



## Safe-T-Scope® 360AHD™ 3D Surround View System

### User Manual

November 12, 2024

90-21 144<sup>th</sup> Place, Jamaica, New York USA 11435

Phone: 800-227-2095

[www.roscovision.com](http://www.roscovision.com)

Version 1.2

**User Manual Part Number: MNL360AHD (V1.1)**

©2024 Rosco® Vision, All Rights Reserved

Specifications and details are subject to change without prior notice.

Patent Pending



## Table of Contents

1. Precautions .....	1
2. Product Features .....	3
2.1 Basic Features .....	3
2.2 Useful Applications .....	3
2.1 Features.....	5
3. Parts List.....	5
4. Specification .....	5
4.1 Main Control Parameters .....	5
4.2 Camera Parameters .....	5
5. Wiring Diagram .....	7
6. Remote Control Instructions .....	8
7. Main Interface .....	9
7.1 Login Instructions .....	9
7.2 Main Menu Interface .....	10
7.3 User Setup .....	10
7.3.1 Basic Setup .....	11
7.3.2 Display .....	13
7.3.3 Triger .....	15
7.3.4 View Adjust .....	16
7.4 AVM (Around View Monitor) Interface.....	18
7.4.1 Automatic Calibration.....	19
7.4.2 Calibration File .....	20
7.4.3 Vehicle Type .....	21
7.4.4 Surround View.....	22
7.4.5 Parking Lines .....	22
7.4.6 3D Perspective .....	23
7.4.7 3D Display Adjust .....	24

8. Information .....25

# 1) Precautions

## **Storage and Usage**

1. Do not expose the system to extreme temperatures. The storage temperature range is -30°C to +80°C, and the operating temperature range is -20°C to +70°C. The relative humidity should not exceed 90%. Avoid using this device near bathtubs, wash basins, kitchens, damp basements, swimming pools, or similar places.
2. Do not use this device in environments with excessive moisture, dust, or smoke. Avoid dropping or striking the device.
3. Avoid using this device in enclosed spaces, areas with excessive vibration, or places subject to severe impacts.
4. Never puncture, scratch, or use abrasive cleaning materials on the device. Ensure cables are not pinched or stepped on.
5. The ECU (Electronics Control Unit) is not designed to be waterproof.

## **Operating Precautions**

- 1) The device may be powered by a 12- or 24-volt automotive battery or vehicle electrical system.
- 2) Ensure all cables are securely connected and observe polarity. Improper cable connections may damage the system. Remove the power cable connections when you do not intend to use the unit.





### **Warning!**

- 1) Do not open the ECU case unless directed by Rosco
- 2) Driver must exercise caution when viewing the monitor during vehicle operation

## Maintenance

- 1) Disconnect all the cable connections from the ECU before cleaning the cameras.
- 2) Use a mild household detergent and clean the unit with a slightly damp, soft cloth.
- 3) Never use strong solvents such as thinner or benzine, as they might damage the finish of the camera housing.

	Caution	
	Risk of electric shock Do not open	
Caution: to reduce the risk of electric shock, Do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.		



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



This symbol is intended to alert the user not to dispose of electrical and electronic equipment.

### CAUTION:

You are cautioned that any changes or modifications not expressly approved in this manual and by Rosco personnel could void your warranty and risks potential damage to the device

## 2. Product Features

### 2.1 Basic Features

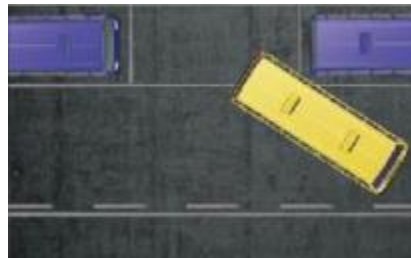
- 1) Includes 4 190° FHD (Full High-Definition) 1080P wide-angle fisheye cameras with a horizontal view angle greater than 170°.
- 2) Utilizes quad-core ARM Cortex-A9 and SOC (System-on-a-Chip) development with built-in high-performance H.264 video encoding/decoding, ensuring efficient and accurate seamless image composition.
- 3) Quick calibration hardware (sold separately) and software capabilities to simplify calibration procedure.
- 4) Provides FHD 1080P video output and multiple video signal output formats.

### 2.2 Useful Applications

- 1) **Reverse Parking:** Simplifies backing into tight spaces.



