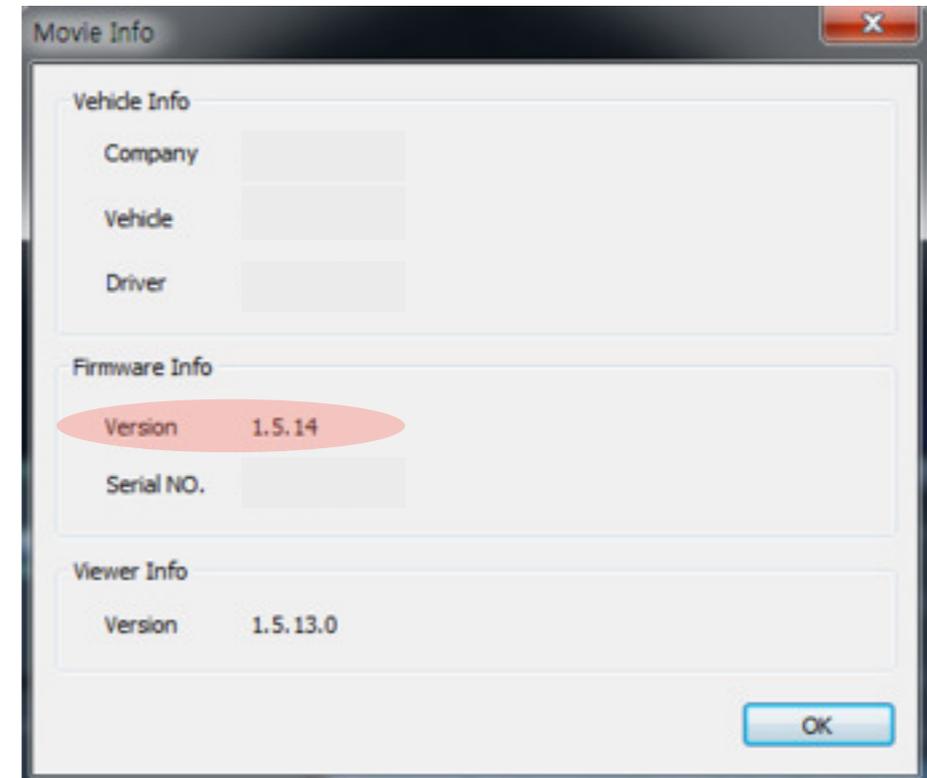
### C) Upgrading Time

- \* Firmware update time will be takes around 1 minute and 30 seconds.
- \* The NDR system will reboot automatically after update completed. ( System reboot time will be takes around 15 seconds.)

\* Plug in DC power cable after inserted micro SD card which 'update' folder is contained.



\* It is able to check updated firmware version via PC manager.



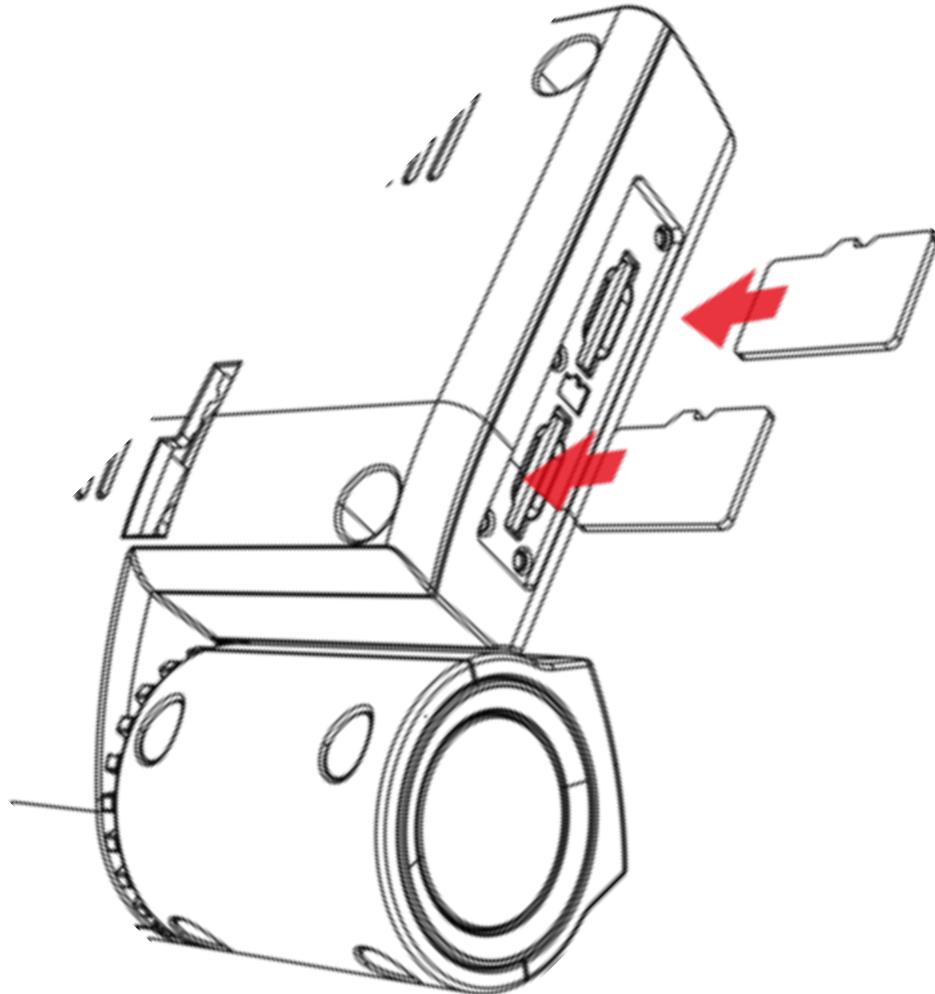
#### D) Others

\* Firmware file is should be inserted 'Primary memory card slot' or 'Secondary memory card slot'. If firmware update is operating via 1(one) micro SD card then no matter slot place select. But if firmware update is operating with 2(Two) micro SD card inserted statue then update firmware file is should be inserted to 'Primary memory slot'.

Firmware is will not be upgraded by external USB memory device.

### To insert a memory card.

- 1) Insert micro SD card when NDR power off.
- 2) Open the memory card cover as shown the the figure.
- 3) Insert the micro SD card into the card slot until it softly click of a latch. (Make sure that the NDR is placed as shown above and the terminal portion of the card is facing up.)



### To eject a memory card

- 1) Turn off the NDR. (Pull off DC power jack)
- 2) Open the memory card cover and gently push the micro SD card to eject it.
- 3) Pull the micro SD card out of the memory card slots and close the cover.

\* To avoid data loss, turn off the NDR by removed the power cable before inserting or ejecting the memory card.

\* Be careful not to push the memory card too hard. The memory card may suddenly pop out.

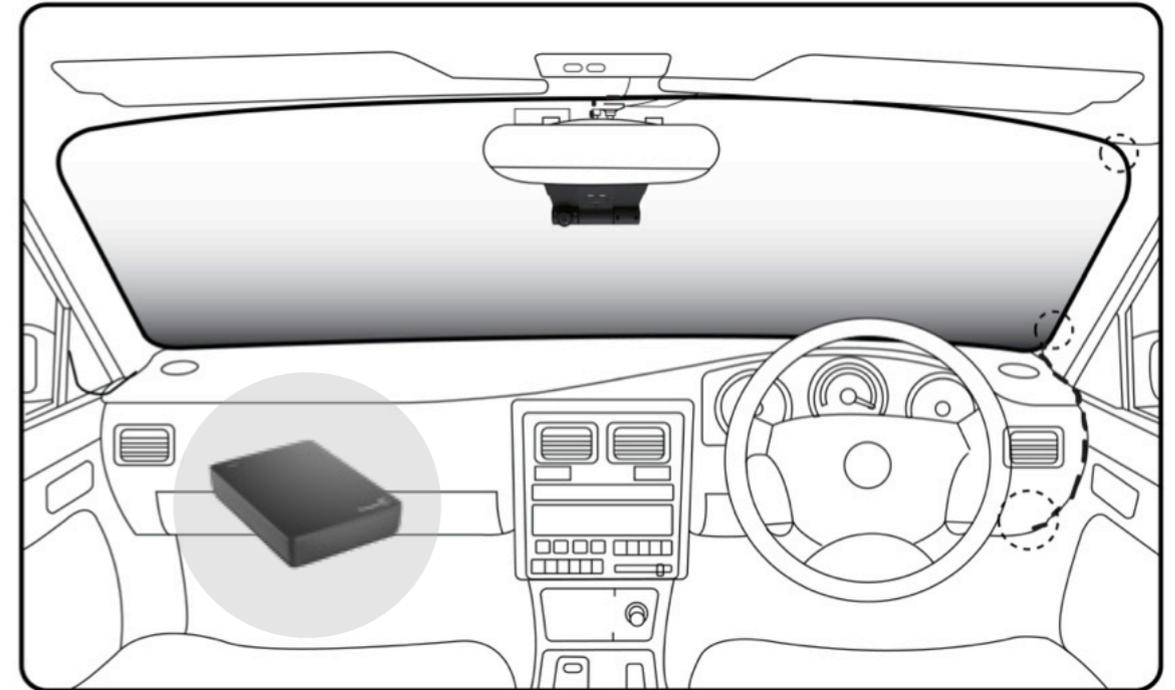
\* If you eject the memory card from the NDR while it is on, the NDR turns off.

\* Card compatibility with this NDR may vary depending on the card manufacturer and type.

## Section 6

### Connect external memory

- \* The NDR is able to save all the data to external memory device instead of micro SD card as like SSD/HDD even flash memory stick via micro SD or USB port use.
- \* The port USB and micro USB is supply power DC 5V to external device and this port's speed is USB 2.0 type.
- \* When connect external device via micro USB or USB then the NDR will not be saved the data to micro SD memory.
- \* If connect external device while recording to micro SD card then the NDR will start data backup to external device from micro SD card as setup order. After completed backup tasking then the NDR will start recording automatically.(▶ Page 78- Setup configuration)

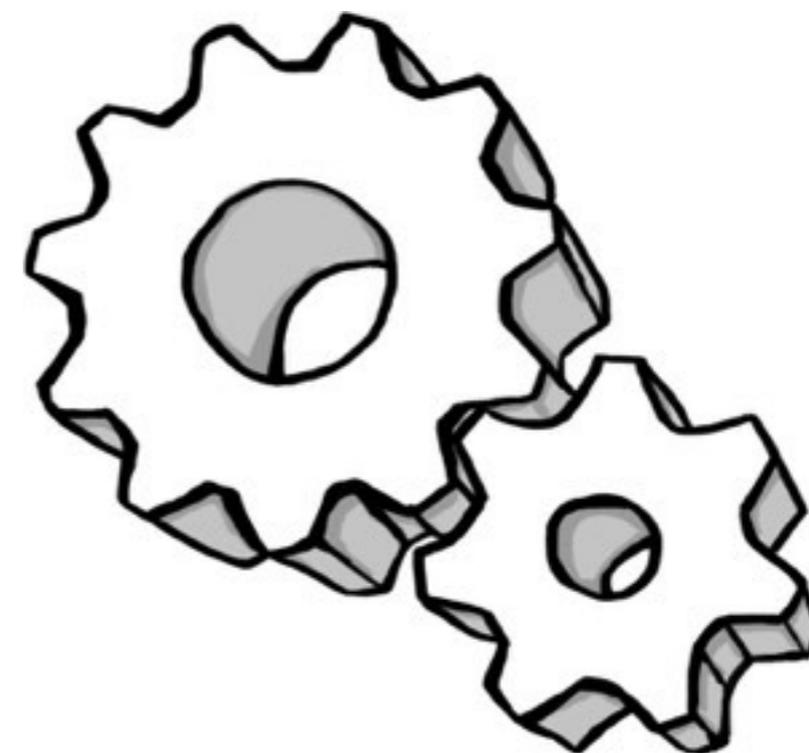


USB / microUSB cable connection

# Installation

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**Please read carefully for  
safety install the NDR.**

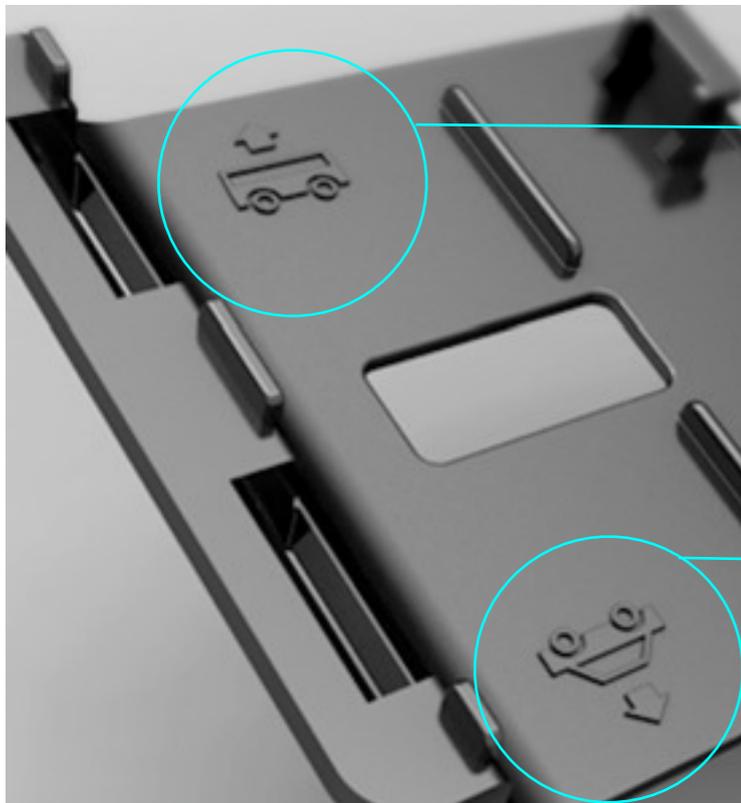


## Section 1

### Direction of Cradle

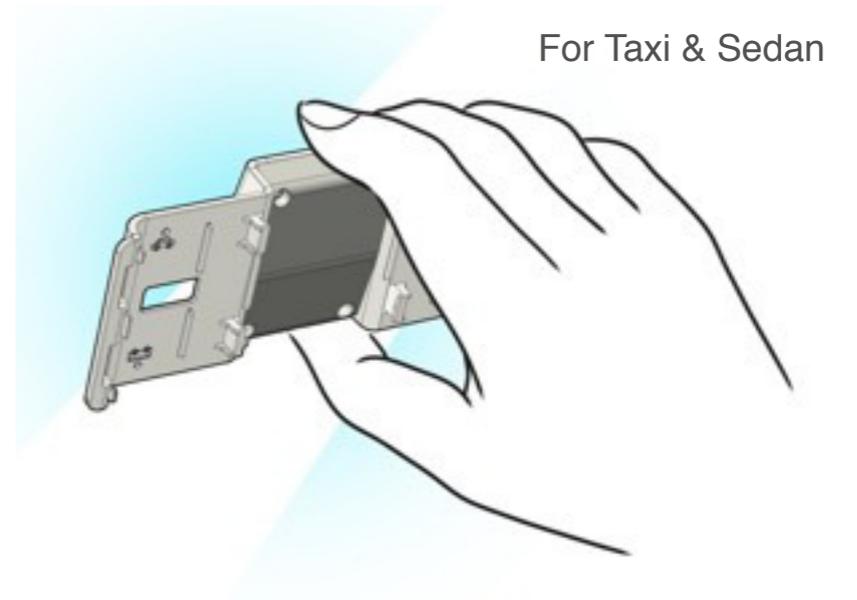
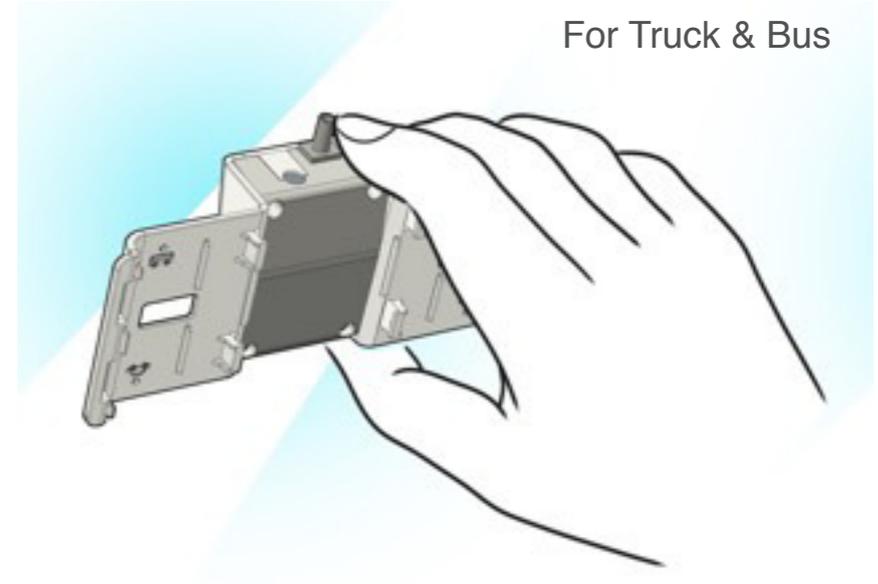
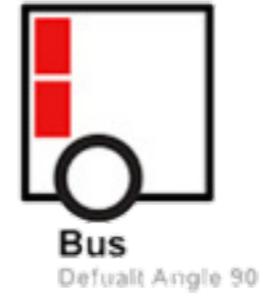
The NDR is designed that support various angle of windshield from the vehicle. Please refer to below figure for right installation for video angle fit.

The NDR has marked direction guide as icon of vehicle type. you can follow direction by icon as your vehicle.



Truck & Bus

Taxi & Sedan



## Joint the cradle with main device

The NDR is designed that support various angle of windshield from the vehicle. Please select and placing cradle to windshield.

### MOVIE 4.1 Joint the cradle with main device

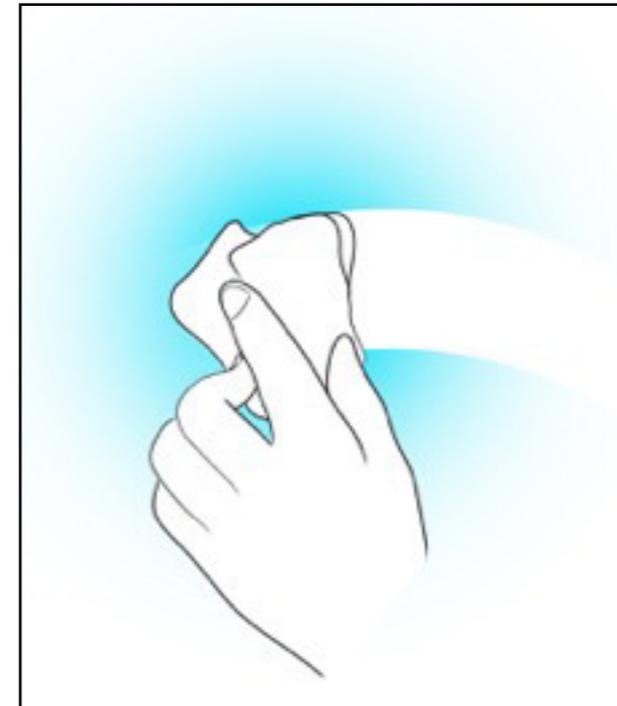


Please refer to above tutorial movie for joint main device with cradle.

## Mounting the NDR

The NDR is designed that support various angle of windshield from the vehicle.

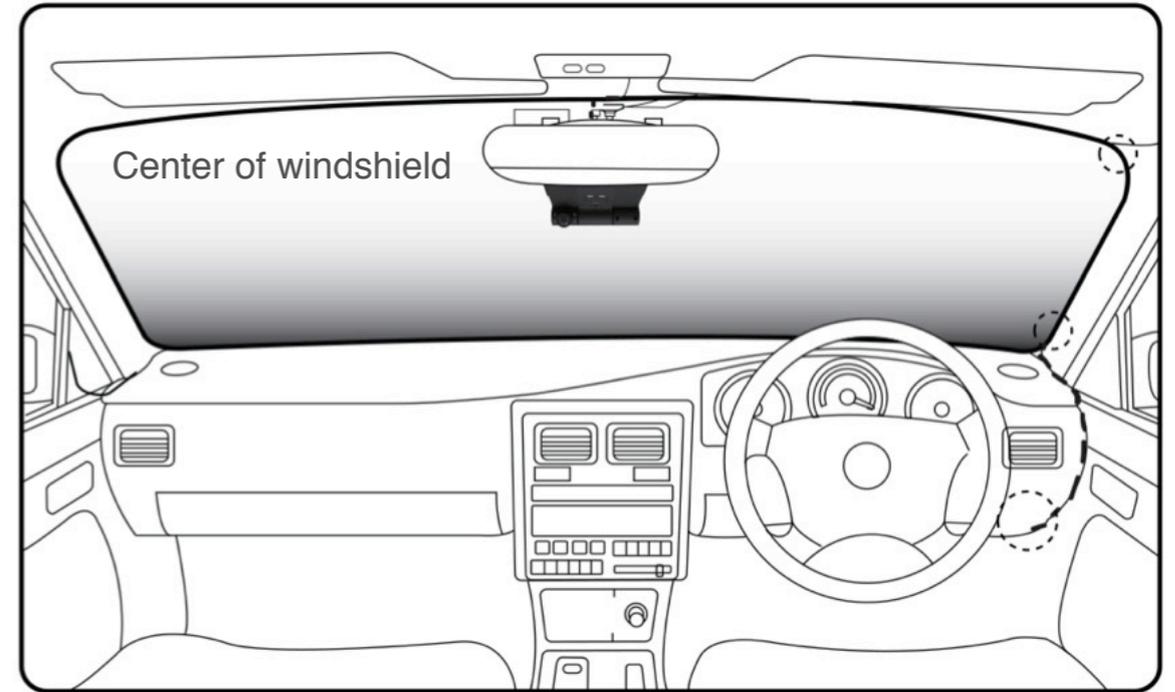
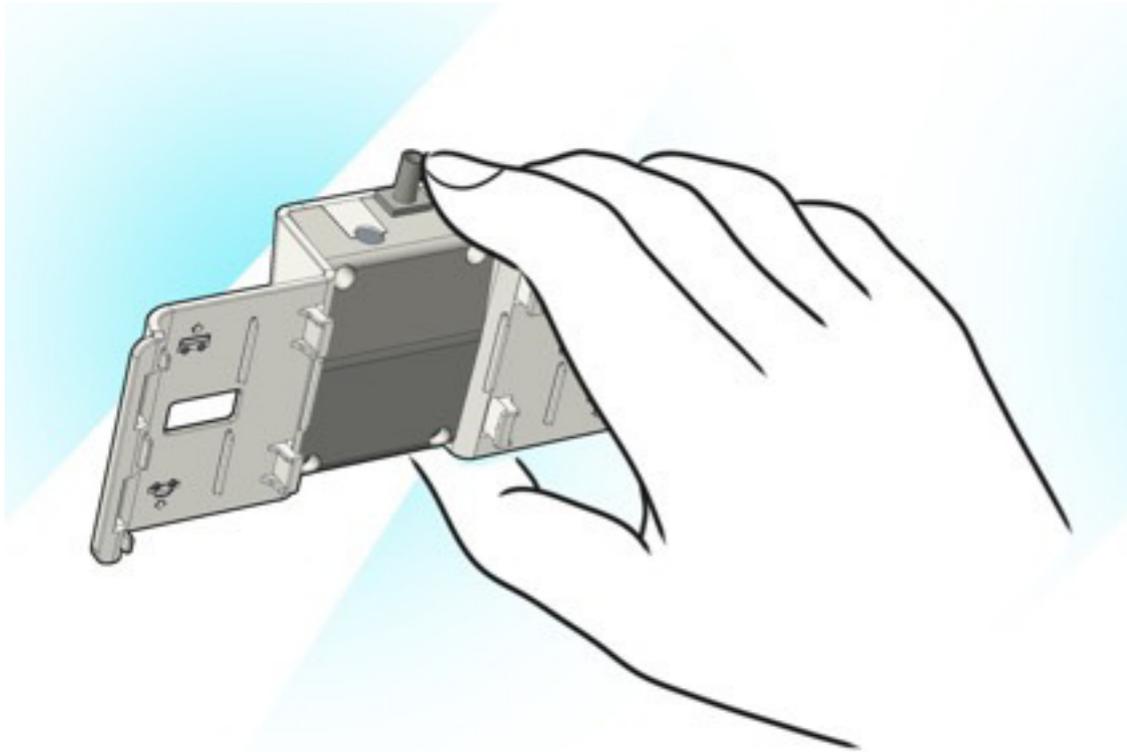
- 1) Before mounting the NDR, please ensure that the windshield is free of grease, dust and any other dirt that may result in poor adhesion. It is recommended that the windshield is wiped with a glass cleaner such as Windolene or similar.



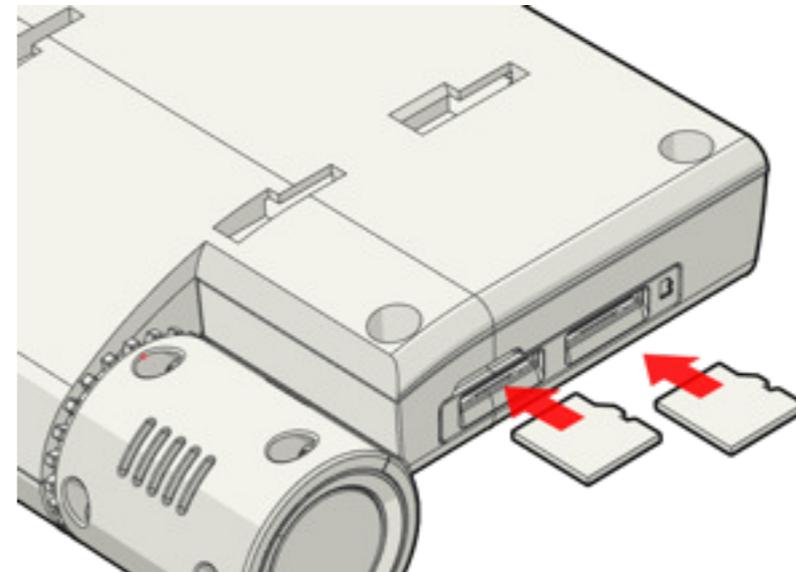
2) Remove the film on the double-sided adhesive tape.



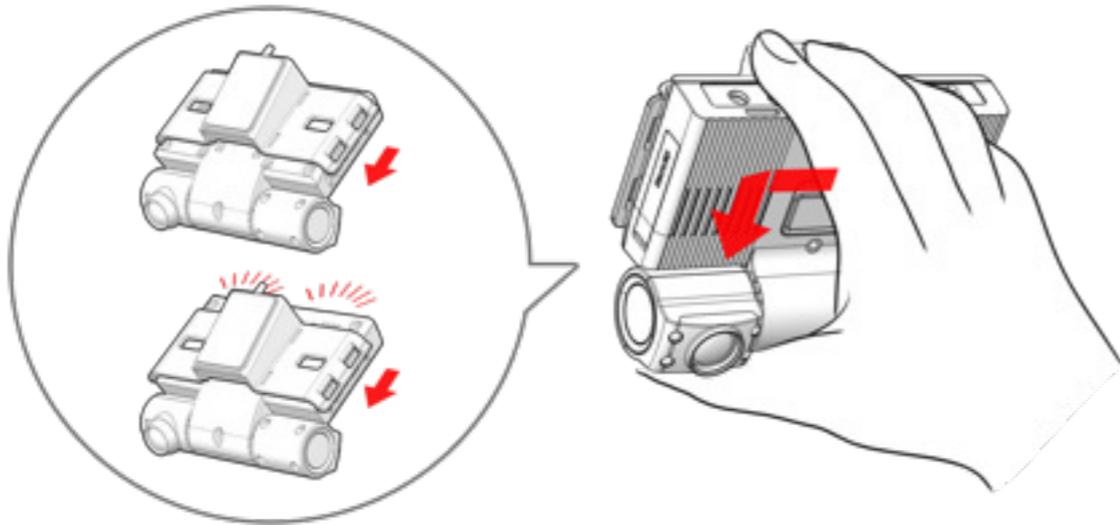
3) Placing cradle on the windshield.



4) Insert micro SD card.(Power off statue.)



5) Joint the main NDR with cradle.



