Brigade

VBV-360-1000-AI
High Definition Backeye®360 System with AI
Installation and Operating Instructions
v1.1

Please read this manual thoroughly before operating the system
and keep it for future reference.

Contents

1. General Information, Precautions and Maintenance

1.1. Software/ Firmware Updates

Your new Brigade AI360 system is supplied with Firmware installed in both the ECU and the 4 AI cameras, over time changes will be made to these firmware versions to improve either functionality or the AI algorithm, these updates will be made available in the support section of our website, https://brigade-electronics.com/product-support-area, for further information regarding updating the firmware in the cameras or ECU please refer to 11.

1.2. General Information

Due to continuous further development, Brigade reserves the right to change the system components without prior notice.

This manual is for use with the Brigade AI360 system, (part no. 7524 or it's variant kits).
This manual is subject to change due to technical developments.
The operator must ensure that the instructions are read and understood by all relevant persons before work.
The manufacturer is not liable for any damage resulting from non-compliance with these instructions.
You can find the CE marking on the product as well as on the accompanying product documentation.
All other certificates can be found on our homepage under https://brigade-electronics.com/product-support-area/

1.3. Storage and General Advice

Do not expose the System to excessive heat or cold. The storage temperature of this device is -40°C ~ +85°C, and the operating temperature is -30°C ~ +70°C.

Never use this device in environments with excessive moisture, dust or smoke.

Avoid dropping or striking this device.

Avoid using this device in enclosed spaces, areas with excessive vibration or subject to severe impacts.

Never puncture, scratch, or use abrasive cleaning materials on this device.

Do not place cables where they may be pinched or stepped on.

The ECU is not designed to be waterproof.

1.4. Operating Precautions

The device may be powered by a 12 or 24 Volt automotive battery or vehicle electrical system.

Make sure all cables are connected properly. Observe polarity. Improper cable connections may damage the system. Remove the power cable connections when you do not intend to use the unit.

1.5. Maintenance

The camera is maintenance-free, however the camera lens must be regularly checked for dirt and cleaned if necessary.
A dirty camera lens deteriorates the image quality.
To protect the lens from scratches never dry clean the camera lens.
Clean the lens with a damp soft cloth or sponge, do not use harsh or aggressive cleaning agents!
The camera housing is IP69K protected and resistant to cleaning using high-pressure or steam blasting devices.
Remove all the cable connections from the control box before cleaning the device.
Clean the unit with a slightly damp, soft cloth.
Never use strong solvents such as thinner or benzine, as they might damage the finish of the device.

1.6. Safety Instructions

Warning!

Make sure that all cables are connected correctly, pay attention to polarity, improper cable connections can damage the camera.
A 100% detection rate cannot be guaranteed.
Never try to repair this device yourself.
No warranty is given for any changes or modifications that are not part of this manual.
Failure to follow the instructions and safety instructions listed in these instructions may result in significant hazards to humans and property damage to the product.
Never put products that have safety-relevant defects into operation or continue to use them.

Check all products for detectable defects before use and observe the behaviour during operation regarding malfunctions that occur.

Deficiencies that impair safety must be eliminated before further operation. Otherwise, the product must not be used!

The correct installation and operation of the product must be monitored by the operator.

The operator must ensure that the fitter, electrician and user have read and understood the instructions.
Operators and users are responsible for the correct use of the product.

The driver must carry out a visual inspection before starting the journey and a functional test before using the product.

The valid manufacturer and safety specifications of the machine or vehicle must be observed and adhered to during installation of the product and during operation.

⚠ Warning!

- **The case should only be opened by a trained technician.**
- **Do not watch the video while driving unless you are monitoring the camera**

	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		

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.

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 could void your warrantee and necessitate expensive repairs

1.7. Areas of application and conditions of use

The use of an AI-based camera in both on and off-road situations is particularly useful where large machines and vehicles such as box trucks, buses, excavators, wheel loaders, dump trucks, etc. manoeuvre in areas with limited visibility and a high risk of accidents.
By being used in these areas, the AI camera helps to improve worker and pedestrian safety and increases efficiency by providing the operator/ driver with a better overview and additional information about the vehicle's environment.
In principle, a camera system with person recognition contributes to safety and supports the machine operator in his work. In detail, the following areas of application are useful:

1. **Construction sites with heavy passenger and machine traffic:**
   On construction sites, where numerous machines and workers are active at the same time, the AI camera helps to detect people and obstacles at an early stage, e.g. in the rear area. This increases safety by minimizing the risk of collisions and accidents.

2. **Haulage and transport:**
   Manoeuvring vehicles around streets and in car parks or loading bays presents its own challenges the AI camera will detect people that are near to the vehicle and alerts the driver to their Prescence.

3. **Confined space and limited visibility:**
   In confined areas or during construction work with limited space, e.g. in tunnel construction, on inner-city construction sites or in road construction, the camera supports manoeuvrability and facilitates precise reversing.

4. **Working in poor visibility:**
   On construction sites that are also operated at night or in adverse weather conditions (rain, fog, snow), an AI camera with optimized image processing enables better detection of obstacles. This reduces the risk of accidents even in low light conditions.

5. **Automated and semi-autonomous machines:**
   In machines that are partly automated or remote-controlled, the AI camera is an important support for monitoring the environment and helps to avoid possible collisions at an early stage.

<u>In addition, the following operating conditions must be observed:</u>

1. **Operational readiness**:
   The AI360 system must be properly installed and calibrated.
   The functionality of the cameras and the AI system must be checked before starting work.
   Regular system testing is necessary to ensure detection accuracy.

2. **Surroundings and terrain**:
   In heavily soiled environments, the lens must be cleaned regularly to ensure optimal image quality.

3. **Driver instructions:**
   Drivers must be informed about how the AI-based system works and how to use it. The operator remains responsible for the operation of the machine and must not rely solely on the system.

1.8. System and function description

AI cameras are a new generation of active people detection.
With the help of artificial intelligence, the cameras recognize the human form within the predefined detection range and reliably warn the driver visually and/or acoustically before a possible collision occurs.