- 2) **Side Parking:** Assists with parallel parking maneuvers.



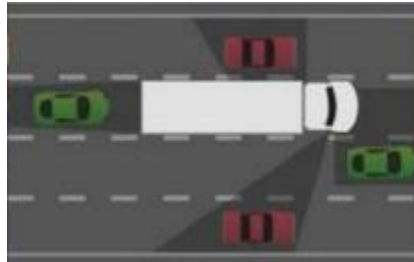
- 3) **Tight Space Navigation:** Guides you through confined roadways.



- 4) **Congested Roads:** Helps navigate through heavy traffic.



- 5) **Blind Spot Monitoring:** Ability to monitor vehicles, objects, and pedestrians in your blind spots.



- 6) **Turning View:** Provides optimal viewing angles during turning and lane changes.



## 2.3 Features

- 1) **Panoramic Imaging:** Capture wide-angle views with high clarity.
- 2) **Seamless Blending and 360° View:** Provides a smooth, uninterrupted 360-degree visual experience.
- 3) **Automatic Image Triggers:**
  - Reversing Image: Automatically triggers to the rear view when the reverse wire is activated.
  - Side Images: Automatically triggers to the left or right view when the corresponding wire is activated.
- 4) **Automatic Plane Correction:** Ensures images are correctly aligned and free of distortion.

### 3. Parts List

<b>STSK360AHD – 360 AHD Surround View Kit</b>			
<b>Item</b>	<b>Description</b>	<b>Rosco Part No.</b>	<b>Quantity</b>
1	ECU (Electronic Controls Unit)	STSK360AHDECU	1
2	AHD Fish-eye Camera	STSC360AHD	4
5	Power Harness	STSK360AHDPHAR	1
3	34-button remote control	STSA5785	1
4	Infrared extension cable	STSA1040	1
5	Video Input Harness	STSK360AHDARA	1
6	4CH Video Output Harness	STSK360AHDHARB	1
7	Video Extension Harness (65 ft.)	STSH556	3
8	Video Extension Harness (33 ft.)	STSH557	1
9	6Pin to 4Pin Adapter Cable	STSH642	1

<b>STSA1102 (Sold Separately) – Calibration Kit</b>			
<b>Item</b>	<b>Description</b>	<b>Rosco Part No.</b>	<b>Quantity</b>
1	Power Harness	STSK360AHDPHAR	1
2	34-button remote control	STSA5785	1
3	Special Industrial Grade Calibration Mats	STSA1101	4