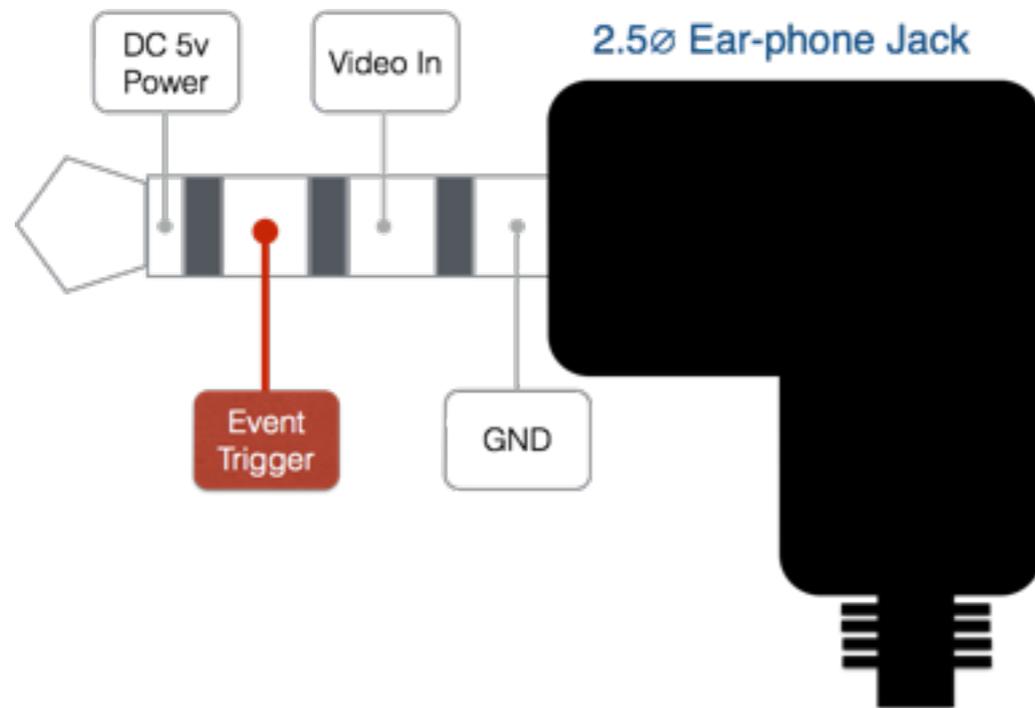
6) Connect the cables. (All the cables are must be connected to each port before supply the power to main NDR).



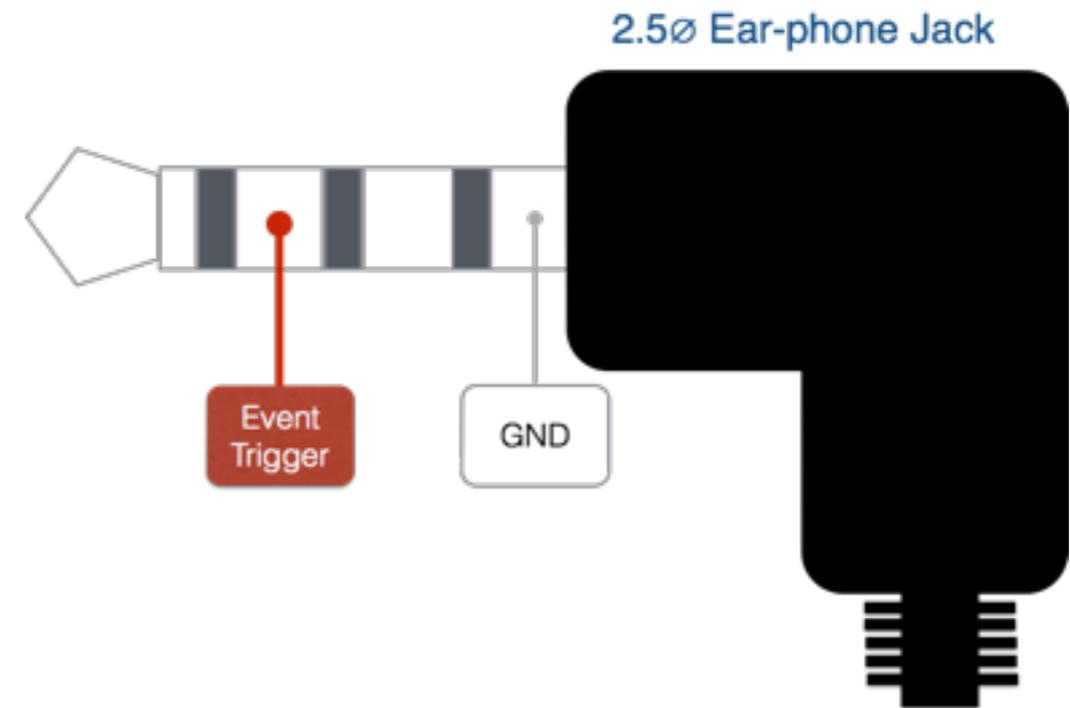
Full connected wires



## PIN Assignment 1

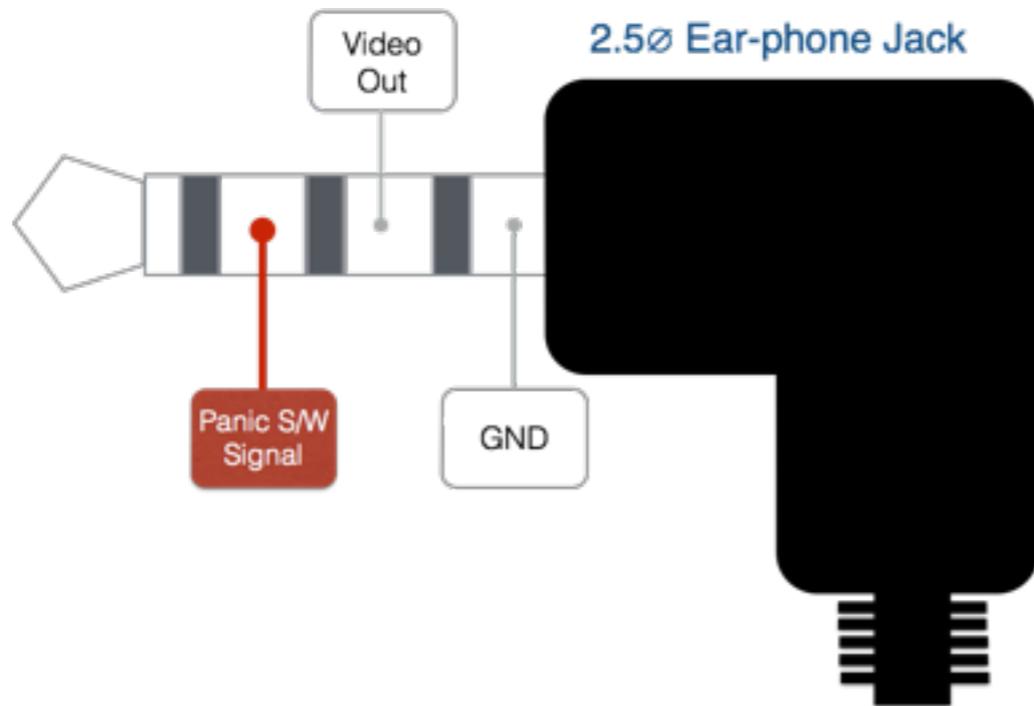


3rd Camera Jack(CAMERA IN)

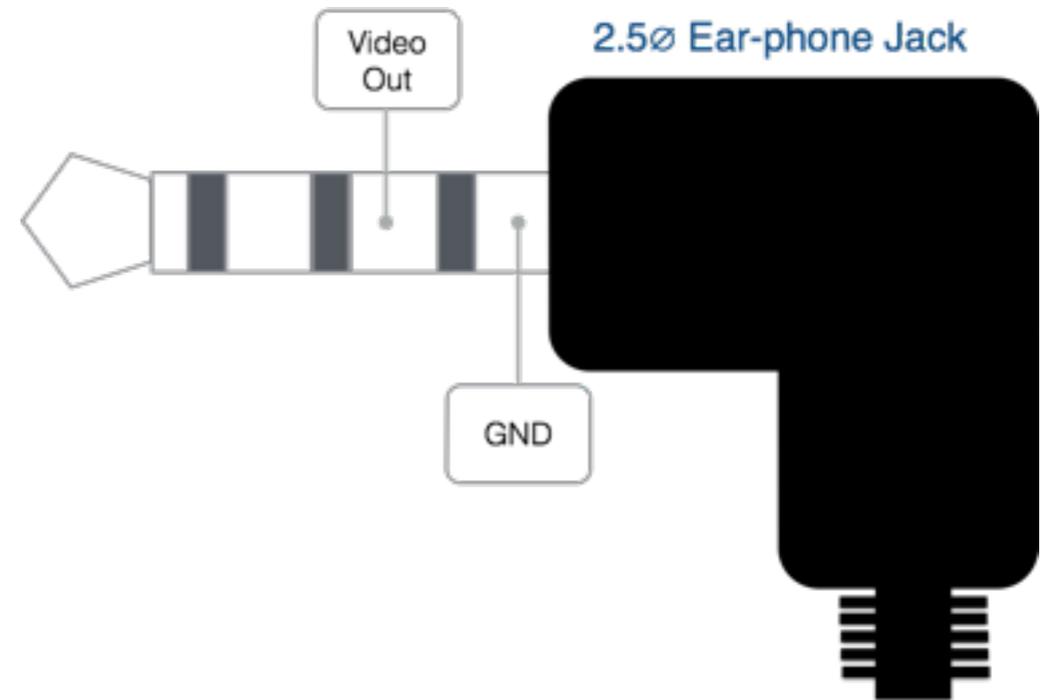


SOS Panic Button Jack(VIDEO OUT)

## PIN Assignment 2



Y-Type Cable Jack(VIDEO OUT)



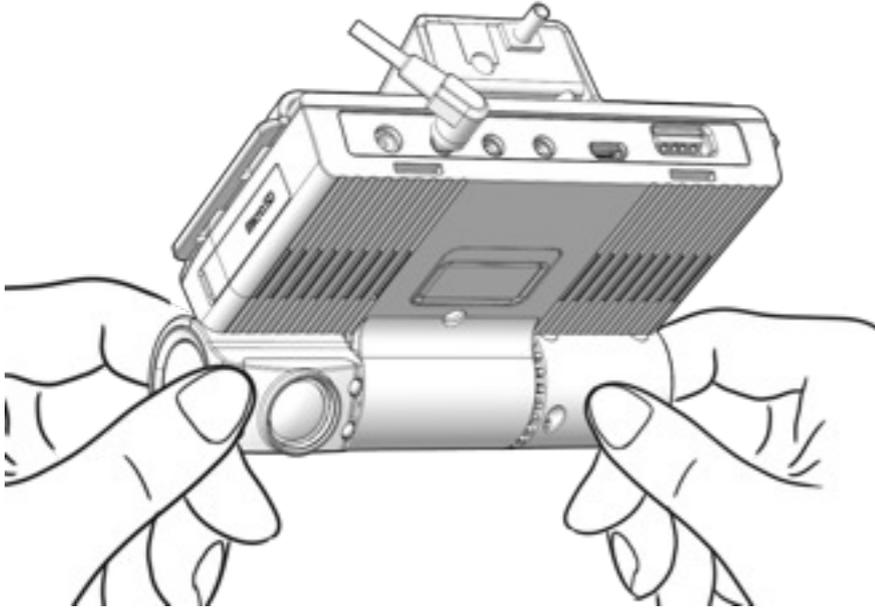
Video Out Cable Jack(VIDEO OUT)



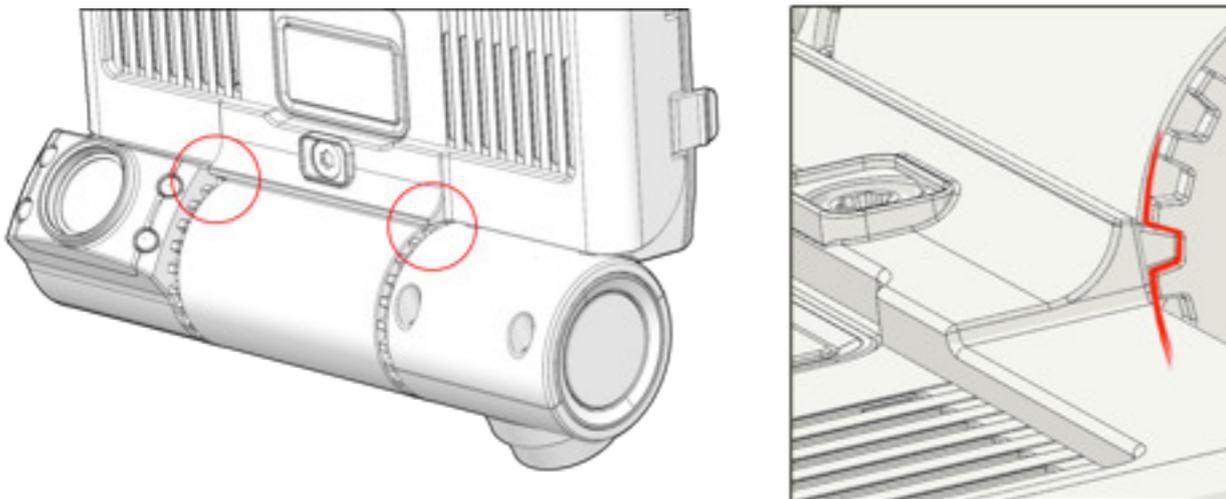
## Section 3

### Joint tamperproof cover

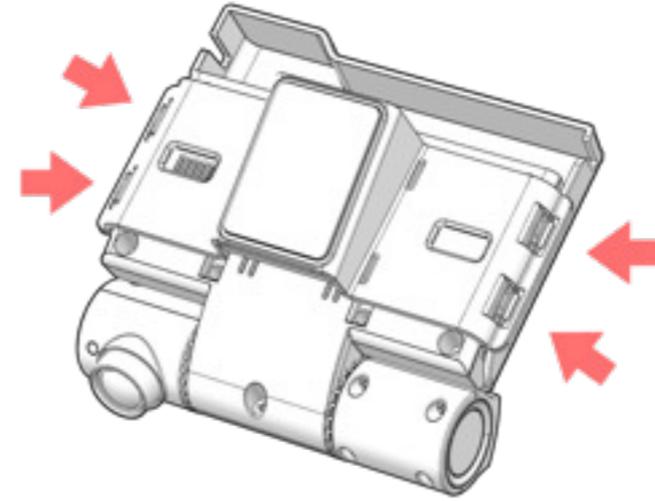
1) Adjust camera angle of view.



2) Fit tamperproof cover's hook to camera angle's hole after adjust camera angle.



3) Joint tamperproof cover with cradle clips.



#### MOVIE 4.2 Joint tamperproof cover



Please refer to above tutorial movie for joint main device with cradle.

4) Joint and lock the screw



5) Extract tamperproof cover from NDR.

**MOVIE 4.3** Extract tamperproof cover



Please refer to above tutorial movie for extract tamperproof cover.

# LED Signals

5C

The NDR has LED lamps for operating signals.



## Section 1

### LED Signals

#### System boot

The LEDs are indicate system operating state.



#### MOVIE 5.1 LED State of system boot



This LED signal is normal start state NDR.

#### Update setup file

The LEDs are indicate that setup configuration value.(Setup.cfg)



#### GPS signal detection

The LEDs are indicate that receiving GPS signal.



Receiving GPS signal (Blue LED hold)

## LED Signal table

 Blinking

Operating	LED	Operating	LED
System Booting (Approx. 5sec.)		Connecting External Device	
Re-booting (Approx. 20sec.)		Not inserted memory card	
Firmware updating (Approx. 40sec.)		GPS signal detected	
Normal Recording		Event Recording (Approx. 15sec.)	
USB Backup		USB Backup completed	

## USB Backup

When it completed backup USB then Green and Blue LED are blinking at once. The NDR is not recording and save the video file to micro SD card while backup to USB.

### MOVIE 5.2 USB backup LED state.



Just remove to connection after completed data backup to external USB memory or HDD.

## Firmware update

After completed firmware update then the NDR will reboot system and start recording in automatically.

### MOVIE 5.3 LED state of Firmware update



## Remote download Firmware(OTA)

After download firmware via wireless network then the NDR will update and reboot in automatically. This OTA function is based on FMS Network service approved.(Option) Please contact to your distributor to use OTA function and FMS service.

### MOVIE 5.4 LED state of OTA firmware downloading



The NDR is keep recording and save the video data while OTA firmware downloading.

# Features

---



## Section 1

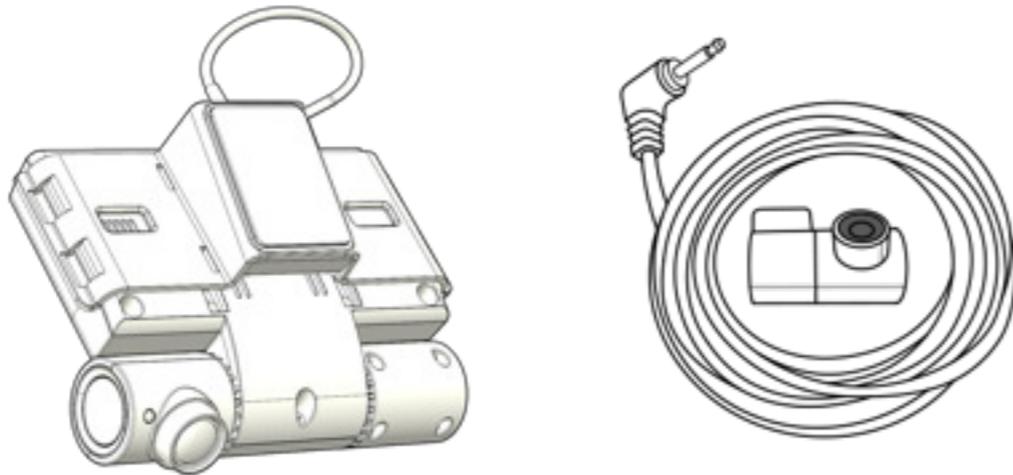
### Features-NDR

#### Encryption Video

The NDR is designed secure video data. It is unable to playback via common media player except by use private PC manager. Encryption video file format is 'file name.kds'

#### 3rd Camera Recording(Extra)

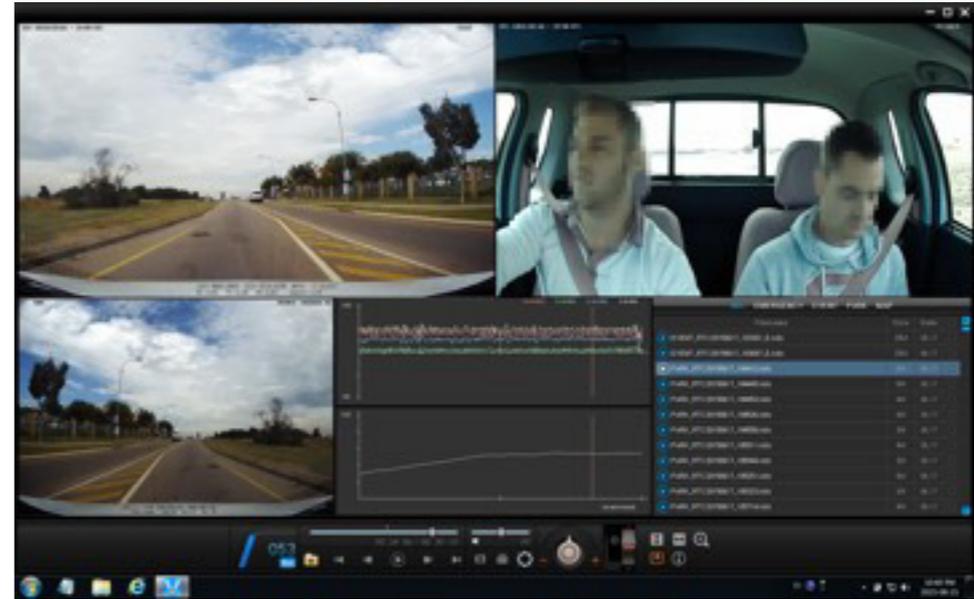
It is able to use 3 Channels recording by connecting optional rear camera or dome camera for 3 Channels video recording. The NDR is able to use DC5V 3rd camera.



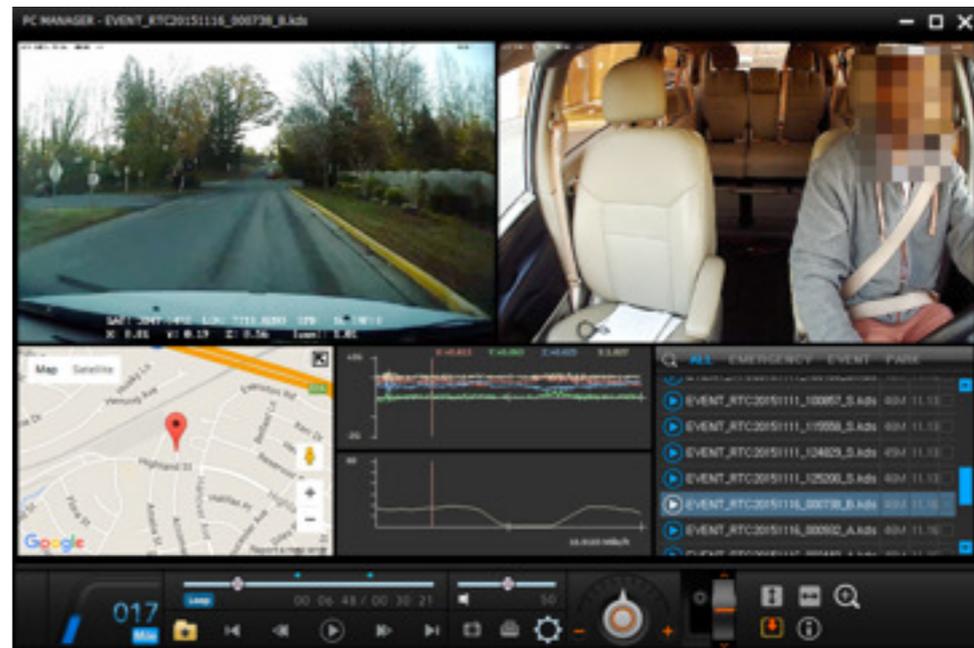
3 Channel recording function is able to select setup via PC manager.



3 Channel



2 Channel



### Video resolution as channel selection.

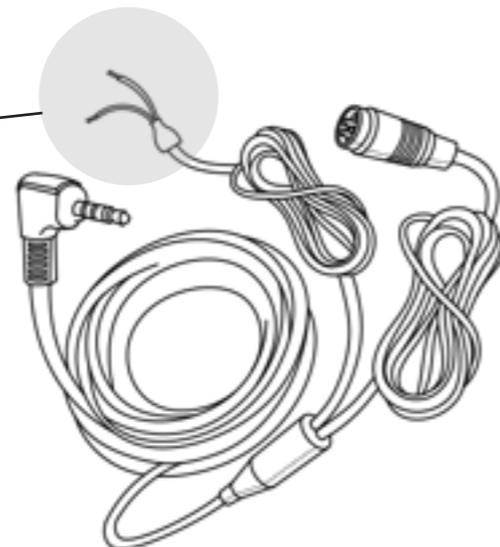
2 Channel	Resolution	Bit-rate	fps/sec.
Front Ch.	1280x720p	4Mbps	30 fps
In-Cabin Ch.	1280x720p	4Mbps	30 fps

3 Channel	Resolution	Bit-rate	fps/sec.
Front Ch.	1280x720p	4Mbps	30 fps
In-Cabin Ch.	1280x720p	2Mbps	Max 15 fps
3rd Ch.	720 x 480p	512kbps	Max 15 fps

## Back-up gear signal cable

When connect the back-up gear signal cable to back-up light or back-up shift terminal then the NDR will mirror 3rd camera's live view to video monitor.

Back-up gear signal wire.



Do not connect the back-up gear signal wire to any power output port. It may cause product failure.

## IR Recording



Providing a brighter video and picture, wider view, and longer range in low-light situations, the NDR cameras use the latest night vision technology to surpass expectations for quality video even in the dark.

In-Cabin camera with 4(four) IR\_LED are automatically turns ON and OFF according to surrounding luminance. If closer object in front of In-cabin lens then IR LED lamps will turn and off repeat, this is normal and is not a malfunction.

## Cycle Recording

During normal operate the video files are saved in 60 second intervals. If the capacity of the micro SDHC card runs short, the files will be overwritten from the oldest to newest.

EMERGENCY files will not be overwritten. (factory default). It is able to be changed configuration via PC manager setting.

## Video out(Monitoring)

The NDR provides a CCTV interface for real-time video monitoring from the drivers seat. Single and multi-view options are selectable and the device can output the 3rd camera video signal automatically when the vehicle has signal. User is able to select 4 type of video out display mode.(► Page.14)



Front



In-Cabin



Front & In-Cabin



- 1) 3rd Camera always
- 2) 3rd Camera while back-up signal detected.

## Input External Trigger

The NDR is able to receiving and sending trigger signal or data via micro USB port. some features are may needs to customize for software as requirement.

## LBP(Low Battery Protection)

The NDR is able to setup cutoff voltage and timer for protecting the discharge of the battery of vehicle. And multiple power control options allow recording to start and stop using vehicle ignition, delayed system shutdown and/or preset ON/OFF times. (DC 11.8V,12V,23.7V,24V)

## Voice Guide & Alarm

The NDR has voice guide via internal speaker for several international language. The driver is able to recognize operating situation as working and several alarms.

## Sound Recording

The NDR is able to setup sound recording enable to use or not.

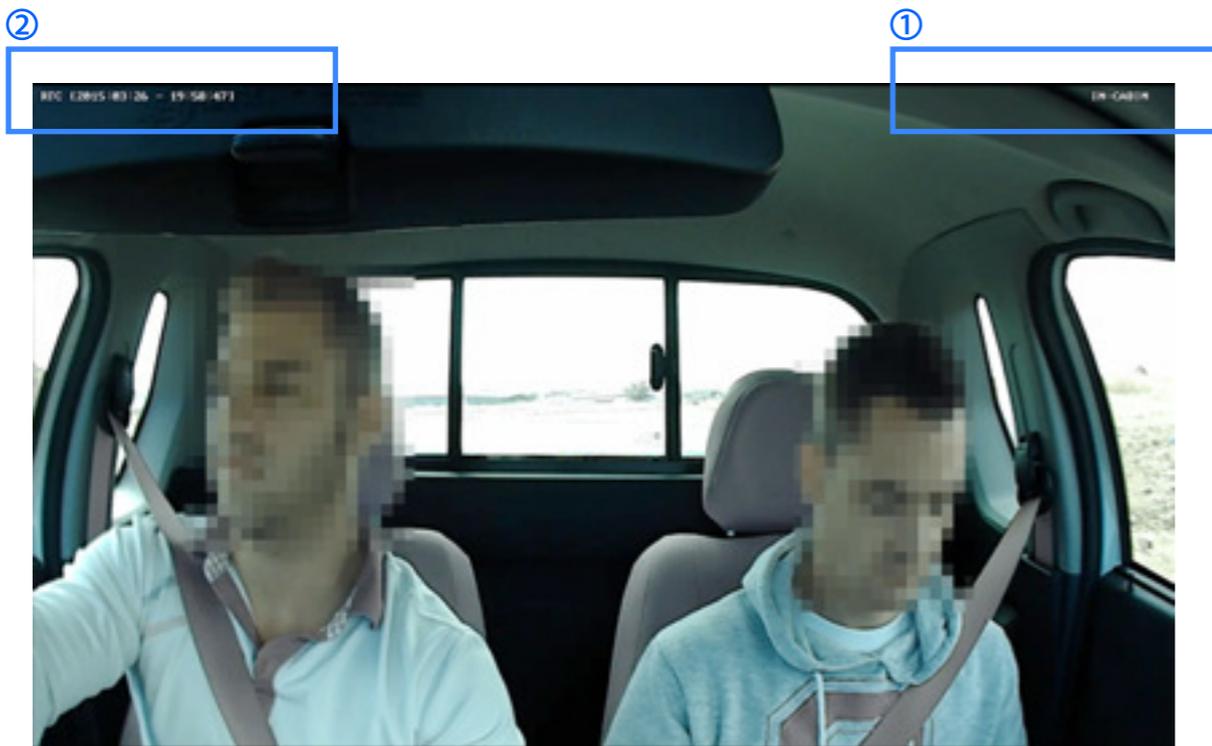
## Video Overlay

The video image is contain the information about time and location even have driver information. In case of information that the driver and company name with number plate of vehicle.