If a person appears in the warning area of the camera system, the detected person is automatically provided with a red frame and displayed to the machine/vehicle operator on the screen. In addition, an acoustic signal sounds and thus warns the driver visually and acoustically.

The monitor is automatically switched on and off with the ignition change.
System adjustments do not need to be made by the machine operator at any time.

1.9. AI Usage Information

Important Safety Information

Brigade AI camera systems and solutions are designed to assist vehicle and machine operators by enhancing visibility and aiding the detection of people in the surrounding environment by alerting operators to the potential presence of people or Vulnerable Road Users (VRUs). These systems are driver aids only and do not replace the operator's own judgment, attention, or responsibility to safely operate and control the vehicle or machine. This AI camera system is intended solely for informational and monitoring purposes. It is not designed, tested, or certified for use in any safety-critical control functions of a vehicle.
Important information for EU customers
This AI camera system is classified under the EU AI Act as a low-risk AI system. This system **must not** be used or relied upon as a safety component as defined in the EU AI Act.

System Capabilities and Limitations
AI human form recognition systems assist in identifying people and VRUs within a defined detection range. While these systems provide enhanced visibility, they should not be solely relied upon to detect every person or VRU in every situation. System performance may be affected by:

- Environmental conditions (weather, lighting, visibility)
- Physical obstructions or sensor blockages
- Camera positioning and field of view
- Complex backgrounds or crowded environments
- Speed of vehicle operation
- Clothing or posture of individuals

The AI system provides visual and/or acoustic warnings as an aid to the operator. False negatives (missed detections) and false positives (incorrect detections) may occur. The system does not guarantee detection of all people or obstacles.

Operator Responsibility
When driving or manoeuvring, the vehicle operator remains completely responsible for:

- Making all assessments and decisions for safe operation
- Maintaining continuous attention to surroundings
- Taking every normal precaution when conducting manoeuvres
- Obeying all traffic rules and local regulations
- Using training, judgment, and other safety aids (such as mirrors)

The presence of this system does not reduce or remove the operator's responsibility to operate the vehicle or machine in a safe, fully attentive and lawful manner. The manufacturer accepts no liability for any injury, damage, or loss arising from:

- Negligent operation of the system;
- Misuse or incorrect installation of the system;
- Failure to maintain or update the system as recommended; or
- Overreliance on the AI functionality in situations requiring human judgment or intervention.

Installation and Training Requirements
Brigade AI camera systems must be installed and commissioned by competent, trained technicians. The installer is responsible for ensuring the system is fit for the purpose and complies with all relevant regulations and legislation.
Operators should receive appropriate training on:

- How to interpret system warnings and alerts
- System capabilities and limitations
- Appropriate response to system notifications

Maintenance
Regular visual inspections, functional testing, calibration , software updates and maintenance are essential to ensure proper system operation. Refer to the maintenance section of this guide for specific requirements.

AI System Transparency
This product uses artificial intelligence to analyse camera images and detect human forms. Users should be aware that the system's operation involves automated human form recognition (identifying an object as a human) that may be affected by the factors listed under “System Capabilities and Limitations” above. This product does not perform autonomous decision-making with respect to vehicle operation or otherwise automatically control the vehicle.

2. Product Features

2.1. Basic Features

- 4 pcs 190° FHD 1080P wide-angle fisheye cameras inputs, horizontal view angle＞ 170°,
- High performance H.264 video encoding / decoding for high quality image blending.
- Simplified calibration procedures.
- High definition 1080P video output and multiple formats of video signal output.
- Simulated 360° Birdseye View
- Switches to reverse image when reverse wire is triggered.
- Switches to left / right image when left / right wire is triggered.
- Compatible with the Brigade MDR.

Applications

Reverse and Parallel Parking

Congested Road

Narrow Road

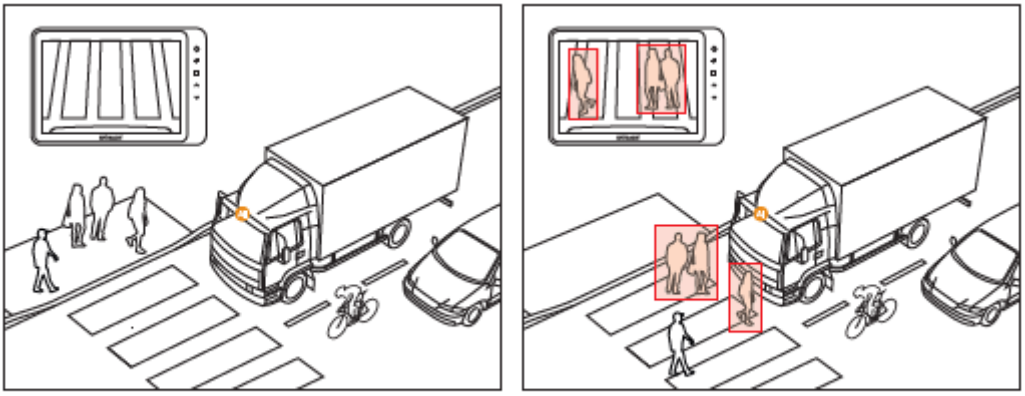
Blind Spot

Mobile Digital Recorder

2.2. Human Form Recognition, (HFR)/ AI Pedestrian Detection

When pedestrians enter the detection zone, the vehicle/ machine operator will receive the following alert:

- Every pedestrian detected within the detection zone is identified and tracked with a red frame around them and an audible alarm, (if supported by the monitor), the alarm will continue until the pedestrian leaves the detection zone.
- When connected to an internal or external buzzer the buzzer will also sound an audible alarm, the alarm will continue until the pedestrian leaves the detection zone.