## 4. Technical Specifications

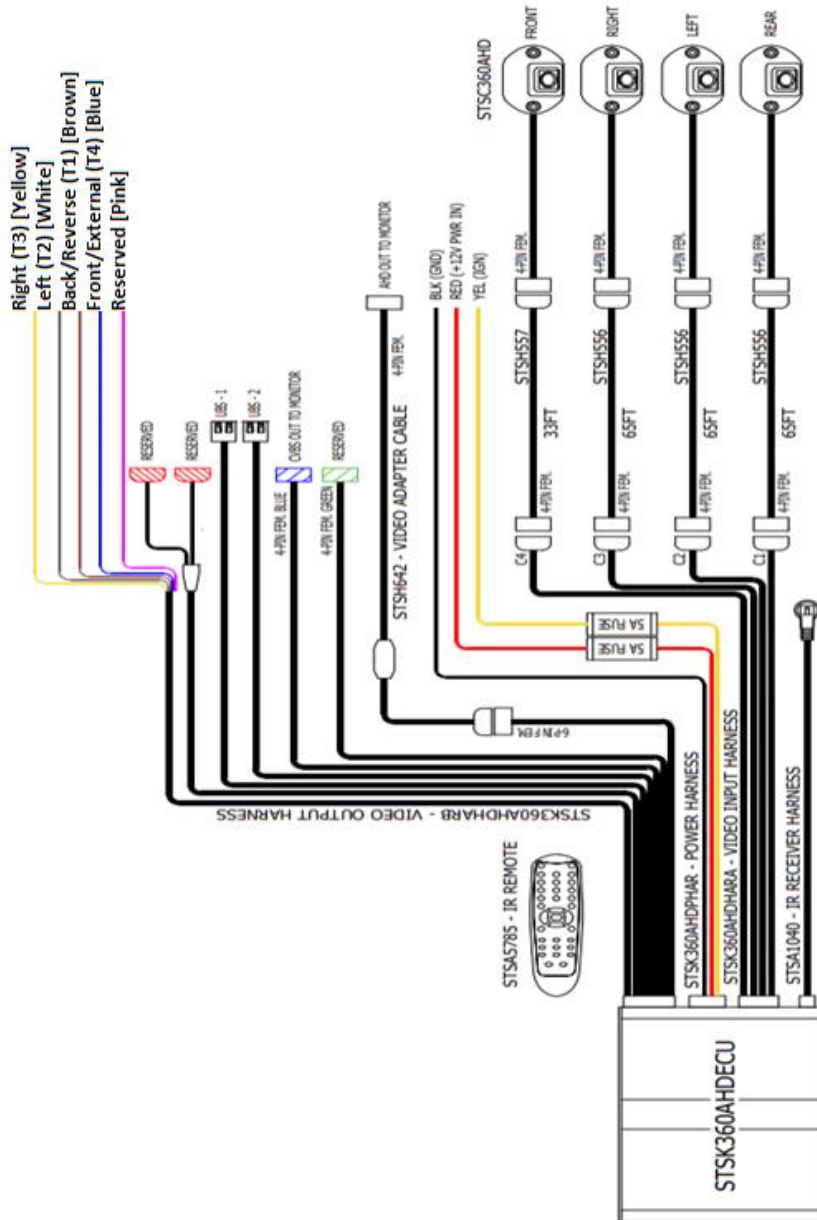
### 4.1 Main Control Parameters

Input Voltage	12Vdc – 24Vdc
Nominal Current Draw	2A @12Vdc
Operating Temperature	-20°C – +70°C
Storage Temperature	-40°C – +85°C
Video Output Resolution	1080P @ 30FPS
Video Input/Output Format	AHD/AHD, CVBS
Environmental Rating	ROHS
Relative Humidity	+10% RH – +95% RH

### 4.2 Camera Parameters

Input Voltage	12Vdc
Operating Temperature	-20°C – +70°C
Storage Temperature	-40°C – +85°C
Video Output Resolution	1080P @ 30FPS
Horizontal FOV (Field of View)	>170°
Waterproof Rating	IP69K
Environmental Rating	ROHS

# 5. Wiring Diagram



## 6. Remote Control Instructions

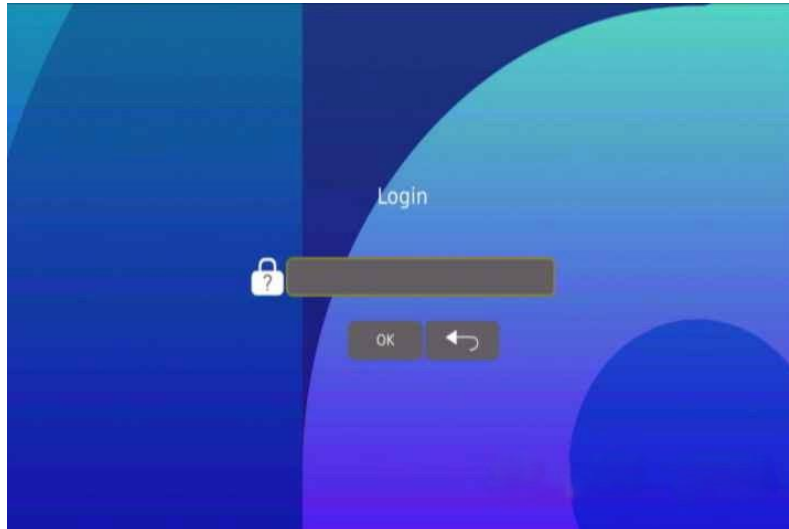


- **ENTER:** Enter the main menu or confirm a menu selection.
- **ESC:** Exit the main menu interface or return to the main menu interface.
- **◀▶:** Use the left and right keys to switch between left and right single views in the main interface; adjust settings in the menu page.
- **▲▼:** Use the up and down keys to shift the image channel to front/back view in the main interface; switch options in the menu page.
- **SHIFT:** Shift the current display mode to quad-view in the main menu interface; switch menu selections in the menu interface.
- **POWER:** Turn the video display on or off.
- **Number buttons (0-9):** Input numbers in the input box or switch views in the main interface.
- **CLEAR:** Delete a character each time.
- **MULTI:** Switch to full-screen surround view in the main interface.
- **PTZ:** Enter a decimal point.