[ Figure 6.1.1] Information of overlaid on the front video

Location	Descriptions
① Camera View	“FRONT” is overlaid
② Time Information	The time information is selected by configuration setup as “Timezone” <b>[Case 1: Only RTC is overlaid]</b> RTC[YYYY:MM:DD-HH:MM:SS] <b>[Case 2: Only UTC is overlaid]</b> RTC[YYYY:MM:DD-HH:MM:SS] <b>[Case 3: RTC &amp; UTC are overlaid]</b> RTC[YYYY:MM:DD-HH:MM:SS] UTC[YYYY:MM:DD-HH:MM:SS] <b>[Case 4: RTC with Daylight Saving Time]</b> DST[YYYY:MM:DD-HH:MM:SS]
③ GPS Coordinates	LAT is ‘Latitude’, LON is ‘Longitude’. If the NDR will not be received GPS data then each of the value filed are inserted as “-”
④ G-Sensor	Each value is displayed up to the decimal point second place. The section shows procedures regarding X-axis value Gx, Y-axis value Gy and Z-axis value Gz.
⑤ Sum	This value is total sum about G-sensor
⑥ Speed	This value is receiving from GPS signal. (Km/Mph/Knot per every 0.5 seconds)
⑦ Company name	This value is able to setup by PC manager
⑧ Driver name	
⑨ Vehicle number	



[ Figure 6.1.2] Information of overlaid on the In-Cabin video



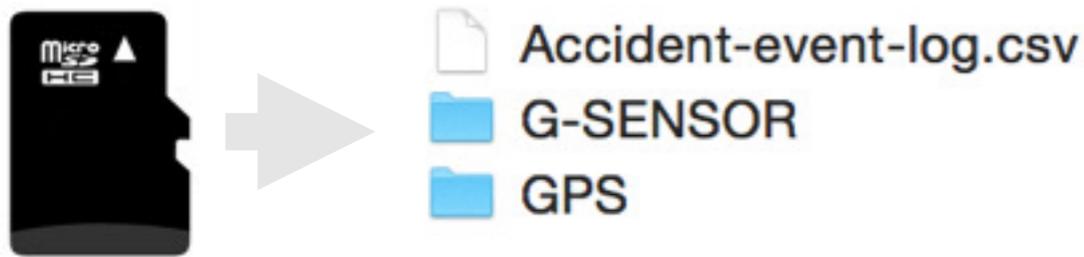
[ Figure 6.1.3] Information of overlaid on the 3rd camera video

Location	Descriptions
① Camera View	“IN-CABIN” is overlaid
② Time Information	<p>The time information is selected by configuration setup as “Timezone”</p> <p><b>[Case 1: Only RTC is overlaid]</b>            RTC[YYYY:MM:DD-HH:MM:SS]</p> <p><b>[Case 2: Only UTC is overlaid]</b>            RTC[YYYY:MM:DD-HH:MM:SS]</p> <p><b>[Case 3: RTC &amp; UTC are overlaid]</b>            RTC[YYYY:MM:DD-HH:MM:SS]            UTC[YYYY:MM:DD-HH:MM:SS]</p> <p><b>[Case 4: RTC with Daylight Saving Time]</b>            DST[YYYY:MM:DD-HH:MM:SS]</p>

Location	Descriptions
① Camera View	“REAR” is overlaid
② Time Information	<p>The time information is selected by configuration setup as “Timezone”</p> <p><b>[Case 1: Only RTC is overlaid]</b>            RTC[YYYY:MM:DD-HH:MM:SS]</p> <p><b>[Case 2: Only UTC is overlaid]</b>            RTC[YYYY:MM:DD-HH:MM:SS]</p> <p><b>[Case 3: RTC &amp; UTC are overlaid]</b>            RTC[YYYY:MM:DD-HH:MM:SS]            UTC[YYYY:MM:DD-HH:MM:SS]</p> <p><b>[Case 4: RTC with Daylight Saving Time]</b>            DST[YYYY:MM:DD-HH:MM:SS]</p>

# Data Logs

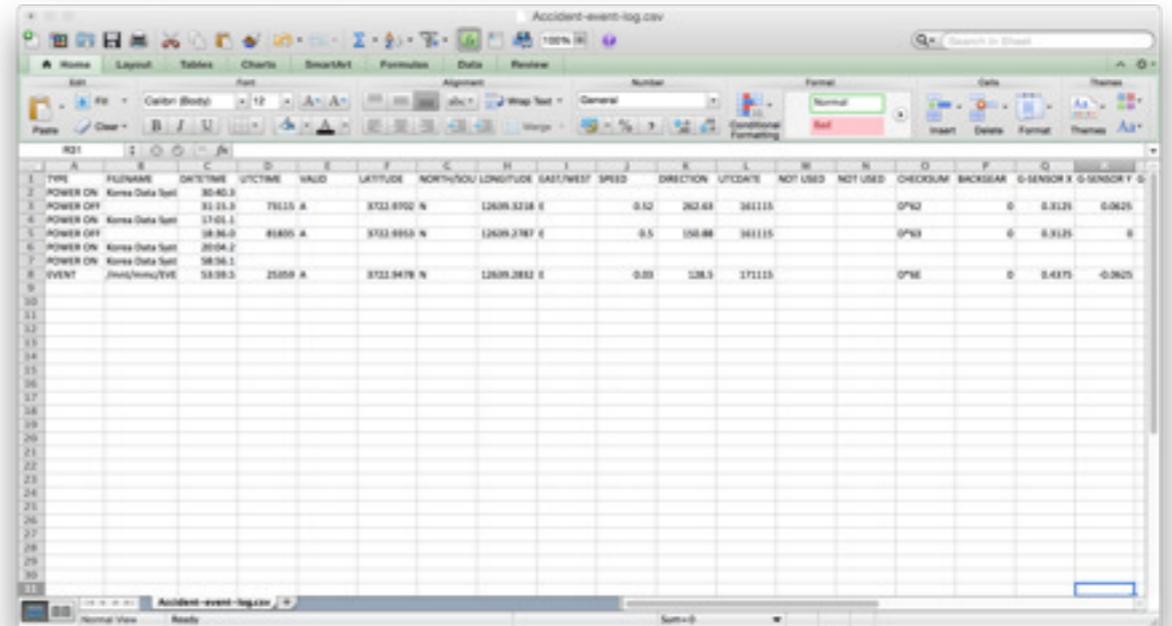
The NDR is recording log history data about Accident event and G-Sensor and GPS by CSV file format. This log file folder will be created at 'Primary SD card'. The CSV format file is able to open Microsoft® Excel software.



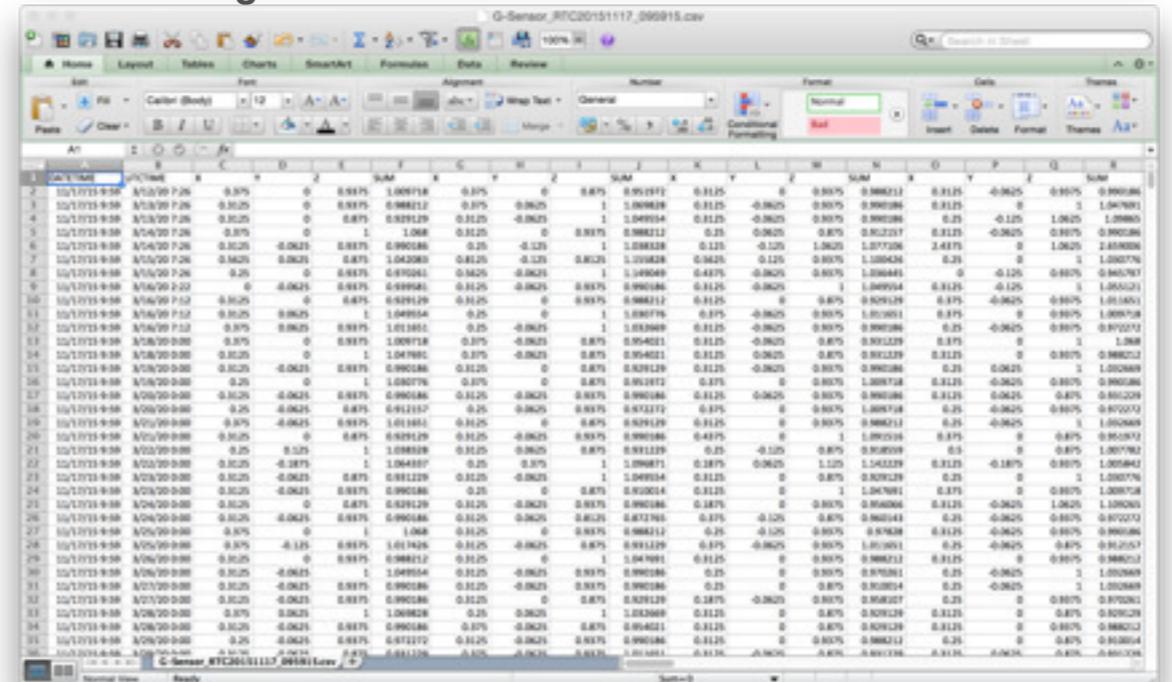
Logs data has contained below data

Log File Name	Contained data
Accident-event-log	Event Type, File name, RTC Date & time, UTC Date & time, GPS signal state, Latitude, Longitude, Direction(N.S.E.W), Speed value, G-Sensor(X,Y,Z,Check SUM) value, Back-up dear state
G-SENSOR	RTC Date & Time, UTC Date & Time, G-Sensor(X,Y,Z,Check SUM) value per every 0.5 seconds interval.
GPS	RTC Date & Time, UTC Date & Time, GPS signal valid, Latitude, Longitude, Direction, Speed, Check SUM.

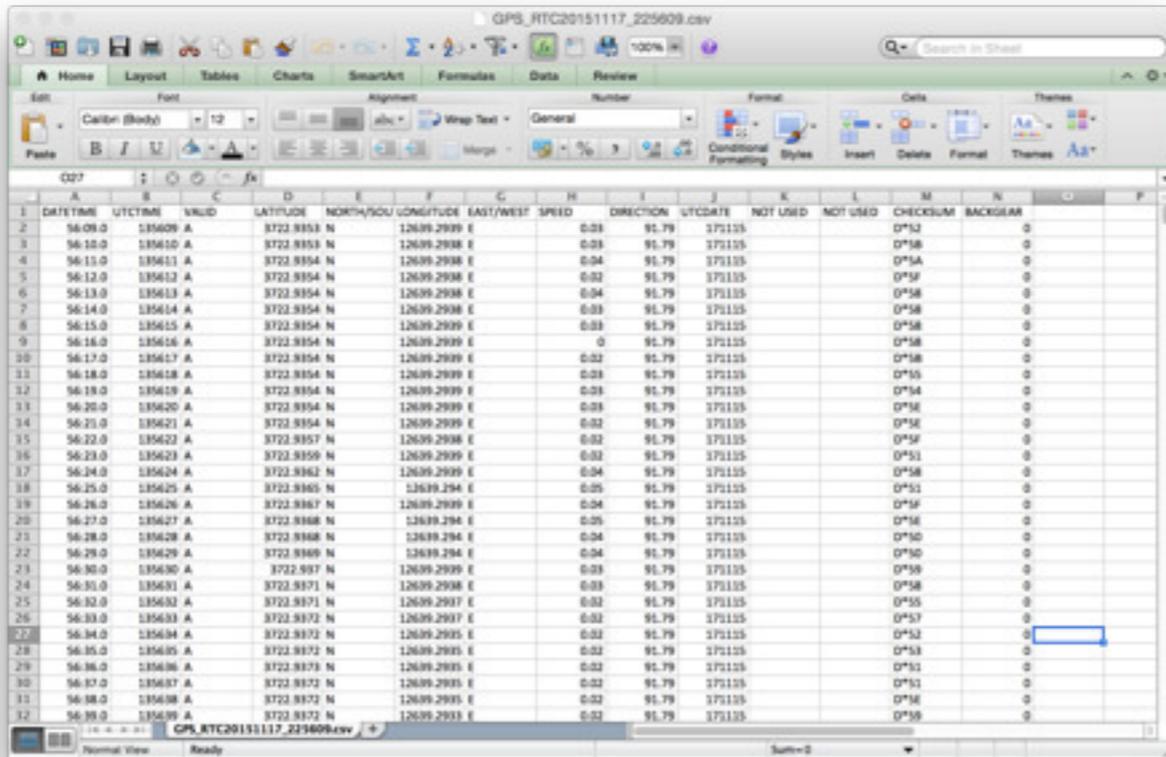
## Accident-event-log file



## G-Sensor log file



## GPS log file



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	DATE/TIME	UTC/TIME	VNOID	LATITUDE	NORTH/SOUTH	LONGITUDE	EAST/WEST	SPEED	DIRECTION	UTC/DTE	NOT USED	NOT USED	CHECKSUM	BACKGEAR
2	56:09.0	135609	A	3722.8953	N	12639.2999	E	0.09	91.79	175133			0*52	0
3	56:10.0	135610	A	3722.8953	N	12639.2998	E	0.09	91.79	175133			0*58	0
4	56:11.0	135611	A	3722.8954	N	12639.2998	E	0.04	91.79	175133			0*5A	0
5	56:12.0	135612	A	3722.8954	N	12639.2998	E	0.02	91.79	175133			0*5F	0
6	56:13.0	135613	A	3722.8954	N	12639.2998	E	0.04	91.79	175133			0*58	0
7	56:14.0	135614	A	3722.8954	N	12639.2998	E	0.09	91.79	175133			0*58	0
8	56:15.0	135615	A	3722.8954	N	12639.2999	E	0.09	91.79	175133			0*58	0
9	56:16.0	135616	A	3722.8954	N	12639.2999	E	0	91.79	175133			0*58	0
10	56:17.0	135617	A	3722.8954	N	12639.2999	E	0.02	91.79	175133			0*58	0
11	56:18.0	135618	A	3722.8954	N	12639.2999	E	0.09	91.79	175133			0*55	0
12	56:19.0	135619	A	3722.8954	N	12639.2999	E	0.09	91.79	175133			0*54	0
13	56:20.0	135620	A	3722.8954	N	12639.2999	E	0.09	91.79	175133			0*56	0
14	56:21.0	135621	A	3722.8954	N	12639.2999	E	0.02	91.79	175133			0*56	0
15	56:22.0	135622	A	3722.8957	N	12639.2998	E	0.02	91.79	175133			0*5F	0
16	56:23.0	135623	A	3722.8959	N	12639.2999	E	0.02	91.79	175133			0*51	0
17	56:24.0	135624	A	3722.8962	N	12639.2999	E	0.04	91.79	175133			0*58	0
18	56:25.0	135625	A	3722.8965	N	12639.294	E	0.05	91.79	175133			0*51	0
19	56:26.0	135626	A	3722.8967	N	12639.2999	E	0.04	91.79	175133			0*5F	0
20	56:27.0	135627	A	3722.8968	N	12639.294	E	0.05	91.79	175133			0*56	0
21	56:28.0	135628	A	3722.8968	N	12639.294	E	0.04	91.79	175133			0*50	0
22	56:29.0	135629	A	3722.8969	N	12639.294	E	0.04	91.79	175133			0*50	0
23	56:30.0	135630	A	3722.897	N	12639.2999	E	0.09	91.79	175133			0*59	0
24	56:31.0	135631	A	3722.8971	N	12639.2998	E	0.09	91.79	175133			0*58	0
25	56:32.0	135632	A	3722.8971	N	12639.2997	E	0.02	91.79	175133			0*55	0
26	56:33.0	135633	A	3722.8972	N	12639.2997	E	0.02	91.79	175133			0*57	0
27	56:34.0	135634	A	3722.8972	N	12639.2995	E	0.02	91.79	175133			0*52	0
28	56:35.0	135635	A	3722.8972	N	12639.2995	E	0.02	91.79	175133			0*53	0
29	56:36.0	135636	A	3722.8973	N	12639.2995	E	0.02	91.79	175133			0*51	0
30	56:37.0	135637	A	3722.8972	N	12639.2995	E	0.02	91.79	175133			0*51	0
31	56:38.0	135638	A	3722.8972	N	12639.2995	E	0.02	91.79	175133			0*56	0
32	56:39.0	135639	A	3722.8972	N	12639.2995	E	0.02	91.79	175133			0*59	0

## Manual Event Recording

This enhanced feature enables an additional method for triggering Event Alarm Video for a specific incident to be recorded for quick, future review. And built-in LED status light will indicate the system is functioning properly.

Manual Event Recording Button



## SOS Panic Button Recording(Extra)

The driver is able to create 'Emergency Video' file save by Panic button(Hidden button) push. The video file will be stored 'EMERGENCY' folder total 30 seconds.(before event 15 sec. and after 15 sec.) And If the NDR has connected network then SOS signal will be transmitted to Administrator.

## Excessive Speed Trigger

Combined with the GPS, the NDR can be stored speed event alarm video when the vehicle exceeds a preset speed.

## Motion Detection - Sleep mode

Under motion detective when it entering sleep mode(park mode) the NDR will automatically start recording when any object movement is detected. The NDR can be setup to enter 'Sleep mode' when the vehicle is parked for conserve memory space.The built in motion sensor will cause the NDR to resume 'Park event' recording if motion is detected.

Sleep mode is not recording and save any video file instead of monitoring object movement. It will be saved 'PARK' event video file total 30 seconds( before event 15 sec. and after 15 sec.) when it detected any object movement and back to the sleep mode again in automatically.

## GPS(GNSS)

By simply connecting an GPS jack, you will know your vehicle's location and speed. Use the included the NDR PC Manager and your video will also display with an integrated GPS map. The GPS will also enable the use of the systems max speed setting to trigger event alarm video when a selected speed is achieved.

## External GPS Antenna(Extra)

This optional GPS antenna is useful for metal film coated vehicle. Metallic coating on windshield of vehicle may cause signal trouble in GPS signal.

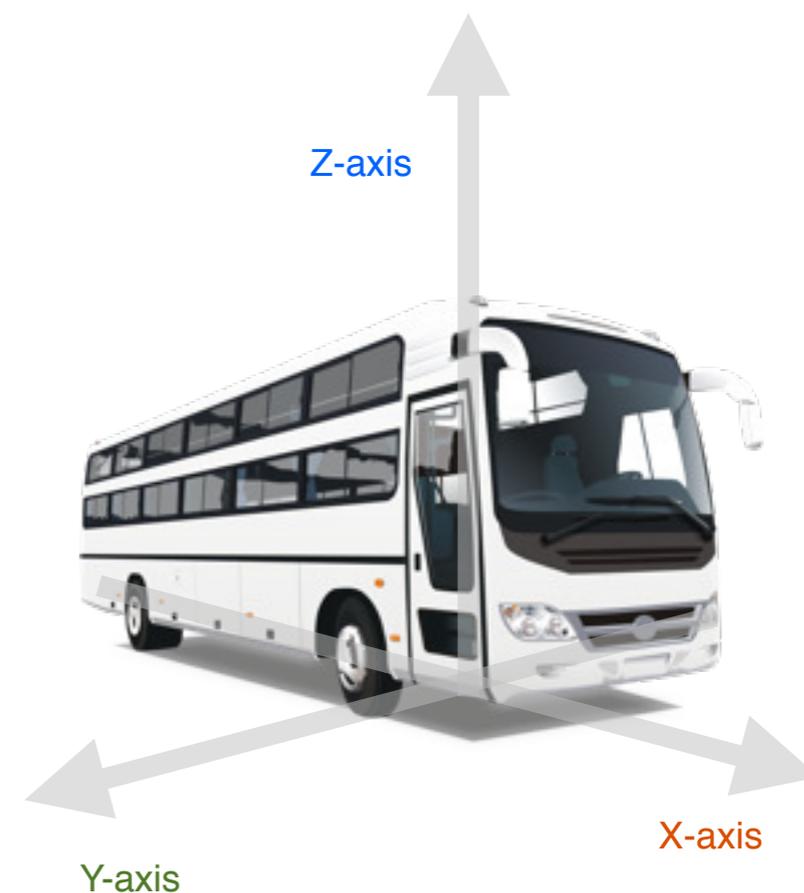
## Map Tracking

Review route efficiency and safety with available synchronized GPS mapping and tracking embedded within the NDR.



## G-Sensor

- \* The direction of X-axis is an advancing direction of vehicle.
- \* The direction of Y-axis is a horizontal direction, whose positive direction relative to advancing direction of the vehicle.
- \* The direction of Z-axis is a vertical direction, whose positive direction is a downward direction.



## Driving Report

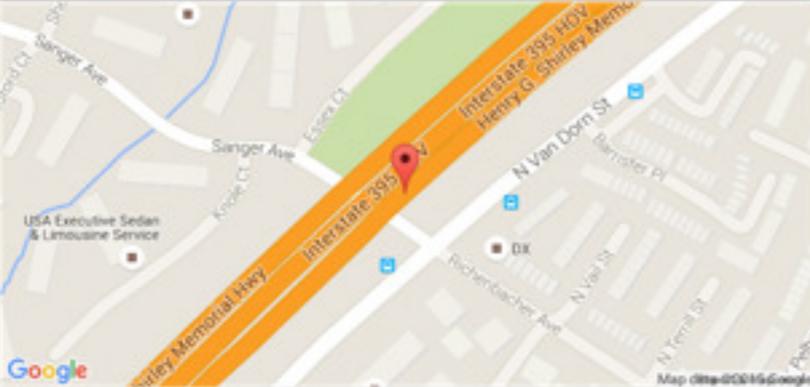
It is able to print out driving report or save PDF file format to sending secure email. The report has contained below items.

Driver name, Vehicle number, Company name, Driving date & speed, Video file name, Location address and map.all the video snapshots.

### Driving Reports

Driver Name	[REDACTED]	Company Name	[REDACTED]
Vehicle Number	[REDACTED]	File Name	EVENT_RTC20151116_002448_A.kds
Driving Date	2015-11-16 21:24:36	Latitudes	38.82408
Latitudes	38.82408	Longitudes	-77.123905
Speed	0.00 (Mile/H)	Case	Event

Report Comment Here



Henry G. Shirley Memorial Hwy, Alexandria, VA 22311, USA



## Output Power DC5V

Micro USB and USB terminal is output DC power 5V for smart-phone or other USB device use. If vehicle has pocket Wi-Fi modem then it is able to charging battery by USB/micro USB terminals.

## External Memory Storage(Extra)

The NDR is able to use external hard drive or SSD instead of micro SD card use via micro USB and USB terminal. The NDR will not be saved video file while use HDD.

## Wi-Fi LAN USB Adaptor(Extra)

The NDR is able to connect wireless internet by Wi-Fi LAN USB adaptor. (Hotspot, Tethering, AP mode Wi-Fi..etc)

## 3G/LTE USB Modem(Extra)

The NDR is able to use 3G/LTE modem for network communication. The NDR is support below products modems(Firmware version 1.5.16)

1. HUAWEI E8231 Wingle / Model: E8231s-2
2. Vodafone 3G / Model: K4607-Z USB Stick
3. Vodafone Mobile L4607-Z

# 3G/LTE Telecommunications

The NDR is able to contact to FMS/CMS server via wireless telecommunication.



# Internet Telecommunications

The NDR is able to contact to FMS/CMS server via wireless telecommunication.

- Internet/GSM/3G/4G —
- \* Log data(Location,Speed,G-force,Event,Driving info. etc.)
  - \* jpg image
  - \* Accident VOD



Administrator

## INTERNET WEB SERVER

- \* Live GPS Tracking
- \* Real-time streaming
- \* VOD Download
- \* Snapshot download
- \* Analysts driving data

## PC Manager

- \* Analysis driving data
- \* Configuration setup
- \* Information setup
- \* Print out report
- \* Password setup

# File & Memory Structure

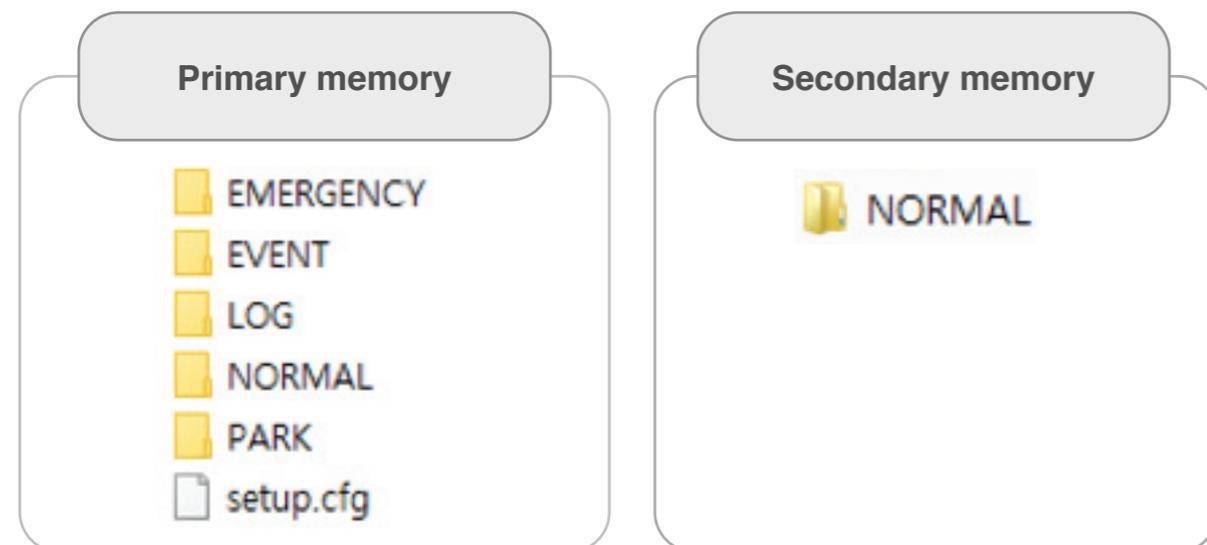
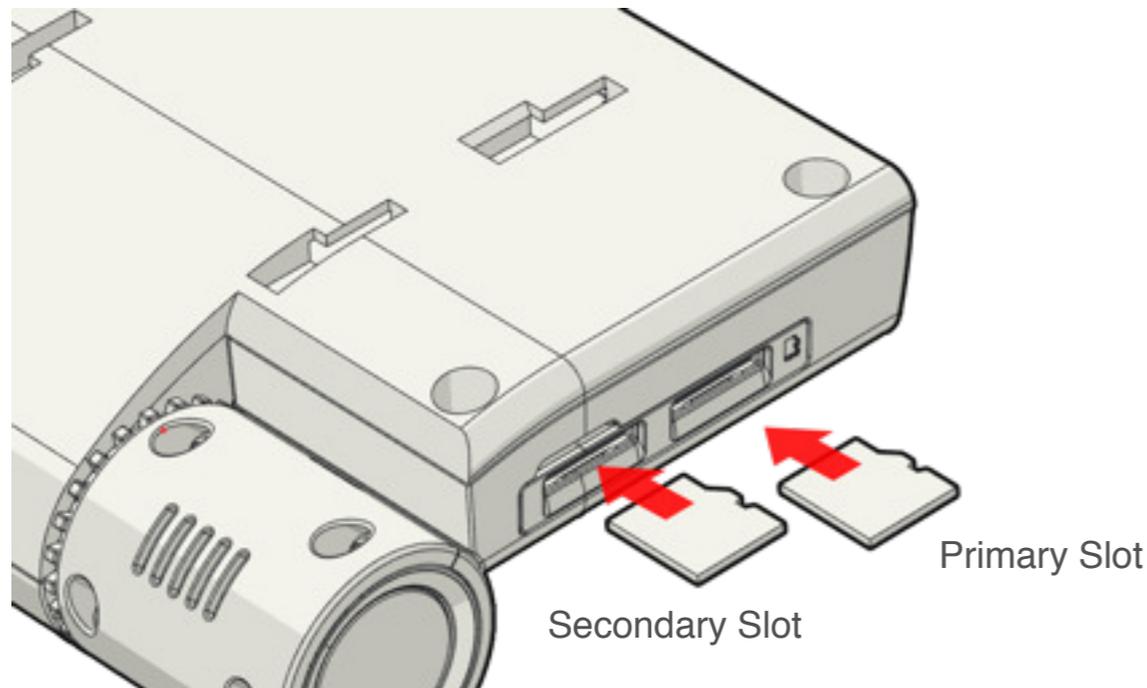
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## Section 1

### Usage of Memory

The NDR prepares 4 types of directories and system margin area in Primary SDHC and Secondary SDHC slot.