No pedestrian within the detection zone Pedestrian entering the detection zone

3. Box Contents

Item	Qty
Backeye®360 VBV-360-1000 ECU	1
Backeye®360 VBV-360-1000-AI, AI FHD Camera	4
Rubber mounting mat for camera	4
20m camera cable VBV-AI820	1
10m camera cable VBV-AI810	2
5m camera cable VBV-AI805	1
Backeye®360 VBV-360-1000-AI Remote Control	1
Backeye®360 IR receiver	1
Backeye®360 Power Harness	1
Backeye®360 Video Input Harness	1
Backeye®360 VBV-360-1000 Video Output Harness	1
Backeye®360 VBV-360-1000 Video Output Cable	1
2mm Allen Key	1
2.5mm Allen Key	4
ST4.2*25 screw	8

4. Specification

4.1. ECU Product Specification

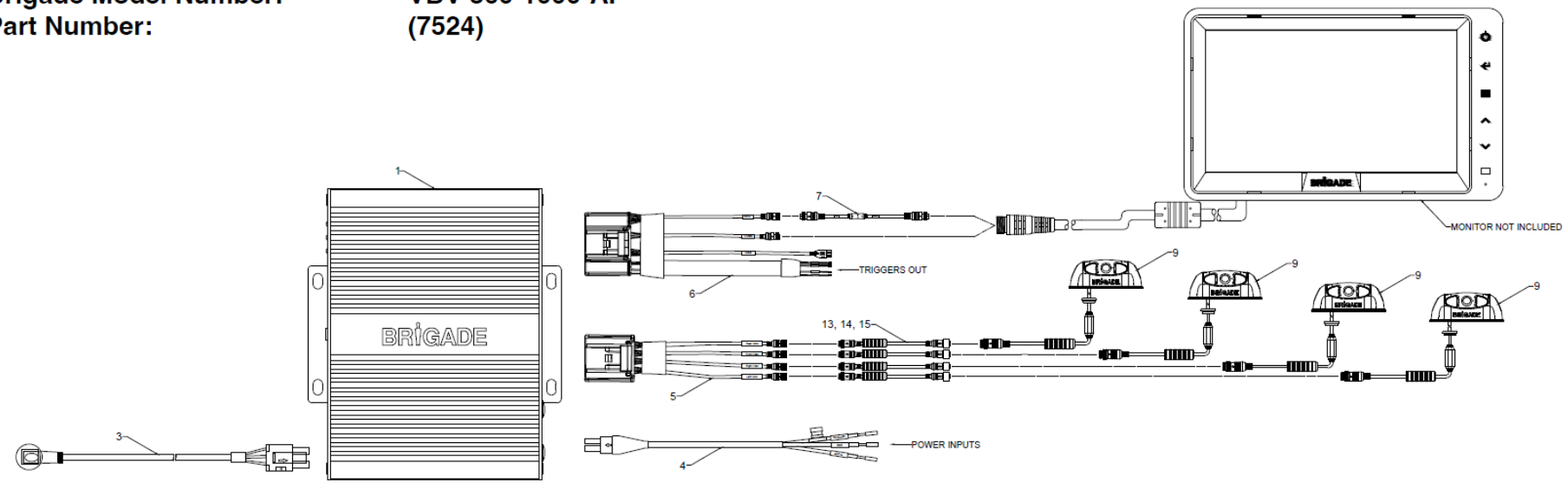
Panoramic Video Parameter	Input Video		Max 4CH×1080P25f/30f
	Display Mode		2D/3D
	HD Output	Resolution	1080P
		Refresh Rate	30 fps
	SD Output	Resolution	720x 480
		Refresh Rate	25 / 30 fps
Working Voltage			12/24V
Current Consumption			<2.2A@12V
Working Temperature Range			-30°C ~ +70°C
Storage Temperature			-40°C ~ +85°C

4.2. Camera Specification

Image Device	1/2.9" 2Mega CMOS
Frame Rate	25 / 30 fps
Resolution	1920 (H) x 1080 (V)
Pixel Size	2.8 µm x 2.8 µm
Compression	1080P
Video Output	1.0Vp-p, 75 Ω
White Balance	Auto
Viewing Angle	190(H)
Power Supply	12V
Working Temperature Range	-30°C ~ +70°C
Storage Temperature	-40°C ~ +85°C
Waterproof Rating	IP69K

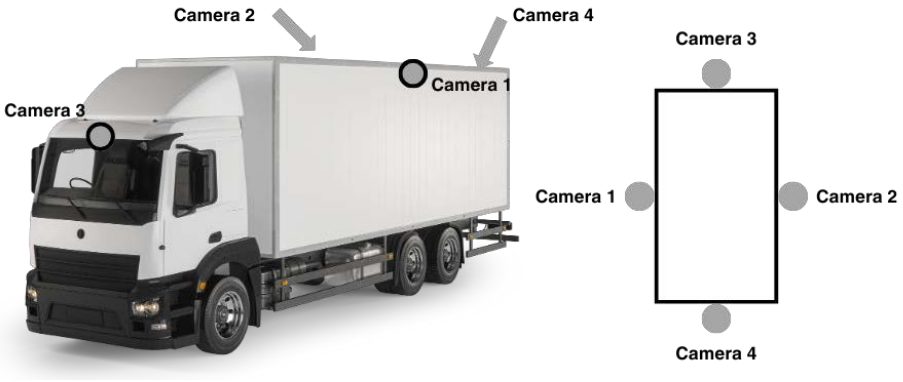
VBV-360-1000-AI (7524) CONTAINS:			
No.	**Model No.**	**Description**	**Qty**
1	VBV-360-1000-ECU-AI	Backeye®360 VBV-360-1000-ECU	1
2	2mm Allen Key	2mm Allen Key	1 (NOT SHOWN)
3	VBV-360-1000-IR	Backeye®360 IR receiver	1
4	VBV-360-1000 ECU-PH	Backeye®360 Power Harness	1
5	VBV-360-1000 ECU-VI	Backeye®360 Video Input Harness	1
6	VBV-360-1000 ECU-VO	Backeye®360 VBV-360-1000-Video Output Harness	1
7	VBV-360-1000 ECU-VOC	Backeye®360 VBV-360-1000-Video Output Cable	1
8	VBV-360-AI-RC	Backeye®360 VBV-360-1000-AI, Remote control	1 (NOT SHOWN)
9	VBV-2240C-AI-D04-C	Backeye®360 VBV-360-1000-AI, AI-FHD Camera	4
10	VBV-222XC-AI-DVS-RM	Rubber mounting mat for VBV-2220C-AI-DVS & VBV-2240C-AI-D04	1 (NOT SHOWN)
11	ST4.2*25 screw	2x ST4.2*25 screw	1 (NOT SHOWN)
12	2.5mm Allen Key	2.5mm Allen Key	1 (NOT SHOWN)
13	VBV-AI820	20 Metre 8 pin to 8 pin extension cable	1
13	VBV-AI810	10 Metre 8 pin to 8 pin extension cable	2
13	VBV-AI805	5 Metre 8 pin to 8 pin extension cable	1

