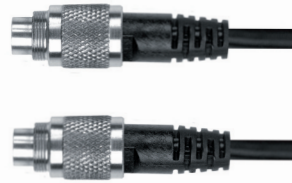




SmartyCam HD

USER GUIDE



SmartyCam HD

- 04** GETTING STARTED
- 12** THE VIDEO CAMERA
- 26** THE CONFIGURATION SOFTWARE
- 34** THE TRACK MANAGER
- 44** TECHNICAL DRAWINGS





Thanks

Dear Customer,

SmartyCam HD, the AiM on board camera with data overlay, is a product of our extensive experience in developing data acquisition systems for motorsport applications.

With SmartyCam HD you can review your laps on a PC or TV, merging crystal clear video images with graphical data overlays coming from GPS, from accelerometer, from the ECU or from an AiM logger. SmartyCam HD can be used in any situation, on any sort of vehicle.

Acquired data is overlaid on to the video in real time, with a multitude of gauge choices, all configurable by the user.

We recommend regularly checking www.AiM-Sportline.com for software and/or firmware updates or subscribing to the AiM-Sportline FaceBook page to receive all updates in real time.



What is SmartyCam HD?

SmartyCam HD is a video recorder developed for motorsports environments. SmartyCam HD automatically overlays graphical indications of the vehicle data to an HD video.

Its components have been specifically designed to meet the demands of the extremes of motorsports environments: specialty lenses, CMOS sensor, reliability under vibrations, connectivity to the vehicle data, and capability to start and stop video recording automatically are among the features customized for our sport.

Which data does it show?

Data shown in overlay come from your vehicle ECU, from the internal accelerometers, from GPS and from datalogger analog/digital inputs. It is also possible to display the map of the track and personal images (i.e. logos).

Is it possible to configure the graphical overlays?

You can choose from a wide library of graphical overlays and set the position of each of them. End of scales and measure units can also be easily defined using the SmartyManager software included in the kit.

To which AiM systems can SmartyCam HD be connected?

It is possible to connect SmartyCam HD, through CAN network, to all the AiM Loggers, that is to say, to MXL, EVO, MyChron, SoloDL and ECU Bridge.

Does it work in a stand alone mode?

Yes, SmartyCam HD has an internal battery and can work also without being connected to the AiM CAN network.

Of course, in this case, only lateral acceleration coming from Smarty-

Cam HD's internal sensor can be shown in overlay.

If a GPS receiver is connected, SmartyCam HD can show also the position on the track, speed and lap times.

Is it possible to connect more SmartyCam HD cameras on the same CAN network?

Yes, every SmartyCam HD has its own configuration and automatically retrieves the data it needs from the network, without interfering with the others.

Is it possible to synchronize video and data recorded by the loggers?

Yes. Using the new RaceStudio3, ready in the second half of 2013, it will be possible to automatically synchronize video and data, and show them on the same dedicated view.

RaceStudio2 enables you to manually synchronize data and video.

Which video format does SmartyCam HD generate?

SmartyCam HD generates .mov files with H264 compression.

You can choose from three different compression levels (low, medium, high) and two different frame rates (25 and 30 frames per second).

Does SmartyCam HD start and stop automatically?

Yes. SmartyCam HD offers different logics for starting and stopping video recording.

Acceleration or speed can be used for triggering when to start and to stop the activities.

You can choose your preference using the on-board Menu or through SmartyManager software.

SmartyCam HD kit includes:

- 1** - SmartyCam HD
- 2** - SD Card 4GB
- 3** - External CAN Cable or External power cable
- 4** - 110/220v Battery Charger with AC power adapter
- 5** - Software RaceStudio2 CD





SmartyCam HD





Aluminum Body

Watertight door latch design

GPS05B Connection

CAN - Power Connection

SD and USB capable

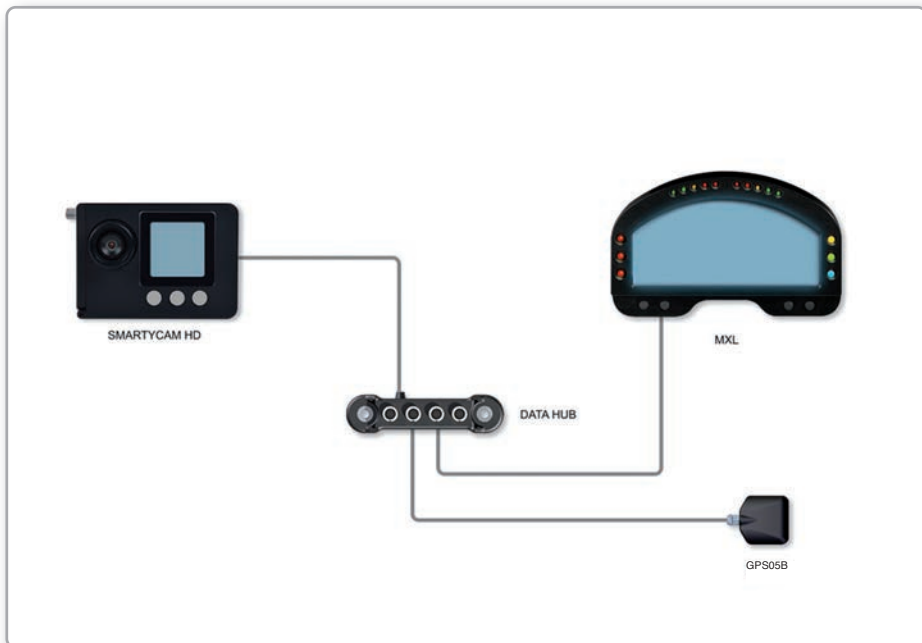
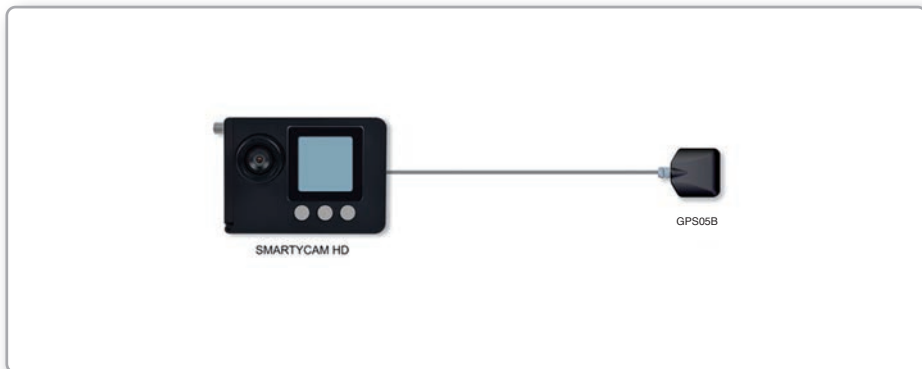
SmartyCam HD connections

SmartyCam HD features two connectors in the back.

The four-pin connector is used only for connecting an external GPS receiver (module AiM GPS05B).

The five-pin connector is used for connecting an external power and the CAN net.