### Directory of NORMAL File Area

- This NORMAL folder includes all non-alarm and event video file.
- Allocate 84% in primary SD Memory, 95% in secondary SD memory.
- The NDR stores the all-time 60 seconds' movie files in NORMAL movie area.
- When movie files reached full capacity of NORMAL movie file area in one SD memory, The NDR starts to store NORMAL movie files in NORMAL movie file area of another SD memory. When it reached full capacity of NORMAL movie area in both SD Memories, The NDR should overwrite all-time movie files in this area (delete the oldest file and store the new file).
- The EMERGENCY Event file is store in this area with separated folder name use 'EMERGENCY'

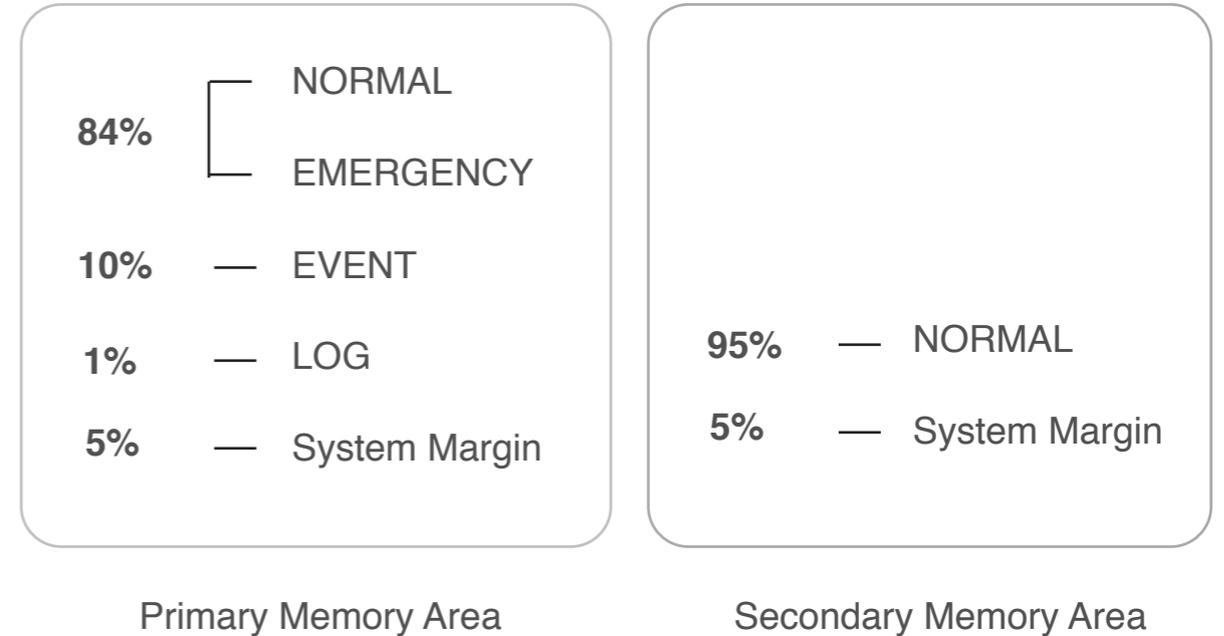
### Directory of EVENT File Area

- Allocate 10% in primary SD memory.
- The NDR stores the accident 30 seconds movie file in EVENT file area.

- Although the NDR depletes capacity of Event Move File area in primary SD, the NDR will overwrite EVENT Movie files stored in the area. When this case occurs, even if EVENT occurs the NDR must not record new EVENT Movie file in Event Movie File area of primary SD.
- The NDR is record file names of Accident-Event-Log files to CSV format.
- The PARK Event file is store in this area with separated folder name use 'PARK'

## Directory of LOG File Area

- Allocate 1% in primary SD memory and Event Logs and Sensor Logs will be stored in this area.
- A GPS Log is up to 1MB. If this log file becomes 1MB, the NDR should close this log file and open new log file to record GPS data continuously.
- The NDR is stores G-Sensor data detected by the NDR in 20[Hz] as G-Sensor Log by CSV format.
- A G-Sensor Log is up to 1MB. If this log file becomes 1MB, the NDR should close this log file and open new log file to record G-Sensor data continuously.



It is able to customize each file area by setup configuration.

(▶ page 86)

- \* If one SD memory was inserted in only Primary SD memory slot of NDR then It operates according to the allocation of Primary SD slot.
- \* If one SD memory was inserted in only Secondary SD memory slot of the NDR then It operates according to the allocation of Primary SD slot. NORMAL movie file area and EVENT movie area are prepared in the SD memory.

## Section 2

# Recordable Time and Capacity

## Recorded File Size

2 Channel mode

Audio	Video	4fps	5fps	10fps	15fps	30fps
ON	Normal	10 MB	12 MB	22 MB	32 MB	62 MB
	High	14 MB	17 MB	32 MB	47 MB	92 MB
OFF	Normal	4 MB	9 MB	20 MB	29 MB	59 MB
	High	6 MB	14 MB	30 MB	44 MB	89 MB

3 Channel mode

Audio	Video	4fps	5fps	10fps	15fps	30fps
ON	Normal	9 MB	10 MB	19 MB	27 MB	52 MB
	High	12 MB	14 MB	26 MB	39 MB	75 MB
OFF	Normal	7 MB	8 MB	16 MB	24 MB	49 MB
	High	10 MB	12 MB	24 MB	36 MB	72 MB

## Recordable Time - 2Ch.

30 fps / Secondary SDCARD

[ 2 Channel mode ]

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	4.1 hours	8.2 hours	16.3 hours	32.7 hours
	OFF	4.2 hours	8.4 hours	16.9 hours	33.8 hours
High	ON	2.8 hours	5.5 hours	11.0 hours	22.0 hours
	OFF	2.9 hours	5.6 hours	11.3 hours	22.5 hours

30 fps / Primary SDCARD

[ 2 Channel mode ]

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	3.6 hours	7.2 hours	14.5 hours	28.9 hours
	OFF	3.8 hours	7.6 hours	15.2 hours	30.4 hours
High	ON	2.4 hours	4.9 hours	9.7 hours	19.5 hours
	OFF	2.5 hours	5.0 hours	10.1 hours	20.1 hours

### 4 fps / Secondary SDCARD

[ 2 Channel mode ]

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	25.3 hours	50.7 hours	101.3 hours	202.7 hours
	OFF	31.7 hours	63.3 hours	126.7 hours	253.3 hours
High	ON	18.1 hours	36.2 hours	72.4 hours	144.8 hours
	OFF	21.1 hours	42.2 hours	84.4 hours	168.9 hours

### 4 fps / Primary SDCARD

[ 2 Channel mode ]

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	22.4 hours	44.8 hours	89.6 hours	179.2 hours
	OFF	18.7 hours	37.3 hours	112.0 hours	224.0 hours
High	ON	16.0 hours	32.0 hours	64.0 hours	128.0 hours
	OFF	18.7 hours	37.3 hours	74.7 hours	149.3 hours

## Recordable Time - 3Ch.

### 27 fps / Secondary SDCARD

[ 3 Channel mode ]

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	4.9 hours	9.7 hours	19.5 hours	39.0 hours
	OFF	5.2 hours	10.3 hours	20.7 hours	41.4 hours
High	ON	3.4 hours	6.8 hours	13.5 hours	27.0 hours
	OFF	3.5 hours	7.1 hours	14.1 hours	28.1 hours

### 27 fps / Primary SDCARD

[ 3 Channel mode ]

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	4.3 hours	8.6 hours	17.2 hours	34.5 hours
	OFF	4.6 hours	9.1 hours	18.3 hours	36.6 hours
High	ON	3.0 hours	6.0 hours	11.9 hours	23.9 hours
	OFF	3.1 hours	6.2 hours	12.4 hours	24.9 hours

#### 4 fps / Secondary SDCARD

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	28.1 hours	56.3 hours	112.6 hours	225.2 hours
	OFF	36.2 hours	72.4 hours	144.8 hours	289.5 hours
High	ON	21.1 hours	42.2 hours	84.4 hours	168.9 hours
	OFF	25.3 hours	50.7 hours	101.3 hours	202.7 hours

#### 4 fps / Primary SDCARD

[ 3 Channel mode ]

Video	Audio	16 GB	32 GB	64 GB	128 GB
Normal	ON	24.9 hours	49.8 hours	99.6 hours	199.1 hours
	OFF	32.0 hours	64.0 hours	128.0 hours	256.0 hours
High	ON	18.7 hours	37.3 hours	74.7 hours	149.3 hours
	OFF	22.8 hours	44.8 hours	89.6 hours	179.2 hours

- Your recordable time and capacity may differ from the figures in the tables depending on your subject and actual recording conditions.
- The higher the resolution, the more memory is used.
- Lower resolution increases the recording time, but the image quality may suffer.
- The bit rate automatically adjusts to the recording image. Accordingly, the recording time may vary.
- Memory cards bigger than 64GB may not operate normally.

1GB ≙ 1,000,000,000 bytes : Actual formatted capacity may be less as the internal firmware uses a portion of the memory.

## Section 3

### File Naming Rule

Data File		Recorded Folder
NORMAL Movie File		/NORMAL/"each folder including 20 files"
EVENT Movie File		/EVENT
EMERGENCY Movie File		/EMERGENCY
PARK Movie File		/PARK
Event Log	Accident Event Log	/LOG
Sensor Log	GPS Log	/LOG/GPS
	G-Sensor Log	/LOG/G-Sensor

If user selects "UTC", File Naming Rule filed of configuration file has an indicator of UTC.

Recorded Folder	Example of File Name
NORMAL File	UTC20160726_020010.kds
EVENT File	EVENT.UTC20160726_020010_E.kds
EMERGENCY File	EMERGENCY.UTC20160726_020010_E.kds
PARK Event File	PARK_RTC20160726_020010_E.kds
Accident Event Log	Accident-event-log.csv
GPS Log	GPS.UTC20160726_020010.csv
G-Sensor Log	G-Sensor_RTC20160726_113006.csv

File name using RTC as "RTCYYYYMMDD\_HHMMSS.kds", where "RTC" is indicated as using RTC time.

- "YYYY" is indicated as current YEAR,
- "MM" is indicated as current MONTH,
- "DD" is indicated as current DAY,
- "HH" is indicated as current HOUR,
- "MM" is indicated as current MINUTE,
- "SS" is indicated as current SECOND.

## Type of File

The file name has includes video type information.



Status type

Letter mark	Type of Movie
<b>_M.kds</b>	<b>Pushed Manual EVENT Button Movie</b>
<b>_P.kds</b>	<b>Motion Detection Movie</b>
<b>_S.kds</b>	<b>Speed Event Movie</b>
<b>_A.kds</b>	<b>Rapid Acceleration Movie</b>
<b>_B.kds</b>	<b>Sudden Brake Movie</b>
<b>_G.kds</b>	<b>Detected G-Sensor Movie</b>
<b>_R.kds</b>	<b>Server Pushed Event Movie</b>

# PC Manager Software

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Please read the chapter for PC Manager use. This chapter is contain that how to setup configuration for the NDR use.



## Section 1

# System Requirement

Your computer must meet the following requirement to run PC manager.

Items	System Requirements
OS	Microsoft Windows XP SP2, Windows Vista, Windows 7, Windows 8, Window 10 or higher
CPU	Intel® Core 2 Duo® 1.66 GHz or higher is recommended, AMD Athlon™ X2 Dual-Core 2.2 GHz or higher is recommended, (Notebook: Intel Core2 Duo 2.2GHz or AMD Athlon X2 Dual-Core 2.6GHz or higher is recommended)
RAM	6GB or higher is recommended
Video card	NVIDIA GeForce 8500 GT or higher, ATI Radeon HD 2600 series or higher
Display	1024 x 768, 16-bit color or higher (1280 x 1024, 32-bit color recommended)
USB	USB 2.0 or higher
Direct X	Direct X 9.0 or higher
micro SD memory	40MB/s (Class 10) or higher / MLC type

- System requirements mentioned above are recommendations. Even on a system that satisfies the requirements, PC Manager may not operate optimally.
- On a slower than recommended computer, video playback may skip frames or operate in an unexpected manner.
- If the version of DirectX on your computer is lower than 9.0c, install DirectX 9.0c or higher.
- We recommended you transfer recorded videos to a PC before playing back or editing the videos.
- To run PC Manager, a laptop computer requires faster and better components than a desktop PC.
- PC Manager is not compliant for MAC OS.
- On 64-bit environment of Windows XP, Windows Vista, and Windows7, PC Manager may be installed and work as 32-bit program.

## Section 2

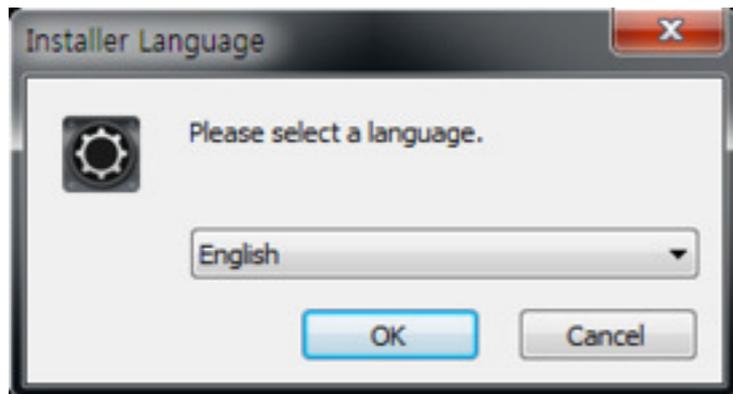
# Install PC Manager

1. Double click and run 'PC Manager' installation program file.

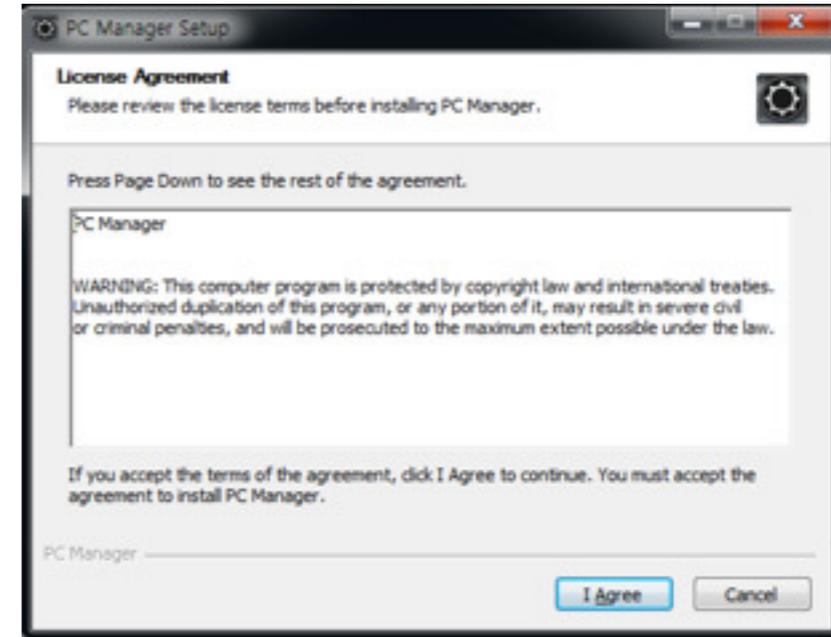


If needs update PC Manager then please remove previous PC Manager from PC first.

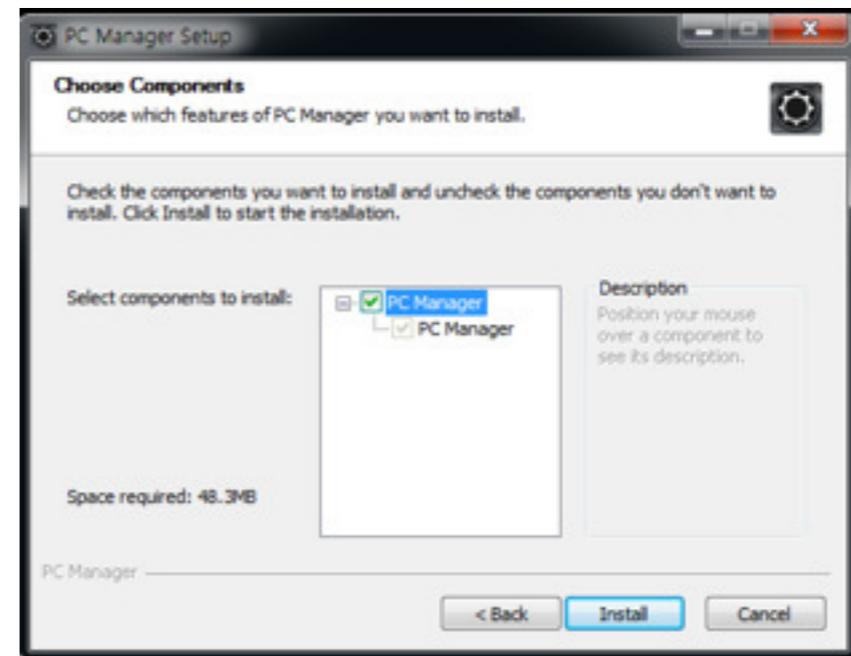
2. Select a language.



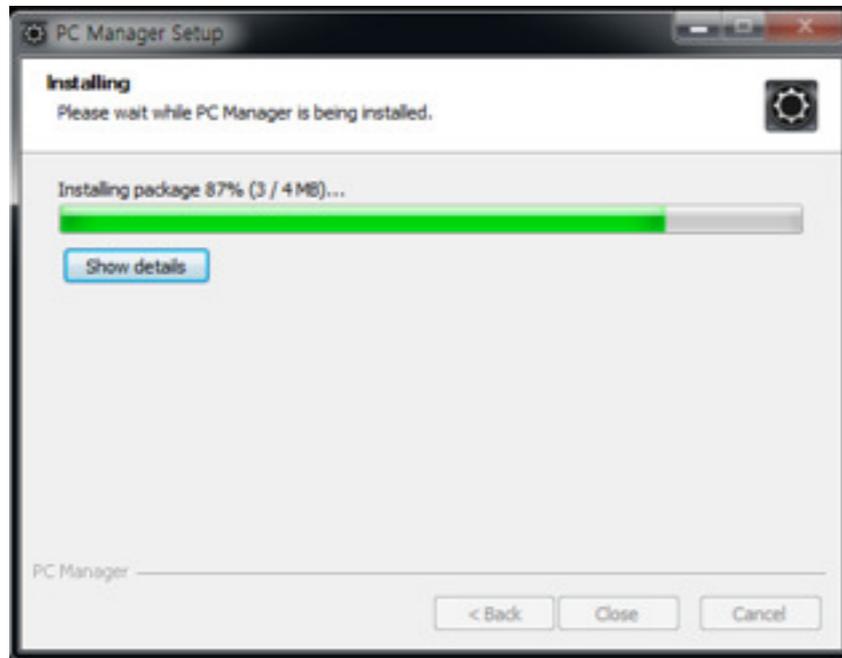
3. Click to 'I Agree' for next step of installation.



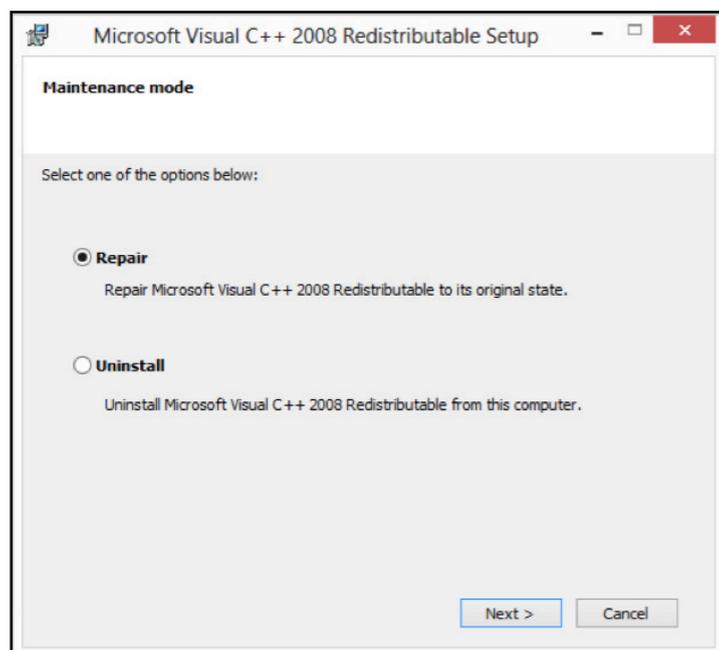
4. Choose install components and click to 'Install'



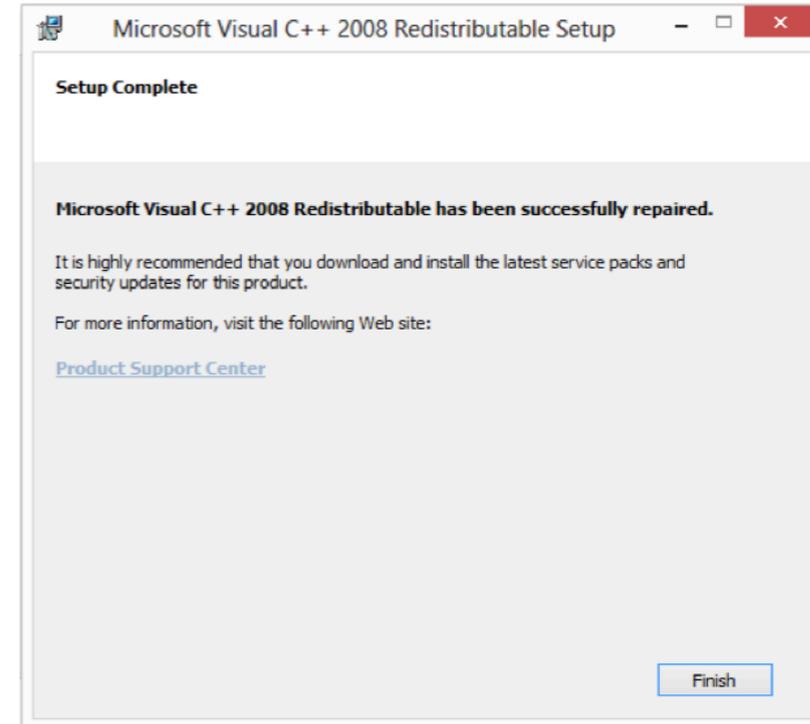
5. Installing.



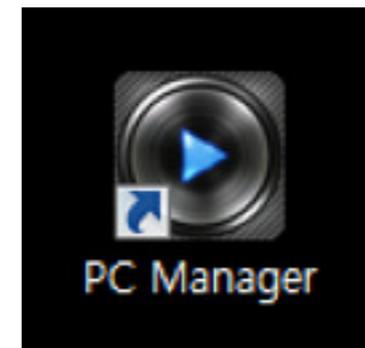
6. Select 'Repair' for Visual C++-redistributable setup and Click to Next.



7. Installation complete.



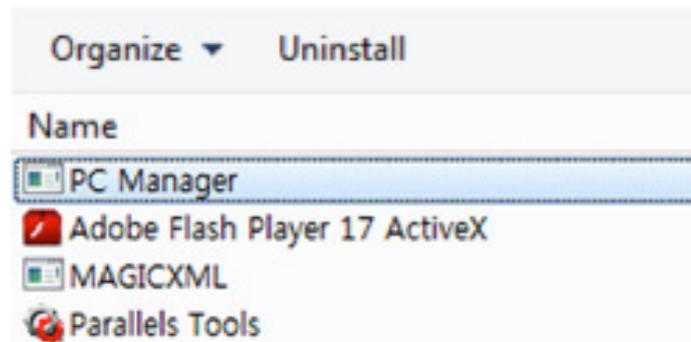
8. Click to PC icon at your desktop and running the program.



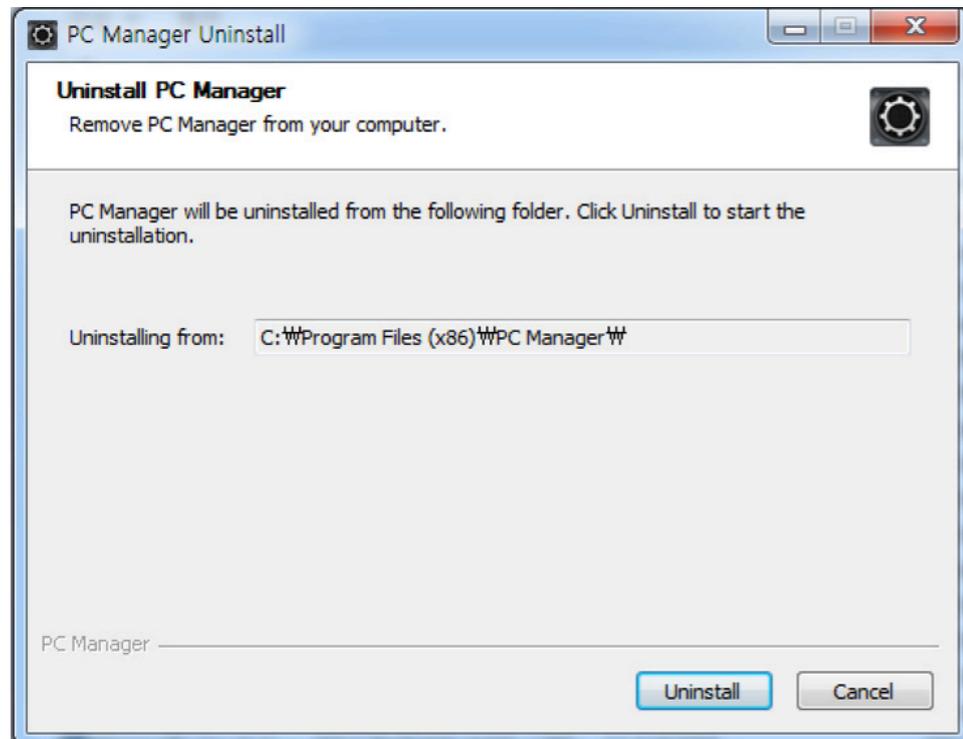
## Section 3

# Uninstall PC Manager

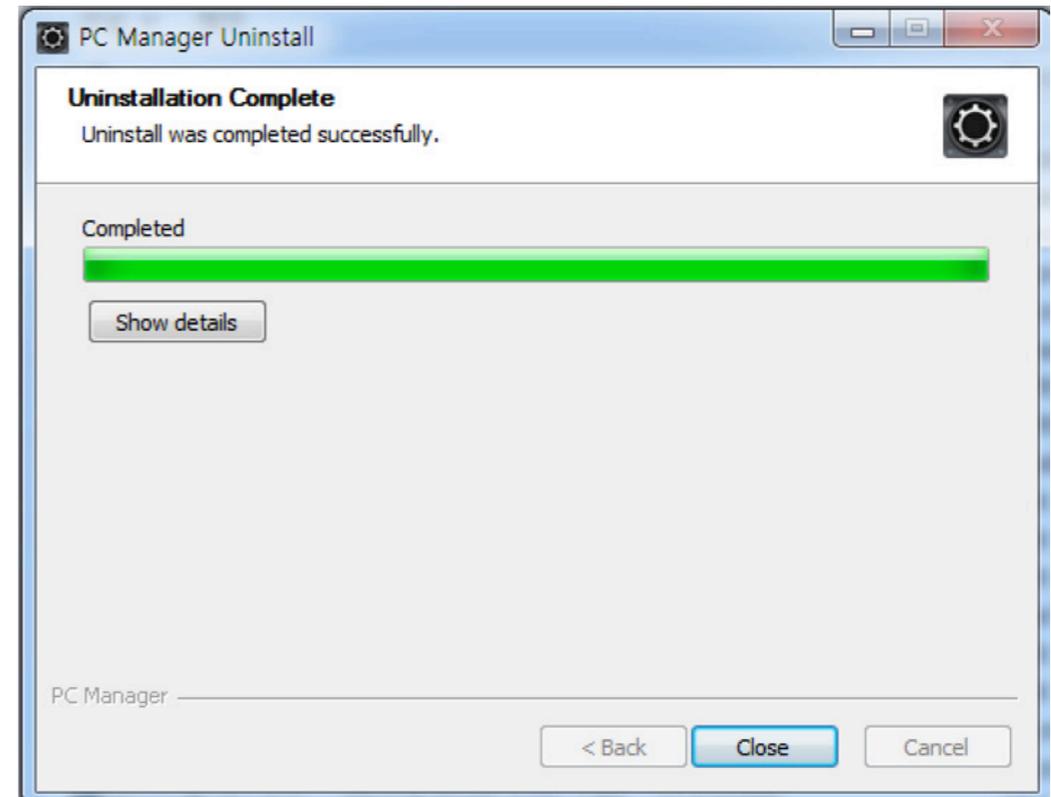
1. Click to PC manager in control panel.



