SMARTER

DUAL Video Drive Recorder

Installation and Operators Manual

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SMARTER Main Features

Unlike other in-car recording systems, your SMARTER Drive Recorder is used to record both video and audio data in a continuous loop fashion. If the vehicle is involved in an accident such as a collision, impact, and sudden acceleration-related incident, this data is marked and stored. One may thereafter analyze the data to find its root cause by playing back the scenes of interest and where acceleration, vehicle speed, direction, and location are available for review. Added to the recording are vehicle speed and direction and GPS location. Interior video helps a company enforce existing cell phone restrictions and policies. Exterior video provides protection where the driver is not at fault.

Continuous recording

The video and audio data from the front and interior views is continuously recorded while power on. When the capacity of the SD card has been reached, the oldest files are overwritten by the latest ones in a "round-robin", first in, first out fashion.

Pre and post event recording

When impact or unusual acceleration or deceleration is detected by the built-in 3 axis G-Sensor and has exceeded the preset limit or the external emergency record button is pushed----the recorded video data is locked-in and is erased only by an authorized party and by using a PC or laptop, accessing that camera's SD card. Event data records 1 minute before and 1 minute after it is triggered. (Note: The User may set the pre-event time to either 1 minute, 2 minutes or 3 minutes of pre-event recording). The next time the SD card is read by the unit, the unit's set up parameters will be uploaded into the recorder.

Night view recording with Infra-Red Light

The included IR (Infra-Red) Light module with adjustment used this invisible light source to assist in recording nighttime views from the interior camera facing the driver and passenger.

Playback of video/audio data

The recorded data can be played back using the provided playback software which resides on the SD card. By removing the SD card and accessing the Player folder and double clicking on the "Player.exe" line starts the playback software.

Data analysis

The recorded data can be easily analyzed for speed, vehicle location and direction of travel including impact by using the Player that is found on conveniently on the supplied SD card.

SMARTER Technical Specifications

Item	Specifications	
Camera Type (DUAL---front + back)	1.3 MEGA pixel CMOS sensor	
Video Resolution	VGA (640 x 480) up to 20 frames per second, 2 channels	
Audio	Built-in microphone Selectable in software---on/off	
GPS	Built-in GPS module	
Automatic Event Sensor,	G-sensor selectable sensitivity (3-axis),	
Alarm Input	Manual alarm external button trigger	
Memory	SD card 2GB provided---takes up to 16GB SD card	
Power Input	Body	DC 5V to recording unit
Power Input	Body	DC 12V to 24V input

Safety Instructions

To ensure proper operation please read the manual before installation and use. Failure to follow this safety notice may cause a malfunction and may void the warranty.

Do not clean the product with water or volatile solvents.
This may damage the product, cause a fire or electric shock.

Video quality is affected by lighting conditions. GPS is affected by signal receipt. Nighttime or use in tunnels affects system operation.

Do not disassemble, repair or modify the product.
This voids the warranty and where we take no responsibility for product damage or problems caused by the user.

Do not cover the camera lens with any materials or objects.
This may affect recording quality.

Ensure that the capacity of the SD card is not exceeded.
A full SD card will not allow one to record manual alarms or G-sensor based triggers.

Do not obstruct the view of the product through the front windshield.
The GPS receiver may not work properly.

Do not apply excessive shock or never insert foreign materials into the product.
This may cause product damage, a fire or a short circuit.

Do not arbitrarily change the product location.
This may cause a GPS communication error.

Any excessive window tinting may cause an unclear or distorted image on playback.
First record and then play back the video to see if the recorded video is acceptable.

Once installed, do not manipulate the product while you're driving a car.
This may cause a traffic accident.

Use only the provided cables and specified power input.
A cable not supplied by the manufacturer may cause product damage, a fire or a short circuit.

Only use factory approved parts. Use the approved power cable.
Contact your authorized Reseller for assistance.

Components

Descriptions

SMARTER Front Face (Toward Street) Shown without mounting bracket installed

Number	Name	Description
1	**Forward Facing Camera**	Used to record scenes through the windshield.
2	**SD card Slot**	Used to insert the SD card into unit.
3	**Emergency Record Protection Cancel Button**	Used to cancel protection of all the emergency recording data.
4	**Emergency Record Button**	Used to perform an emergency recording.
5	**Volume Control**	Used to adjust the audio volume when recording
6	**Mounting Connection**	Used to mate with the mount.

SMARTER Rear Face (Toward Driver) Shown without IR installed

Number	Name	Description
1	**Status Display**	Used to display the status of Drive Recorder or traffic information by using English text or symbols.
2	**IR Light Connection**	Used to mate with IR Light module.
3	**Built-in Speaker**	Provides audio output for chime and any information.
4	**Interior Facing Camera**	Records video from inside your vehicle.
5	**Power Connection Port**	Used to connect the power cord with the unit.
6	**Serial Number**	Serial number of the unit.