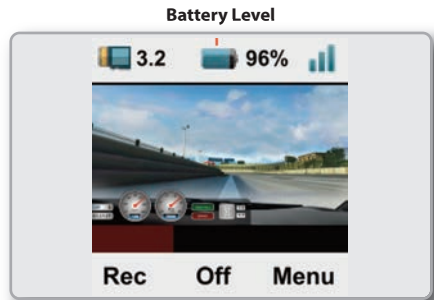


Power On/Off

SmartyCam HD NOT connected to an external power source.

SmartyCam HD has an internal Lithium ion battery, which provides 1.5 hours of life, so SmartyCam HD may be used with or without external power.

The level of the battery is always shown on the display.



After using SmartyCam HD without external power, please do not forget to charge the internal battery, using the battery charger included in the kit.

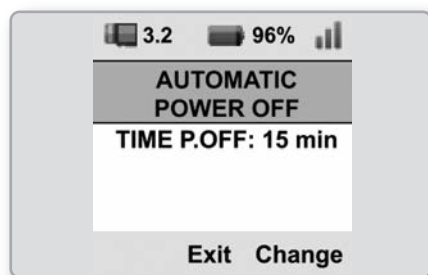


In order to turn it on push the center pushbutton.(1)



In order to turn it off push the center pushbutton. SmartyCam HD can be set to automatically turn itself OFF after a period of no activity (from five minutes to two hours). In order to configure this feature, select:

MENU>>SETTINGS>> AUTO POWEROFF
and set the desired value



When the battery is too low, a warning message appears for a few seconds on the video.

The video file itself is closed and the camera automatically shuts down.



SD card insert and removal

The housing is under the lateral door (close carefully after insertion).

A microswitch detects when you open the door, and the video file is automatically closed in less than one second, allowing for safe removal of the SD card.

Recording Support

SmartyCam HD kit includes a 4 GB SD card and can support up to 128 GB.



SmartyCam HD buttons and display

SmartyCam HD is managed using the three buttons located under the display: 1, 2 and 3 in the image.



The functions of each button are shown on the LCD screen display, immediately above each button.

All SmartyCam HD pages are made up of three parts:

- The "Battery and Memory Status" field is always displayed at the top of the page;
- Specific info is displayed in the middle of the page;
- The functions of the buttons are displayed on the lower part the page.



SmartyCam HD battery charge

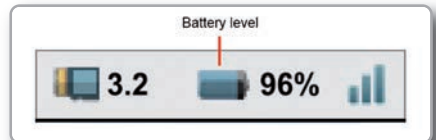
SmartyCam HD is supplied with a 1040mAh 3.7 Volt internal rechargeable lithium battery. It can be charged using either the cable connected to the five-pin connector or the USB battery charger inserted into the USB port, as shown in the following image:



When the battery is fully charged, the LED is GREEN



The battery charge status is shown on the display.



When the battery is charging by USB cable, an internal LED becomes RED



SmartyCam HD On/Off

SmartyCam HD can be switched on in two ways:

- Pressing the center ("2") button
- Connecting the external power cable to SmartyCam HD.

As soon as the camera detects the 12V power on pin three of the five-pin connector (see scheme at page 44) it switches on.



SmartyCam HD can be switched off in the following ways:

- Pressing the center ("2") button any time the "Off" option is available
- Pressing the center ("2") button for ten seconds.

This force-shutdown option is to be used **ONLY** in case the camera locks up.

- Automatic switch-off: if idle for a fixed amount of time (no button pushed, no acceleration/speed detected), SmartyCam HD will switch off automatically.

This time period can be set by selecting

MENU>>SETTINGS>>AUTO POWEROFF

Available options are: 15 min, 30 min, one hour, and two hours.

SmartyCam HD connected to an external power source

In case SmartyCam HD is connected to an external 12V power or to the AiM CAN Network, it works in a fully automatic way: it turns itself ON and OFF when the external power drops down.

The internal battery is charged during the activity.

Start/Stop recording

There are three ways for starting and stopping video recording:

■ Manually

push the pushbutton REC to start recording and the pushbutton STOP to stop recording.

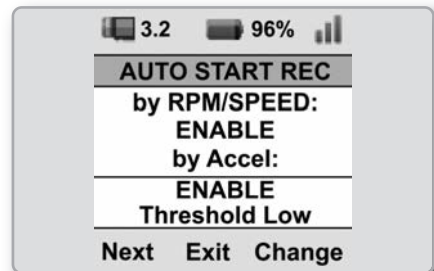
■ Depending upon the acceleration

SmartyCam HD has an internal, three-axis accelerometer that controls the start/stop recording.

It is possible to define three different thresholds: Low, Medium and High.

These thresholds may be configured by selecting

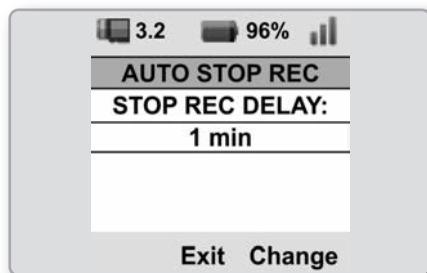
MENU>>SETTINGS>>AUTO START REC



The video file is closed when the acceleration remains under a threshold for a period of time.

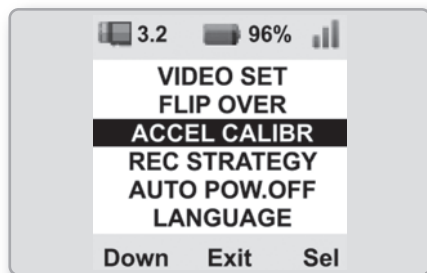
This time period may be configured by selecting

MENU>>SETTINGS>>AUTO STOP REC

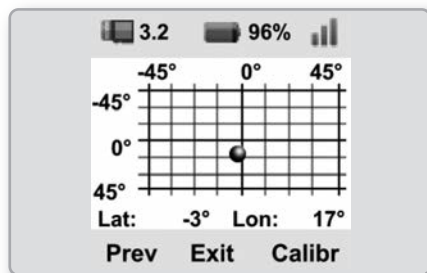


After having installed your SmartyCam HD on the vehicle, the accelerometers must be calibrated by selecting

MENU>>SETTINGS>>ACCEL CALIBR

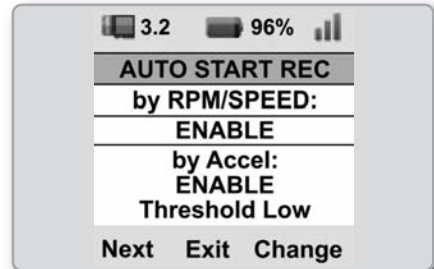


Then click **"CALIBR"**



■ **When SmartyCam HD is connected to an AiM CAN Network and the logger starts recording:**

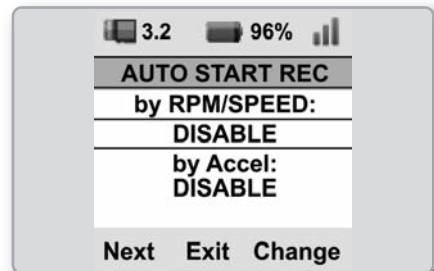
SmartyCam HD starts and stop recording in tandem with the logger, in dependence upon the logic implemented in the logger.