Brigade Model Number: **VBV-360-1000-AI**
Part Number: **(7524)**



6. Camera Installation Instructions

6.1. Camera Position



Camera Position Notes:

- For the best results cameras should be positioned at the mid-point along each side of the vehicle/ machine.
- Ideally all the cameras should be installed at the same height, if this is not possible, mount the cameras as high as possible keeping as many of the cameras at the same height as possible.

6.2. Camera Installation

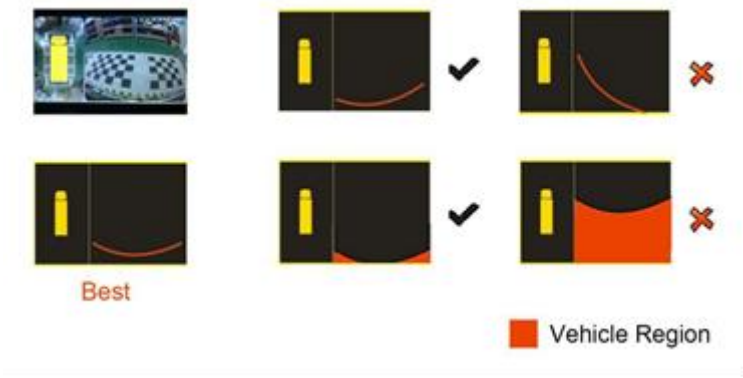
- Drill suitable sized holes to accommodate both the camera cable and camera mounting screws
- Mount the cameras and run the camera extension cables to the cab for connection to the ECU

6.3. ECU Installation

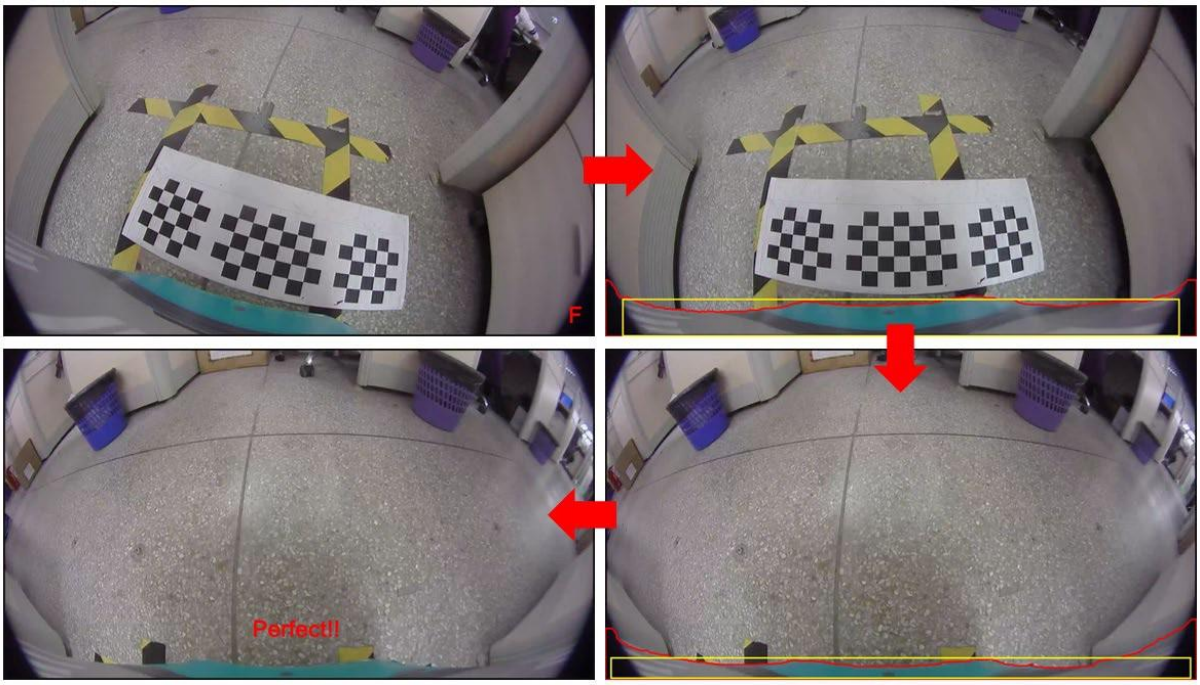
- The ECU should be installed in a well-ventilated area.
- Connect the ECU to the cameras and monitor, please refer to the System diagram in section 5 for details.
- Power on and test the wiring.
- Perform basic functional tests, ensure you have an image from all 4 cameras.

6.4. Adjustment of Camera Viewing Angles

- Each camera must be adjusted so that you can just see the bottom of the vehicle at the bottom of the image on the screen.



