From www.DriveCam.com

What is DriveCam?

DriveCam is a palm-sized video recorder mounted behind a vehicle's rearview mirror. When triggered by unsafe driving, **DriveCam** automatically records everything a driver sees and hears in the 20 seconds before, during and after the driving event. Events are stored in the unit's digital memory along with the level of G-forces on the vehicle.

Commercial fleets, including passenger transportation, limousine, ambulances and service vehicles, are using **DriveCam's** event recordings as a part of a complete Driving Feedback System that provides drivers and their managers with accurate, unbiased feedback on their driving performance.

By promoting safe driving, **DriveCam** reduces fleet operating costs, including:

- Lower insurance costs
- Improved fuel economy
- Reduced vehicle maintenance
- Elimination of "mystery" damage
  Improved image in the community

How Does it Work?

DriveCam continuously records video, audio and four directions of G-forces into a digital looping memory. Erratic driving habits such as hard braking, acceleration and harsh cornering trigger the unit to save an event for later viewing. Identifying these high-risk driving habits enables fleet managers to counsel employees and promote safe driving.

DriveCam's digital recording also allows fleet managers, police and insurance investigators to easily view an event on a TV,

Seeing and hearing an event just as the driver did provides them with information critical to assessing driving skills and determining fault in the case of a collision. Using **DriveCam** recordings, insurance claims examiners have been able to shorten the amount of time needed to process claims from months to days.

No special technical knowledge is required to operate **DriveCam**. It uses the same familiar "Rewind, Play and Fast-Forward" controls as a VCR. In addition, **DriveCam's** digital design is maintenance-free, with no tapes to change.

DriveCam Overview

DriveCam is a self-contained digital video event data recorder. **DriveCam** is designed to record the 10 seconds before and the 10 seconds after an unexpected event such as erratic driving or a crash. It can also be triggered manually to capture road rage or other safety threat.

After **DriveCam** is triggered, it stores the recorded video, audio, and G-forces into a tamper-proof digital memory. The recording of the events may then be replayed on a camcorder, television, or laptop computer. **DriveCam** will replay everything the driver could see, hear, and feel (G-forces) in the time surrounding the recorded event.

DriveCam is designed to record the 20-second period surrounding an event and may be triggered by any of three means:

Priority	Type of Event
1	Crash
2	Erratic Driving
3	Manually triggered

Each event type is assigned a priority. An event already recorded in memory may only be overwritten by an event of equal or higher priority. For example, a crash event is the highest priority and will always overwrite previous events. An erratic driving event will record and overwrite previous erratic driving or manually triggered events, but cannot record over a crash event. Manually triggered events are lowest priority; they may only record over previous manually triggered events, but not crashes or erratic driving events.

Installation

Adjusting The Bracket

The bracket should be adjusted before affixing it to the windshield. The bracket has a wide range of adjustment of 90 degrees, from horizontal to vertical. This will accommodate windshields with a long rake, such as on sports cars, to a very steep angle such as on bus windshields. The bracket may be adjusted to any of 8 screw-hole positions within this range.

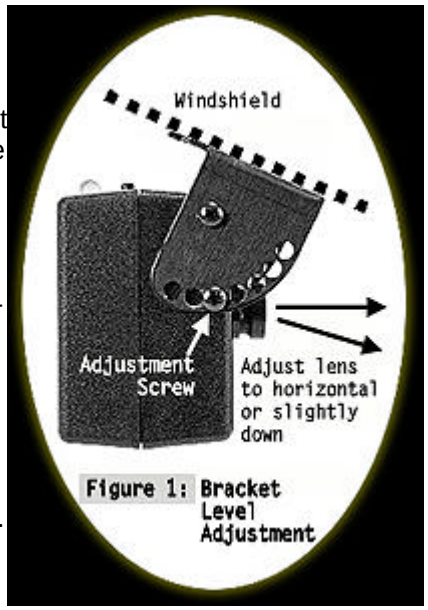

Figure 1: Bracket Level Adjustment

Removing the two Adjustment Screws allows changing the angle of the camera in the bracket. Adjust the bracket so that the **DriveCam** camera lens is almost horizontal when the bracket is held against the windshield. The camera lens should be pointing horizontally, or slightly down (<10 degrees). Reinstall the two Adjustment Screws, with moderate force to prevent stripping of the thread.