IR (Infra-red) light module

Number	Name	Description
1	CDS	Used to illuminate interior while nighttime recording.
2	Power Connection	Used to connect the power cord to the IR light module.

SD Memory Card specifications

***Denotes an average time.**
(Motion affects recording duration. Times reflected see recordings made during the daytime in typical city downtown areas.)

Size of SD Memory Card	Max Storage Time	Event Recording Time	Number of Event Generated Recordings according to the Preset Recording Time		
			1Min	2Mins	3Mins
2GB (included)	90	64	25	80	70
4GB	180	120	50	40	30
8GB	370	280	90	80	70
16GB	750	320	120	100	80

* Time varies depending on the amount of motion seen by the camera & lighting conditions.

Note: **Use a thin object to remove SD card. Some customers drill small hole in the surface of the enclosure next to slot and insert a wire tie. When removing the SD card, you must then cut the wire tie making removal by the operator harder.**

SD card –Opening Software on your PC and loading video from "Data" file

Use only the provided SD card with the unit to ensure proper operation. Consult your Reseller or the Company website for SD card compatibility. In case where the computer used to playback the video does not support the SD card and the SD SDHC2.0 memory card standard, use a separate SDHC2.0 USB reader. (SD to USB adapter). Periodically format the SD card so as to prevent SD card errors over a long period of time.

To playback video, use the SMARTER exclusive viewer that is located on the SD card. With the SD card inserted in your computer, explore the SD card, locate the "player .exe" file which is located on the SD card. Then open the "DATA" folder and double click the video file you wish to playback.

CAUTION!

- After formatting the SD card set the time zone in SMARTER configuration.
- If you do not configure the settings, system initialization may take up to 10 minutes and where the time and time zone may not match.
- When re- formatting the SD card, the existing recorded video files are all deleted, so be sure to perform a backup for any important files.

Do Not use this SD card for any other purpose.
If you use this SD card for any other purpose or copy unrelated files can cause a fatal error.

Installation:

CAUTION!! Before Installing

- Be sure to stop the engine before installing the product.
- Remove all power to any areas where wires will be connected.
- Install in a location where the GPS signal will be received
- Before permanently mounting the unit, ensure that the camera views meet your requirements. (ex: where the interior view is not hidden by the mirror inside your car)
- SMARTER must be installed on the mounted straight both horizontally and vertically

Installing the Unit

1. Insert the holder into the mounting connection.

2. Insert the IR light module's knob, on the rare face of the body . Only connect power cord to the IR light after it is connected to camera

3. Clean the mounting surface with alcohol and remove the red film from tape the mount, and press in place the mount to the windshield tightly

Installing the Remote External Alarm Button

1. Insert the Jack of the manual alarm input cable into the connection port on the upper part of the Cigarette Lighter Plug. Run the Cable, hiding and securing it in place.

2. Locate the best position for the remote alarm button. Secure the button by removing the adhesive film attached to the tape on the external button, press and hold.

Connecting the power cord

1. Connect the "Y" power cable to the power connection port on the right side of the unit

2. Connect the other side of "Y" power cable to the power connection port of the attached IR light module of the unit

3. Arrange the power cord neatly after inserting it in the chink of the door near the driver or passenger seat.

4. Insert the power cord into the Cigarette Lighter Plug.

Note: Cigarette lighter plug can only be hard wired to 12-24 vehicle power when using the JACK-EXT option. Using the AWP-22OO option also allowsdirect hard wiring to vehicle power

The recorder will only record when there is power to the cigarette lighter.

Note: ***To "hard wire" the device to vehicle power, you will need our optional AWP-2200 module or JACK-EXT accessory. Go to end of this manual to review their installation requirements and capabilities.***

NOTE: Do **NOT** try to circumvent the "cigarette ligher plug" unless you use the optional AWP-2200. This has a circuit that protects the camera and provides power to the IR illuminator. If the "cigarette lighter plug" is circumvented and wired direct to vehicle power---it will "fry" the camera and this is **NOT** covered under warranty

Tips before Using the Product

Unit Preparation for video recording

1. Take the SD card out of your SMARTER drive recorder. Access the Player.exe menu and enter the set up mode, setting time zone, daylight savings time and other settings (as noted in the programming section of the manual). Re-insert the SD card in the recorder. Following the installation instructions---when you connect the unit to power, or turn the engine on, **"dR Init"** appears on the LED display on the unit, indicating that the video recorder is initializing. The LED display window will show a series of numbers, this indicates that GPS satellites are beginning acquired.

