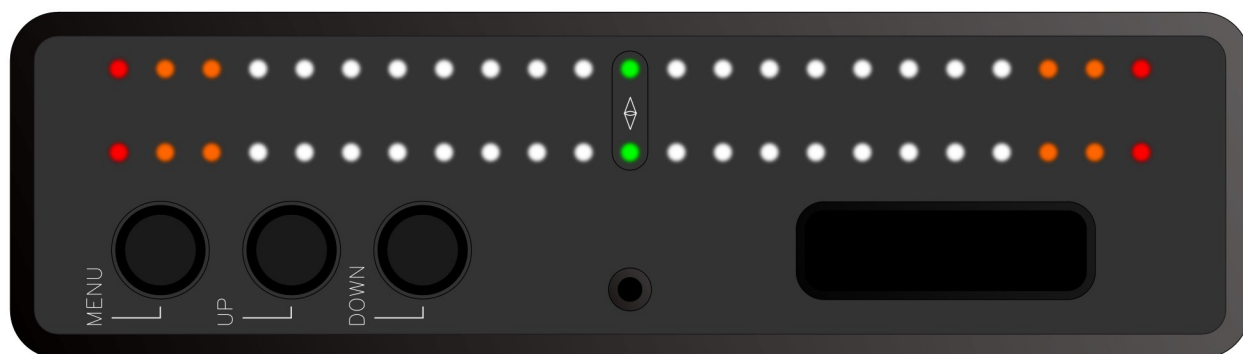


ZEN

GUIDA RAPIDA
QUICK REFERENCE GUIDE



smartsystem

MADE IN ITALY

Marchi depositati presso l'Ufficio Brevetti e Marchi. Tutti i diritti riservati
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v. 1.3

1 Safety

SmartCAM Zen has been designed considering all the technical regulations concerning the product.

Please, carefully read the safety instructions and retain for future reference.

- Protect your equipment from wet environments.
- Avoid any contact with water or other liquids.
- Never use in case of accidental introduction of liquids into SmartCAM Zen. Our technical department is at your disposal for any information about it.
- Clean only with a dry cloth.
- Do not use a power supply different from the one provided with the product.
- In case of failure, the SmartCAM Zen must be repaired only by qualified staff, authorized by SmartSystem Srl.
- Use SmartCAM Zen just for its own function.
- Do not remove any part or disassembly the SmartCAM Zen. There are no reusable parts in the SmartCAM Zen

WARNING



To prevent fire, explosion or electrical shock, **NEVER USE** the product in the rain, in wet or dusty environments.

TO AVOID ELECTRICAL SHOCK, DO NOT OPEN THE PRODUCT FOR ANY REASON. ALWAYS REFER TO QUALIFIED STAFF AUTHORIZED BY SMARTSYSTEM SRL.



The user has been informed about the importance of reading and understanding the safety instructions contained in this manual.

2 In the box:

- 1 SmartCAM Zen
- 1 Cage for SmartCAM Zen
- 1 1/4-16UNC Screw
- 1 kit adhesive pads kit