Adjustment Example:



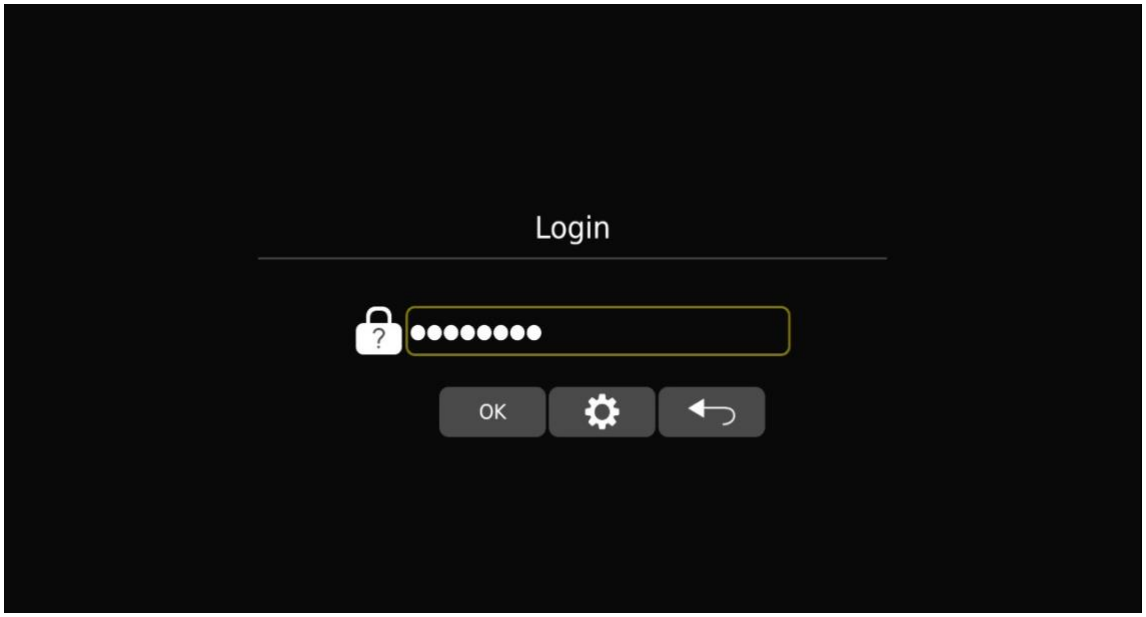
System calibration will be covered in a section 10

7. Remote Control Operating Instructions

- ENTER: Enter main menu or confirm menu selection.
- ESC: Exit main menu interface / return to main menu interface.
- ◀ ▶: Left and right buttons are used to switch the left and right single view in the main interface; it is also used to add and subtract settings in the menu page.
- ▲ ▼: Up and down keys, shift image channel to front/back view. When in the main interface, in the menu page, it is used to switch left and right options.
- SHIFT: Shifts current display mode to quad-view, when in main menu it is used for switching menu selection in menu.
- POWER: Turn on / off video display.
- Number button 0-9: For inputting numeric information.
- CLEAR: Delete button, delete an individual character.
- MULTI: Switch to full screen surround view in the main interface.
- PTZ: Enter decimal point

8. Operation of Menu Interface

8.1. User Administration Login



Using the remote control input the password (default password is 88888888）

: Login confirmation.

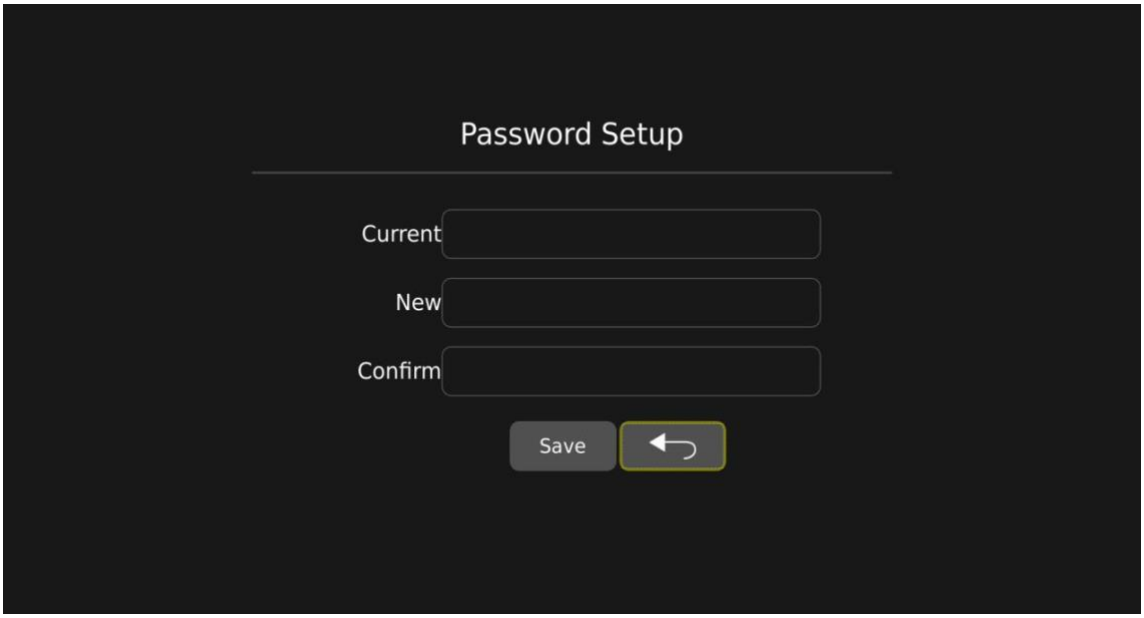
: Modify password.

: ESC key, return to the last menu.

Note:
The initial password is 88888888 (8x no.8).
The password can be composed of numbers and letters, and the password length supports up to 16 characters. If you forget the password, please contact the Brigade helpline to apply for the key, please note this process may take a few days.

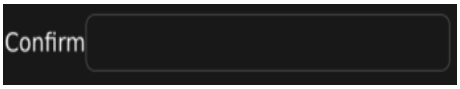
After the password is entered, there is no need to re-enter the password within 10 minutes.