2. In about 25 seconds after power on, longer if one has not set the local time zone on the SD card, the unit completes initializing and a "ding dong" chime is heard along with the words **"Hello".** The unit may still show a series of numbers followed by and "GPS FINE" will appears. This adjusts the unit further for increased accuracy.

3. After the chime, the Drive Recorder starts continuous recording without GPS data. The unit is recording video and audio as well as vehicle speed, direction and location, when: a) when the vehicle is stopped, the unit shows local time; b) when the vehicle is in motion, it displays the vehicle's speed.

Continuous recording while driving

1. Your SMARTER drive recorder informs you of your vehicle's speed, when stopped, the unit displays the time on the LCD facing the driver.

2. When the capacity of the SD card has been reached, the oldest files are overwritten for continuous recording. The data recorded by either the unit's internal G-Sensor or external manual record button are not overwritten. (This alarm data must be erased by the User with the SD card inserted in the computer, erasing event data in the DATA folder.)

3. When you stop the engine or remove the power cable from the cigarette lighter plug, SMARTER stops recording.

Functions of each component

Forward facing and rear facing/interior view camera

The camera must be aligned horizontal and vertical. When the lens of the camera is obstructed or is dirty, clear images may not be captured. Periodic cleaning is required. To clean the lens, use a soft camera lens cloth to prevent damage.

Emergency record button (Video image removal protection)

In order to record diver detected scenes of interest, press the emergency record (E) button to record. This data records 1 minute before and 1 minute after. (User may set pre-event time 1 minute, 2 minutes or 3 minutes). Stored event recording data in SD card will not be erased unless user cancels (A remote button is also provided for this function for covert recording) The recording time is determined in prerecording time.

SD card slot

Before inserting / removing the SD card, Power must be **OFF.**
The LED Display must be off. (BLANK!)

Manual Cancellation of the Emergency Manual Record if enabled in software

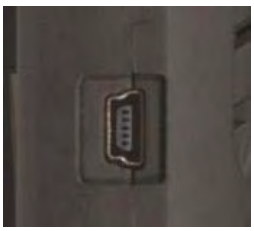
Press the “M” button for about 3 seconds until you hear a chime from the speaker. This is used in the rare case if the SD card is full and was not replaced. This function is typically not enabled so to secure all recordings. If enabled in system setup, all the previous events and the overwritten record protection is disabled when this button was activated, allowing the system to overwrite alarm data. (rarely used)

Volume control

Adjust the audio volume level for driver’s convenience. When you turn it left (<<), it increases the volume while a right (>>) turn decreases the volume. Audio can also be turned off by software configuration.

Power connection port

Connect one end of the cigarette lighter plug cable into the matching connector of the power port of the unit. Plug the other end of this cable to the cigarette lighter plug of the vehicle. {Power may be hard wired (permanently wired) into the ACC (accessory) switched power of the vehicle for a more secure installation. REFER THIS TO TRAINED PERSONEL ONLY. Do not lose the supplied power cord or use other cables. If damaged or lost, contact your Reseller for a cable replacement



LED Display window

System status—GPS speed, time of day is displayed on this multi-segment display. Also used for system diagnostics

Using the Player: Playback, SD card and Initial System Set-Up

PC Minimum Systems Requirements:

Component	Requirement
CPU	Pentium 4 / 1GHz processor or higher
Memory	512 MB of RAM or higher
Operating system	Microsoft Windows XP Home Edition or higher
Graphics	DirectX 8.1b or higher
Hard disk drive space	200 MB or higher

Note:
When using MS Windows Vista and SMARTER T-Eye Player software for the first time, you may have to run the Player in Administrator Mode.

To Review Video:

Remove Power from the unit. Remove the SD card from the unit and Insert the SD card into a PC or SD card reader and connect it to a computer. Explore the SD card. Locate the 'Player.exe" file that is found in the 'PLAYER' folder. Double click on 'Player.exe'. The following window will appear:

No.	Name	Description
1	Forward Camera View	Displays the video images recorded by the forward facing camera.
2	Rear Facing Camera	Displays the video images recorded by the interior facing camera.
3	Vehicle Speed	Displays the speed of your vehicle.
4	Vehicle Location	Displays the coordinates (latitude and longitude) of the vehicle. (Requires GPS signal lock)
5	Direction of Travel	Displays the vehicle's direction of travel.
6	G Force Analyzer	Displays vehicle motion and any impact detected by the G-Sensor with a graphically in 3-axis.

Volume and Playback Speed Control

Volume Control: Adjusts the volume level while playing back the recorded data.
Playback speed control: Adjusts the video playback speed.
To playback video, select the "Open a File" button, explore the SD card or other location where the recorded (or saved) data is located, (file called DATA is on the SD card), then double click the selected file from the list in order to play.