2. Click to 'Uninstall' for next step of uninstallation.



3. Click to 'Close' for uninstall complete.



## Section 4

# User Interface

The screenshot displays a software interface titled "PC MANAGER - EVENT\_RTC20151116\_000738\_B.kds". The interface is divided into several sections:

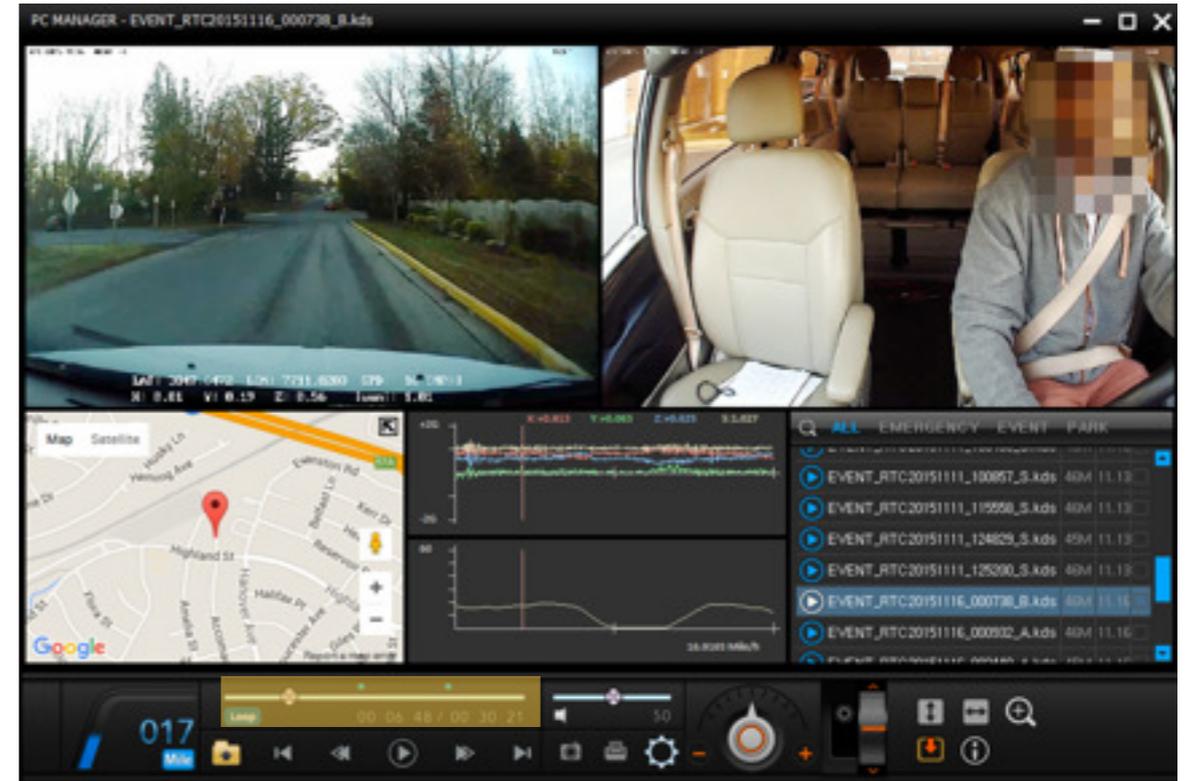
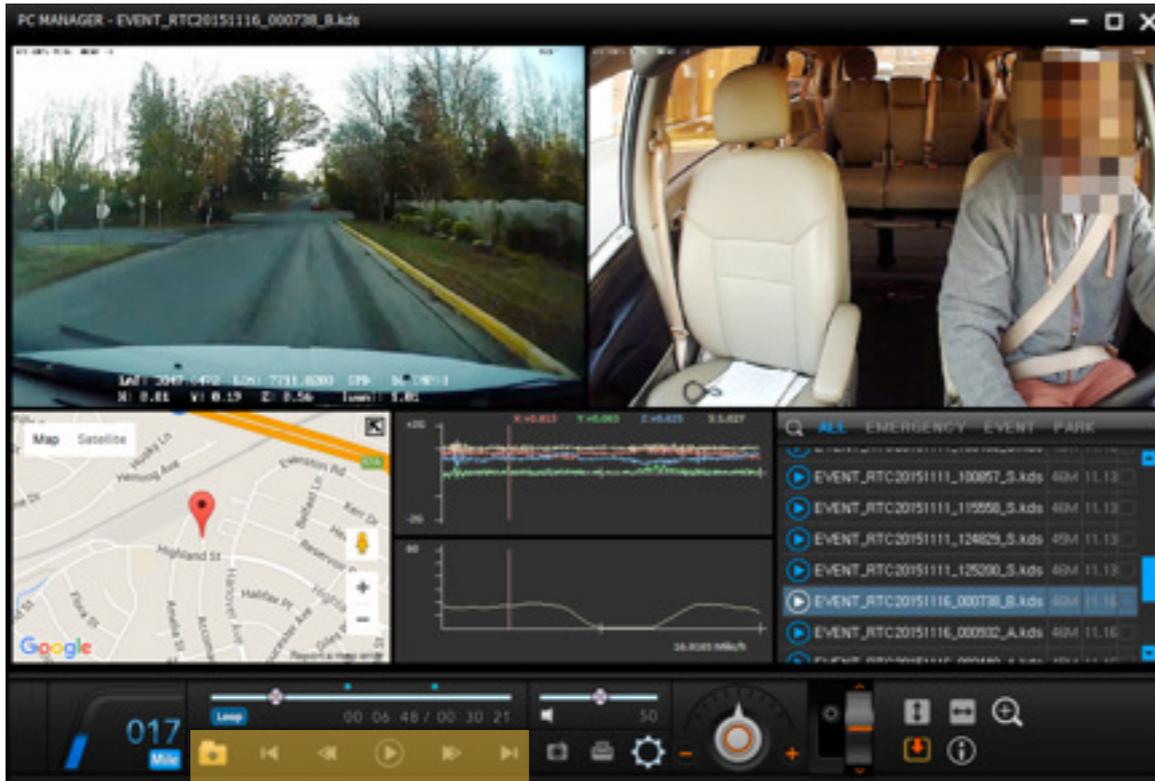
- Front View:** A live video feed from the front of the vehicle, showing a road with trees and a yellow curb. Below the video, coordinates are displayed: LAT: 39.47, LON: 77.11, SPD: 16, and other sensor data.
- InCabin View:** A live video feed from inside the vehicle, showing the driver's seat and a person wearing a grey hoodie and a seatbelt. The person's face is blurred for privacy.
- Map or 3rd camera view:** A Google Maps interface showing a street view of the current location, with a red pin and various street names like "Highland St" and "Esanston Rd".
- Data Graphs:** Two line graphs showing sensor data over time. The top graph shows acceleration (X, Y, Z) and the bottom graph shows speed (16.9165 Mile/h).
- File List:** A table listing recorded events with columns for event name, size, and date. The selected event is "EVENT\_RTC20151116\_000738\_B.kds".
- Control Panel:** A bottom navigation bar containing a speedometer (017 Mile), a "Loop" button, a progress bar (00:06:48 / 00:30:21), a volume slider (50), and various control icons like play, stop, and settings.

Red arrows point from the text labels to the corresponding sections of the interface:

- Front View
- InCabin View
- Map or 3rd camera view
- File List
- Control Panel

# Section 5

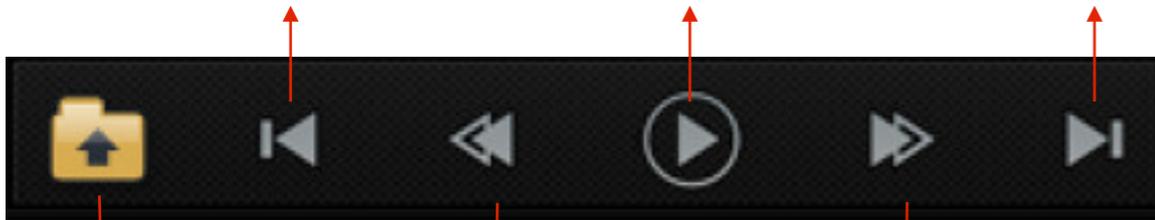
## Icon & Button



Previous file play

Play / Pause

Next file play



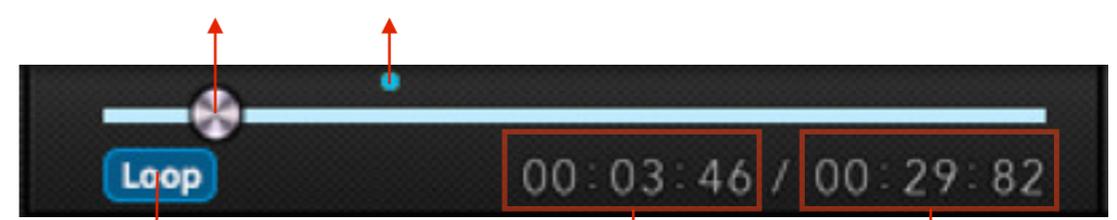
Folder open

Re-

Fast forward

Play tap

Event marker

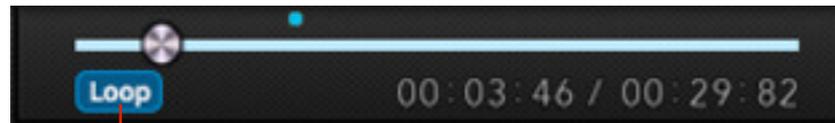


Repeat play control button

Playing track time

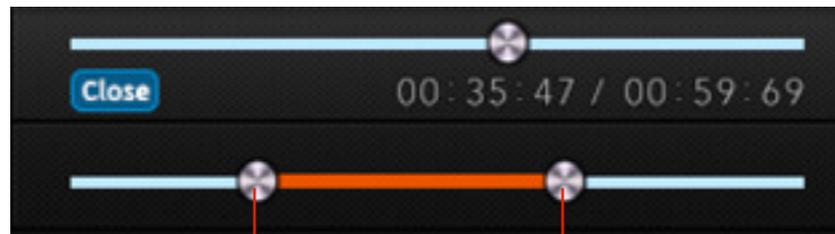
Total track time

## Repeat Play Control



1. Click 'Loop' button

2. Just drag play tap to start and end line

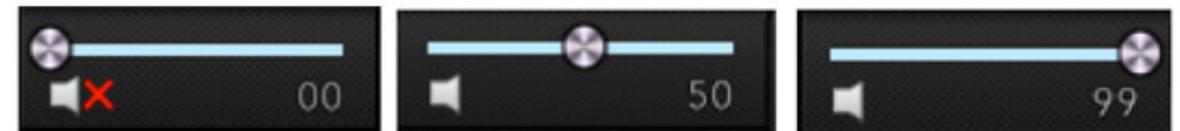
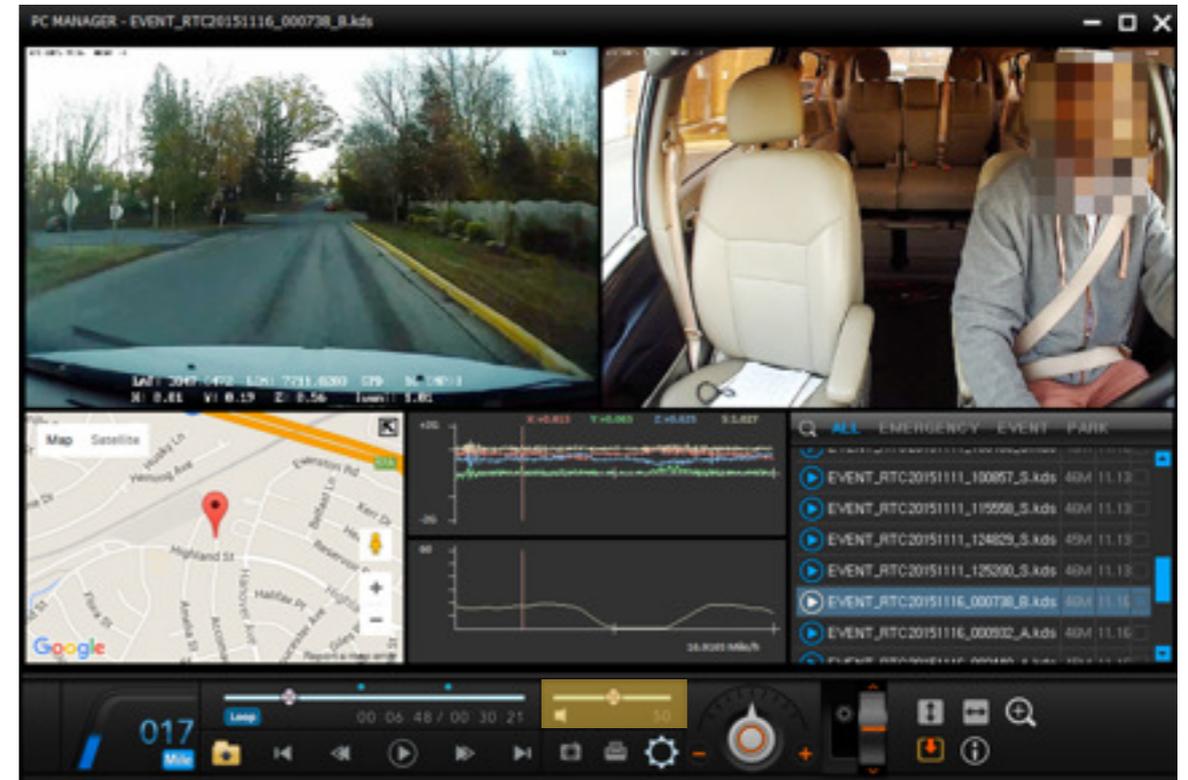


Repeat start

Repeat end

3. Click 'Close' to end of repeat play.

## Volume Control

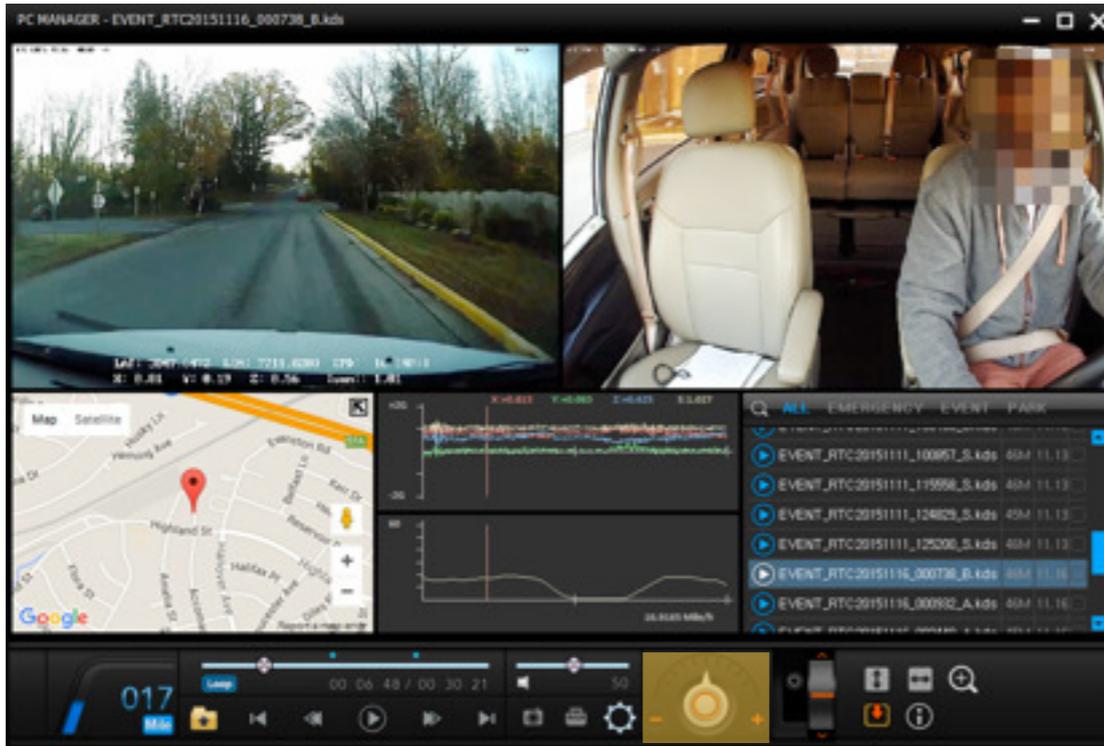


Mute

Default

Max

## Playback Speed



Slow Level

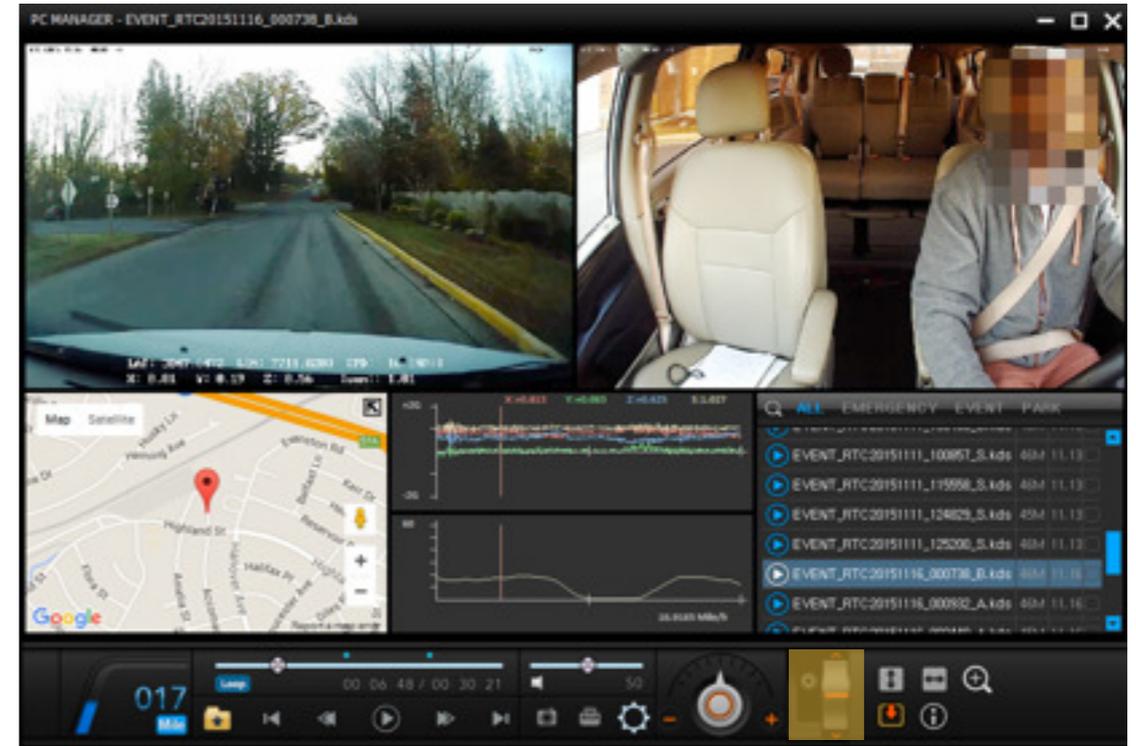


Default



Fest Level

## Brightness Control



Normal



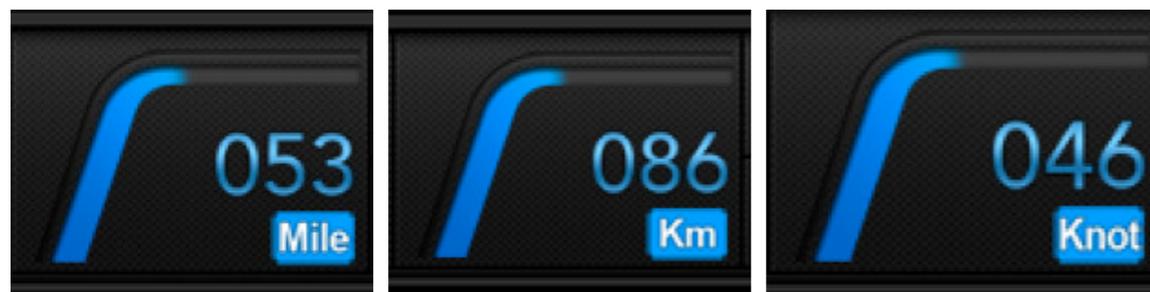
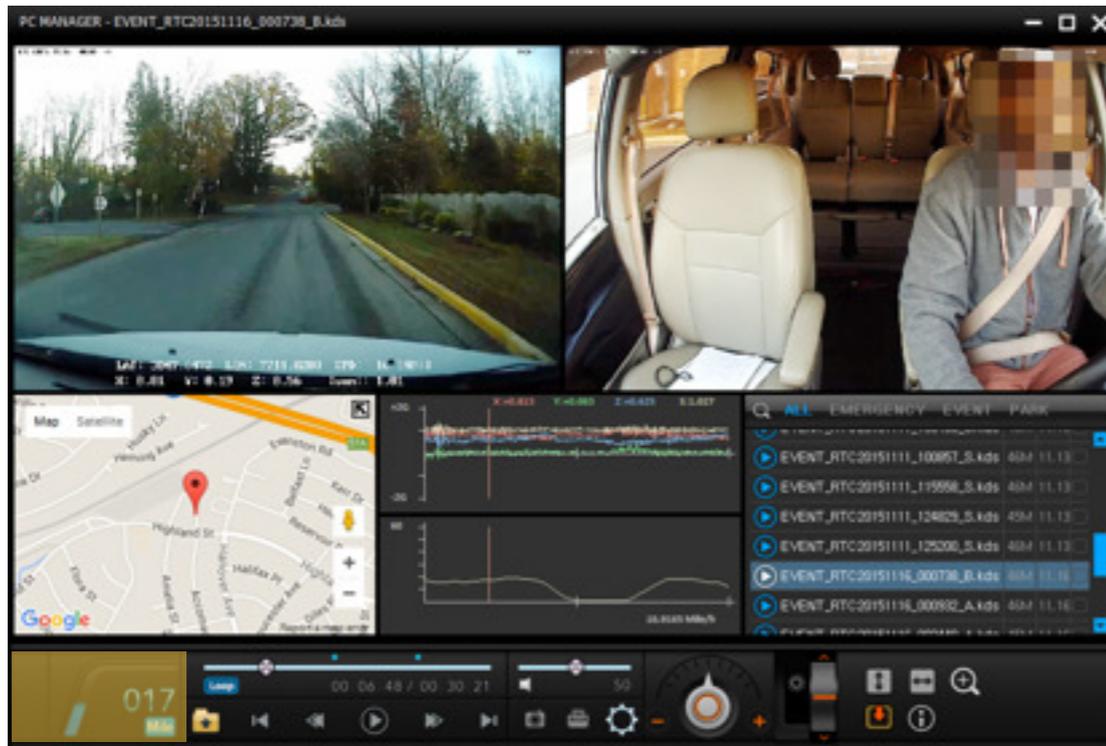
Brighter



Darkly



## Speed Indicator

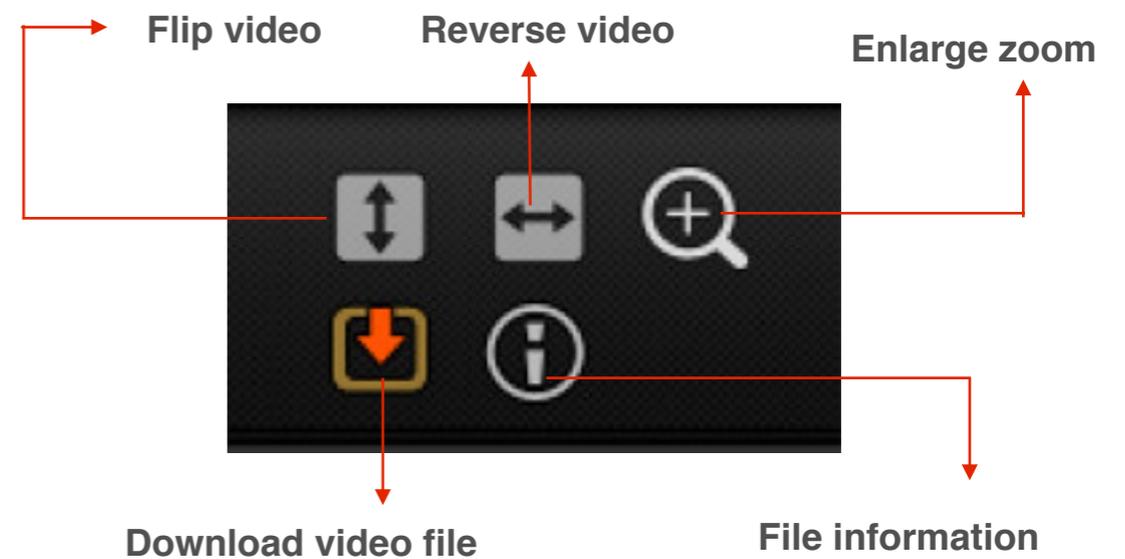
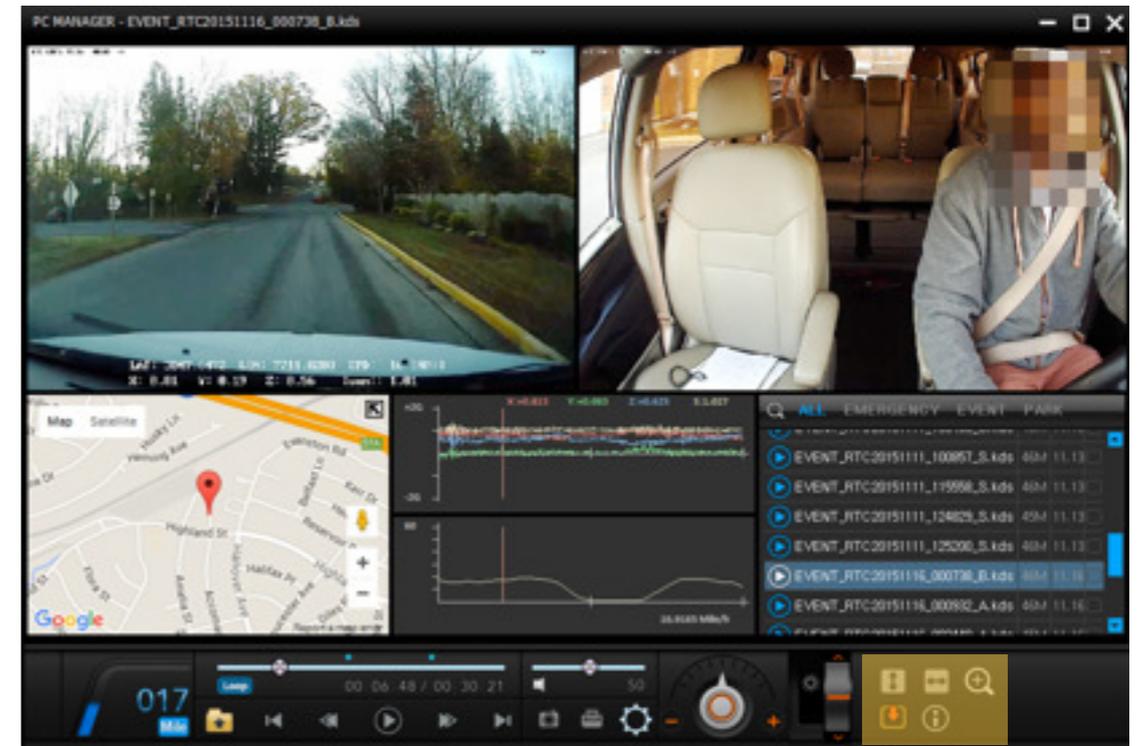


Miles per hour

Kilometer per hour

Knot per hour

## Video flip & info





Flip the video. The NDR's camera are able to rotate degrees for movie analysis.