All AiM loggers begin recording at speeds higher than 10 km/h or rpm higher than a 500 rpm threshold.

To disable the automatic start/stop video recording from accelerometers or/and from the logger signal, select

**MENU>>SETTINGS>>AUTO START REC
>>DISABLE**





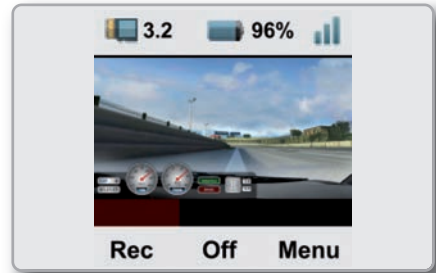
Video recording

Video recording can start and stop manually or automatically. Please, ensure that the SD is properly inserted into the slot and that the door is properly closed.

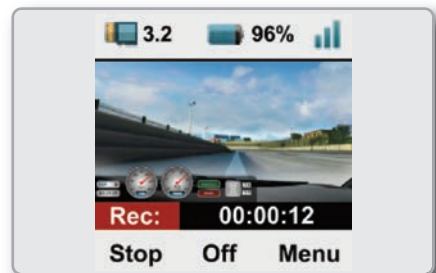
Note that the system stops recording as soon as you open the door. On the other side if you forget to close the door when the recording starts, it tries to record anyway.

■ Manual Recording

At power on, if the SD card is inserted and the door closed, SmartyCam HD display will show this page:



To start recording, press **“REC”**:
SmartyCam HD will show this page:



To stop recording, press “STOP”:
SmartyCam HD will switch to “Online Status”

■ Automatic Recording

- In slave mode (SmartyCam HD connected to an AiM logger).

The logger transmits a 'Start Recording' signal to SmartyCam HD as soon as it starts recording the data.

This generally happens when it detects rpm or a speed higher than 10 km/h.

The logger transmits a 'Stop Recording' signal when it stops recording data.

This generally happens when the speed goes under 10 km/h, or when RPM turn OFF.

- After receiving the 'Stop Recording' signal, SmartyCam HD continues recording for a period from five seconds to five minutes. To configure this setting, select:

MENU>>SETTINGS>>AUTO STOP REC

- In stand alone mode (SmartyCam HD not connected to any AiM logger).

SmartyCam HD can start and stop the video recording automatically, depending upon the accelerations it detects.

To enable the Automatic Start/Stop mode, select:

MENU>>SETTINGS>>AUTO START REC

And select the acceleration threshold value at which recording starts. You have three possibilities:

Low acceleration (0.2 G)

Medium (0.4 G)

High (0.8 G).

- When SmartyCam HD does not detect acceleration, it will stop recording after the delay (from five seconds to five minutes) set by selecting:

MENU>>SETTINGS>>AUTO STOP REC

SmartyCam HD menu

Pressing “**MENU**” shows the following menus:

- **GPS STATUS** Shows the level of the GPS satellites signals. It is useful when SmartyCam is not connected to any AiM Dash.
- **SETTINGS** For setting the configuration parameters.
- **TRACKS VIDEO FILE** Shows the video files recorded inside the SD Card

Pressing “**SETTINGS**” shows the following options:

- **AUTO POWEROFF** Enables/disables automatic power-off of the camera after a fixed period of inactivity
- **LANGUAGE** Chooses the desired language.
- **TIME SETTINGS** Chooses the time and date format, the time zone and enables or disables daylight savings time. Default setting is Greenwich Time.

- | | |
|-------------------------|---|
| ■ CONF LOAD | Allows configuration files to be loaded from the SD. You have to select from: <ul style="list-style-type: none">• Overlay• Tracks• Parameters |
| ■ INFO | Shows information about the camera and its software |
| ■ VIDEO SET | Sets some Video options:
Video quality: High, Medium, Low
Frame rate :25, 30, 15
Open/closed roof mode
(choosing the spot light settings) |
| ■ FLIP OVER | Reverses the video image (i.e. when the camera is affixed to a roll-bar). |
| ■ ACCEL CALIBR | Calibrates the 3D accelerometer: samples acceleration and tunes SmartyCam frame. |
| ■ AUTO START REC | Enables automatic recording. |
| ■ AUTO STOP REC | Enables automatic stop of recording. |

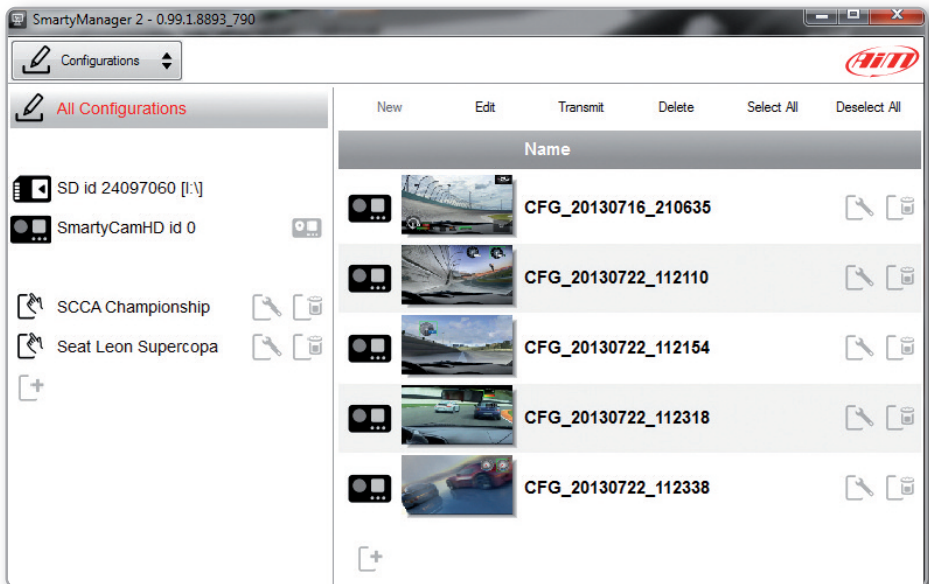
SmartyCam HD configuration SmartyManager2 software

SmartyManager 2 software lets you configure your SmartyCam HD. You can:

- Create/modify/delete overlay configurations.
- Transmit track maps.
- Download new firmware releases from our site www.Aim-Sportline.com and upgrade SmartyCam HD.

- Download movies from SmartyCam to your PC.
- View SmartyCam HD movies.

This software is provided on a CD included in the SmartyCam HD or can be downloaded from www.Aim-Sportline.com, "Download" area.



When you run SmartyManager2, a first page appears, divided in two sides.

In the left side, you can create different folders, in order to better organize your configurations.

Simply push the [+] pushbutton in order to create a new one.

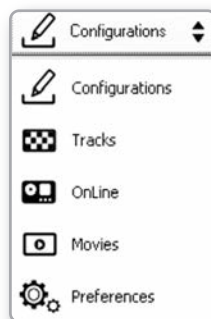
When you connect a SmartyCam HD, or insert an SD card in your PC, they both appear in the left side of your screen.

In the right side of the screen you can see all the configurations of the selected folder.

Please, click on the desired one for editing it.