Volume Control **Playback Speed Control**

System configuration

Before using the system, remove the SD card from the recorder and insert the SD card into the SD slot of a PC or in the SD card reader of a computer. MS Windows will automatically see the device. Locate the Folder called "Player". Double Click on "Player.exe". When the player's main screen appears, click on the System Setup configuration icon () located at the lower right corner. The following window will then appear.

No.	Name	Description
1	Video Quality	Sets the video recording quality. (Default: Standard)
2	G-Sensor Sensitivity	Sets the sensitivity of G-Sensor. (Default: Low) By un-checking the box the G-sensors will NOT work. This would be necessary on an application like a motor boat
3	Audio Recording	Enables or Disables the audio record function.
4	Pre-Event Recording Time	Sets the time to record the previous scenes before the event. (Ex. in case of 3 minutes, T-eye records scenes for previous 3 minutes and next 1 minute for a manual record event.)
5	Password Setting	Sets any Password to be used to access the recorded data. (Default: none)
6	Time Zone Setting	Sets the time zone for the user. (Ex. EST= GMT+5:00)
7	Unit for Speed	Set the unit of the vehicle speed (MPH or KPH).
8	Vehicle ID Number	Sets the license plate number or fleet vehicle ID number associated with the vehicle where the SD card is to be installed in.

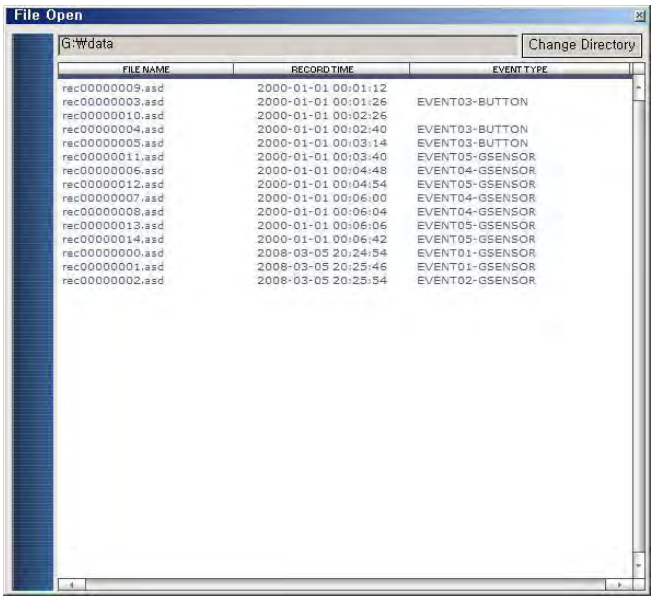
Playback Interface Controls

Button	Function	Button	Function
	Move to the previous frame		Open a file
	Reverse Playback		Convert the file into an AVI format
	Pause the Playback		Link recorded data with map
	Stop Playback		Configuration Set Up Menu
	Playback		Exit, close the program
	Move to the next frame		Hide/close the window

Playback

***1.* With the Playback interface Open: After clicking the folder icon on the lower right corner of the viewer, click Change Directory to select the location for the recorded data. Typically the first time you do this all the files are located on the SD card. If saved elsewhere, use this utility to explore your computer to locate the file for playback.**

***2.* When the file list appears, double-click the desired file to play back.**



- FILE NAME: File name of the recorded video images.
- RECORD TIME: Date and time when the images have been recorded.
- EVENT TYPE: Displays recording type (Continuous recording/event button
- Click the list name to sort by File Name, Record Time or Event Type.

*** Event Type:**

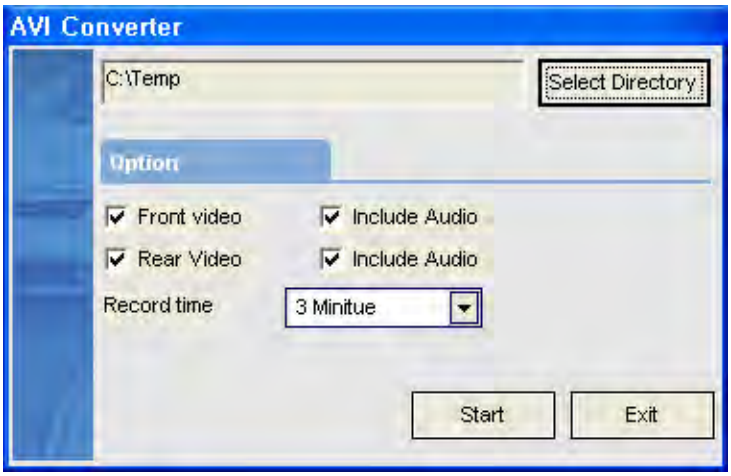
- **Continuous recording: No nomenclature applied. Clicking on this shows the recorded file when driving.**
- **Manual Event Recording: Annotated with the word BUTTON. This allows you to locate files that were marked by the driver using the push button on the recorder or the remote event pushbutton.**

- **G-Sensor (shock sensor) automatic recording: Annotated with G-SENSOR. This data is recorded when any impact, sudden acceleration, or accident is detected.**

Converting the Authenticated files into AVI file format

One may convert a portion of the recorded data into an AVI file format when one wants to share the recorded data with someone else or email a file.