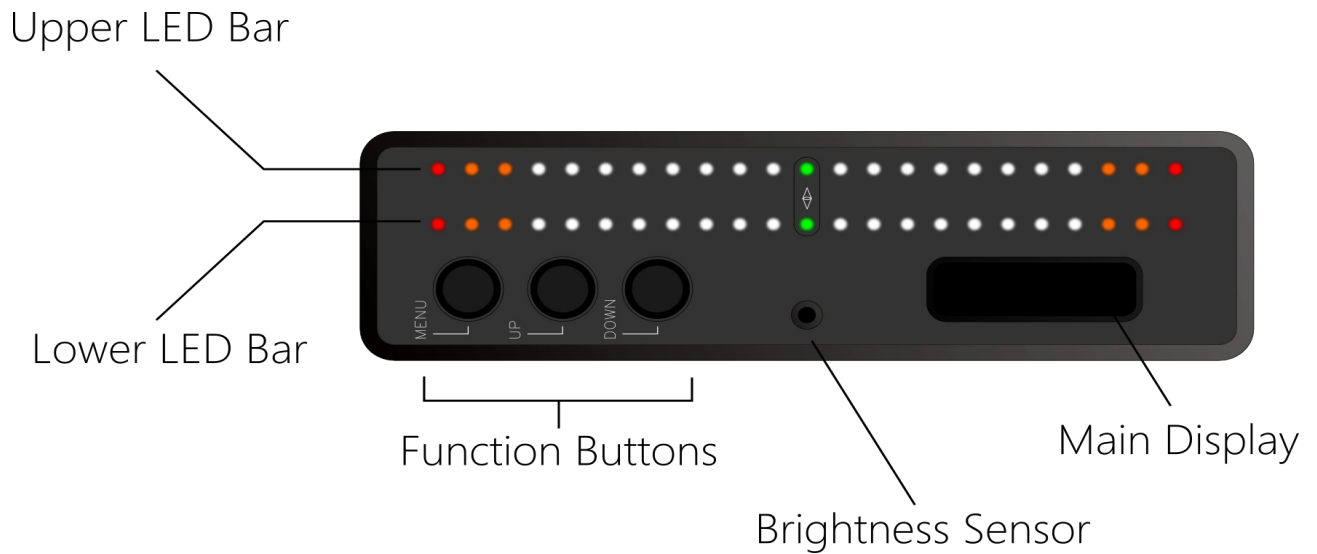
3 Specifications:

- Multi axis Digital Level indicator
- Possibility to visualize
 - Roll
 - Tilt
 - Pan
 - Roll + Tilt
 - Roll + Pan
 - Tilt + Pan
 - Roll + Side To Side
- Completely milled from solid aluminum case. Shot peened and Hard anodized
- Possibility to zero in every position.
- Double multicolor LED bar for displaying up to two axis simultaneously with fixed or automatic brightness adjustment based on ambient brightness
- Graphic display for management and for visualization of operating parameters
- USB-C connection for powering the unit and for Firmware update
- Power supply via PushPull 2 Poles connector. Voltage range from 5V to 20V
- Auto shutdown for voltage lower than 5V or higher than 20V
- Protected against polarity inversions
- Temperature range: -10 ° C + 45 ° C

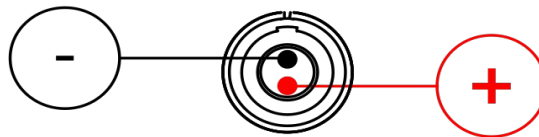


IN CASE OF MALFUNCTIONING, IMMEDIATELY CONTACT AN AUTHORIZED SMARTSYSTEM TECHNICIAN. DO NOT OPEN THE SMARTCAM ZEN TO PERFORM LUCKY REPAIRS OR TO DIAGNOSTICATE A FAULT UNLESS EXPRESSLY AUTHORIZED BY SMARTSYSTEM SRL.

4 SmartCAM Zen Overview



PushPull Connector Polarity



5 LED Bars visualization

The two LED bars of SmartCAM Zen allow immediate viewing of the chosen axis. The operating range is proportional to what is set for the specific axis.

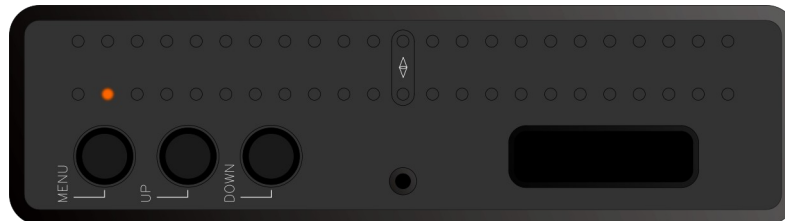
For each LED bar there are 23 emitters which therefore make it possible to divide the maximum selected angle into 11 subdivisions.