Reverse video



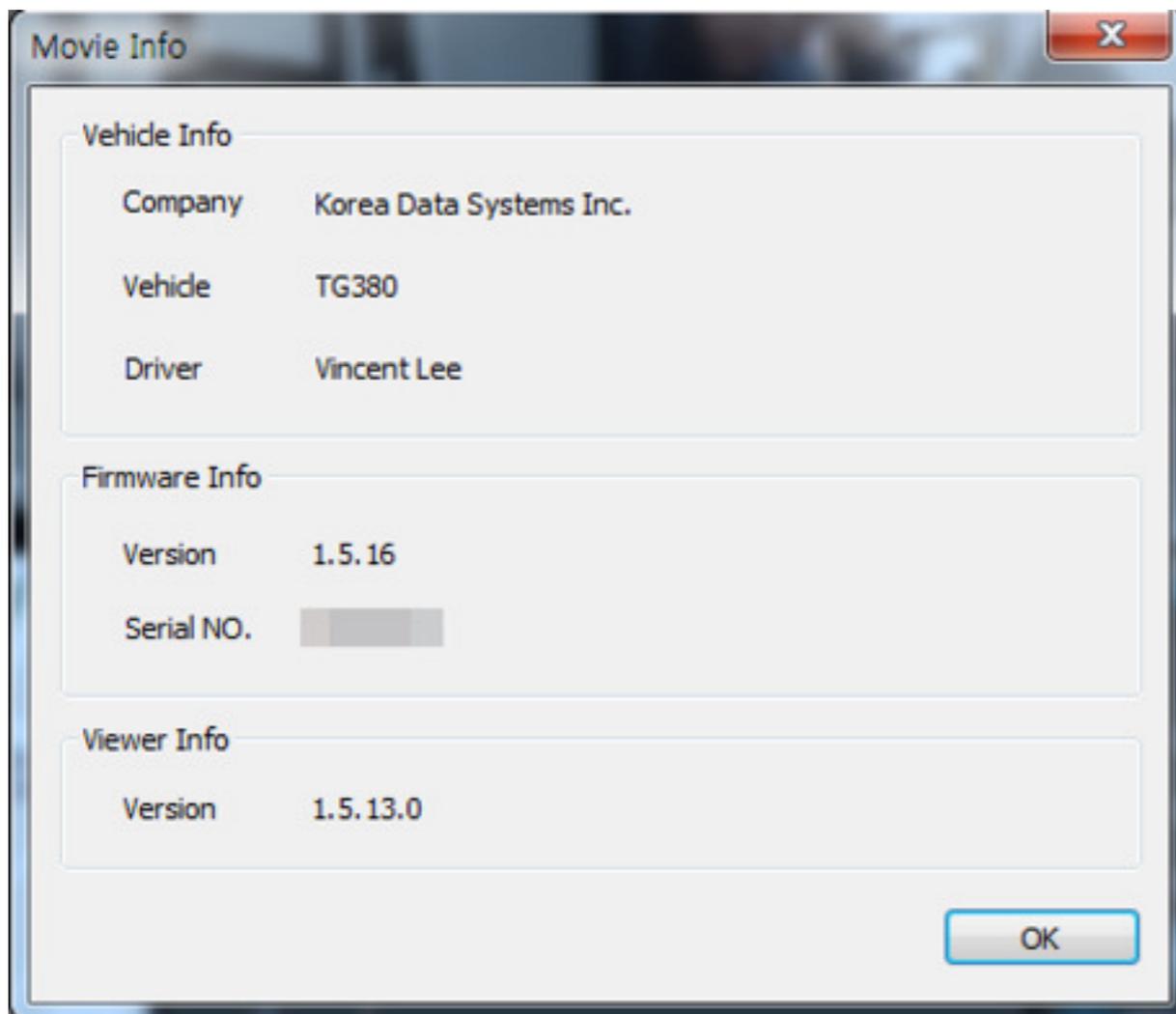
Enlarge Zoom





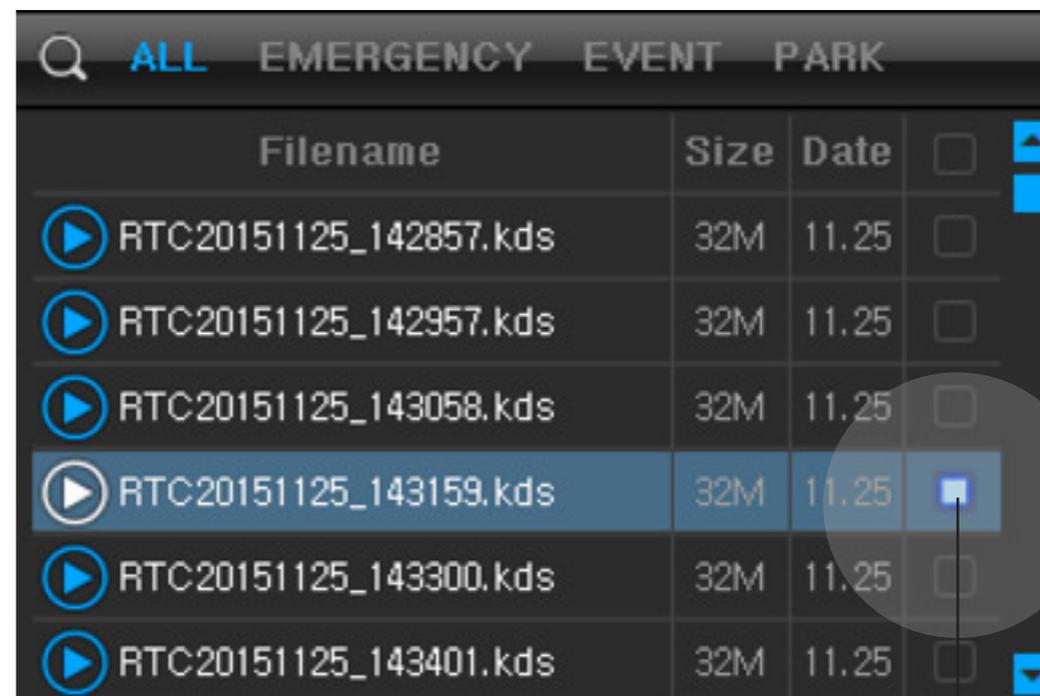
### File information

It is able to check the video file information.



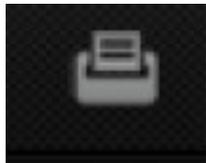
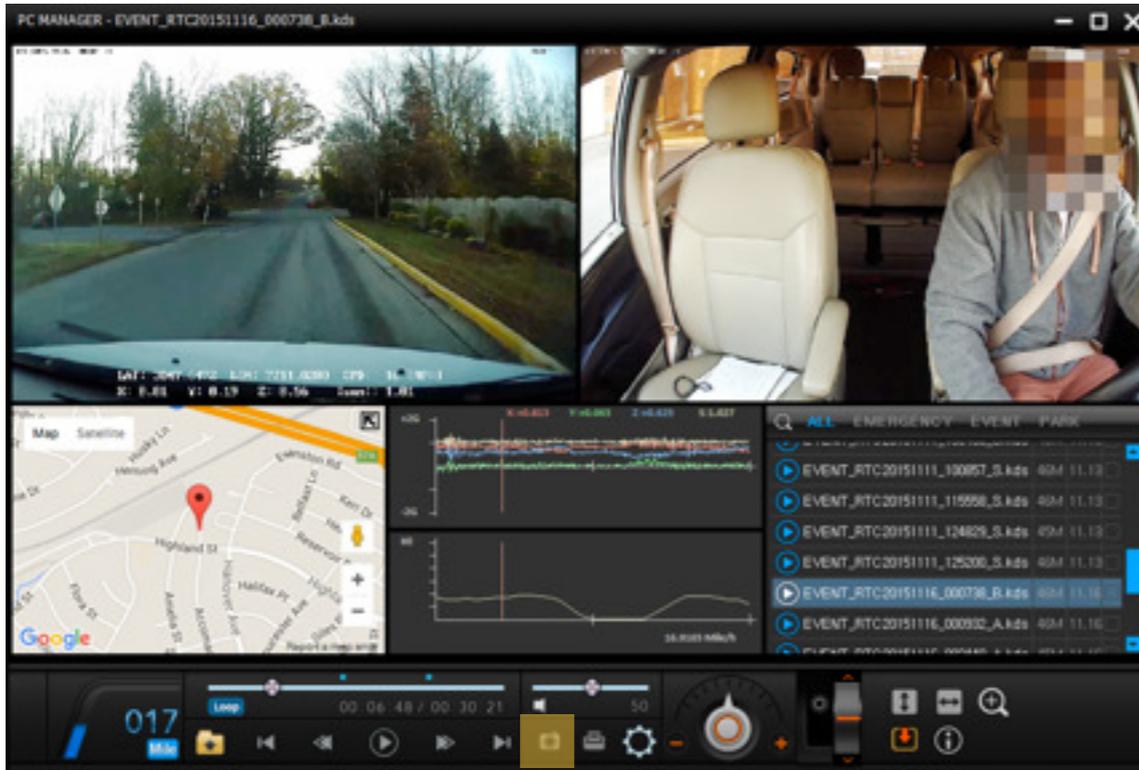
### File download

It is able to scrap the video file.



The file select

## Print Out Report



Click 'Print icon' to ready to print and entering comments on the report.



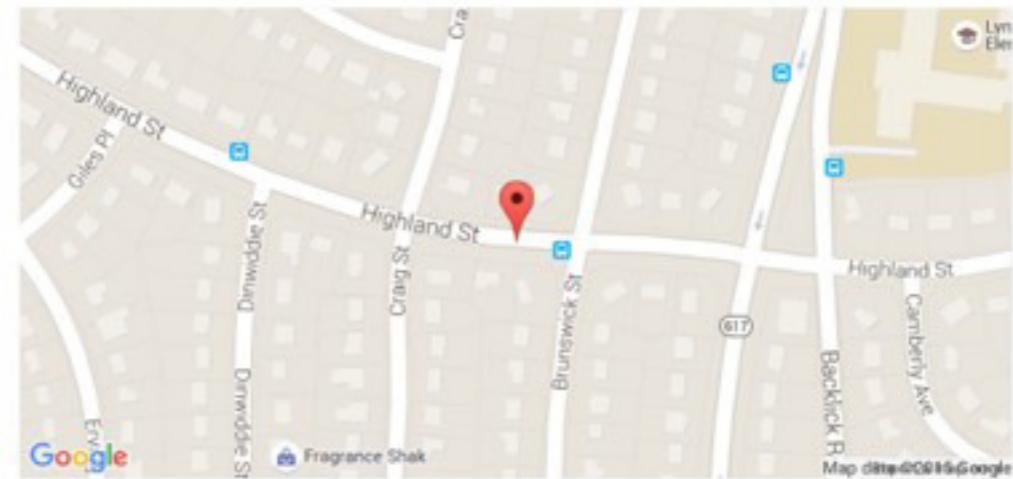
Enter any comments and click 'Print' button.

Print out the driving reports with map address and video snapshot.

## Driving Reports

Driver Name		Company Name	7038624572
Vehicle Number		File Name	EVENT_RTC20151116_000932_A.kds
Driving Date	2015-11-16 21:09:19	Longitudes	-77.188658
Latitudes	38.791142	Case	Event
Speed	6.98 [Kmh]		

Enter Comments Here: Aenean vulputate arcu nec urna imperdiet pretium eget sit amet augue. Mauris sit amet quam at augue laoreet hendrerit. Suspendisse potenti. Integer interdum purus nec nisi interdum egestas. Sed lacus eros, fermentum ut facilisis at, tristique vel diam. Vivamus elit justo, luctus ut lobortis id, mollis ac elit. Donec in dui eu nibh pulvinar porttitor.



7053 Highland St, Springfield, VA 22150, USA

## Snapshot image



Save JPG snapshot images

Front view snapshot / YYYYMMDD\_HHMMSS\_CH1.jpg



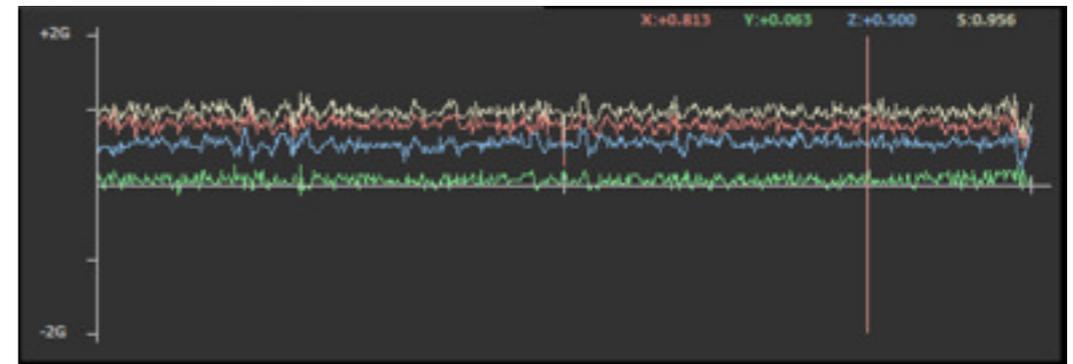
InCabin view snapshot / YYYYMMDD\_HHMMSS\_CH2.jpg



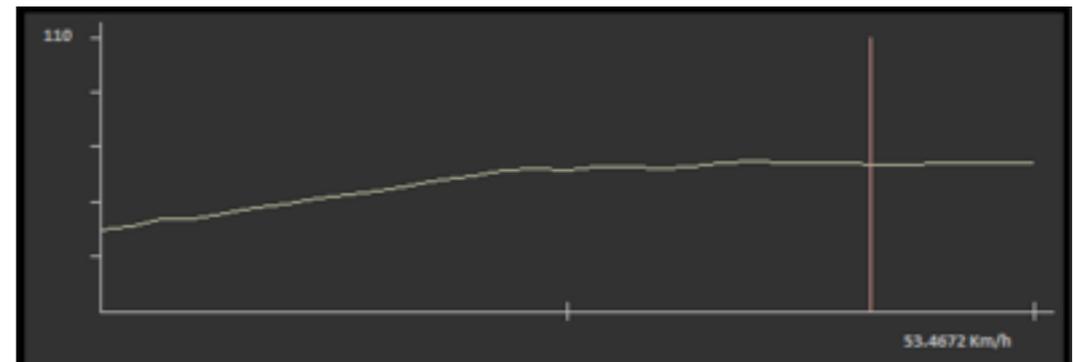
3rd view snapshot file name is YYYYMMDD\_HHMMSS\_CH3.jpg

## G-Sensor & Speed Graph

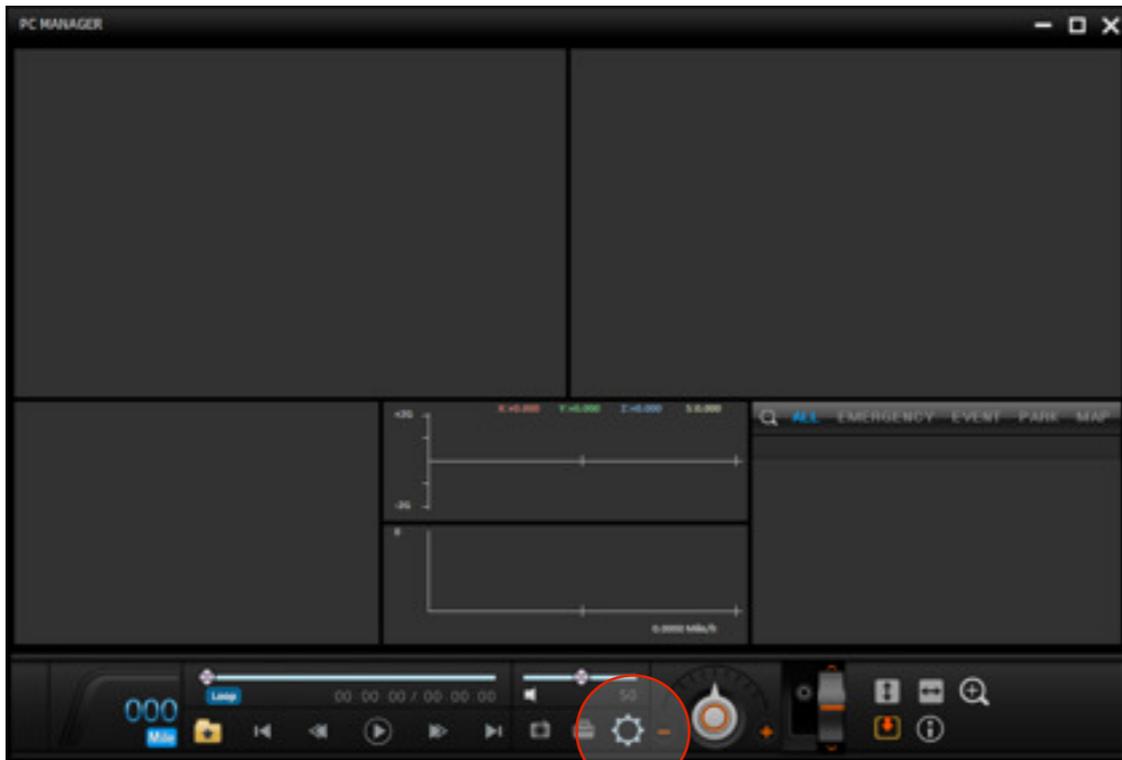
G-sensor Graph



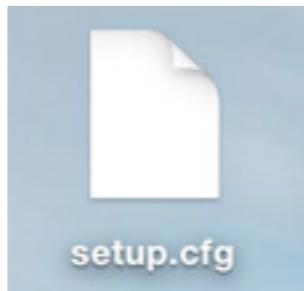
Speed Graph



# Configuration Settings



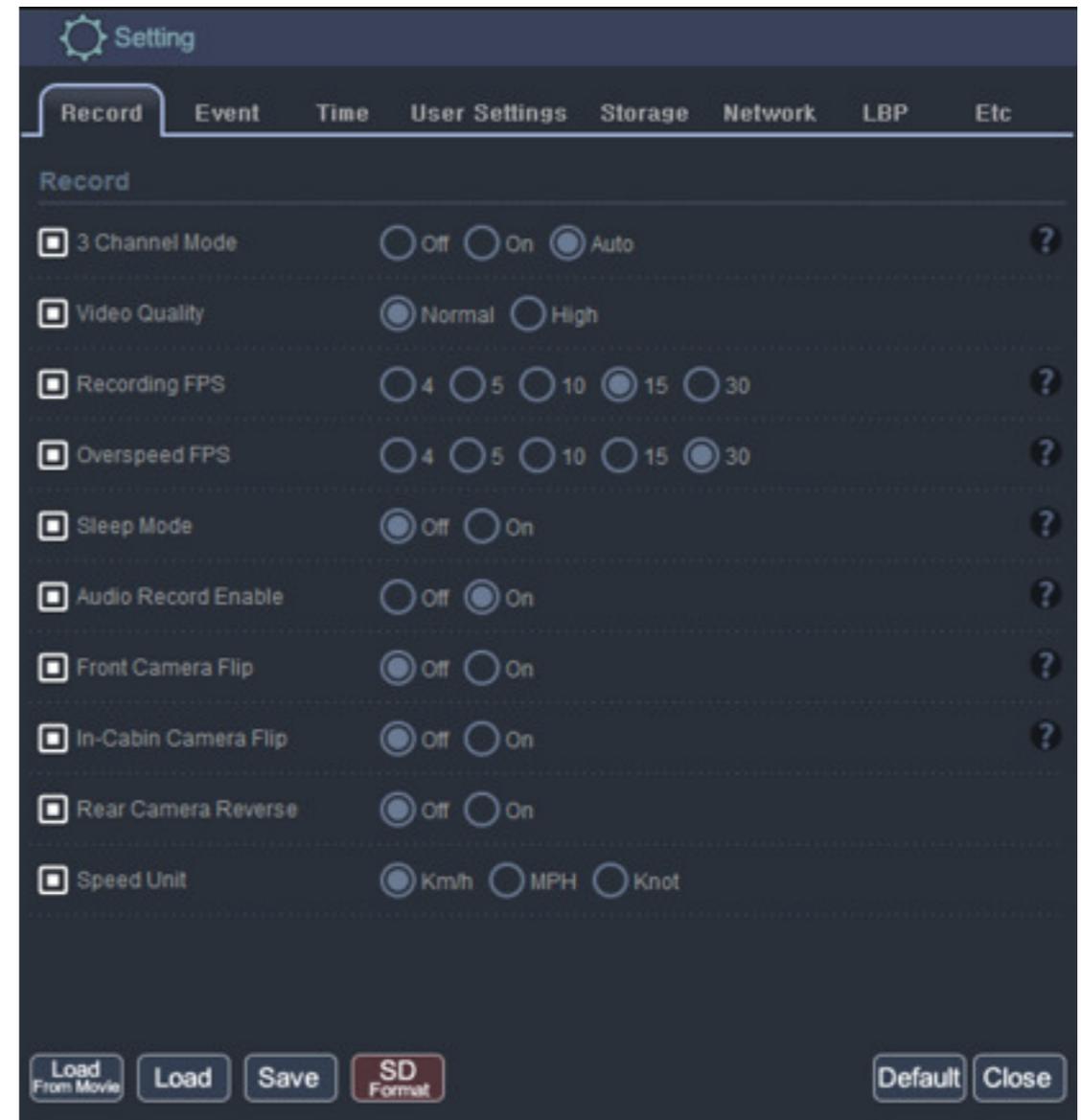
Setting Icon



It can be changed and save value of settings via creating setup.cfg file to memory card or HDD.

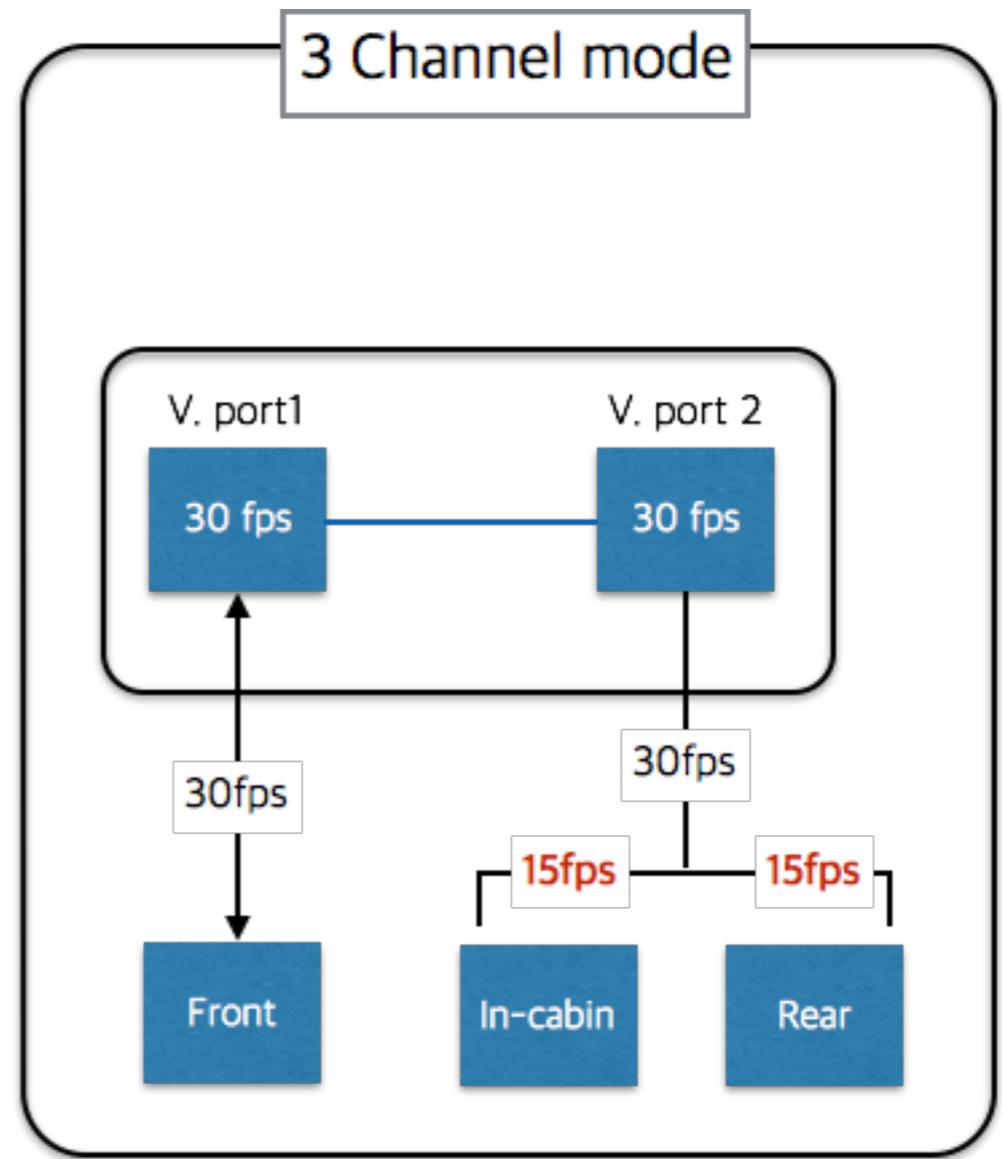
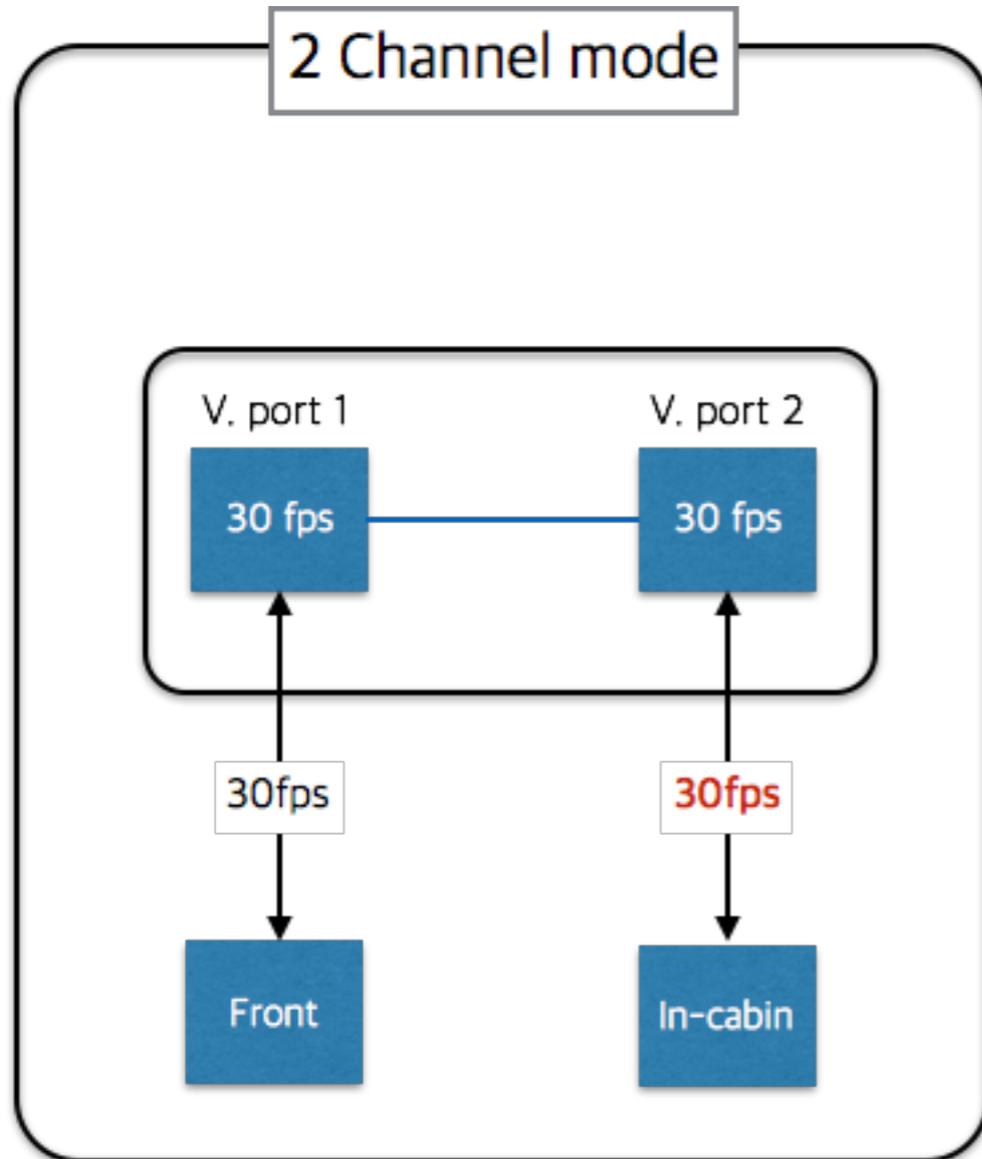
## Record

This 'Record' tap is able to setup for record type and other setting for video.