1. **Click the AVI conversion button ( ) at the start of video clip position where you want to convert the images into the AVI file format. The video playback stops and the AVI conversion window appear.**



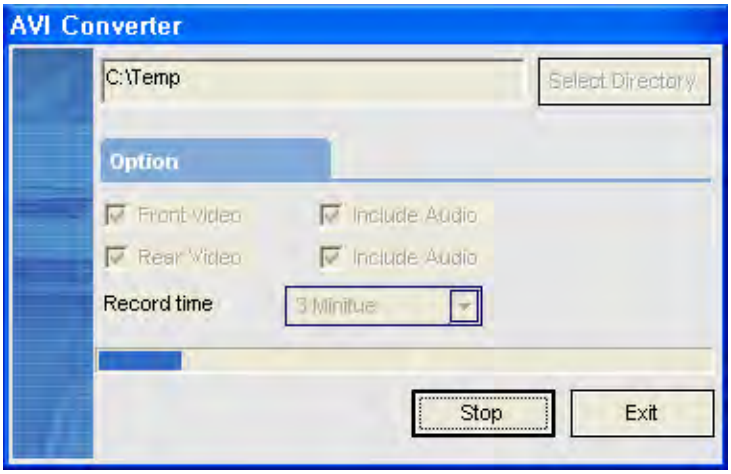
2. **Set the following options from the window and click Start.**

   A. AVI storage directory

   B. Selection of previous/next videos and whether or not to include audio data

   C. AVI recording time

3. **The conversion progress appears as follows:**



NOTE:
The AVI files cannot be created on a portable disk such as SD card or USB memory stick but only on a hard disk first due to speed required for the conversion

Interfacing with a GIS/City map

SMARTER Drive Recorder simultaneously records the GPS data while driving so you can check the driver's route start—stop times, direction and speed on the map. Click the GIS/MAP icon ( ) on the lower right corner. The map window appears for the user to see the vehicle location and travel onto a city map.

- **To use this function, the system must access the Internet!!**

When you click on the MAP icon at bottom right of screen, the vehicle position exactly synchronized with the video is shown. You can choose, Google Map, Satellite (Earth view) or Hybrid (Earth with road names)

Movement, scale up/down on the map

Map — View normal map

Satellite — View satellite map

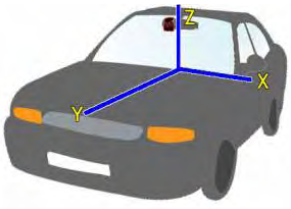
Hybrid — View both normal and satellite maps