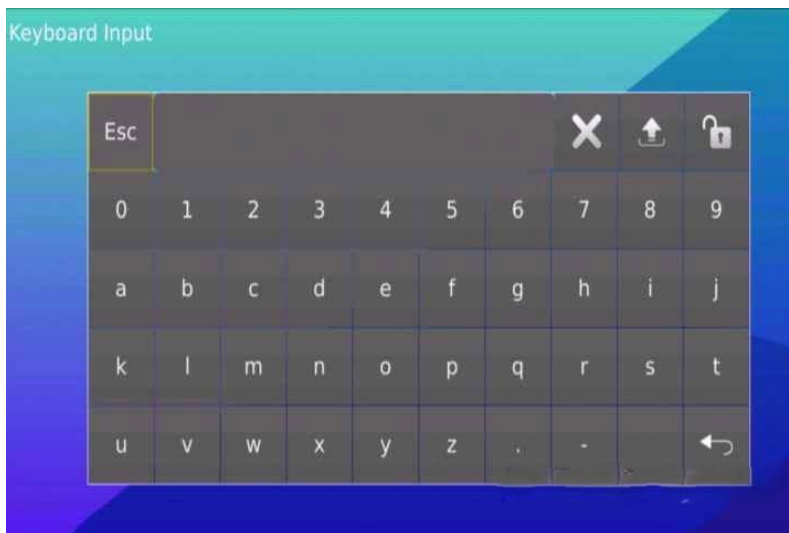
# 7. Main User Interface

## 7.1 Login Instructions

*Note: The remote control will be used to navigate the menu in its entirety unless specified otherwise*



1) The Login page looks like the image above

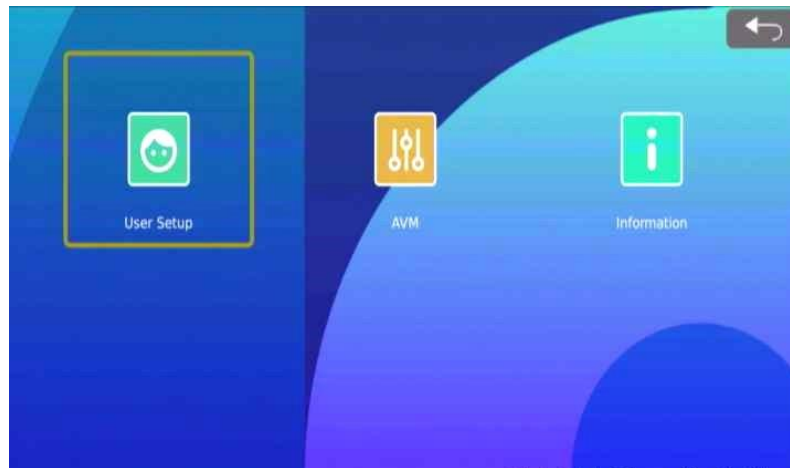


2) Use the remote to enter the password; doing this will display a keyboard shown above.

**NOTE:**

- The default password for this system is: 22061.
- After the password is logged in, there is no need to re-enter the password within 10 minutes; once the timeout or restart of the device or wake up from sleep, the password

## 7.2 Main Menu Interface



### Feature Description:

- 1) **User Setup:** Configure basic functions and display settings.
- 2) **AVM:** Auto-Calibrate, import/export calibration files, switch vehicle models, and adjust view settings.
- 3) **Information:** Display system information and perform software updates.

## 7.3 User Setup -update with removed time



### Feature Description:

- 1) **Basic Setup:** Interface for basic setup configurations.
- 2) **Display:** Interface for display options.
- 3) **Trigger:** Interface for setting triggers
- 4) **View Adjust:** Corrections