This allows to have a better granularity in the visualization while allowing to exploit the external emitters as markers always active and to maintain an adequate minimum resolution.

6 Main Display and Operational Modes

This manual refers to firmware version 1.5.6.3 and subsequent updates. Please update SmartCAM Zen to the latest version available through its Burner software as specified in chapter 9. The operating mode SmartCAM Zen is in when it is turned on is defined as SLEEP MODE.

SmartCAM Zen powers up in what is called **SLEEP MODE**.

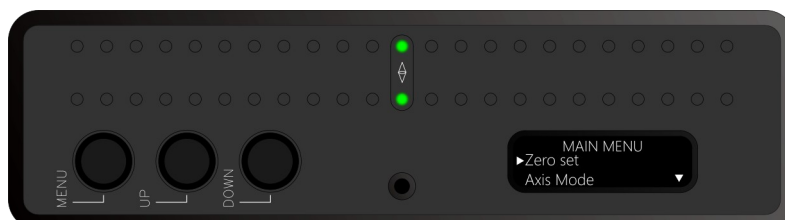


In this mode, SmartCAM Zen keeps all the sensors and signal processing components active without displaying any graphic elements(LED Bars and main display are OFF).

The main operating mode is called **STANDARD MODE** and it is the operating mode in which the LED bars show the data coming from the sensors according to the user's choices. The main display of SmartCAM Zen allows the direct visualization of the selected axis with an accuracy of up to 0.1 °.



The other operating mode is the **SETUP MODE**. In this operating mode, the LED bars continue to show data from the sensors based on the user's choices while the display shows all possible menu items.



7 Function Buttons

The SmartCAM ZEN function buttons, in addition to allowing intuitive navigation of the system settings, also allow you to perform advanced functions.

Each button can perform different functions based on how long it is pressed.

The possible states for each button are:

- SINGLE CLICK
- LONG CLICK

7.1 Menu Button

Operational Mode	Button State	Description
SLEEP MODE	Single Click	Set the operational mode to STANDARD MODE
	Long Click	-----
STANDARD MODE	Single Click	Set the operational mode to SETUP MODE
	Long Click	Set the operational mode to SLEEP MODE
SETUP MODE	Single Click	Allows you to enter the selected menu or perform the action shown on the display
	Long Click	Allows you to perform the action shown on the display and immediately return to STANDARD MODE or to execute a RETURN BACK to the previous menu based on the specific configuration (see 8.4.1.3)

7.2 Up Button

Operational Mode	Button State	Description
SLEEP MODE	Single Click	Set the operational mode to STANDARD MODE
	Long Click	-----
STANDARD MODE	Single Click	-----
	Long Click	It allows you to quickly reset the displayed axis while maintaining the operating mode
SETUP MODE	Single Click	Allows navigation of the menu
	Long Click	It allows you to quickly reset the displayed axis while maintaining the operating mode

7.3 Down Button





Operational Mode	Button State	Description
SLEEP MODE	Single Click	Set the operational mode to STANDARD MODE
	Long Click	-----
STANDARD MODE	Single Click	-----
	Long Click	-----
SETUP MODE	Single Click	Allows navigation of the menu
	Long Click	-----

8 Menu overview

The selectable menu items are:

- Set Zero
- Axis Manager
- Display Setup
- System

Beside each menu items, the system will indicate with an icon the function related to the click of menu button.

Icon	Description
	Pressing the menu button will execute the function
	Pressing the menu button allows you to enter a lower menu level
	Pressing the menu button allows you to return to a higher menu level
	Pressing the menu button enables or disables the indicated function

8.1 Zero Set

It allows you to reset SmartCAM Zen in any position.



8.1.1 Execute

It executes the zeroing of the axis in the current position. The axis that are zeroed are only those currently displayed. By performing the zero set via menu, a countdown will be carried out in order to minimize vibrations or movements imposed on the system during interaction with SmartCAM ZEN



It is possible to perform a quick reset by simply holding the UP button down for more than 2 seconds as previously reported

8.1.2 Set Countdown

It allows you to define the time needed to reset SmartCAM Zen when this is done using the Execute function.