Modifying the Password:



1. Select 
2. Using the remote-control input current password 

3. Using the remote control input a new password 

4. Using the remote control confirm the new password 

5. Select 

to save the changes

6. Once the changes have been saved select 
7. If you select  before you save the changes your changes will be discarded

9. Main Menu Interface

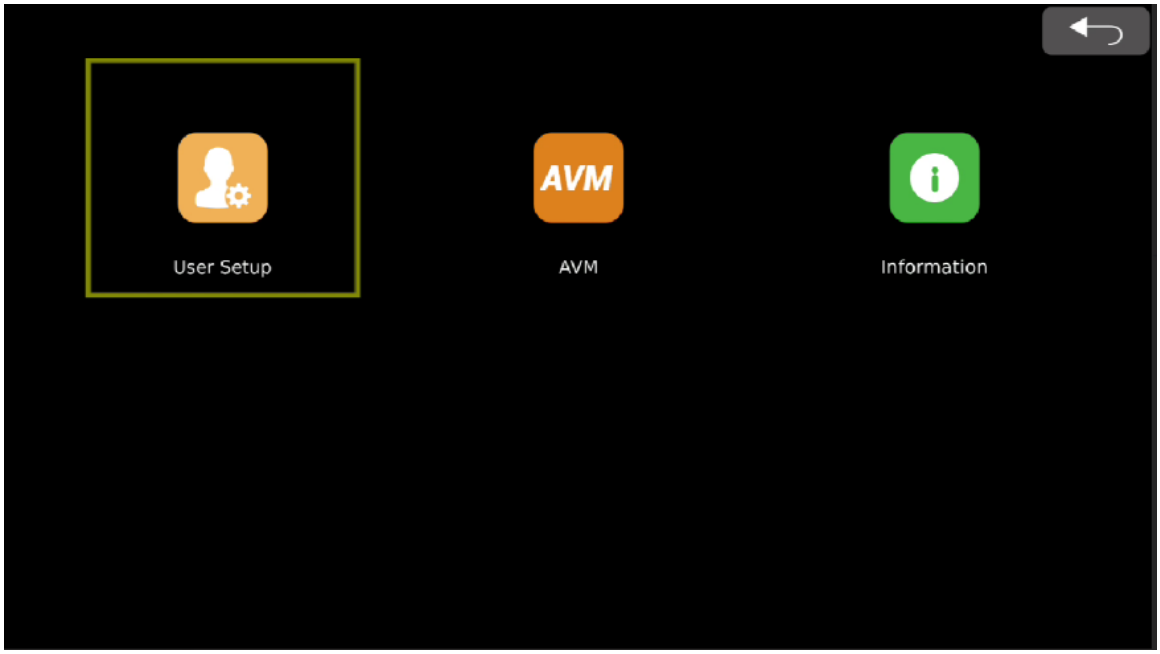
Menu Navigation with the Remote control

1) **SHIFT:** Switch configuration item button.

2) **Left / right:** Modify the parameters of the current configuration item.

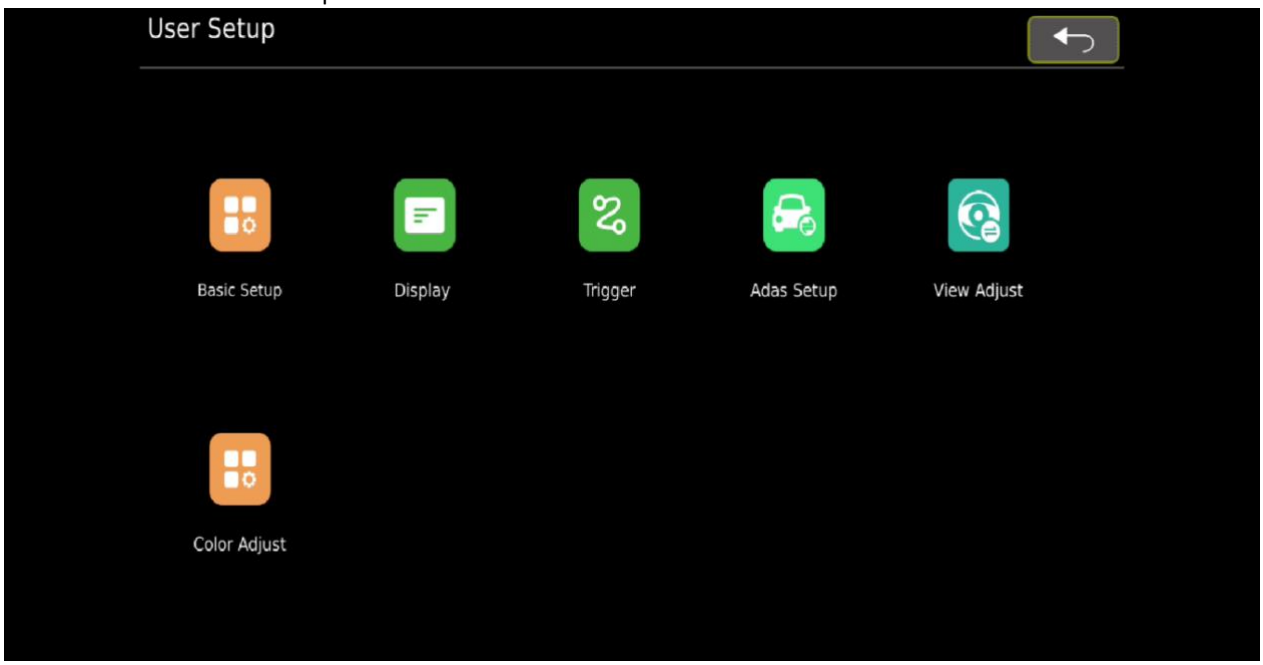
3) **ESC:** Exit the shortcut key and return to the main menu.