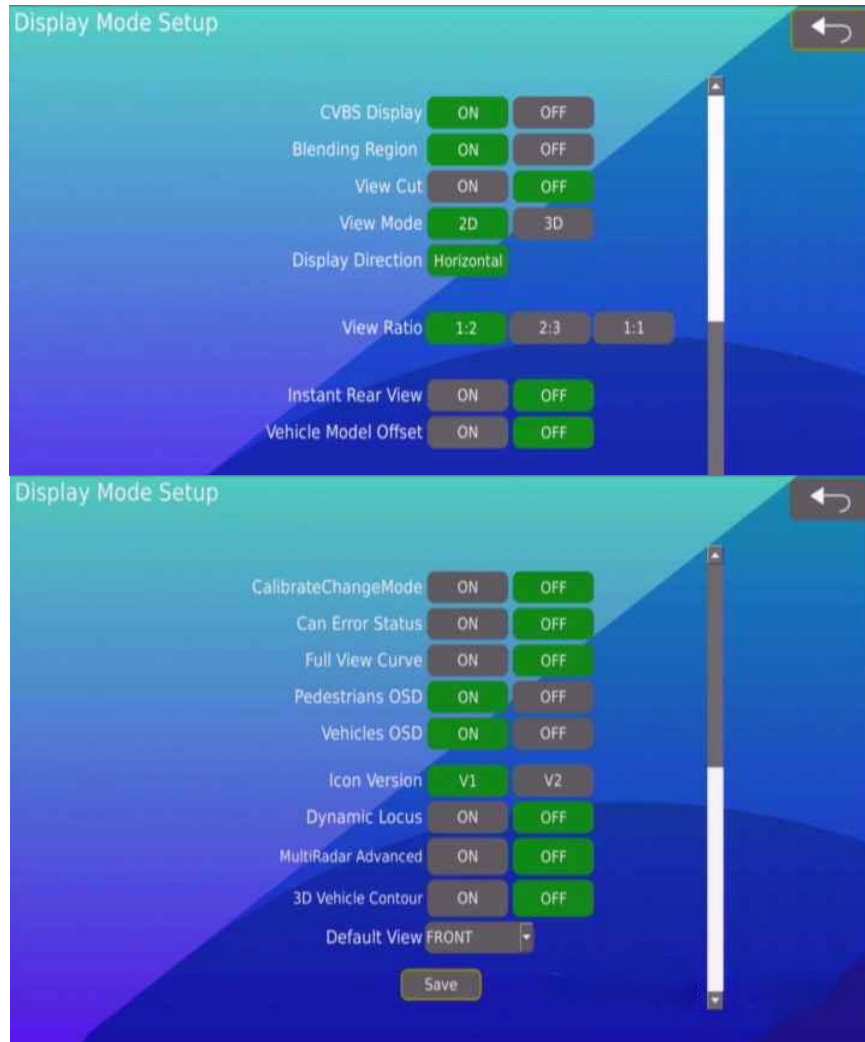
### 7.3.1 Basic Setup



#### Feature Description:

- 1) **AV (Audio-Visual):** The default standard configuration is NTSC. Switching between NTSC/PAL is only available for CVBS output.
- 2) **Display Icon:** The icon hidden function is set to ON by default. When ON, the main interface icon is displayed; when OFF, the main interface icon is hidden (excluding the direction icon).
- 3) **Speed WakeUp:** The speed wake-up function is OFF by default. When set to ON, if the vehicle speed is lower than the set value, the system will automatically wake up the display screen. If the speed is higher, the system will enter standby mode. When set to OFF, the speed wake-up function is disabled.
- 4) **Standby Delay:** The automatic standby function is OFF by default. When set to 3s, the system will enter standby after 3 seconds of inactivity. When set to OFF, the system remains on. The Define option allows customization of the standby time between 3-30 seconds.
- 5) **Language:** The language setting is set to English by default. Select between English, French, and Spanish language options.

### 7.3.2 Display Mode Setup



#### Feature Description:

- 1) **CVBS (Composite Video Blanking and Sync):** If set to ON, video output will be based on CVBS output. If set to OFF, video output will be set to AHD (Analog High-Definition).
- 2) **Blending Region:** The default setting is ON. When set to ON, the overlapping area will blend seamlessly. When set to OFF, the overlapping area will have a sharp cutoff line on the overlapping area.
- 3) **View Cut:** The default setting is ON. When ON, the left and right sides of the single view picture are cropped. When OFF, the single view is not cropped, and the picture remains consistent with the four corners.
- 4) **View Mode:** Toggle between 2D mode and 3D mode for video display. 2D mode will show an areal 2D model of the vehicle, along with 2D surround view, while 3D mode

will display a 3D vehicle model, along with a 2D/3D surround view depending on the visual settings chosen.