Remember that the time for quick zeroing performed by keeping the up button pressed in standard mode is not changed by this parameter.

8.1.3 Gestures (Experimental)

It allows you to define the parameters for the “touchless” zeroing of SmartCAM Zen using the ambient light sensor. **This feature is experimental.**

8.1.3.1 Settings

Allows you to permanently or temporarily activate the "touchless" reset.

8.1.3.1.1 Enable

Once enabled, the system will periodically check the brightness variations received by the sensor at high frequency.

If these variations correspond to a cyclic pattern (high brightness / low brightness which can also be obtained by making a "greeting" with the hand in front of the sensor), the system will automatically reset the displayed axis.

The presence of the activated function is shown to the user with the ~ symbol placed near the numeric representation of the displayed axis.

8.1.3.1.2 Auto Disengage

Auto disengage allows you to disable the touchless reset function immediately after the first run. This function is enabled by default as soon as the user activates the gestures in order to avoid unwanted zeroing.

8.1.3.2 Sensitivity

It allows you to define the sensitivity level of the auto zeroing. The possible options are :

- Low
- Normal
- High

8.1.4 Defaults

Cancels the Zero previously setted up and restores the factory values used in the system calibration phase.

8.2 Axis Manager

The Axis Mode menu allows you to select which axis or axis to display on SmartCAM ZEN. The following table allows a quick and exhaustive list of possible combinations.

8.2.1 Axis Selection

SmartCAM Zen allows you to view the aviation standard angles of rotation defined as:

- ROLL
- TILT
- PAN

and combinations of them.

In addition to these, it is also possible to view the lateral acceleration to which SmartCAM Zen is subjected:

- Side To Side (STS)

The following table allows a quick and exhaustive list of possible combinations. The possible options depend on the operating mode in which SmartCAM Zen operates (see 8.4.2)

STANDARD MODE		
MENU ITEM	UPPER LED BAR	LOWER LED BAR
ROLL	ROLL	
TILT	TILT	
PAN	PAN	
ROLL & TILT	ROLL	TILT
ROLL & PAN	ROLL	PAN
TILT & PAN	TILT	PAN
ROLL & STS	ROLL	STS

DYNAMIC MODE		
MENU ITEM	UPPER LED BAR	LOWER LED BAR
ROLL	ROLL	
TILT	TILT	
ROLL & TILT	ROLL	TILT
ROLL & STS	ROLL	STS

Obviously the display will show, in STANDARD MODE, the numerical values detected by the SmartCAM ZEN sensors based on what the user has chosen.

8.2.2 Ranges

This menu allows you to specifically set the maximum ranges that can be displayed via LEDs. The menu options are dynamic and related to the axis you have chosen to display on the LED bar.

For all ROLL, TILT, PAN axis a choice is provided depending on the characteristics of the axis and above all on the operating mode.

The unit of measurement is °.

Only for the Side To Side, the possible choices are expressed in G.

8.2.3 Response Speed

It is possible to filter the response time of the sensors in order to make the display more similar to the operator's needs.

The available options are: **Realtime, Fast, Medium, Slow, Sloth**

8.2.4 Flip Direction

According to user preferences, each axis can be inverted in the display on the LED bar.

This change does not affect the numerical representation on the display.

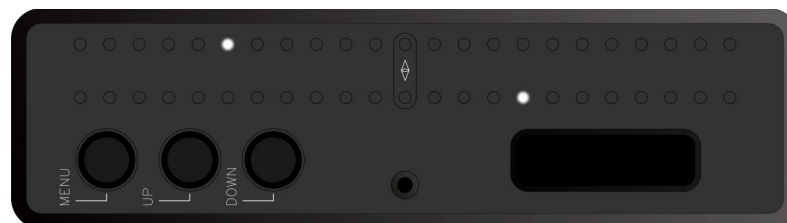
8.3 Display Setup

It is possible to configure the visual style for the upper and lower LED bars of SmartCAM Zen.