In the upper left position of the screen you can see a pushbutton that lets you swap between different features:

CONFIGURATIONS/TRACKS/ONLINE/
MOVIES/PREFERENCES



Create a new configuration

In the **CONFIGURATIONS** page push **"NEW"**, or click on the [+] **pushbutton.**

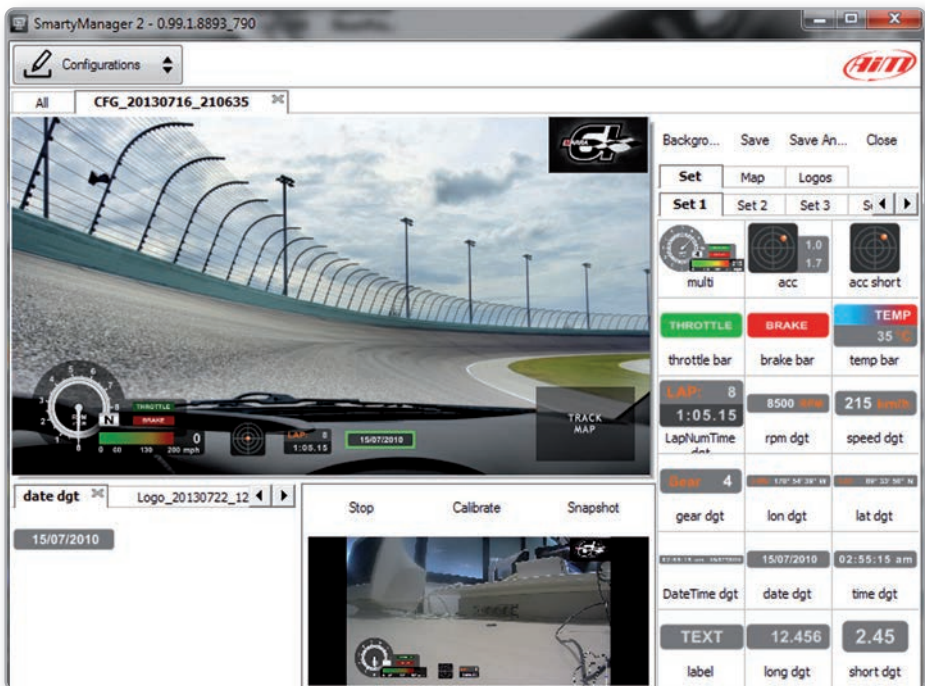
Right of the preview panel available graphic objects are grouped in **"Sets"**; double click on the desired object to select it or drag and drop it in the preview area fill in the layer of the loaded object that appears down on the left of the software window.

When the panel shows the desired configuration, push **"SAVE and CLOSE"** for saving the configuration.

For transmitting the new configuration to your SmartyCam HD, go back to the **"Configurations Page"** and drag and drop it to the camera.

You can also use a snapshot of the image of SmartyCam HD, in order to better understand how the graphical controls fit in the image.

Please, start the **"ONLINE"** feature and push **"SnapShot"**: the image will be immediately saved in the list of possible background images

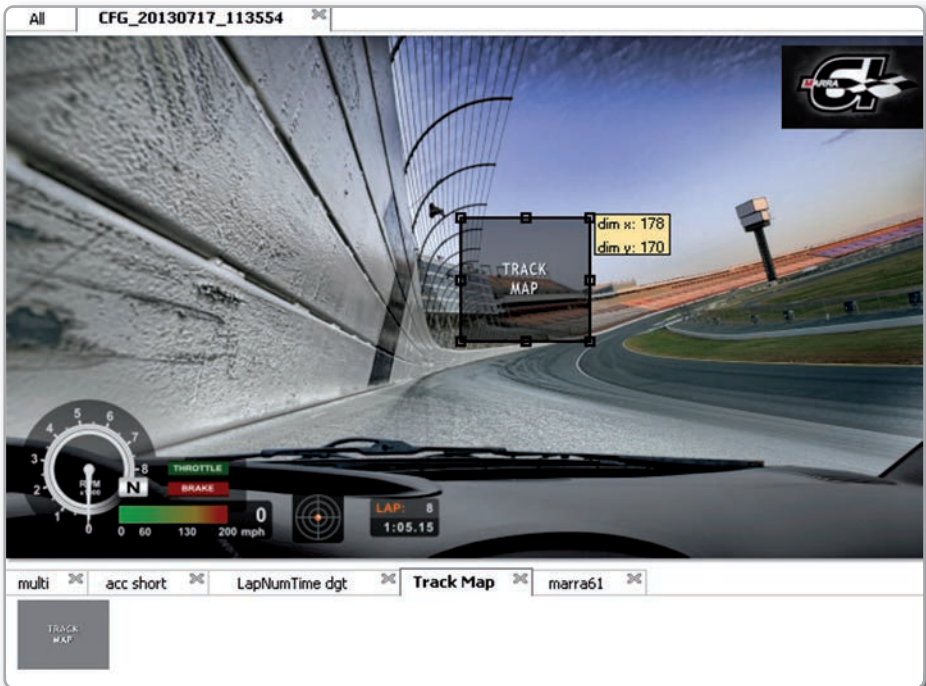


Insert track map

As shown here below, in addition to "Set" layers others are available to manage the Map and the logos to be inserted in the configuration.

After having selected the Track map object, you can resize and move it. The track shape will fit this area

Please, NOTE: with this feature, you ONLY define the space where the track map will be shown. You have then to transmit the tracks information to your SmartyCam HD, using the Track Manager feature, as explained in the next chapter.



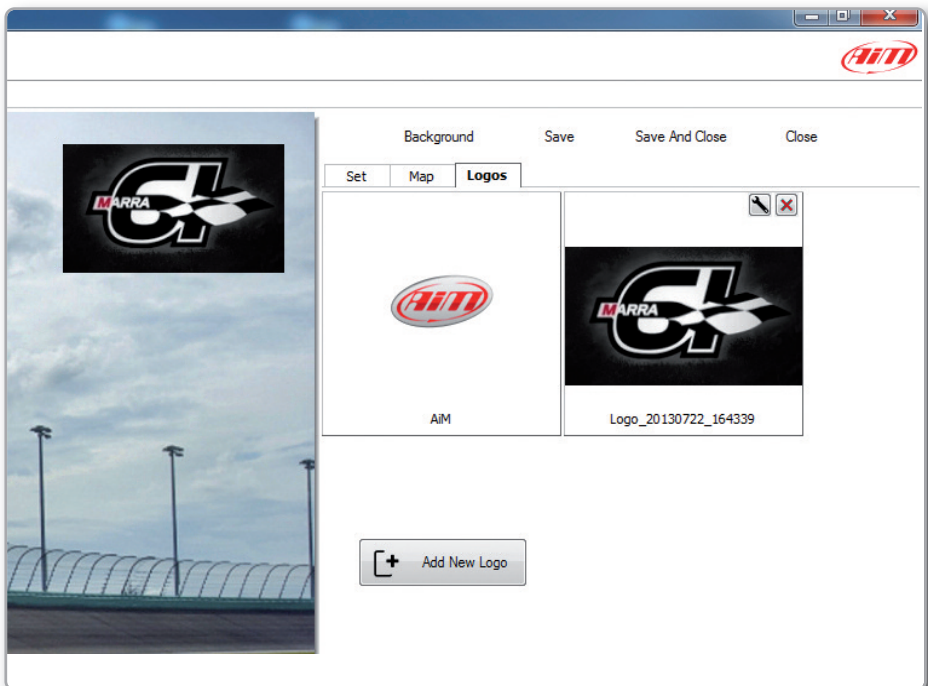
Insert a logo

“Logos” button, located at the top of the Overlay Toolbox, lets you add, modify and delete custom logos and images from SmartyManager2 and thereby from SmartyCam HD overlay.