Affixing the Bracket

Before affixing, the bracket should be adjusted to the correct angle. The mating area of the glass must be cleaned to remove any oil or dirt. Use cleaning alcohol or an alcohol wipe to thoroughly clean the mounting and lens view area of the windshield. Finally, wipe the cleaned area, one last time, with a soft, clean dry cloth to remove any remaining residue.

The **DriveCam** will mount directly behind the rearview mirror on the opposite side, away from the driver. The position should allow an unobstructed field of view for the driver, and permit the driver to access any of the buttons on top to manually record an event. The **DriveCam** lens must be placed far enough away from the rear view mirror mounting post so that the post does not block the camera lens field of view.

Before removing the protective film from the double-sided tape on the mounting bracket, place the **DriveCam** onto the anticipated mounting area to double check that the lens has an unobstructed field of view, and that the bracket is adjusted to the correct angle so that the lens is horizontal or very slightly pointing down. ***Be sure to remove the lens cap!***

To achieve a good bond, the glass and bracket must be at least 50 degrees Fahrenheit (10 C) before affixing. Remove the adhesive backing from the double-sided tape and carefully press the **DriveCam** into place on the cleaned windshield. Apply firm pressure over the entire bracket surface to assure strong adhesion to the glass. From outside the vehicle, look through the windshield at the **DriveCam** bracket to ensure that there are no voids or gaps in the adhesion. If there are any voids or gaps, continue pressing the bracket. When mounting is complete, wiggle the **DriveCam** to check that it is firmly mounted. Maximum bond strength occurs after 72 hours.

Connecting The Power

The **DriveCam** must be hardwired to your vehicle. It may be wired so that your ignition will turn the unit off and on, or wired so that it always remains on. **DriveCam** places minimal drain on your vehicle battery (<120 mA), so it is suggested to only power on the unit with the ignition if you expect that the vehicle will be left without running for more than three weeks at a time. The **DriveCam** has four wires inside the cable jacket. The connection description for each wire is shown in the table below:

Wire Color	Name	Description
Black / 22 gauge	**Negative**	**Power ground (-), connect to vehicle negative supply.**
Red / 22 gauge	**Positive**	**Power positive (+), voltage range 11-16 volts. May be connected direct to vehicle power or switched with ignition. DO NOT connect to 24 volt supplies.**
White / 22 gauge		**Not used**
Green / 22 gauge		**Not used**

Table 1: Wiring Connection Descriptions

The **DriveCam** cable should be routed directly up the windshield to the headliner, concealed in the gap between the headliner and the windshield, then inside the door pillar molding down to the fuse-box or wiring position underneath the dashboard. Any unused wires should be left un-stripped and taped to prevent possible shorting or an unintentional connection. If you are unsure of how to make the wiring connections to your vehicle, you may take it to a local two-way radio or car stereo installation center. They will install **DriveCam** for a nominal charge.

Operational Instructions

DriveCam senses a crash event when pre-determined G-force values are exceeded. Typically, this will be a collision of 7 MPH or greater. **DriveCam** will record the 20-second time period surrounding the crash event.

Once triggered, **DriveCam** will have captured the 10 seconds prior to the crash event and continue recording an additional 10 seconds. The status light will blink red until recording is complete. **DriveCam** then transfers the visual images to permanent memory. This will take approximately one minute. During this time, the status light will flash red and green. When the transfer is complete, the status light will be steady red.