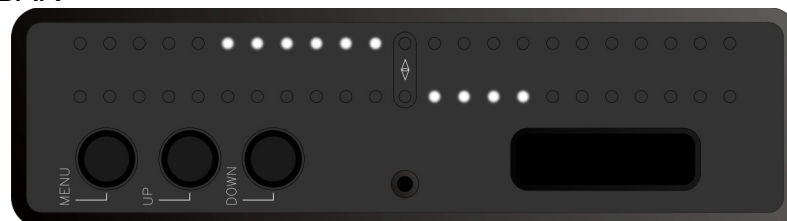
8.3.1 Display Style

Regardless if you are in single or dual axis, you can visualize the angle on the led bar with these styles:

- MOVING DOT



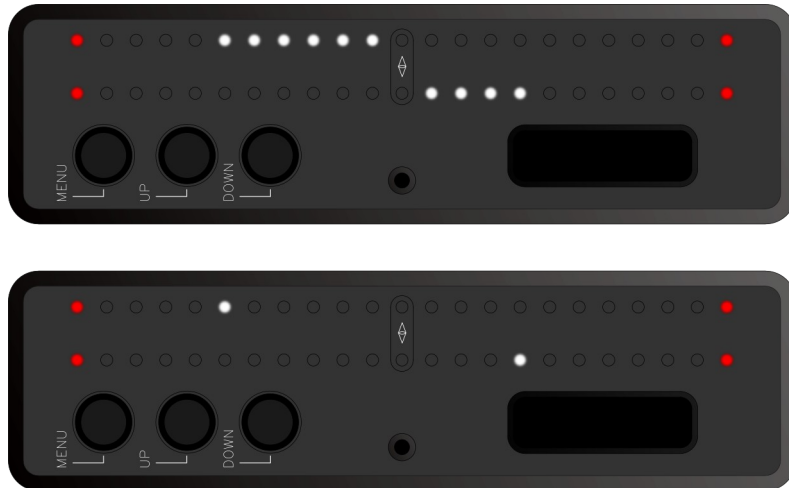
- SLIDING BAR



8.3.2 Markers

To help the operator make the extremes of the preset range for the chosen axis or combination of axis more visible, it is possible to activate or deactivate the display of the limits.

This setting is independent whether you choose the DOT or BAR display.



8.3.3 LED Deadband

It allows you to define an arbitrary space between the central LED and the first useful LED on the right and left for viewing the inclination of the axis.

It is very useful for having immediate visual feedback when the displayed axis is at zero.

8.3.4 Brightness

It is possible to vary the brightness of the two LED bars in order to optimize the light intensity according to the working environment.

Thanks to the brightness sensor integrated in SmartCAM Zen, it is possible not only to define a fixed brightness but, above all, to define a minimum and maximum brightness range.

This possibility is available only by setting the automatic mode which allows an autonomous adjustment of the brightness of the LEDs (between the minimum and maximum values chosen) based on the external environment.

8.4 System

In this menu it is possible to select some system parameters of SmartCAM Zen.

8.4.1 Options

8.4.1.1 Auto Power On

As reported in chapter 6, the operational state of the ZEN immediately after supplying power is SLEEP MODE.

On the other hand, it is possible to set an override of this mode and allow to automatically enter STANDARD MODE at power on.

8.4.1.2 Zen Upside Down

It allows you to completely rotate SmartCAM Zen by 180 ° so that the LED display is facing downwards.

This is very convenient for bringing the LED display as close as possible to the third-party LCD monitor.

8.4.1.3 Fast Menu Exit

By enabling this option, you can change the Long Click behavior of the menu button from "RETURN" to "MENU EXIT".