Additional Functions of Player: Pop-up Display window

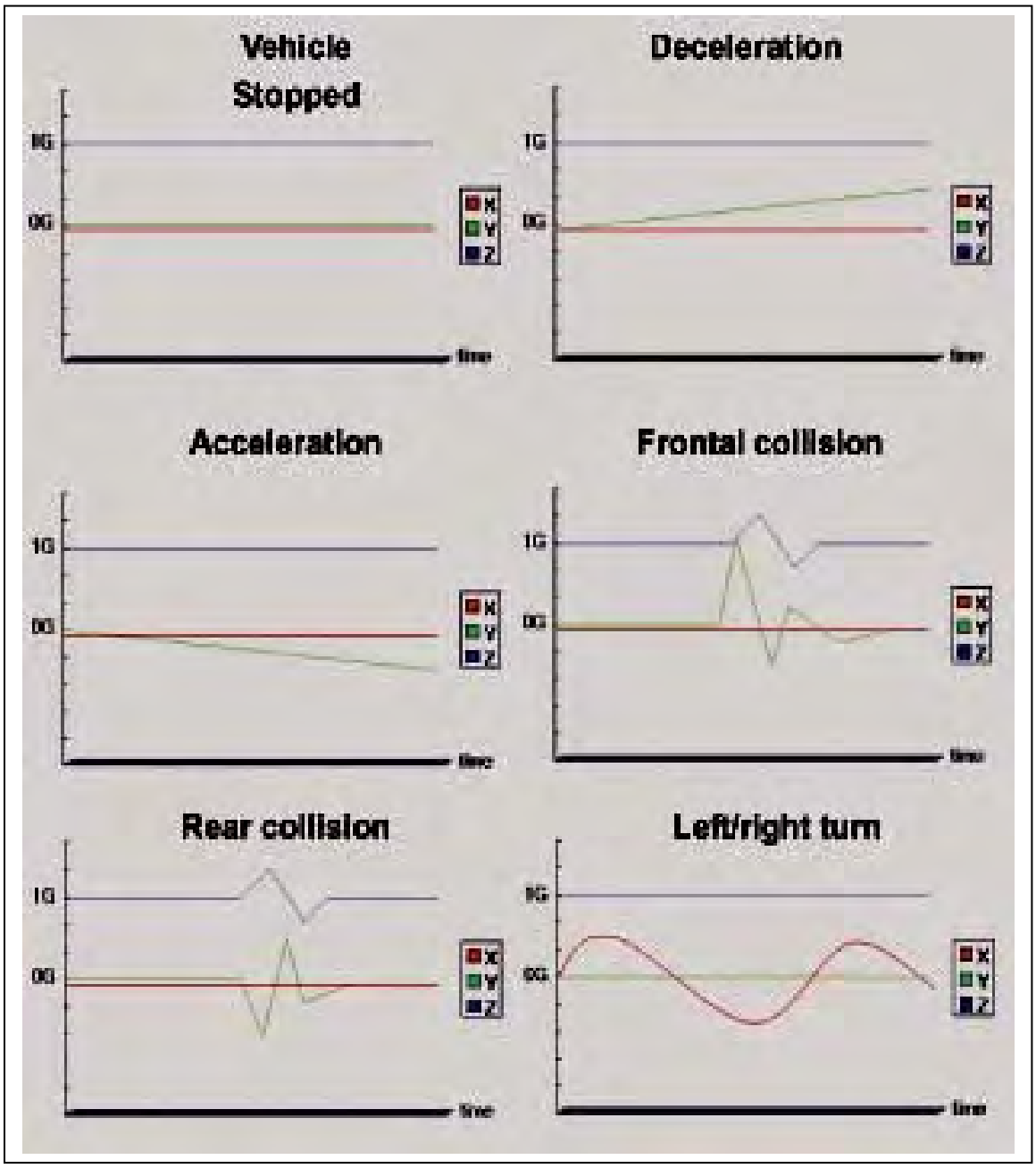
When you double-click the display window, the recorded images are played back at the original size. Double clicking the screen returns the view to normal, original size. You may use your PC's mouse to move the screens and adjust them within your desktop window

Analyzing SMARTER G-SENSOR data

The G-sensor (Gravity Sensor) furnishes data for X, Y and Z axis and stores it along with the other recorded data on the SD card. When using the playback software, this information is represented in a graphic format. The resulting graph may be used to analysis the driving condition and driver's safe or abusive habits. Depending on the type of the vehicle, the amplitude of the curve of shown may vary.



*** X axis: left + right of the vehicle**
*** Y axis: front + rear of the vehicle**
*** Z axis: top + bottom of the vehicle**



System Diagnostics via the SMARTER LED Display

Event	Sound	Display
Initialization after power applied	No sound.	[dr][Init]
When SD card is not inserted	Chime is heard (“Ding dong”) from the speaker. (Turn off the power, re-insert the SD card, supply power again.)	[Err][Sd]
While GPS is updating	GPS data is now being received and is being downloaded	[Err0]
Event recording	One chime	- - - - - -
Number of events recorded (5) by the system and available	Two chimes	[FULL][---5] (---1)
Event recording is not available as not enough memory is available	Three chimes	[FULL][----]
GPS update Error	Resolution: remove power, wait 10 seconds, re-apply power.	[Err0]
Event captured	Chime	

Information and Status Display

You can see information or the corresponding status is displayed.

Status	Event	Sound or Status	Display
	Greeting	Chime	HELLO
DR initialization is completed.			
	Satellite information (Satellite reception quality)	No sound	5-45
	GPS loading	No sound	GPS FINE

Software start-up issues:

When you start the program, if you have ‘skin control error’ showing follow instructions below;

For XP OS Users,

a. Needed log on with administrator right when start PC.

b. If user log on without administrator right, the player will not run. Skin error message will display

Vista OS users,

a. First log on with administrator right when PC is started.
b. Then before start Player, click the right button of mouse and permit administrator mode

Firmware and Playback Software Update on the SD card

1. With the Unit unpowered (blank unlit multi segment LED display), remove the SD card from the unit; Insert the card into SD card slot on computer.

2. If your computer doesn't have SD card slot, connect the memory reader to the USB port on your computer.

3. If you have received new firmware or have been directed to web site http://panasonic.jp/support/global/cs/sd/download/index.html to get software to reformat the SD card, first download the related firmware or playback software.