Supported image formats are: .png, .jpg, .bmp and .tga but “Png” format is the only compatible with transparency effect.

Pressing “Logos”, you can choose the logo to show as overlay.

For adding a new logo push the proper pushbutton.



Modify or delete an existing configuration

For modifying or deleting an existing configuration, select the desired configuration to be modified and double click on it:

then, proceed like in the creation of the configuration.



Transmit a configuration to SmartyCam HD

You can transmit a configuration to Smartycam HD in two different ways:

■ Connect SmartyCam HD to the PC:

- Select the desired data overlay clicking on it and simply drag and drop on the SmartyCam HD Icon in the left side of the display.
- SmartyCam will automatically select that configuration.

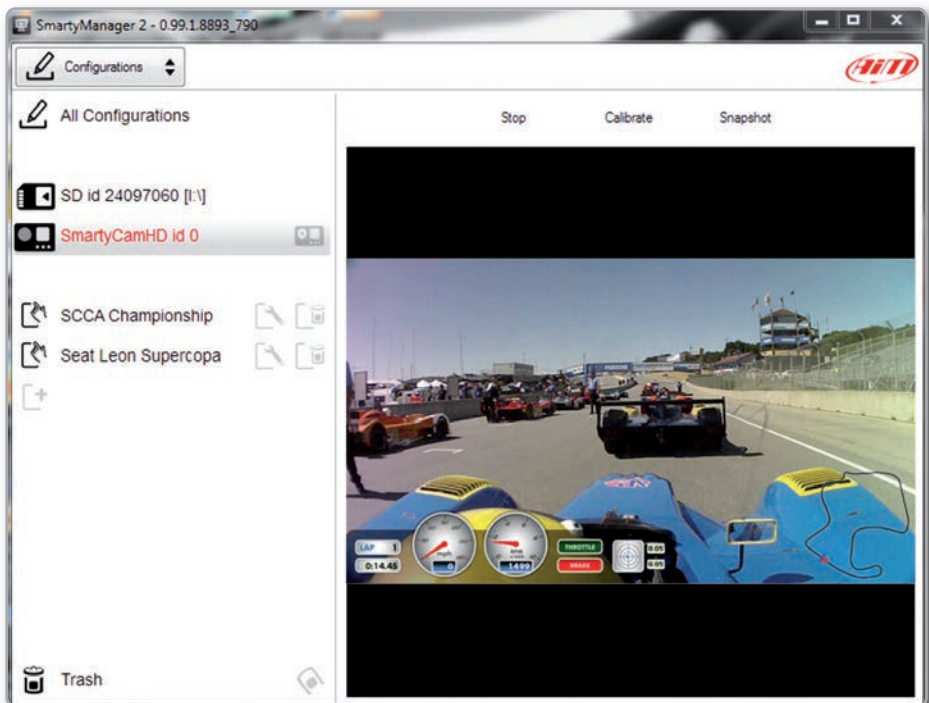
■ Use SD card:

- Insert the SD card into your PC. An Icon will appear on the left side of the display.
- Drag and drop the desired data overlay to the SD Card Icon.
- Insert the SD card into your SmartyCam.
- Go to "Settings / Conf. load" option and select "Smarty Conf" following the requests.

In case you connect your SmartyCam HD to an AiM logger, you need to configure the logger using AiM Race Studio2 software.

On line view

If you select the SmartyCam HD Icon on the left side of your screen, the online view will appear on the right side of your screen.



Viewing SmartyCam HD videos

Videos recorded on SmartyCam HD are in .mov format with H.264 codec.

To view the videos on your PC remove SD from SmartyCam HD, place it in the PC reader and manage it as an USB peripheral.

You will find your videos in the "Video" folder and can view them, after having copied them to your PC, using Smarty Manager2 or any video player you wish.



Track Manager feature

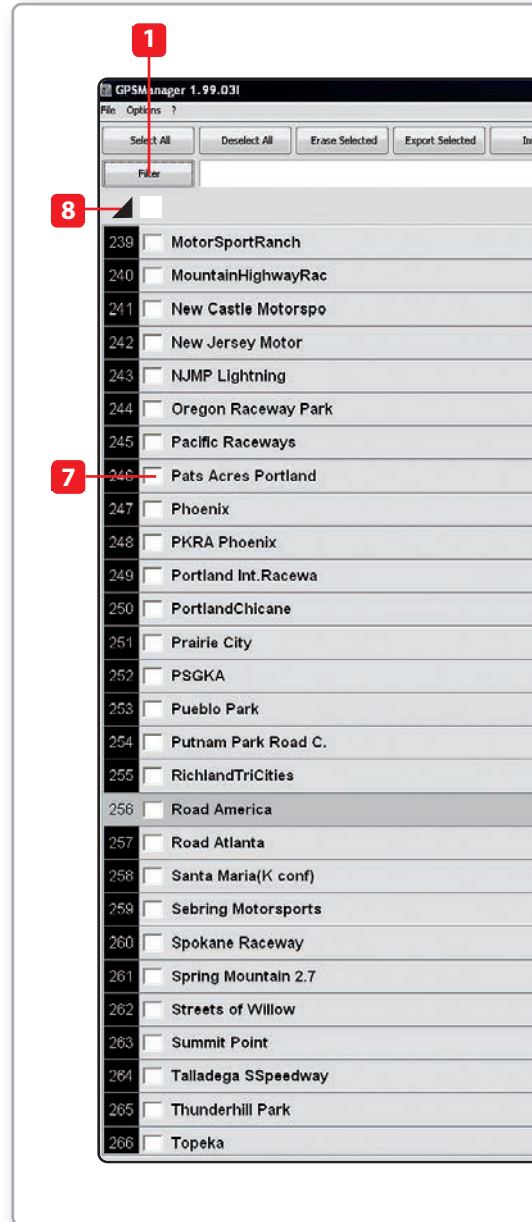
Using Track Manager, you can update, modify, transmit and receive to and from SmartyCam HD the coordinates of finish line and split points of all the tracks where you are going to run.