8.4.2 Zen Mode

It is possible to set the ZEN in two specific operating modes that characterize its behavior: STANDARD and DYNAMIC

8.4.2.1 Standard Mode

In this operating mode, the sensors inside ZEN are calibrated in such a way as to provide maximum stability over time as regards the detection of rotations inherent in ROLL, TILT, PAN and STS.

This mode is recommended for use on static vehicles where ZEN is rarely subjected to continuous movements

8.4.2.2 Dynamic Mode

In this operating mode, the sensors inside ZEN are calibrated in such a way as to provide maximum accuracy in detecting rotations inherent in ROLL, TILT and STS.

This mode is recommended for use on mobile vehicles where ZEN is continuously subjected to movements.

8.4.3 Menu Timeout

In this menu it is possible to modify the time that keep the menu open since last operation.

The possible values are: 5sec, 10sec, 20sec, Never

When "never" is selected, the menu is kept open until manual exit.

8.4.4 Firmware

In this menu, you can check the current firmware version installed in your ZEN.

If necessary, it is possible to reset the ZEN to the factory settings thanks to the "FACTORY RESET" menu



By executing a "FACTORY RESET" the system will be reset itself with all the default parameters

9 Firmware Update

Like any other SmartSystem product, SmartCAM Zen can also be updated to the latest firmware release through the Burner software available for PC and MAC.

Just start the Burner program and connect SmartCAM Zen to your PC or MAC via USB-C cable.

The system will automatically recognize your product and inform you whether or not it is possible to install a new firmware update.

During the firmware update procedure, never turn off the product before Burner completes the firmware upload process.

10 Maintenance

Do not use alcohol or other solvents nor detergents to clean your SmartCAM Zen. To clean metal components, we recommend you to use a paper towel lightly soaked in distilled water. Make sure no water drops reaches the inside components of SmartCAM Zen.

11 Disposal

Dispose of your SmartCAM Zen in accordance with current regulations. Address to special authorities or companies in charge of scrapping metallic materials and waste disposal.

Pursuant to Article 13 of the Italian Legislative Decree no. 151 of 25 July 2005, "Implementation of Directives 2002/95/EC, 2002/96/EC and 2003/108/EC regarding the reduction in use of dangerous substances in electrical and electronic equipment as well as waste disposal". Products bearing the barred dustbin symbol must be disposed of separately from other waste.

The user must therefore dispose of the product in question at suitable recycling centers for electronic and electro-technical waste, or he/she must turn the used product over to the retailer when buying a new equivalent product, on a one-to-one basis. Separate waste collection allows used equipment to be recycled, treated and disposed of without negative consequences for the environment and health, and it allows the materials in the equipment to be recycled.

Illegal dumping of the product by the user entails application of the administrative sanctions stated in the Italian Legislative Decree No. 22/1997 (Article 50 et seq of the Italian Legislative Decree No. 22/1997).

12 Warranty

SmartSystem Unipersonale Srl headquarter is located in Via del Commercio, 22F, 61032 FANO(PU), ITALY. Smartsystem main brand and all the other brands associated with it are property of Smart-System Srl Unipersonale.

Your SmartSystem equipment is guaranteed against any manufacturing or material defects for 24 months from the date of delivery to the customer. Warranty will cover any functioning issues related to manufacturing or material faults.

In this case, the company reserves the right to decide whether eliminating the defect or providing the customer with a new product.

Any claims due to manufacturing or materials faults must be communicated by the customer, upon presentation of the warranty card, properly completed, or of a proof of purchase.

The warranty, which will expire after 24 months, will not be extended either by a complaint, or by subsequent executions. Damage caused by accident, misuse, do-it-yourself repairs or modification, repair by unauthorised service centre, static charges or mechanical damages is not covered by the warranty.

Furthermore, warranty won't be valid neither in case the warranty card is arbitrarily modified.

Repairs must be made only by authorized service centres.

ALWAYS REQUEST THE RMA NUMBER BEFORE SENDING US THE PRODUCT