- 5) **Display Direction:** Toggle between Horizontal/Vertical views of the surround display.
- 6) **View Ratio:** The default setting is 1:2. When set to 1:2, the surround view occupies 1/3 of the screen, and the single view/3D occupies 2/3 of the screen. When set to 2:3, the surround view occupies 2/5 of the screen, and the single view/3D occupies 3/5 of the screen. When set to 1:1, the surround view and the single view/3D each occupy half of the screen.
- 7) **Instant Rear View:** The default setting is OFF. When set to OFF, the system displays the panoramic picture after the boot logo. When set to ON, the single view is displayed for 3 seconds after startup, followed by the panoramic picture. This requires the rear single view to be a mirror image (i.e., using the rear single view screen instead of displaying the logo).
- 8) **Vehicle Model Offset:** The default setting is OFF. When set to ON, the rear single-view screen will be displayed approximately 3 seconds after power-on. If set to OFF, the boot logo will be displayed approximately 3 seconds after power-on.
- 9) **Calibrate Change Mode:** The default setting is OFF, allowing for 4-way calibration. When set to ON, a 3-way calibration can be performed. Note that only a 3-camera connection can be used to perform a 3-way calibration.
- 10) **3D Vehicle Contour:** The default setting for this is OFF. When switched to ON, the 3D vehicle display will switch to a contoured version of the vehicle model. (Note: it is recommended to not switch this setting during operation of vehicle)
- 11) **Default View:** Choose the default display view. Configurations are as follows: FRONT, REAR, SIDE, FRONT ZOOM, REAR ZOOM, FRONT LEFT, FRONT RIGHT, REAR LEFT, REAR RIGHT, LEFT, RIGHT, 3D LEFT\*, 3D RIGHT\*, 3D FORWARD FACING\*, 3D REAR FACING\*

\*Views are only available using 3D mode



### 7.3.3 Trigger Setup



#### Feature Description:

- 1) **Left (T2):** Configure the default view for Left trigger wire. The selection of view will be the same as the default view settings found on section 7.3.3 – point 17 above.
- 2) **Right (T3):** Configure the default view for Right trigger wire. The selection of view will be the same as the default view settings found on section 7.3.3 – point 17 above.
- 3) **Back (T1):** Configure the default view for Back trigger wire. The selection of view will be the same as the default view settings found on section 7.3.3 – point 17 above.
- 4) **Extern. (T4):** Configure the default view for External trigger wire. The selection of view will be the same as the default view settings found on section 7.3.3 – point 17 above.
- 5) **Emergency:** Configure the default view for Emergency trigger. This feature is only available if both left and right trigger are wired for emergency situations and can be triggered in the same time i.e Hazard lights.

### 7.3.4 View Adjust





Feature Description:

**Select Camera:** Select the camera to which you want to apply the view adjustment settings. Options are: Left, Right, Back, External, and Emergency.

- 1) **Fish Eye Rectify:** The fish eye correction switch is OFF by default, resulting in a fish-eye image from the selected camera. When turned ON, the selected camera image will be corrected to a non-fish-eye state.

### Image Adjust

- 2) **View:** When selecting Dual, the right side displays the surround view. When selecting Single, the right side shows the corresponding single view of the selected camera.
- 3) **Brightness:** Default value is set to 46. The value ranges from 0 to 127.
- 4) **Saturation:** Default value is set to 106. The value ranges from 0 to 127.
- 5) **Contrast:** Default value is set to 80. The value ranges from 0 to 127.
- 6) **Sharpness:** Default value is set to 0. The value ranges from 0 to 127.
- 7) **Hue:** Default value is set to 42. The value ranges from 0 to 127.

### Camera Mirror

- 8) **View:** When set to ON, the image will display a mirrored view. When set to OFF, the image will display an unmirrored view.