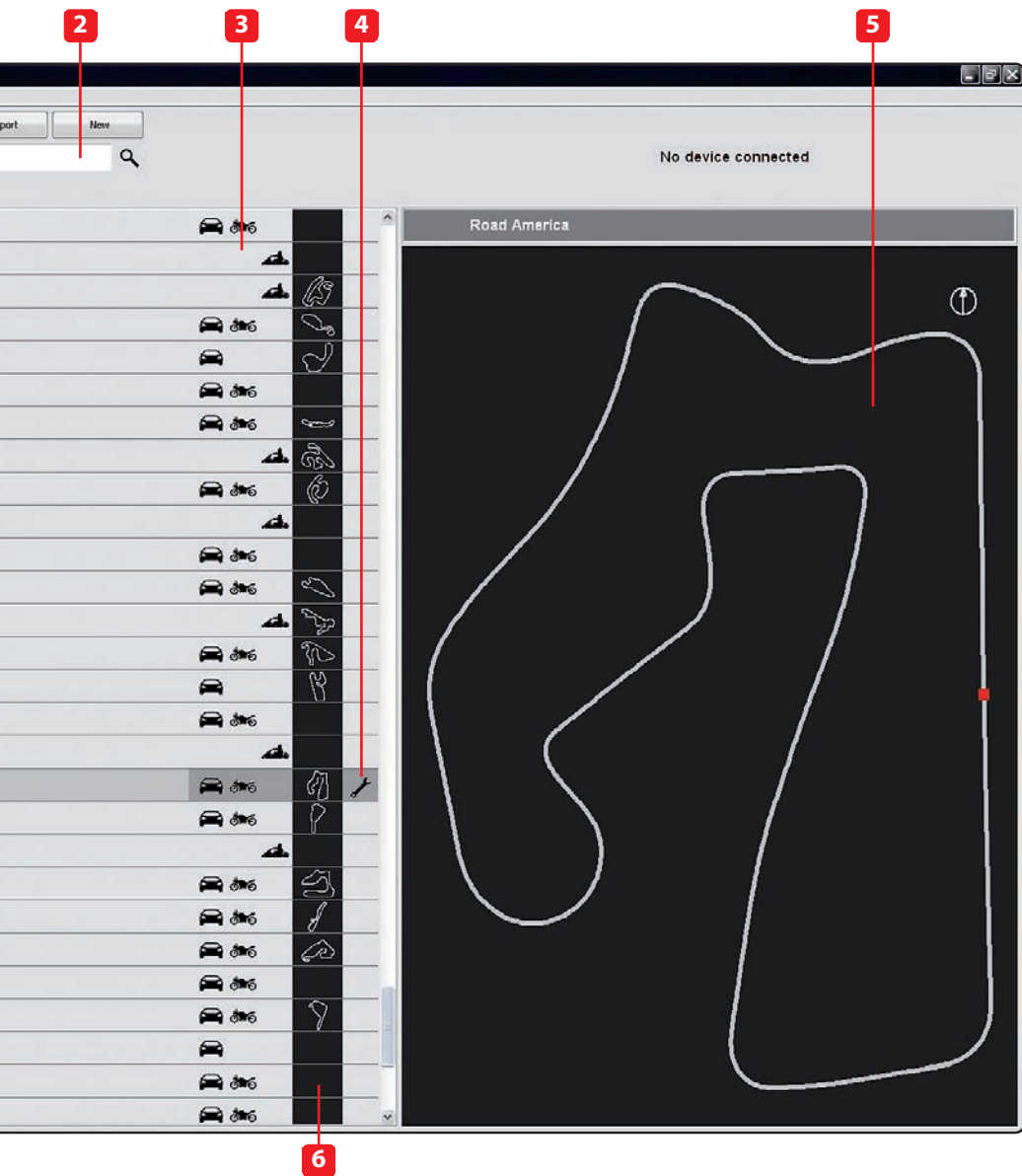
When opening the software, if there is no system connected to your PC via USB cable, you will see the screen shown.

As you can see, the screen is divided into two parts. On the left you see the track list, arranged by country of origin. If available, you will see the track layout and the type of vehicle that usually race on the track: car, motorcycle or kart.

On the right side of the screen, you will find a big picture of the track.

- 1 Track management command
- 2 Selection window for dynamic filters
- 3 Track type: car, bike, karts
- 4 Track data manager
- 5 Track shape, with starting line and split points position
- 6 Small track shape
- 7 Track selection
- 8 Open/Close Country track data

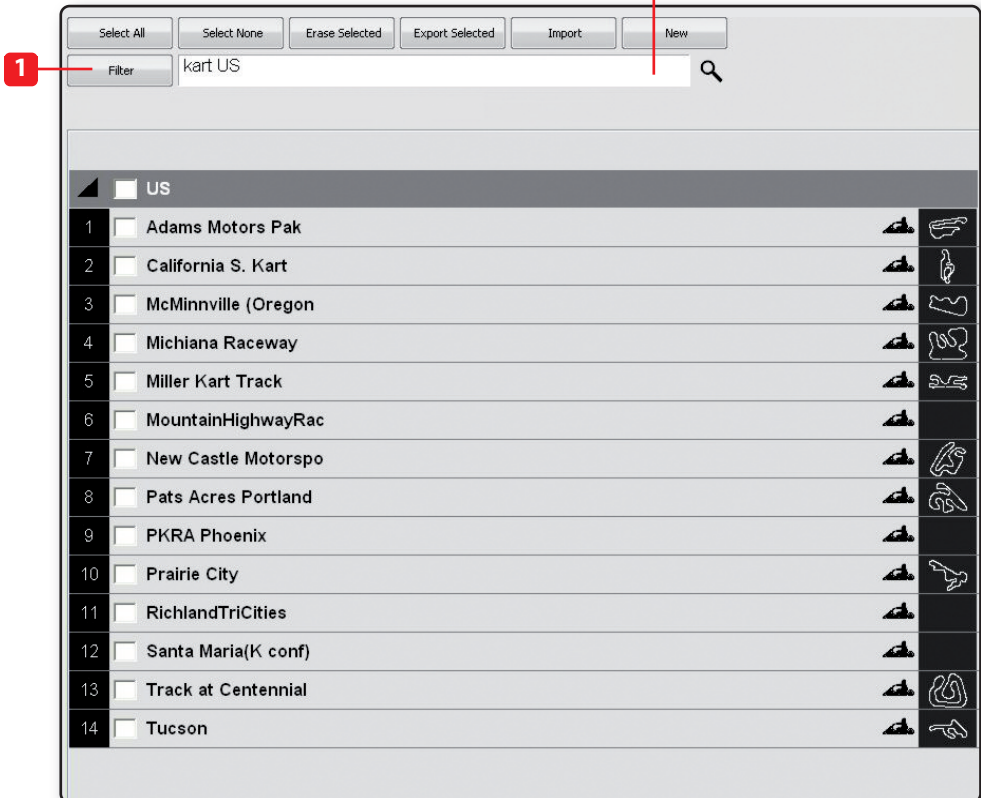




Filters in track data base management

In order to see only tracks you need, you can filter the list of tracks in different ways.

The filters can be static (1) (i.e. recorded and used every time you use Track Manager), or dynamic (2) (i.e. not saved when quitting the program).



■ Static Filters

A static filter is activated by pressing the filter button [1]. The window shown below will appear.



It will allow you to select nations, the type of vehicle and type of circuit.

The lists show only countries, vehicles and types of circuit present at least once in the database.

For example, if the database does not include any track in Germany, this country will not appear in the list.

By default, all countries, types of vehicle and tracks are enabled.

If you are interested in only the car tracks, for example, you must disable karts and motorcycles.