4. After downloading the update file, copy it to the update directory on the SD card. (If the update directory folder does not already exist on the SD card, create a new folder on the SD card and rename the folder name to 'update'. Then copy the file again into this folder.) Then insert the SD card into the Recorder, power up the recorder, and the new operating file or firmware will be uploaded to the Recorder. You need to do this only once per recorder per update.

NOTE: IT IS RECOMMENDED THAT PERIODCIALLY THE SD CARD BE FORMATTED AND THEN RELOADED WITH THE FILES PREVIOUSLY STORED ON THE PC. IDEALLY THIS SHOULD BE DONE ONCE A MONTH. USE THE PANASONICSD CARD FORMATTER FOUND ON THE E INSTRUCTION CD. IT MAY ALSO BE DOWNLOADED FROM: http://panasonic.jp/support/global/cs/sd/download/sd_formatter.html

Software Update

1. After downloading the Playback SW file, copy it to the player directory on the SD card.

2. After installing the SD card on the body and connecting the power, update automatically starts.

Caution **Do not remove the cigarette lighter plug or interrupt power to the unit or stop the engine during update.**

Note **For further information, access the website (http://www.keytroller.com) or contact your retailer.**

APW-2200 – “Hardwire” Installation of Optional Delay Timer Module

NOTE: Do **NOT** try to circumvent the “cigarette lighter plug”. This has a circuit that protects the camera and provides power to the IR illuminator. If the “cigarette lighter plug” is circumvented and wired direct to 12—24V vehicle power---it will “fry” the camera and this is **NOT** covered under warranty

APW-2200 Features:

Option#1 for installations requiring “hard wiring” to the vehicle power and not the cigarette lighter and also the maintaining of power to the recorder after the engine has been turned off. Setting the dip switches per the diagram on the cover, you can keep the Recorder will be powered for a pre-selected time (ranging from 30 seconds to 14 hours) after the vehicle’s ignition has been turned off. The unit is factory set for a 4 minute shutdown.

NOTE: Prior to removing SD card, Power to unit ***must*** be off. This device continues to provide power ***after*** engine shutdown due to timing sequence you have set.. Before removing SD Card, either wait for module to time out, or manually unplug the mini USB connector from the dual camera unit.

For installation instructions, see addendum attached to this pdf document.

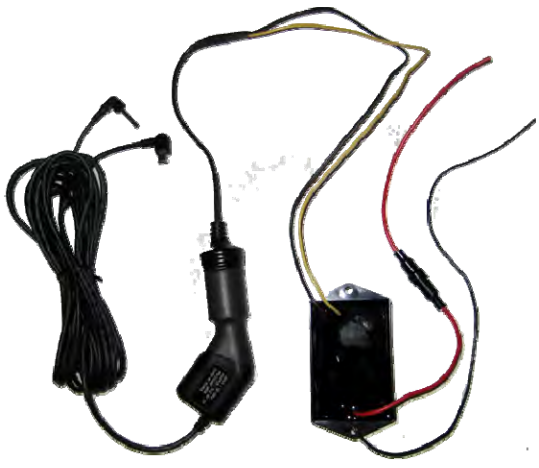
APW-JACK-EXT Features:

Option #2 for installations requiring “hard wiring” . This jack extension plugs into the cigarette plug device. It has two leads that connect directly to vehicle power.

NOTE: Do NOT try to circumvent the “cigarette lighter plug”. This has a circuit that protects the camera and provides power to the IR illuminator. If the “cigarette lighter plug” is circumvented and wired direct to vehicle power---it will “fry” the camera and this is NOT covered under warranty.

Left: Wiring harness with jack adaptor for direct wiring to 12--24VDC power supply

Right: Wiring harness with jack adaptor for direct wiring to 36--48VDC power supply. Includes HVC high voltage converter



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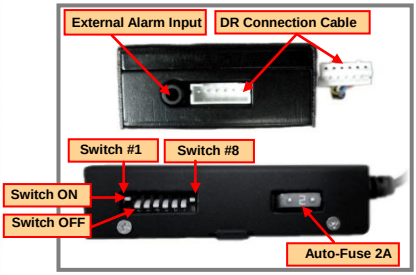
*APW-2200 is an accessory product that can record at 1~3 frames while car parking.