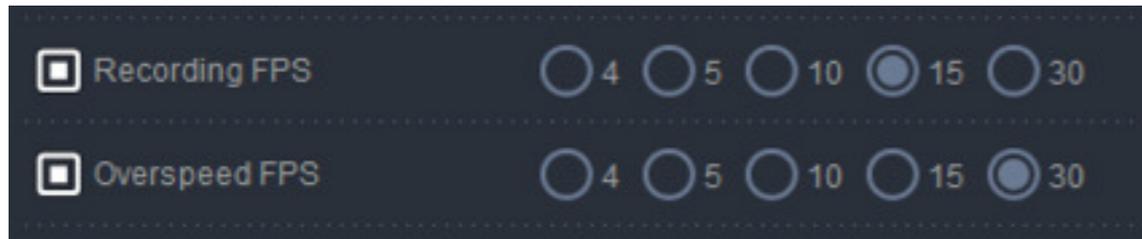
\* **3 Channel Mode:** Default value is 'Auto' and if connected 3rd camera then the **NDR** will auto detect and change 3 Channel mode.

\* **Recording FPS:** It is able to change video's fps value applies to all cameras. The lower frame value is makes longer time video save. Please refer to each channel mode management as below.

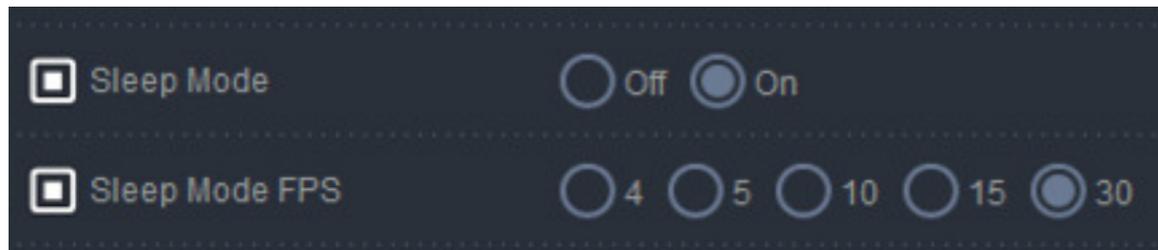


[ Max. fps value ]

\* **Over speed FPS:** It is setup for Event video Recording when an over speeding EVENT occurs.



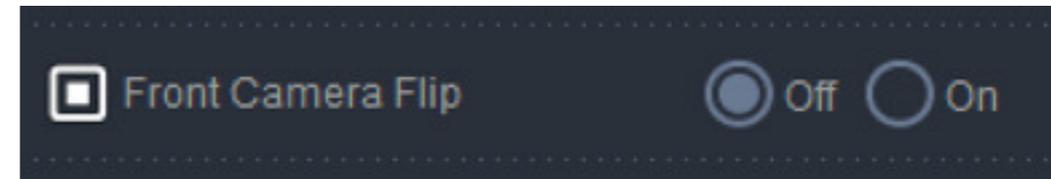
\* **Sleep Mode:** Motion detection mode while vehicle is parked. System automatically records when motion is detected.



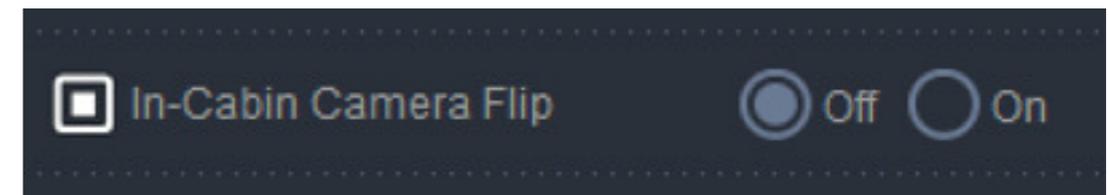
\* **Audio Record Enable:** Enable / Disable Microphone for audio recording.



\* **Front Camera Flip:** Inverting of camera angle.



\* **InCabin Camera Flip:** Inverting of camera angle.



\* **Rear(3rd) Camera Reverse:** Reversing of camera angle.



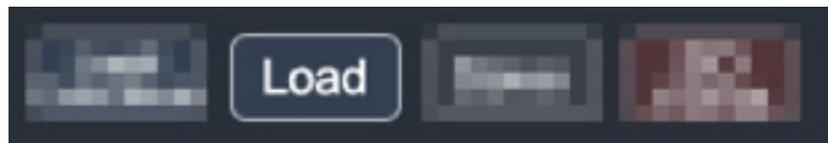
\* **Speed Unit:** Select your speed unit.



\* **Load from movie:** Import setting value from the movie listing.



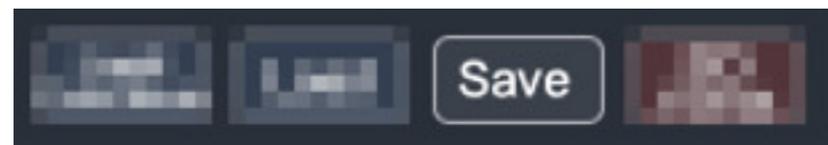
\* **Load:** Import setting value from 'setup.cfg' file from PC.



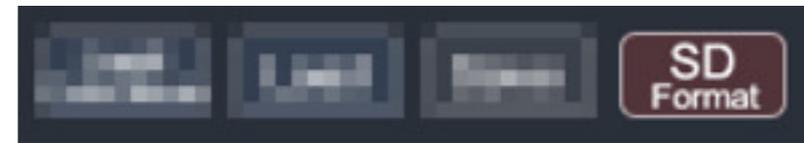
-  EMERGENCY
-  EVENT
-  LOG
-  NORMAL
-  PARK
-  setup.cfg



\* **Save:** Save setting value to micro SD card or removable memory for setting implement.



\* **SD Format:** Format micro SD card by PC. This format function is support maximum 32GB storage memory card. If needs format memory card more greater then 32GB then please use separate format program. Formatting the SD card will erase all content. Please back up data if necessary



\* **Default:** Restore factory settings.

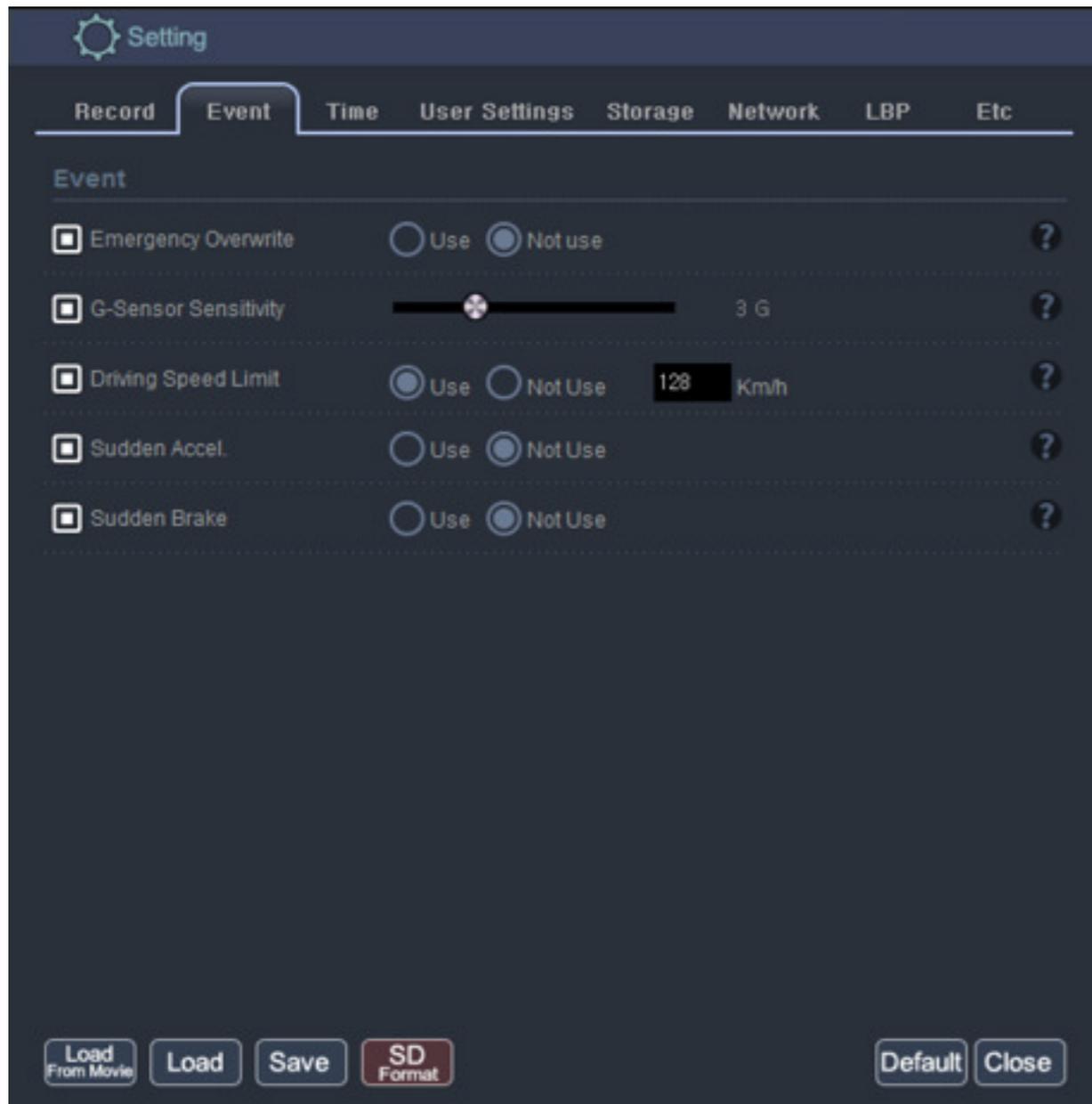


\* **Close:** Exit setting menu( NO settings are saved when exiting via CLOSE.) To save and exit, click on SAVE button.



# Event

This 'EVENT' tap is able to setup for event recording rules.



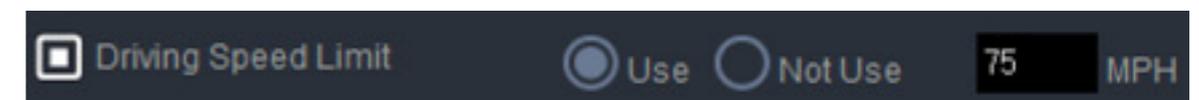
\* **Emergency Overwrite:** Disables overwrite of previously recorded Emergency Events (Foot Pedal Emergency Event Button) when storage capacity is full.



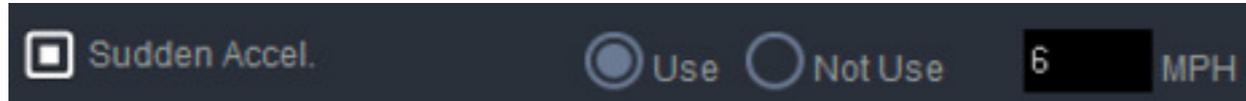
\* **G-Sensor Sensitivity:** Adjust the sensitivity of the G Sensor to detect vehicle vibration and shock. Lower G Sensor values (i.e. 2.0G) represents increased sensitivity than higher GG-Sensor values (i.e. 3.5G). Suggested value is minimum 3.0G to minimize false triggers.



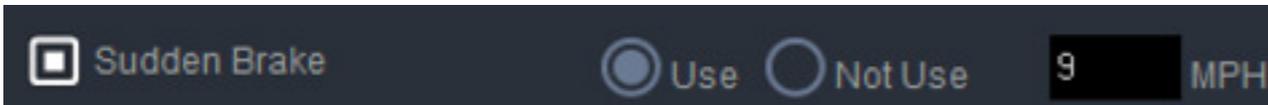
\* **Driving Speed Limit:** Enable / Disable maximum vehicle speed limit EVENT trigger. Enter max speed.



\* **Sudden Acceleration:** To monitor Sudden Acceleration for fleet safety and efficiency. Enter speed based on desired value. Suggested value is minimum 10 miles to avoid excessive false triggers. System calculates variation at 0.5 second intervals



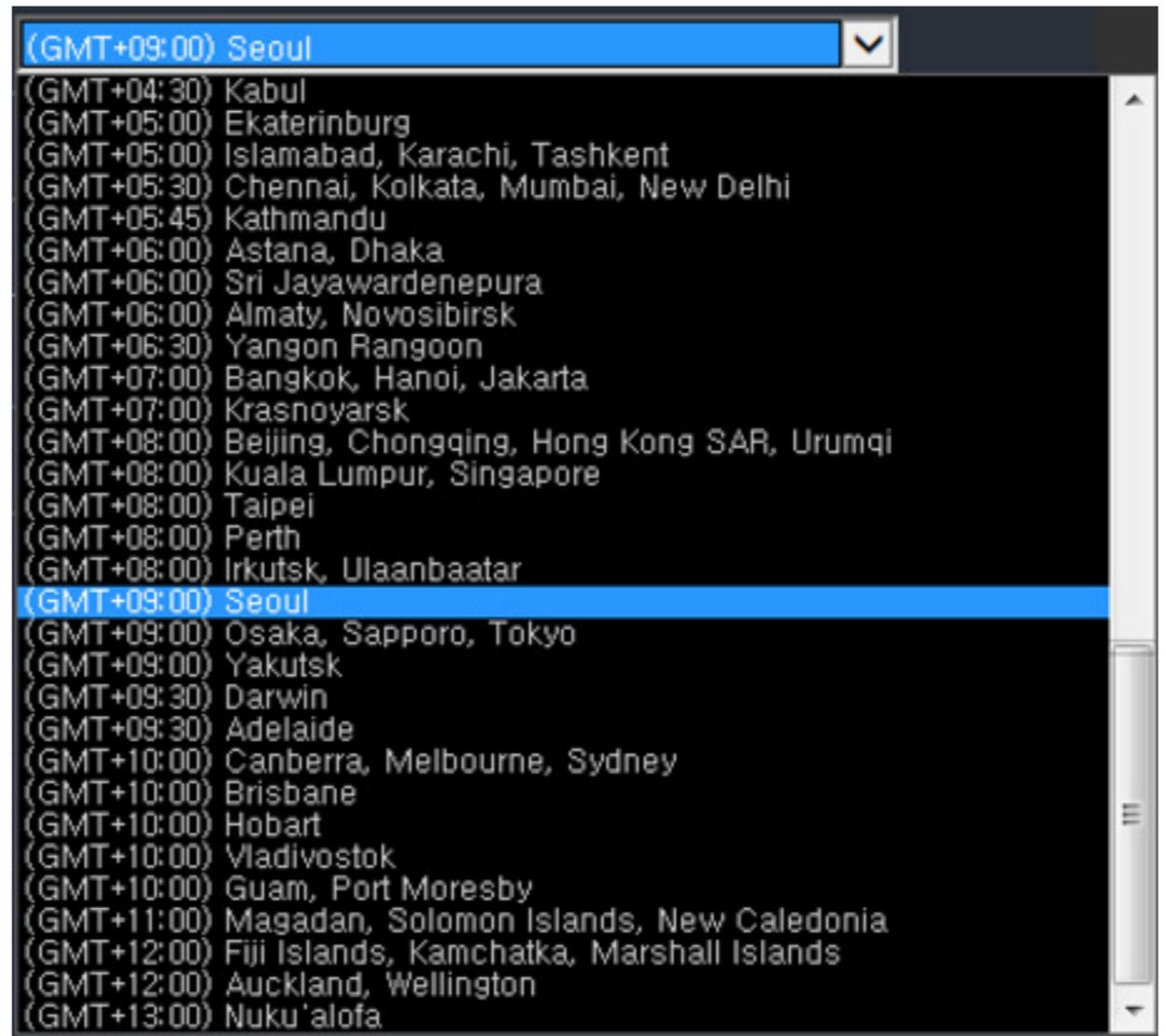
\* **Sudden Brake:** To monitor Sudden Braking for fleet safety and efficiency. Enter speed based on desired value. Suggested value is minimum 10 miles to avoid excessive false triggers. System calculates variation at 0.5 second intervals.



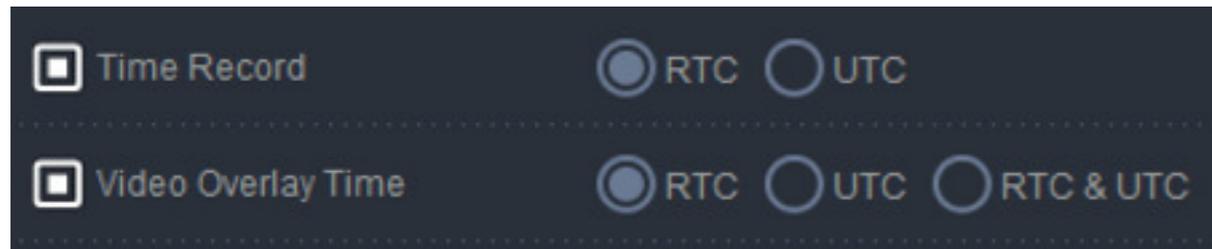
## Time

This 'TIME' tap is able to setup for location time.

\* **Time Zone:** The NDR is recorded time by UTC and RTC so, Please setup time zone to recording current time and location.



\* **Day Light Saving Time:** Enable / Disable Daylight Savings Time.

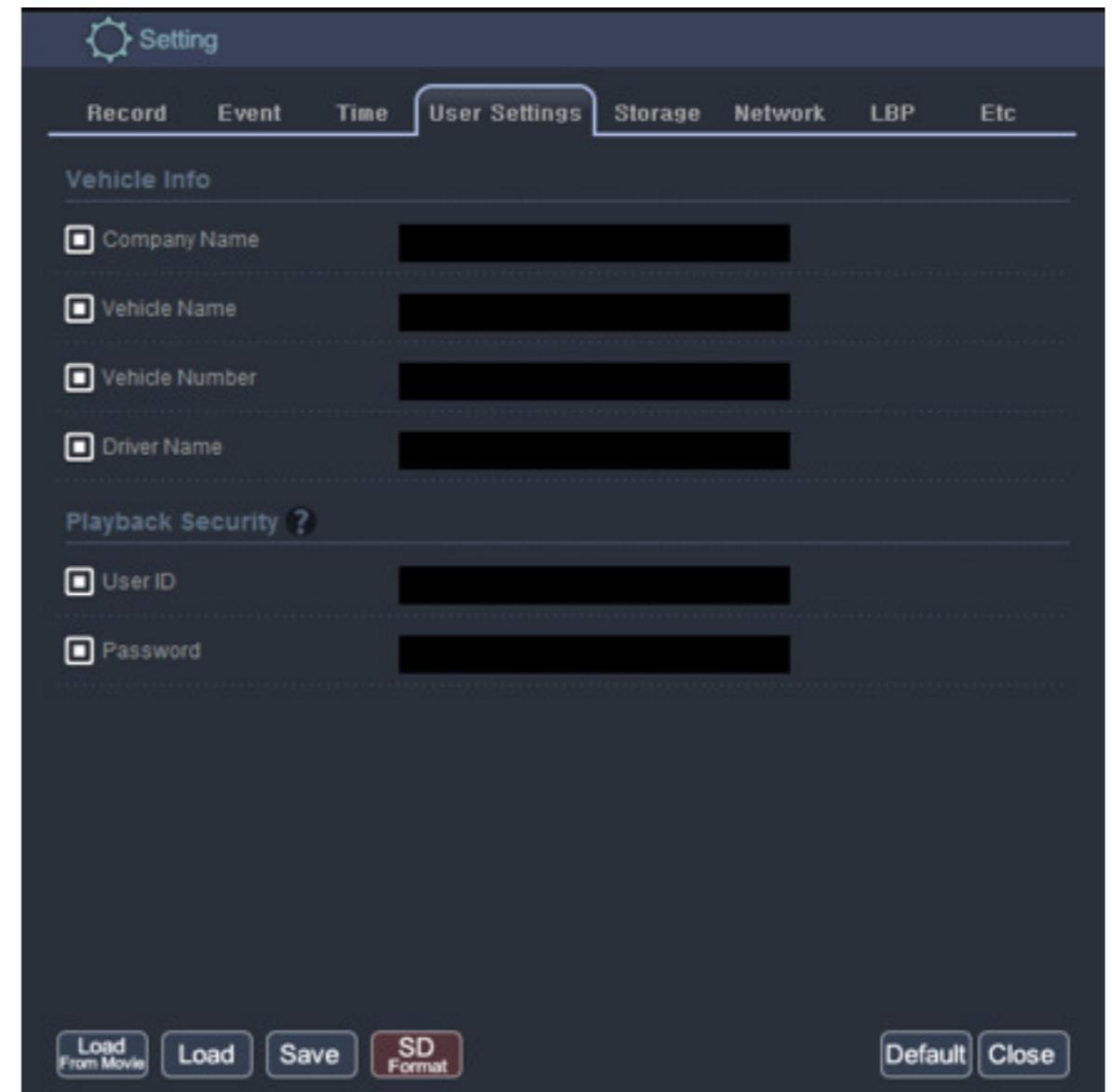


\* **Time Record:** All video and data files are saved in this format. To use local time, select 'RTC'

/RTC: Regional Time in Current  
/UTC: Coordinated Universal Time  
/RTC = UTC + Offset Time(GMT)

## User Settings

This 'USER SETTINGS' tap is able to setup driving information and it will be displayed to video overlay and driving report.



\* **Company name:** Enter company name to this blank and the **NDR** will record video file and data by this company name. This information is able to mark in video overlay(watermark)

Company Name      ABCD Company Ltd.

\* **Vehicle name:** Enter Vehicle name to this blank and the **NDR** will record video file and data by this Vehicle name. This information is able to mark in video overlay(watermark)

Vehicle Name      TG380

\* **Vehicle number:** Enter Vehicle number to this blank and the **NDR** will record video file and data by this Vehicle number. This information is able to mark in video overlay(watermark)

Vehicle Number      45GA4985

\* **Driver name:** Enter Driver name to this blank and DR will record video file and data by this Driver name. This information is able to mark in video overlay(watermark)

Driver Name      Vincent Lee

\* **Playback Security:** Administrator is able to lock the video play and open each file.

User ID      TruckABC

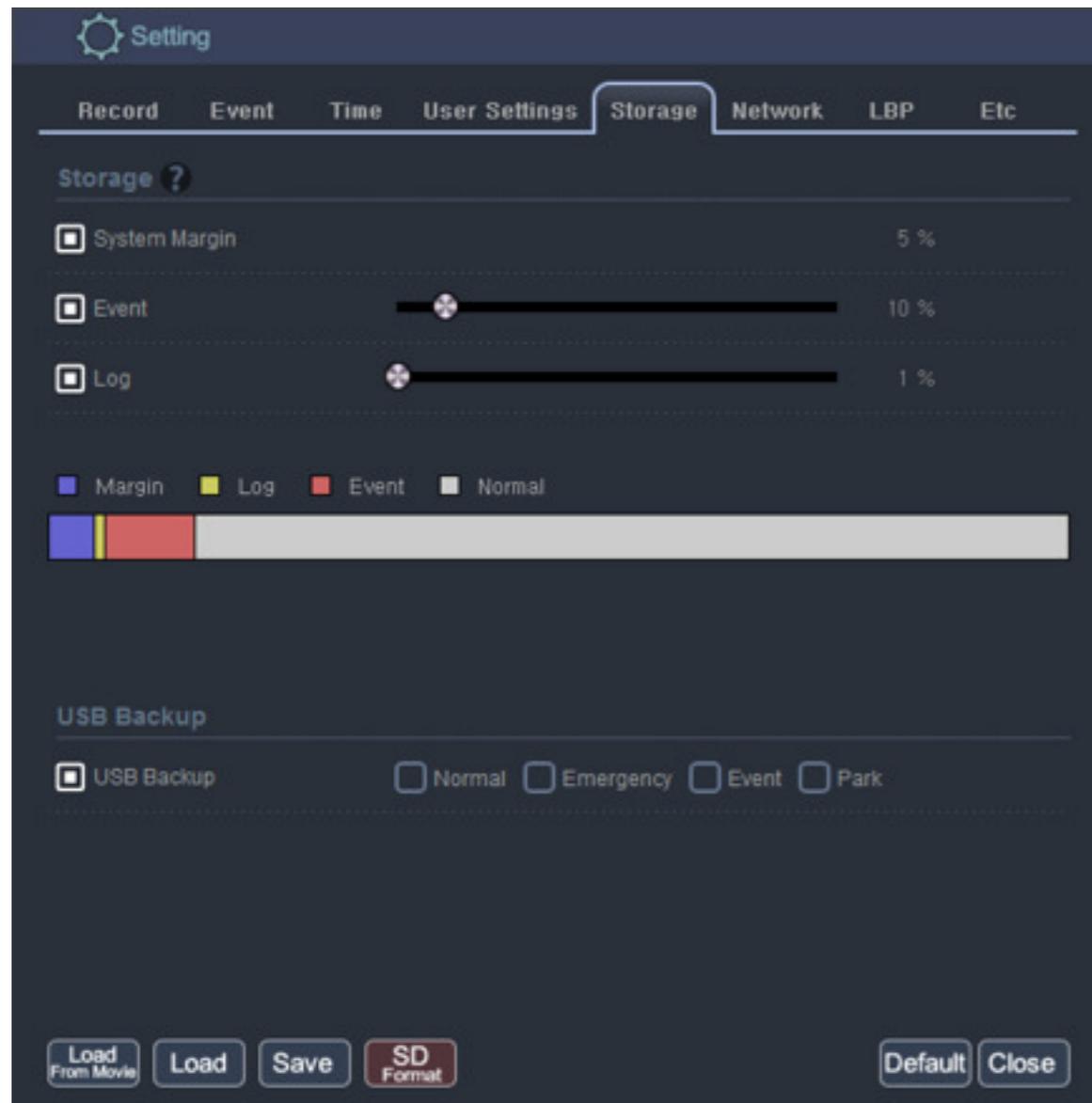
---

Password      ●●●●●●●●

## Storage

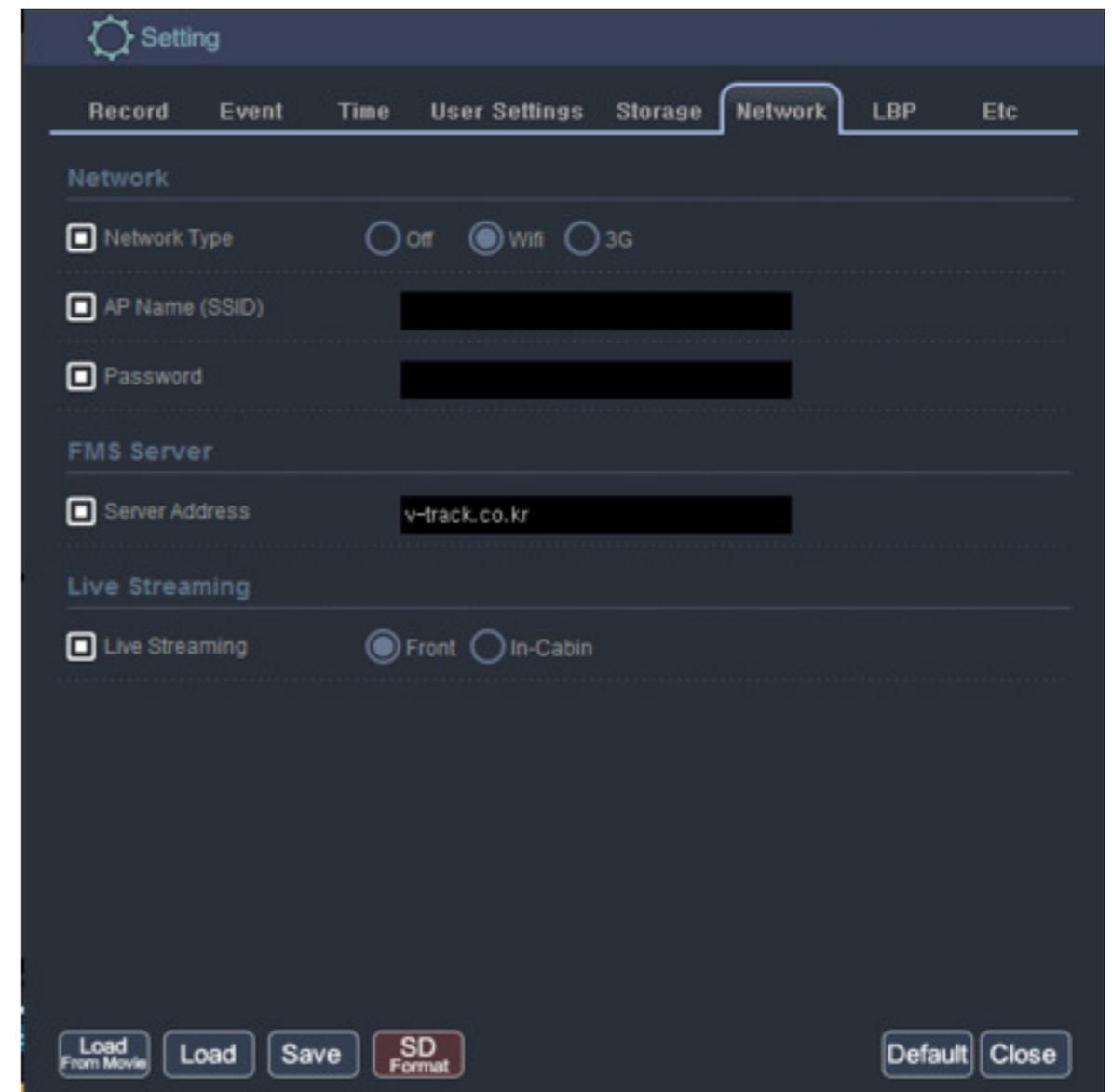
Storage setting is Manage and allocate micro SD card storage capacity to individual recording segment.