■ Dynamic Filters

The dynamic filters are activated in the box at the top left of the screen [2]:

The dynamic filters allow you to further filter the tracks by combining different characteristics.

For example, filtering using "Spain kart," will show only kart circuits in Spain.

How to add a new track to the PC database

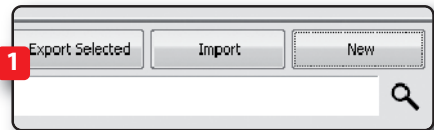
The official AiM track Database is continuously expanding.

To update your PC database, you can import the new tracks by selecting

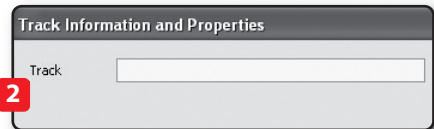
OPTIONS / IMPORT TRACKS FROM AIM WEBSITE

To add a new track

1)) Press the **“New”** button



2) Enter the name of the track.



3) Enter the required information: Country, Type of circuit (**Closed**, **Oval** or **Open**) (**asphalt**, **dirt**, **ice**, **water**).

Finally, using the icon buttons, set the type of vehicle that usually run on the circuit: **Cars**, **Motorcycles** or **Karts**.

If you have already run a test on the track and have downloaded data, you can associate the shape of the track, pressing the **“Load Shape”** button.



You can now select the file **"GPK"**, containing the GPS map of your track session.

Select the proper file, carefully checking name, date and time of the files.

The shape of the track will appear, split in different laps of the test. It is possible to scroll through the different laps, to zoom, to rotate the drawing.

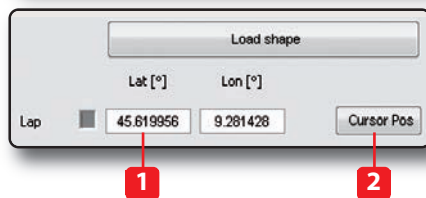
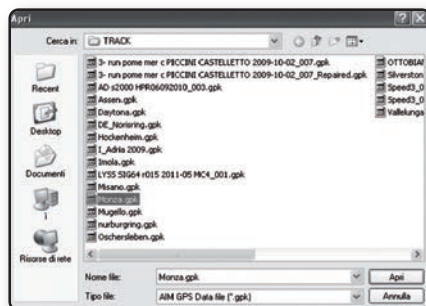
After having selected the desired lap, push **"OK"** to save the image of that lap. That image will be used as a reference shape for the future.

Finish line coordinates are automatically calculated but can be modified as desired in one of the following ways:

Define the coordinate by hand (1) Position the cursor on the desired point of the track and click the pushbutton **"Cursor Pos"** (2)

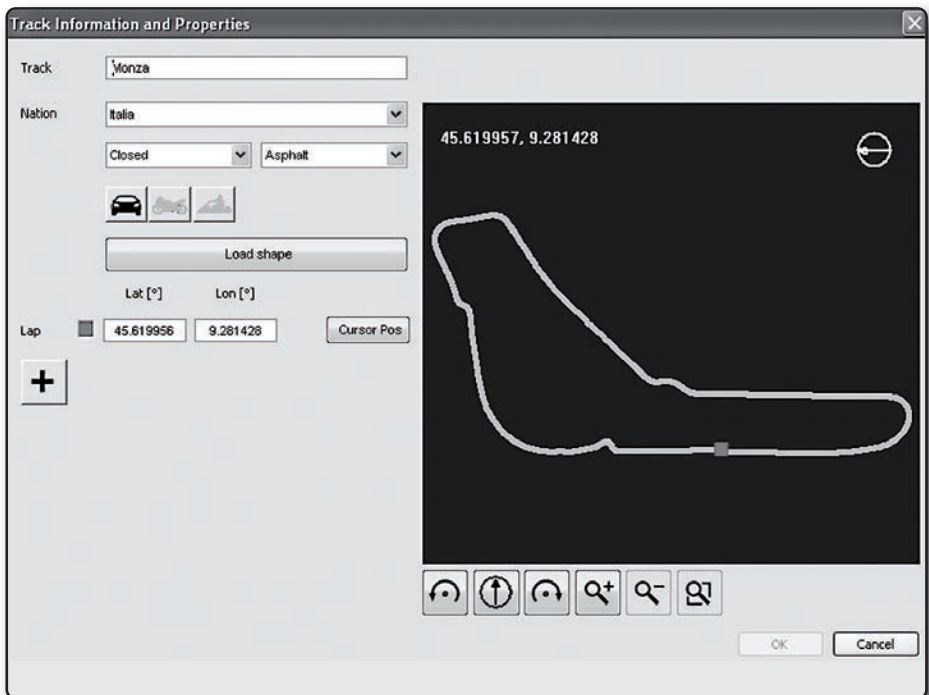
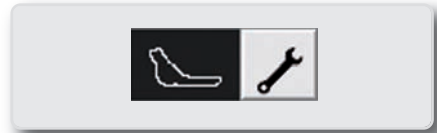
In case of a point-to-point track, it is necessary to define the coordinates of the starting and finish line.

Push **"OK"** for saving the configuration.



How to modify track data in the PC database

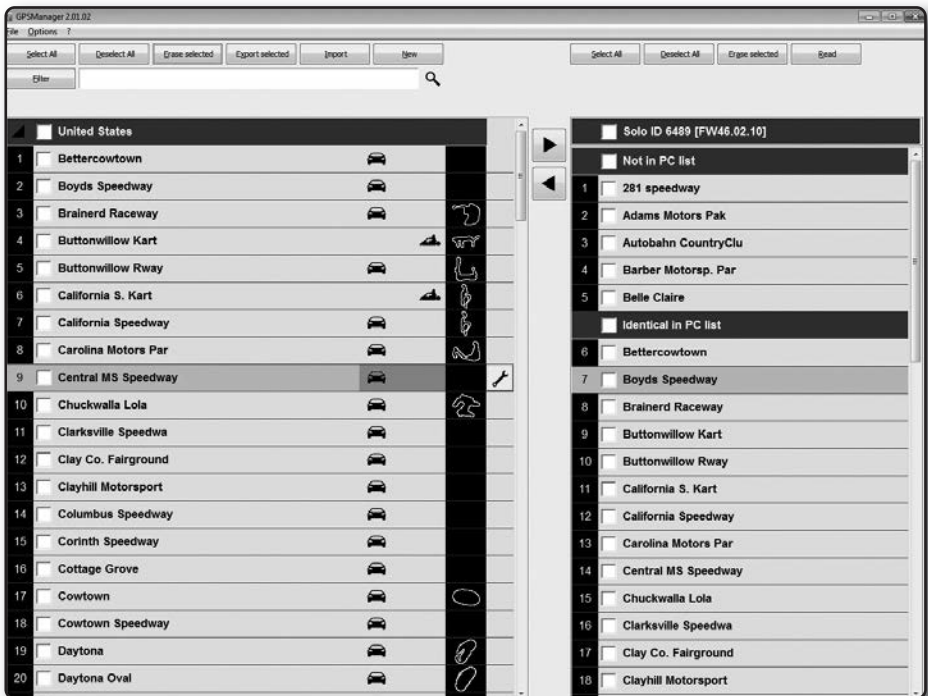
Click the icon aside. The window containing the track data will open..