Removing the **DriveCam** from the vehicle following a crash event is recommended, but first cut power to the **DriveCam**. This eliminates the possibility of inadvertently recording over the crash. Once a crash event recording has been reviewed it may be transferred to and stored on videotape for future reference.

Crash events are the highest priority type of recording. An erratic driving or manually triggered event will not record if there is a crash already recorded. Erasing the crash event will enable manual triggering and recording of erratic driving events.

Recording Erratic Driving

DriveCam senses an erratic driving event when pre-determined G-force values are exceeded. Braking too hard, accelerating too hard or cornering too hard will trigger the recording of an erratic driving event.

DriveCam will automatically record the 20-second time period surrounding the erratic driving event. Once triggered, **DriveCam** will have captured the 10 seconds prior to the event and continue recording an additional 10 seconds. The status light will blink red until recording is complete. **DriveCam** then transfers the visual images to permanent memory. This will take approximately one minute and the status light will flash red and green. When the transfer is complete, the status light will be steady red.

Erratic driving events are the second highest priority type of recording. Erratic driving events will not be recorded if a crash event has already been recorded. Erasing the crash event will enable manual triggering and recording of erratic driving events.

Manual Recording of Events

You may record any event that has occurred up to 10 seconds after it has happened! Simply push any of the buttons on top of the **DriveCam** unit. Manual triggering is used to record road rage, dangerous driving, criminal acts, crashes, stalkers, amazing events, or anything else of interest.

After pressing the button, the status light will begin blinking red and **DriveCam** will continue to record for an additional 10 seconds. 20 seconds total recording time is provided: 10 seconds before the button push and 10 seconds after. When recording is complete **DriveCam** will transfer the visual images to permanent memory. This will take approximately one minute. During this time, the status light will flash red and green. When the transfer is complete the status light will be steady red.

able to manually record an event if either an erratic driving or crash event is already recorded. Erasing the erratic driving or crash event will enable manual recording.

Replaying Events

DriveCam is permanently mounted to the vehicle windshield. **DriveCam** event recordings may be viewed, inside the vehicle, using a portable TV, camcorder, or laptop computer. In emergency situations, such as a severe crash, **DriveCam** may be removed from the vehicle for later viewing.

During replay, there are three readouts at the bottom of the viewing screen. The 'FG' reading on the left shows 'Forward G-forces' (Front to back). The number beside 'FG' indicates acceleration, braking, and the magnitude of any impacts up to +/-50 G's. The 'LG' reading in the middle shows the 'Lateral G-forces' (side to side). This value indicates the forces during cornering, skidding, or magnitude of crashes. The reading to the right 'TIME' shows the time in seconds before (-) or after (+) the trigger. These numbers will automatically change during replay to coincide with the recorded video and audio.

At the end of replay, when the last recorded frame is displayed, the month/day/year and time of day when the event was triggered is statically displayed at the bottom of the viewing screen. This "Date/Time Stamp" is displayed where the 'TIME' readout was seen during replay.

The Real Time Clock

DriveCam's real time clock includes the date and time. The date is shown as month/day/year. For example September 15, 2000 is represented as 09/15/00. Time is in 24 hour format and is formatted as hrs:mins:secs. 1:30 p.m. would be represented as 13:30:00.

General Specifications

Connections:	
Power input: Video output: Audio output:	2.1/5/5 mm (ID/OD) barrel connector, center positive RCA connector x 1 RCA connector x 1
Video System:	NTSC-M
Dimensions (approx.):	90(W) x 60(H) x 50(D) mm (3.5" x 2.4" x 2.0") Note: Does not include mounting bracket
Weight (approx.):	0.2kg (8 oz.)

Electrical Specifications

Input Voltage:	8V - 15V DC
Power Consumption:	1.8W (12VDC input)

Video output level:	0.0 - 2.0V p-p, 75 ohm unbalanced
Audio output level:	-4dBs, 825 ohm unbalanced (0dBs=0.775 Vrms)