Note: It is normal for this system to automatically restart after saving some modified configuration



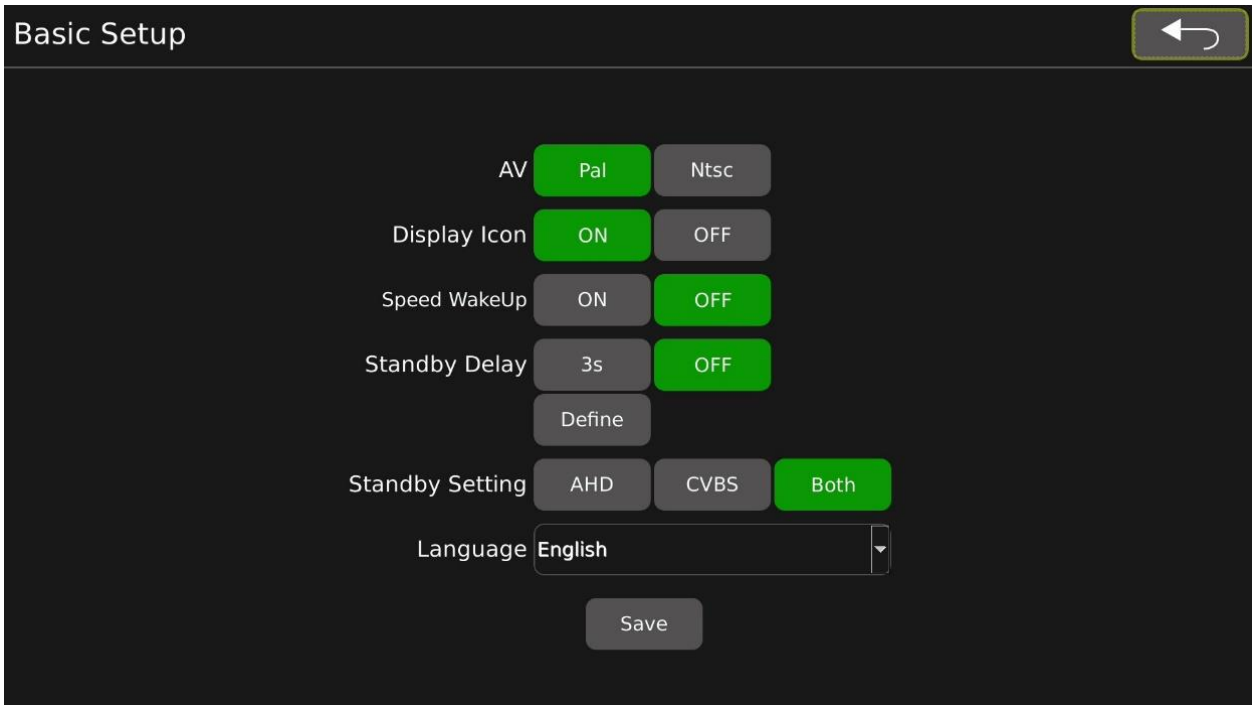
- **User Setup:** Basic Setup, Display, Trigger, ADAS Setup, View Adjust, Colour Adjust
- **AVM:** Automatic Calibration, Calibration File, Vehicle Type, Surround View, Parking Line
- **Information:** Current Version, Upgrade, System Setup

9.1. User Setup Interface



- Basic Setup: Basic setup interface
- Display: Display mode setting.
- Trigger: Trigger settings
- Adas setup: AI assistance setting.
- View Adjust: Adjust image characteristics
- Color Adjust: Adjust monitor characteristics

9.2. Basic Setup



Feature Description:

AV: The default standard configuration is **PAL**. The PAL/NTSC configuration is only for the CVBS output.

Speed Wakeup: The Default setting is **OFF.** When Speed WakeUp is turned on and you connect the system to a speed switch you will be able to set a speed in either Km/h or Miles/h, when the vehicle slows down to the desired speed the monitor will turn on and the system will activate, when the vehicle speed exceeds the set speed the system will turn off.

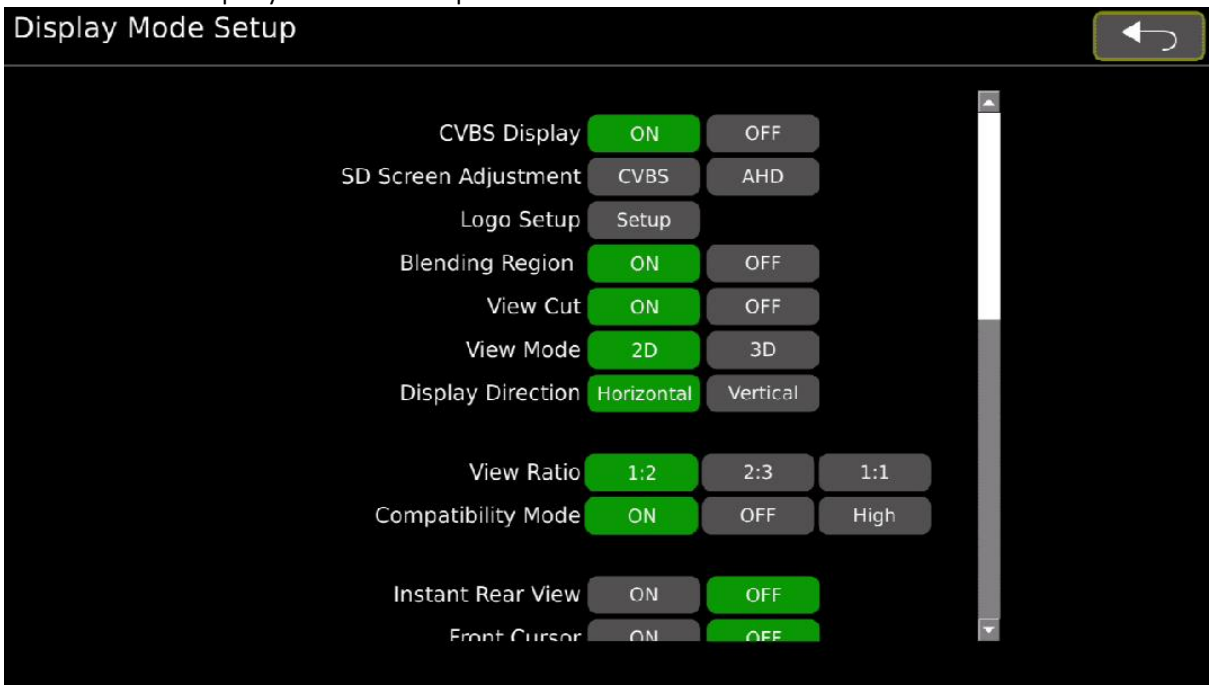
Standby Delay: Automatic standby function, the default is **OFF**. When set to **3s** if there is no operation on the system for 3 seconds the system will automatically enter the standby state. Set to **OFF**, for no standby delay. Set to **Define** to customize the configuration Standby time, the configuration range is 3-30s.