## 7.4 AVM (Around View Monitor) Interface



The image above shows the AVM interface in 2D mode



The image above shows the AVM interface in 3D mode

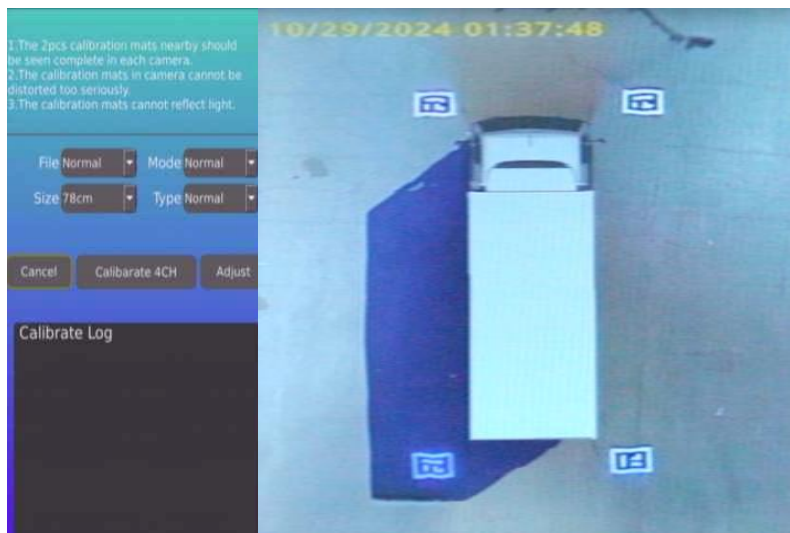
Feature Description [2D and 3D modes]:

- 1) **Automatic Calibration:** Perform automatic calibration of cameras.
- 2) **Calibration file:** Export/Import calibration files and resources.
- 3) **Vehicle Type:** Change the vehicle type being displayed.
- 4) **Surround View:** Configure surround view settings.
- 5) **Parking Line:** Configure parking line display settings.

Feature Description [3D mode only]

- 6) **3D Perspective:** Configure 3D perspective settings.
- 7) **3D Display Adjust:** Adjust 3D user display settings.

### 7.4.1 Automatic Calibration



Feature Description:

- 1) **File/Mode/Size/Type:** These are parameters used to configure the calibration steps. At this moment, Rosco does not support modified calibration. Please leave settings as it is. If unsure, please perform reset of the system to obtain default values.
- 2) **Cancel:** Click this button to cancel the auto calibration procedure at any time.
- 3) **Calibrate 4CH:** Perform calibration of 4 channel camera.



*If calibration is successful, the above prompt will appear. This will also allow you to perform the adjustment feature after the successful calibration to fix minor imperfections with the display vehicle.*

- 4) **Adjust:** Adjust parameters to ensure calibration is as accurate as possible. In here, precision, vehicle length, vehicle width, vehicle rotate position can be configured to ensure that the display vehicle is projected as accurately as possible.

## 7.4.2 Calibration File



### Feature Description:

- 1) **Export:** This will export the calibration file to a USB flash drive. Ensure that a USB flash drive with at least 16GB of storage space available is used for exporting.
- 2) **Export History:** To view previously exported calibration files. This is used to retrace an older file that has been exported from the system. If this option is chosen, there is no need to use the calibration mats.
- 3) **Import File:** List of calibration files found in the USB Flash Drive which can be used in lieu of the automatic calibration feature.
- 4) **Import:** Perform import of selected calibration file.

### Notice:

- 1) Files can only be imported from a USB drive. Ensure the USB drive is accessed before entering this page.
- 2) It is normal for the system to restart after confirming the import of calibration files.



### 7.4.3 Vehicle Type



Feature Description:

- 1) **Vehicle Type List:** Select from a list of vehicles available to choose from the drop-down menu. Please contact Rosco for customization of vehicle types.

## 7.4.4 Around View



Feature Description:

- 1) **Blending Angle Setup:** Adjust the left-top, right-top, left-bottom, right-bottom blending angle values. The default value is set to 30 and can be configured between 0-90.
- 2) **Bird Eye View Setup:** This is to configure the range of visibility on all 4 corners of the image. Units can be displayed and appropriately converted into both inches and centimeters.