Recommend minimum 35% storage capacity to Event.



## Network

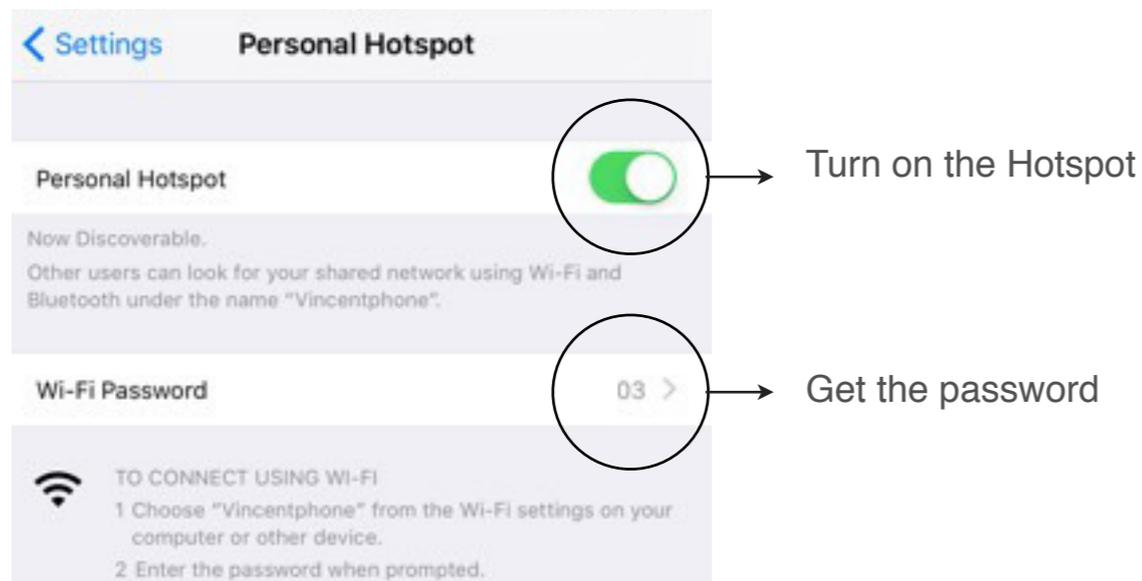
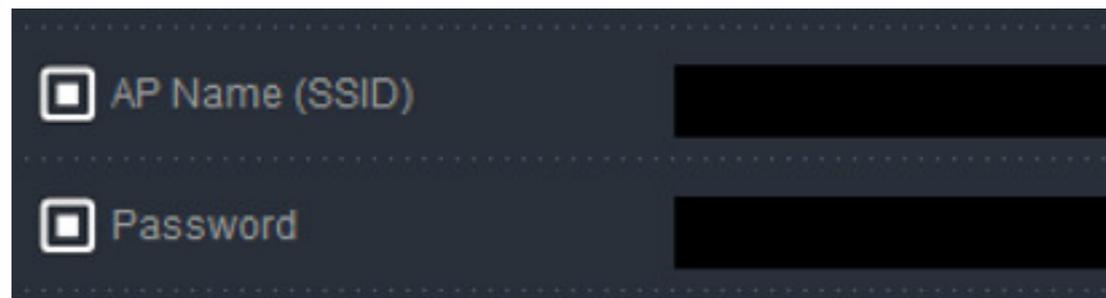
Network setting is setup wireless telecommunication environment to use FMS(Fleet Management System)



\* **Network Type:** Select type of network method for use.



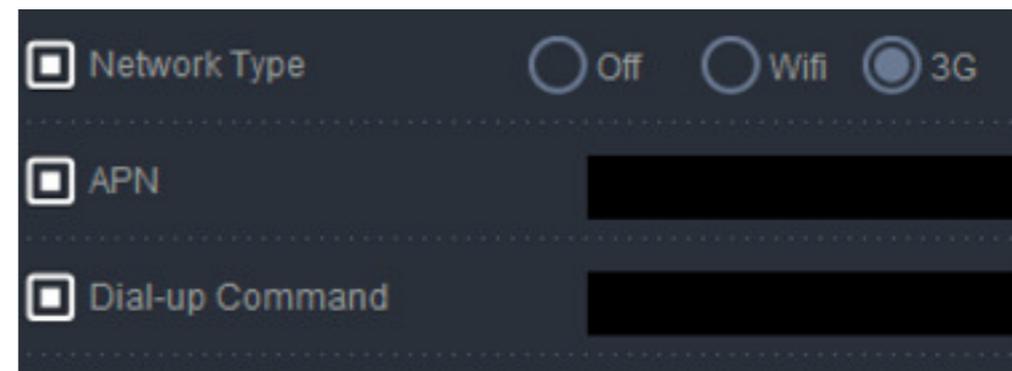
\* **AP Name(SSID) and Password:** Enter the SSID and password.



\* **3G/LTE:** To connect using 3G or LTD modem via USB(micro USB) port.

It is necessary to verify modem from carrier site only first time.

1. Connect the 3G or 4G modem to PC and check driver detect.
2. Open internet web browser and go to carrier site as guiding of program( ex. <http://192.168.9.1/>)
3. Check and enter APN and IPv4 number as your USIM and Carrier information and try to internet connect by the modem.
4. If the internet is available use then connect the modem to the NDR by cable. It is may not necessary to enter APN and Dial-up Command code when the modem has success use internet by PC at first time.



\* **Server Address:** Entering your server address. If you are not sure the URL address for server access then contact to your distributor.



\* **Live Streaming:** This selection is needs to 3 Channel mode device for monitoring cameras via FMS server only. If the **NDR** operating 2 Channel mode then it is able to switching camera between Front and InCabin view.

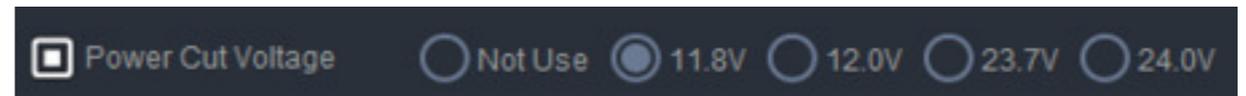


View Switching button by Live Streaming pop-up page

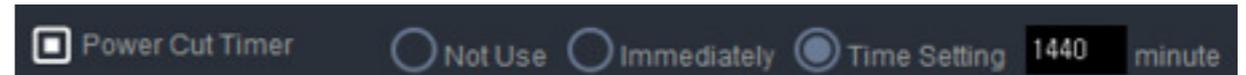
## LBP

The NDR can prevent the discharge of the vehicle battery by blocking power to the NDR and modem if the voltage drops below a configured value or if the configured time has elapsed.

Monitoring the voltage and power cutoff

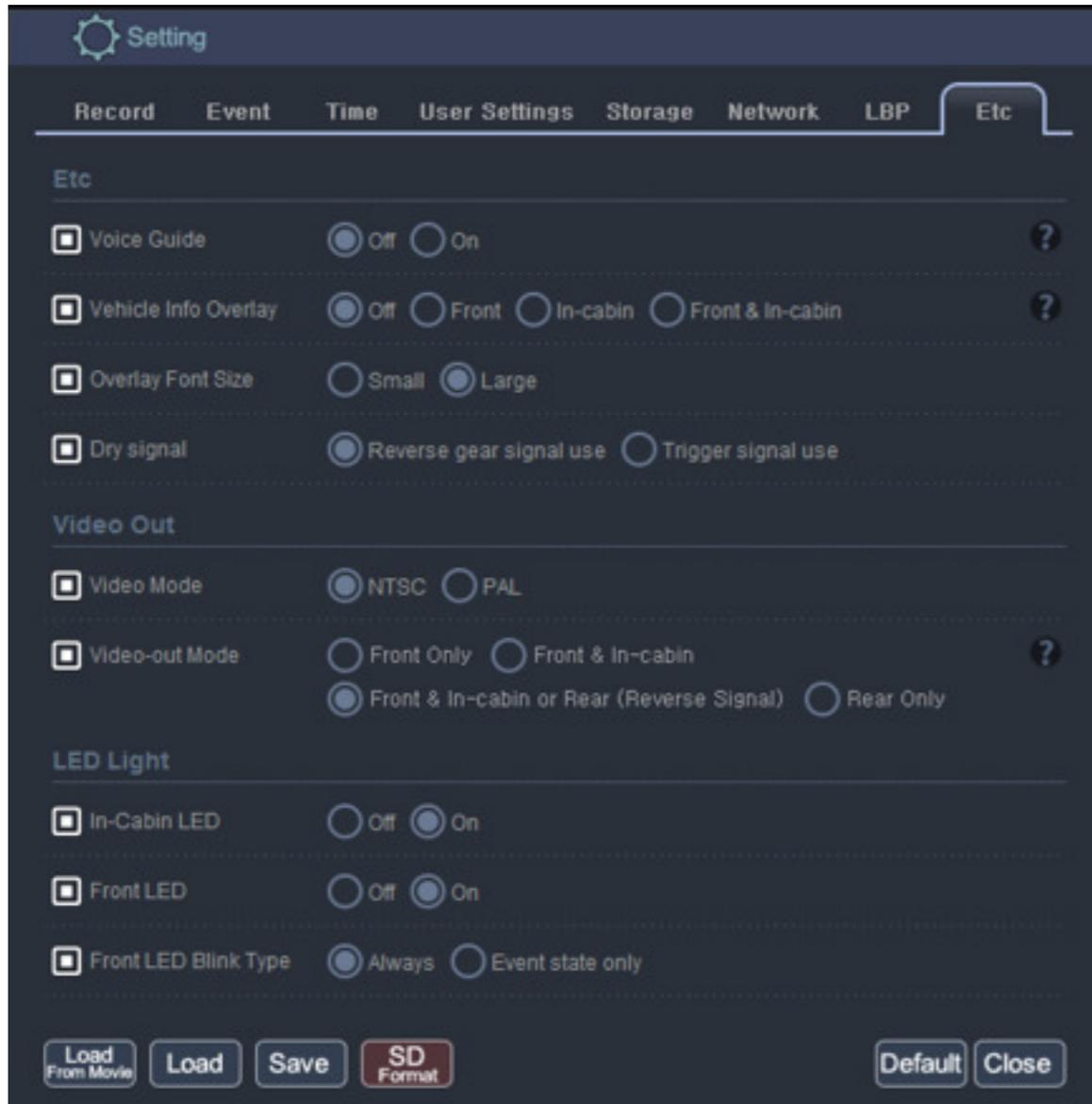


Set power cutoff timer

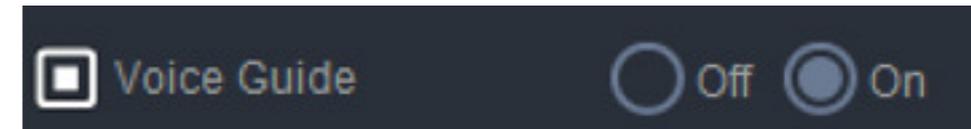


## Etc.

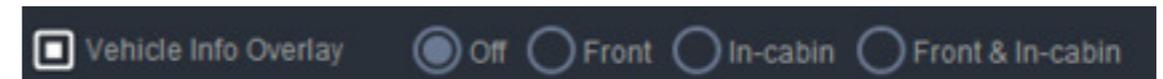
This 'Etc.' tap is for setting LED light and sound output rules.



- \* **Voice Guide:** Voice prompt for system startup and recording. If don't need to any sound out up then select 'Off'.



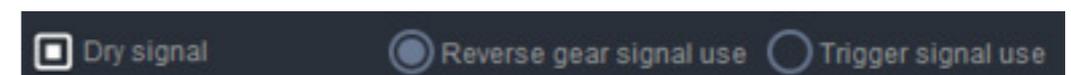
- \* **Vehicle Info Overlay:** Watermark Vehicle, Driver and Company information on video.



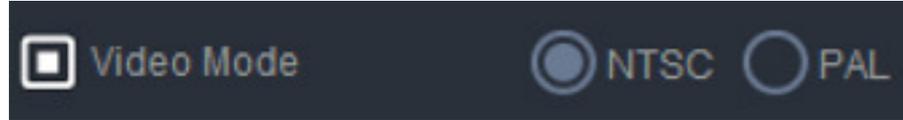
- \* **Overlay Font Size:** This selection is changing overlay text font size.



- \* **Dry signal:** The NDR is able to receive trigger signal from external device which device is output electronic signal 'High' and 'Low'. If it selected 'Trigger signal use' then it is working same as 'Emergency Event' file sort(Trigger Event).



\* **Video Mode:** This selection is for 'Video-out' frequency.



**NTSC-Compatible countries/regions**

Bahamas, Canada, Central America, Japan, Korea, Mexico, Philippines, Taiwan, United States of America, etc.

**PAL-Compatible countries/regions**

Australia, Austria, Belgium, Bulgaria, China, CIS, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Great Britain, Holland, Hong Kong, Hungary, India, Iran, Iraq, Kuwait, Libya, Malaysia, Mauritius, Norway, Romania, Saudi Arabia, Singapore, Slovak Republic, Spain, Sweden, Switzerland, Syria, Thailand, Tunisia, etc.

\* **Video Mode:** This selection is for 'Video-out' mode. When optional LCD monitor is connected for real time video viewing ( ➤ page 44)



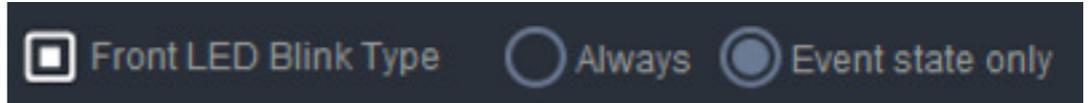
\* **In-Cabin LED:** This selection is setup for control blinking enable to In-Cabin LED operating.



\* **Front LED:** This selection is setup for control blinking enable to operating LED



\* **Front LED Blink Type:** This selection is setup for control blinking rules to operating LED. If don't need to blinking 'Operating LED' without Event occur then select 'Event state only'. ( After saved Event video file then 'operating LED' will off in automatically.)



# Specification

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Component		Description	Remarks
CPU		Cortex-A8 (800MHz) Processor	Linux ARM
Camera	1st/ Front	Digital HD CMOS Sensor	1280 x 720p (HD)
	2nd/In-Cabin	Digital HD CMOS Sensor	1280 x 720p (HD)
	3rd/Rear camera	NTSC Analog D1 Composite	720 x 480p (D1), Optional
Angle of view	Front Lens	92(H), 64(V), 120(D)	5 Element All Glass Lens
	In-Cabin Lens	110(H), 74(V), 150(D)	
DDRII RAM		256 MB	SAMSUNG
NAND Flash Memory		256 MB	SAMSUNG
G-Sensor		3-Axial acceleration sensor	up to $\pm 8G$
Speaker / MIC		Mono Speaker / Internal MIC	
Super capacitor		DC 5V / over 5F	Ensures safe shutdown
GPS Module Antenna		Built in Cradle	Supports additional external GPS Antenna
Removable storage		micro SDHC(MLC) x 2 slots	128 GB max per slot (MLC)
Video out put		NTSC/PAL	2.5mm jack to RCA
Hardware Interface	DC IN	3.5 $\emptyset$ DC input jack	3 Type of wire for Ignition detect
	GPS	2.5 $\emptyset$ 4PIN ear phone jack	
	VIDEO OUT	2.5 $\emptyset$ 4PIN ear phone jack	
	CAMERA IN	2.5 $\emptyset$ 4PIN ear phone jack	Reverse gear or Trigger signal support
	micro USB	Micro-USB Type B	Host mode / DC 5V supply
	USB	USB Type-A	

Component		Description	Remarks
Video Codec	Format	Private Encryption / H.264	mp4 support via Firmware update
	Mode	2 Channel	3 Channel
	Front	4Mbps / @30fps	4Mbps/ @27fps
	In-Cabin	4Mbps/ @30fps	2Mbps/Max.@15fps
	3rd Camera	N/A	512kbps/Max.@15fps
Audio Codec		PCM	Monaural, 22.05Khz, 16bits
Recording	Uninterrupted Recording		One file / min(60s±1s)
	Button Event recording		15 sec.±0.25s before; 15 sec.±0.25s after (Total 30 sec. Event file)
	SOS Event recording		
	G-sensor Event recording		
Operating Power Voltage		DC 8V ~ 32V	
Operating Temperature		-25°C to +85°C	
Storage temperature		-30°C to +95°C	
Dimension	109(w) x 82(H) x 19(D) / mm		Main body, excluding camera lens protrusion
	121.9(W) x 104.2(H) x 46.1(D) / mm		Main body with GPS cradle and tamperproof case, excluding camera lens protrusion
Weight		Main device: 138g / GPS Cradle : 42g	
Warranty Period		1 year after purchased	
MTBF		7 years	KC, FCC, EC, RoHs
Product guarantee period		5 years	Made in Korea

※ The technical specifications and design may be changed without notice.

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## Power Consumption

### DC 12V

Condition		2 Channel	3 Channel
Not Connected	Normal mode	505mA ± 5%	590mA ± 5%
	Sleep mode	470mA ± 5%	560mA ± 5%
Wi-Fi Connected	Normal mode	560mA ± 5%	630mA ± 5%
	Sleep mode	520mA ± 5%	610mA ± 5%

### DC 24V

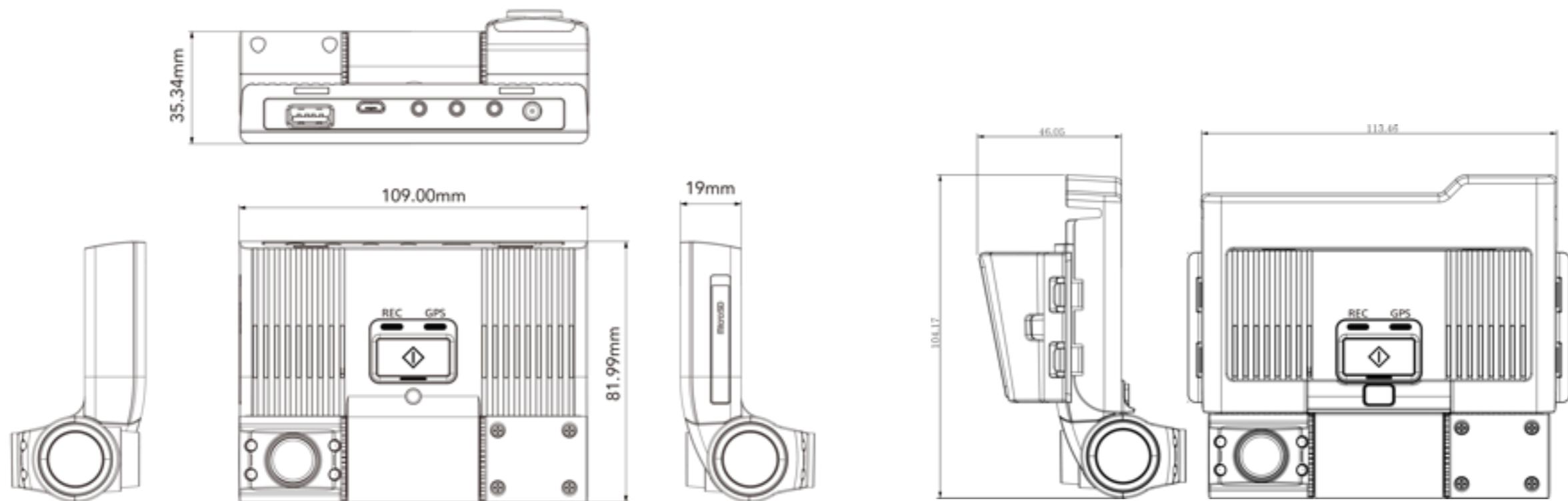
Condition		2 Channel	3 Channel
Not Connected	Normal mode	255mA ± 5%	290mA ± 5%
	Sleep mode	235mA ± 5%	275mA ± 5%
Wi-Fi Connected	Normal mode	280mA ± 5%	315mA ± 5%
	Sleep mode	260mA ± 5%	300mA ± 5%

---

## Power Consumption / 3rd Camera

Supplied Power on VT-300	IR Status	RCAM-9990IR	RCAM-D16M(E)
DC 12V	IR ON	145mA	X
	IR OFF	85mA	60mA
DC 24V	IR ON	73mA	X
	IR OFF	43mA	30mA

## Dimension





### **RoHS COMPLIANT**

The NDR complies with “The Restriction of the use of certain Hazardous Substances in electrical and electronic equipment”, and we do not use the 6 hazardous materials- Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr +6), Poly Brominated Biphenyls (PBBs), Poly Brominated Biphenyl Ethers (PBDEs)- in the NDR.

# Warranty

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## **COMPANY LIMITED WARRANTY**

We warrants that this product is free from defective material and workmanship.

We further warrants that if product fails to operate properly within the specified warranty period and the failure is due to improper workmanship or defective material, We will repair or replace the product at it's option.

All warranty repairs must be performed by a We authorized service center.

On carry-in models, transportation to and from the service center is the customer's responsibility.

The original dated sales receipt must be retained by the customer and is the only acceptable proof of purchase.

It must be presented to the authorized service center.

## **EXCLUSIONS (WHAT IS NOT COVERED)**

This warranty does not cover damage due to accident, fire, flood and/or other acts of God; misuse, incorrect line voltage, improper installation, improper or unauthorized repairs, commercial use, or damage that occurs in shipping.

Exterior and interior finish, lamps, and glass are not covered under this warranty.

Customer adjustments which are explained in the instruction manual are not covered under the terms of this warranty.

This warranty will automatically be voided for any unit found with a missing or altered serial number.

Some Nations do not allow the exclusions or limitations of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you.

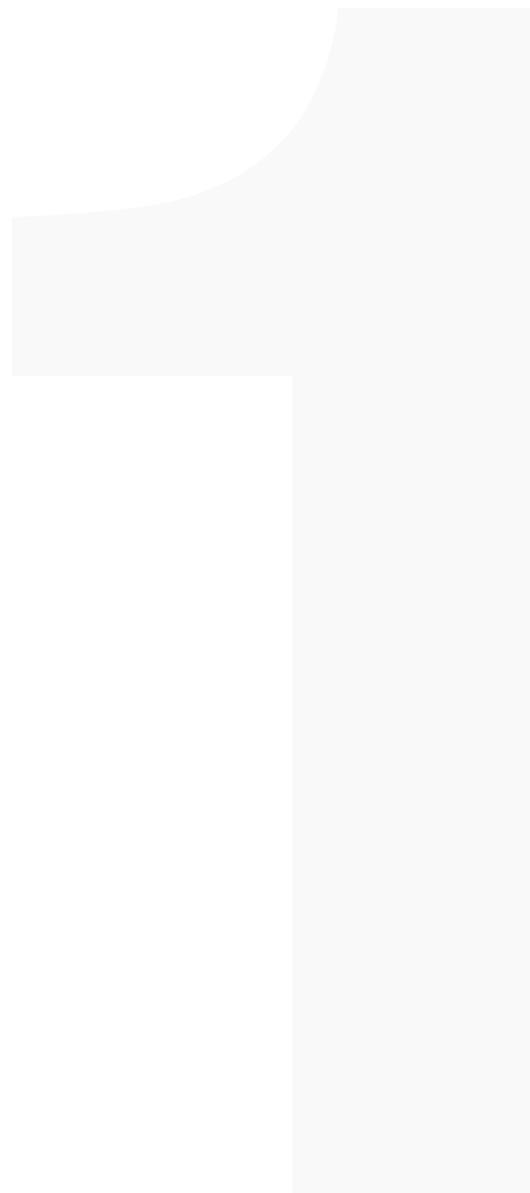
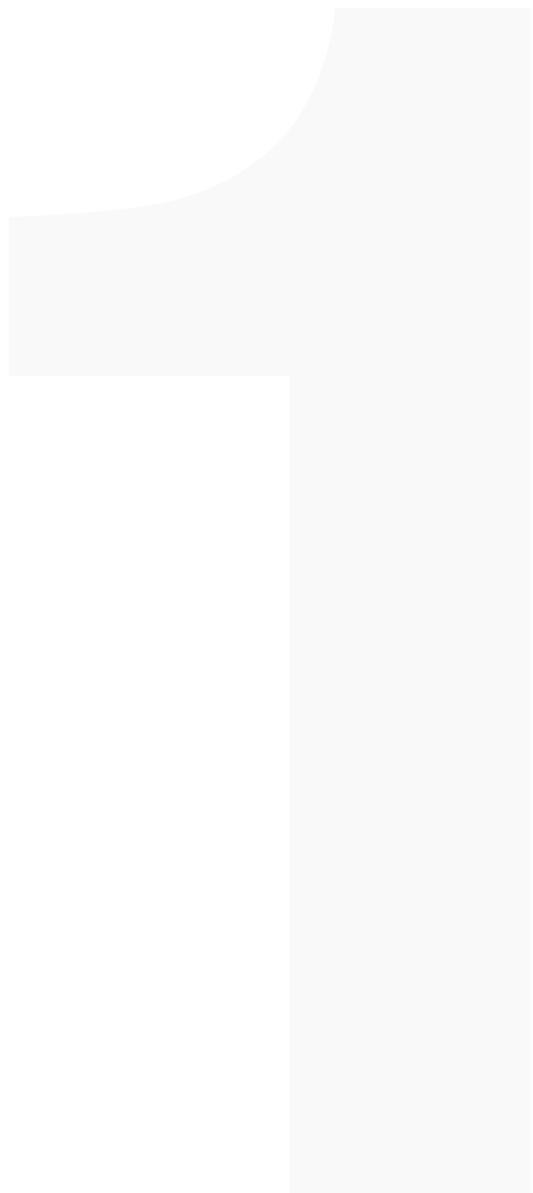
This warranty gives you specific legal rights, and you may also have other rights which vary from nation to nation.

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# Glossary



## Glossary

Items	Descriptions
DST	Daylight Saving Time
FMS	Vehicle Fleet Management Systems
LBP	Low Battery Protection Technology ( Battery Discharge Prevention Technology )
NDR	Network Drive Recorder
Resolution	The number of pixels present in a digital image. High resolution images contain more pixels and typical show more detail than low resolution images.
RTC	Regional Time in Current RTC = UTC + Offset Time(GMT)
UTC	Coordinated Universal Time
SDHC	The Secure Digital High Capacity(SDHC) format. SDHC cards are shipped reformatted with the FAT32 file system.
SDXC	The Secure Digital eXtended Capacity(SDXC) format.

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4G LTE LIVE VIDEO STREAMING | REAL TIME GPS TRACKING

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# DST

Daylight Saving Time.

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## Related Glossary Terms

RTC, UTC

---

**Index**

Find Term

# FMS

Vehicle Fleet Management Systems

---

## Related Glossary Terms

Drag related terms here

---

**Index**

Find Term

# LBP

1.Low Battery Protection Technology

2.Battery Discharge Prevention Technology

---

## Related Glossary Terms

Drag related terms here

---

**Index**

Find Term

# NDR

Network Drive Recorder.

---

## Related Glossary Terms

Drag related terms here

---

**Index**

Find Term

**Chapter 1 - Before reading this user manual**

# Resolution

The number of pixels present in a digital image. High resolution images contain more pixels and typically show more detail than low resolution images.

---

## Related Glossary Terms

Drag related terms here

---

**Index**

Find Term

# RTC

Regional Time in Current

$RTC = UTC + \text{Offset Time(GMT)}$

---

## Related Glossary Terms

DST, UTC

---

**Index**

Find Term

# SDHC

The Secure Digital High Capacity(SDHC) format.

SDHC cards are shipped reformatted with the FAT32 file system.

---

## Related Glossary Terms

SDXC

---

**Index**

Find Term

# SDXC

The Secure Digital eXtended Capacity(SDCX) format.

---

## Related Glossary Terms

SDHC

---

**Index**

Find Term

# UTC

Coordinated Universal Time

---

## Related Glossary Terms

DST, RTC

---

**Index**

Find Term