How to read, write and delete tracks information in Smartycam HD

Connect your system to your PC using the USB cable. The Track Manager screen will display two

lists: the tracks in your PC will be shown on the left, and the tracks in SmartyCam HD will be shown on the right.

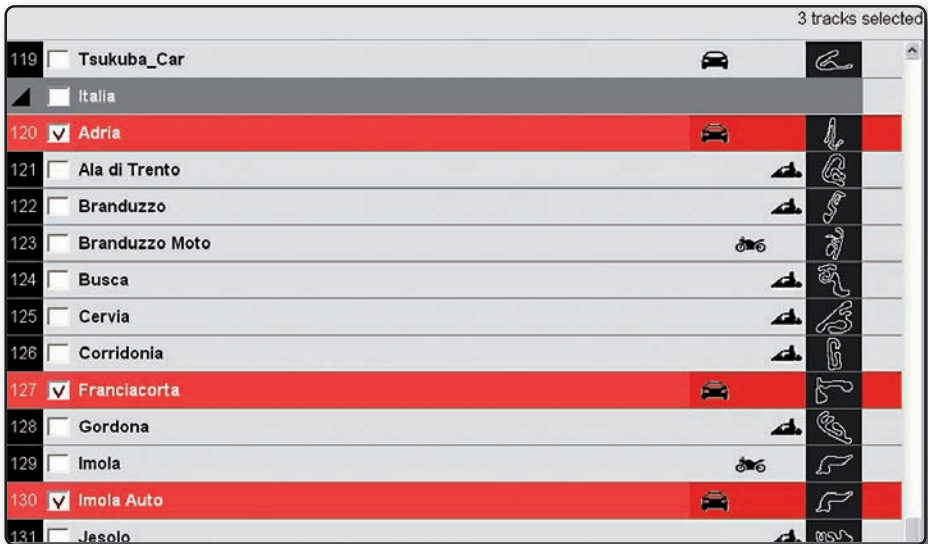


■ To transmit track information to SmartyCam HD

Select tracks to be submitted by clicking on the checkbox or on the name of the track.

■ To read track information from SmartyCam HD

Select tracks to be submitted by clicking on the checkbox or on the name of the track.



1

- Drag in the right panel or press the button ►.

Tracks' information are updated in SmartyCam panel.



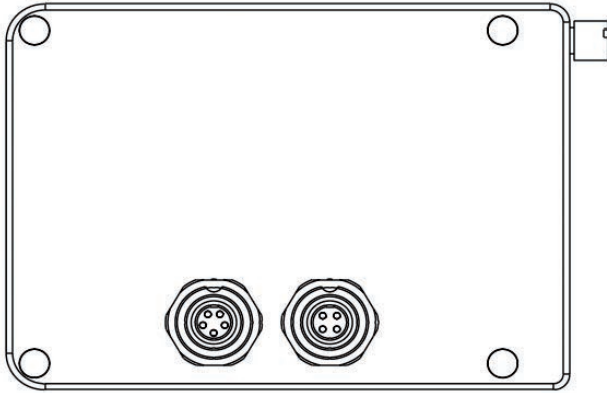
2

- Drag in the left panel or press the ◀ button.

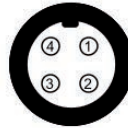
Tracks' information are updated in the PC list.

■ **To erase a track's information
from SmartyCam HD**

Select the track to be erased in the right panel and press "**Delete Sel**".



5 pins Binder 712
female connector pinout
external view



4 pins Binder 712
female connector pinout
external view

CAN Connector	
1	CAN+
2	GND
3	+Vb
4	CAN-
5	Vbext

GPS Connector	
1	CAN+
2	GND
3	+Vb
4	CAN-

SmartyCam HD Part Numbers

X94SHD002S0

SmartyCam HD with 2m CAN cable and 67° standard lens

X94SHD004S0

SmartyCam HD with 4m CAN cable and 67° standard lens

X94SHD001S0

SmartyCam HD with external power cable and 67° standard lens

X94SHD002W0

SmartyCam HD with 2m CAN cable and 84° wide lens

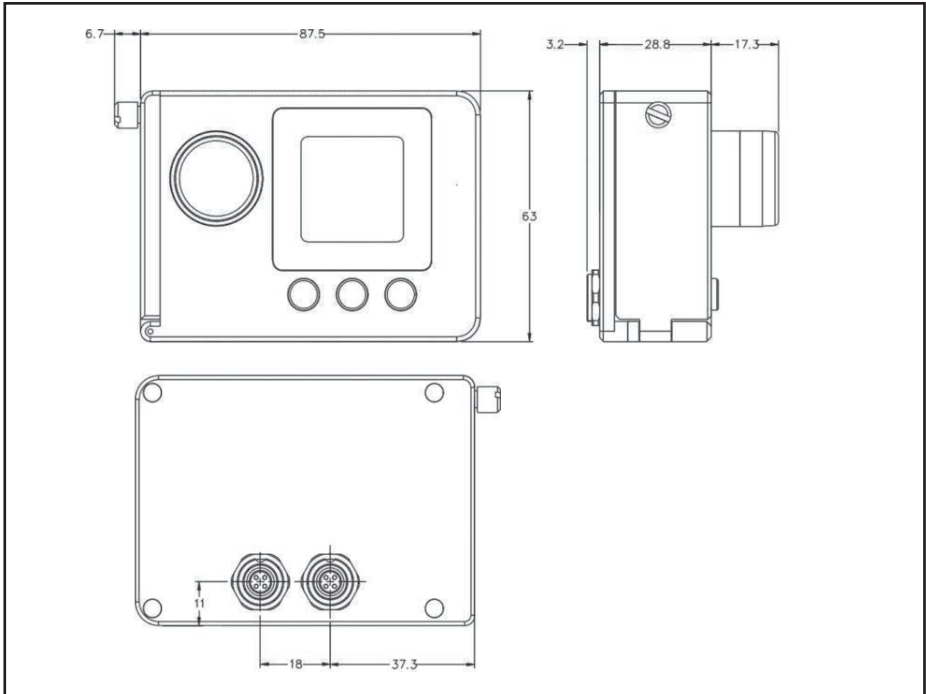
X94SHD004W0

SmartyCam HD with 4m CAN cable and 84° wide lens

X94SHD001W0

SmartyCam HD with external power cable and 84° wide lens

SmartyCam HD



- Video format H.264 1280x700 pixel @ 30 fps
- Accelerometer: three-axial $\pm 5G$
- Internal battery: 1.040 mAh
3.7 Volt lithium – rechargeable
- Battery charge: 700 mAh max 12V
- Battery life: three hours with acquisition
- Temperature working range: $-20^{\circ}C/+60^{\circ}C$
- Display size: 128*160 pixel
- Memory: 4 GB
(up to 128 Gigabytes supported)
- Memory consumption:
1 hour recording = about 4 GB HQ
- Aluminum body
- Dimensions: 87x63x48 mm
- Weight: 250g battery included
- Waterproof IP67



Our web site aim-sportline.com is constantly updated.

Please, constantly check it and download the last versions of the firmware of your products.





Made in Italy



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