## 7.4.5 Parking Lines



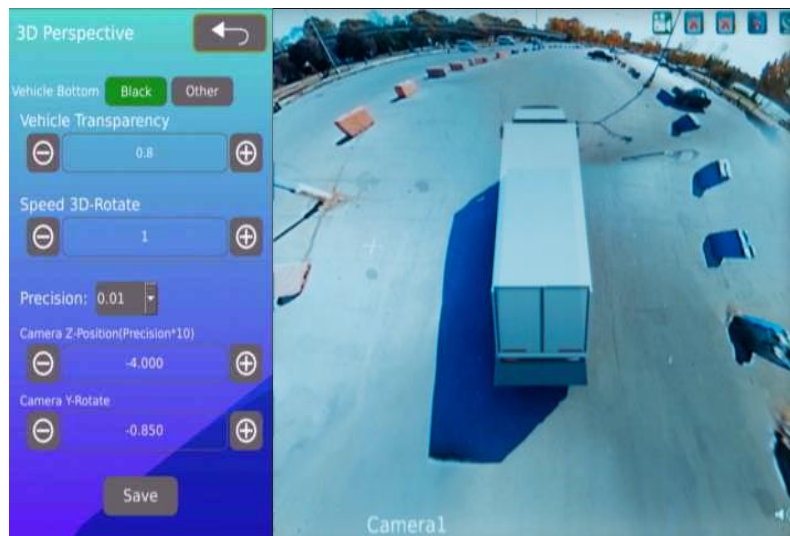
Feature Description:

- 1) **Channel:** Select the camera channel to be configured. Default is set to Back camera.
- 2) **Move:** Move the 2D parking lines along the display output in the X-Y axis.
- 3) **Width Scale:** Configure the Width Scale to adjust the width between the parking lines.



- 4) **Height Scale:** Configure the Height Scale to adjust the height of the parking lines.

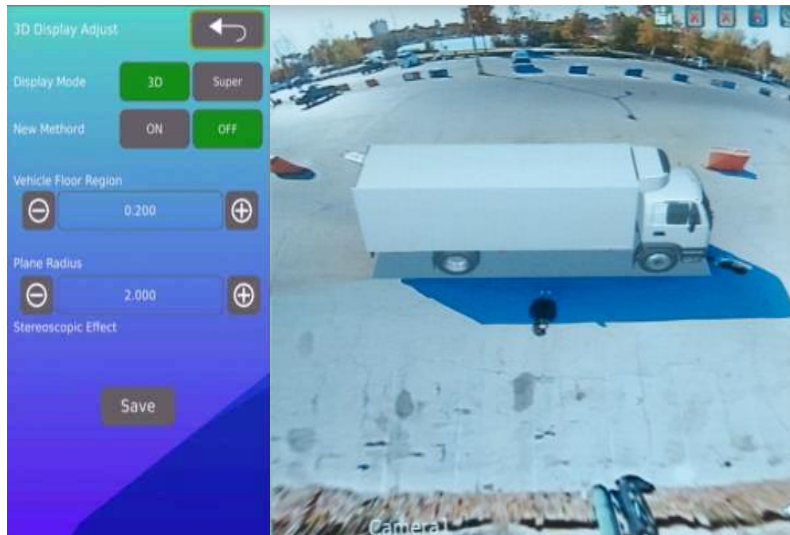
### 7.4.6 3D Perspective



#### Feature Description:

- 1) **Vehicle Bottom:** The vehicle mode bottom area is black by default. When choosing other, the vehicle mode bottom area matches the nearby color.
- 2) **Vehicle Transparency:** Car model transparency setting, default value is 0.8 (range: 0.1-1).
- 3) **Speed 3D-Rotate:** 3D vehicle model rotation speed, default value is 1 (range: 0.5-2).
- 4) **Precision:** Precision setting, default value is 0.01 (range: 0.01-0.1).
- 5) **Camera Z-Position:** 3D view zoom setting, default value is -3.000.
- 6) **Camera Y-Position:** 3D view up/down rotation setting, default value is -0.850.

## 7.4.7 3D Display Adjust



### Feature Description:

- 1) **Display Mode:** Adjust between 3D and super 3D view mode (broadens the range of view).
- 2) **New Method:** Toggle On/Off to implement new method of 3D display adjust
- 3) **Vehicle Floor Region:** Adjust the floor level of the display vehicle which is displayed on the output
- 4) **Plane Radius:** Adjust the radius of 3D plane view. Increase the value to cover a wider radius.

## 8. Information



This menu page contains important information including, device information, software version, MCU (Micro Controller Unit) Information, Rosco Support phone number, 360 web page (Via scannable QR code).

Feature Description:

- 1) **Upgrade:** This is used to select the upgrade file. Upgrade file must be uploaded via USB flash drive and the file desired must be put on the top of the list.

Note: User must only upgrade the system software when an official software version release is uploaded to the Rosco website and/or when directed by a Rosco personnel.

- 2) **System Setup:** Used to perform a factory reset of the system, as well as import and export setups and settings saved on the device.