1. Replacing the fuse of cigar jack

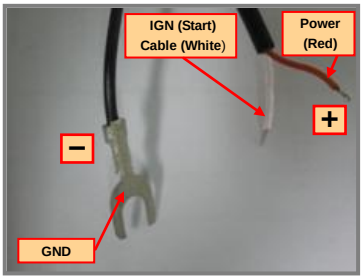
Cables

❶	GND (Black)(-) Connect to Ground.
❷	IGN (White)—Start (ignition) APW2200 start signal.
❸	Power VCC (Red)(+) Power (+12V to +24V)

2. Connecting the external alarm to Body and making its setting



3. Preparing for APW2200's wiring



4. APW2200 wiring procedure

① Connect "-" to Ground.
② Connect "+" to Continuous Power.
Continuous Power supplies power even though ignition is turned off.
For example, the emergency light is on even though ignition is turned off.
③ Connect the IGN cable.
Power is supplied through the cable only when ignition is turned on.
Most cables except the emergency light. Recommended to use the cigar fuse for supplying power.
④ After referring to "APW2200 Guide (Switch Setting)," set the time and the "Low Batt" function.

Caution 1) When connecting the inside power, start wiring from Ground.
Caution 2) For Continuous Power and IGN signal, connect them via the inside fuse.

5. Setting APW2200 switches

Switch No	Function	Initial Value	Remarks
1	Continuous recording (Full Frame)		*With ADR3000, maximum SD card's recordable times are as follows: (In case of ADR2000, recordable time is doubled) - 2GB: 12 hours - 4GB: 24 hours - 8GB: 48 hours Maximum 51 hours is the limit
2	Setting time + 1 hour		
3	Setting time + 2 hours		
4	Setting time + 4 hours		
5	Setting time + 8 hours		
6	Setting time + 12 hours		
7	Setting time + 24 hours	Factory default On	
8	Low Batt function setting	Factory default On	

Note

1) Time setting

The time is accumulated while the switch is on. When the IGN signal is turned off and the specified time is lapsed, power is automatically turned off.

Example 1) #1 On: Full frame recording for the specified time (Off: at 1 to 3 frame rate)

Example 2) #1 & #2 On: Full frame recording is done for an hour and the DR power is turned off.

Eample 3) All OFF: The timer is off. When power is off, it gets off.

2) Low Batt function

It is used to prevent car battery discharge caused by DR.

*** When you drive your car a short distance or the power status of your car is not stable, regardless of the timer setting, DR cuts off power not to discharge your car battery.**

6. Electrical characteristics of APW2200

Item	Value
Input power voltage	9V to 36V
Input signal voltage	5V to 36V
Output power voltage	DC +5.4V
Low batt. Off voltage	minimum 12V (12V battery) or minimum 24V (24V battery)

7. Operation of APW2200

- The car park monitoring starts in about one minute after IGN is turned off. When IGN power is off, it records at maximum frame rate. After one minute, it records at 1 to 3 frame rate. (With #1 switch On, the display is still on.)
- When IGN power is off, I.R does not operate.
- During continuous recording by using the #1 switch, the sensitivity of G-Sensor is changed to Sensitive.

Product Installation

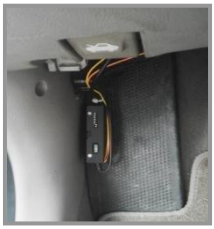
- The installation ways vary depending on the car type so see this page for simple installation.
- Installation must be done with the car key Off. If required, consult with an expert.

1. Check the location of the fuse box.

- Caution: For time setting, a time-worn battery may be discharged.
- It is recommended to upgrade the DR firmware to have the up-to-date one.

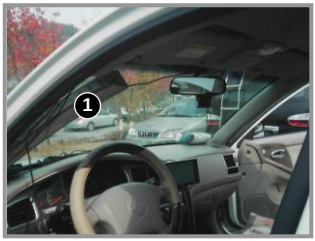
2. Determine the place to install APW2200.

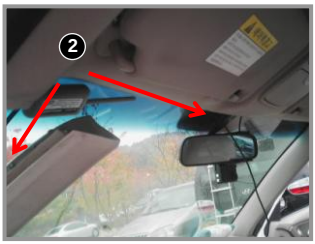
The picture below shows the place near the brake pedal.



3. Determine the place to hide the wire and fix its location to reach to DR.

4. After detaching A-pillar (1), insert the cable to the arrow direction (2) near the ceiling.





5. After keeping the cable neat, the next step is electrical installation.

• Connect the red line (1) to the fuse of the emergency light (any place is OK if power is supplied) and connect the black line (2) to Ground.

• The white line (3) is the ignition line. After detaching the key, detect the car power Off and connect the line to the fuse of the cigar jack. (A certain type of car supplies power with the key detached. In that case, connect the ignition line to another place.)

6. Check whether all lines are well connected by supplying power to DR. Turn the power on and after checking the power On, turn the power off. After one minute, it changes to the car park monitoring mode. In that mode, the numbers on the display do not light. (Note that with #1 switch On, the numbers on the display still light.) When the numbers light, check the wiring condition again.

7. Finally, bind the lines tight by using the cable ties and attach the detached cases to original positions.