Standby Setting: Screen standby control function, the default is **Both**. When set to **AHD**, in standby, only the AHD output will enter the standby state. Set to **CVBS**, when in standby, only the CVBS output will enter the standby state. Set to **Both**, when in standby, both AHD and CVBS outputs will enter the standby state.

Language: English and **Chinese** is available.

Save your settings then select  to go back to the previous menu, (depending on which settings you select, the system may need to restart)

9.3. Display Mode Setup



Feature Description:

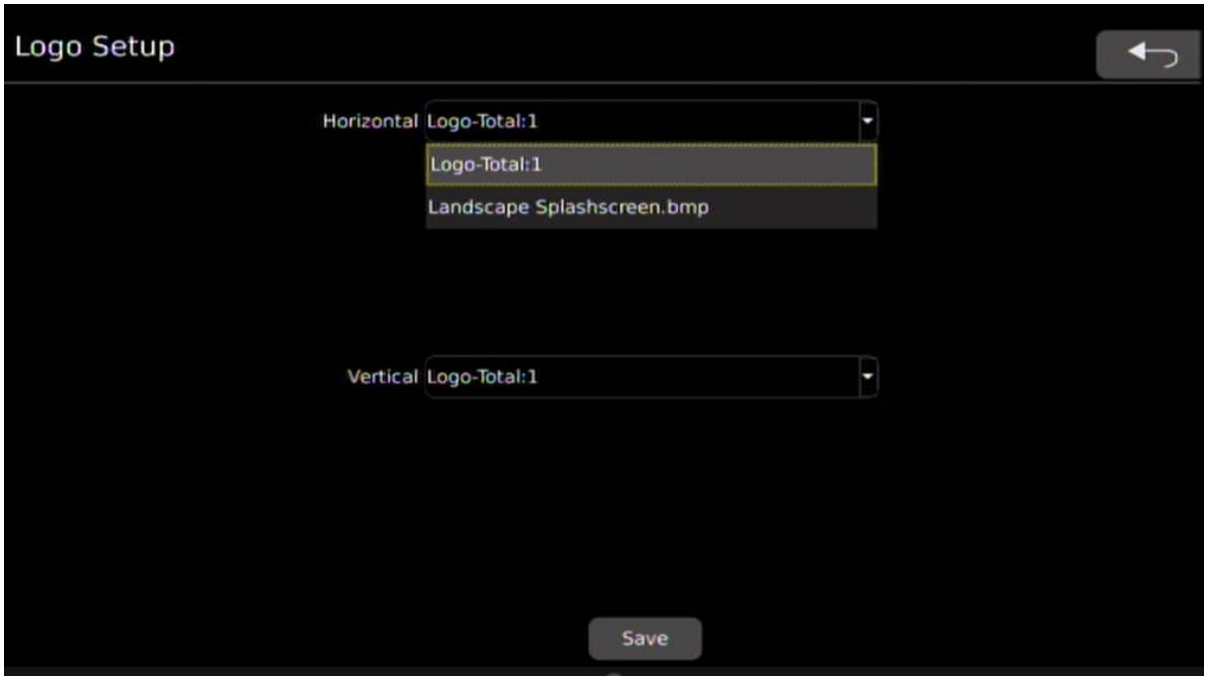
CVBS Display: Default setting is **ON**, this activates the CVBS output in addition to the AHD output, Set to **OFF** you will only get a video signal from the AHD output
SD Screen Adjustment: Adjust the X & Y image position and the width and height resolutions for both the CVBS and AHD outputs.

Note: re-adjustment is required after switching between NTSC and PAL.

Logo Setup: Replacement of the boot logo for both Horizontal and Vertical boot screens, to replace the boot logo, save your chosen logo into the root directory of a USB memory stick, by selecting either the Horizontal, (Landscape) or Vertical, (Portrait) drop down menus you can upload both a landscape, (Horizontal) and Portrait, (landscape) format logo.
With your chosen logo saved to the memory stick, plug the memory stick into the USB connection.

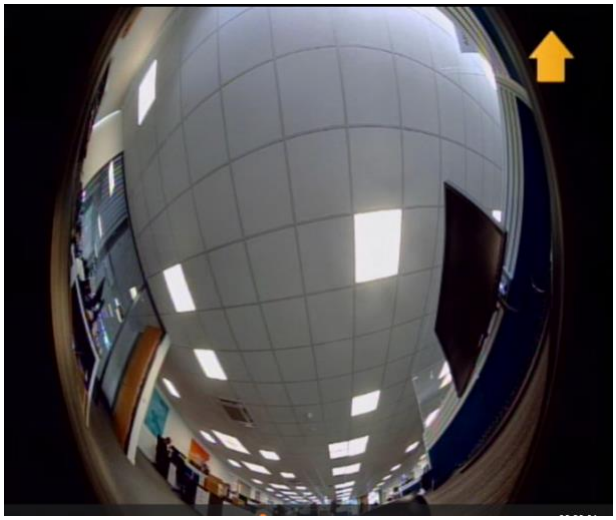
- Select the desired drop-down menu, you will see the root of the USB stick with your files displayed.

  Notes:
- Supported file format 24-bit deep 1920x1080 .BMP



Blending Region: When **ON** the blending region will show the image overlap, when off the blending region will not display any overlap.

View Cut: Default is **ON**, when set to ON, the individual camera angle of view is slightly cropped, so the camera image fills more of the screen. When set to OFF the angle of view is not cropped which will show more of the black border.



View Cut OFF

View Cut ON

View Mode: Switch between 2D and 3D viewing modes, default is **2D**. When set to 2D, the screen display effect is 2D surround view + 2D front view; when set to 3D, the screen display effect is 3D surround view + 3D Front view.

Note: When in 3D display mode you will have 3 extra menus, please see section 11 for more information.

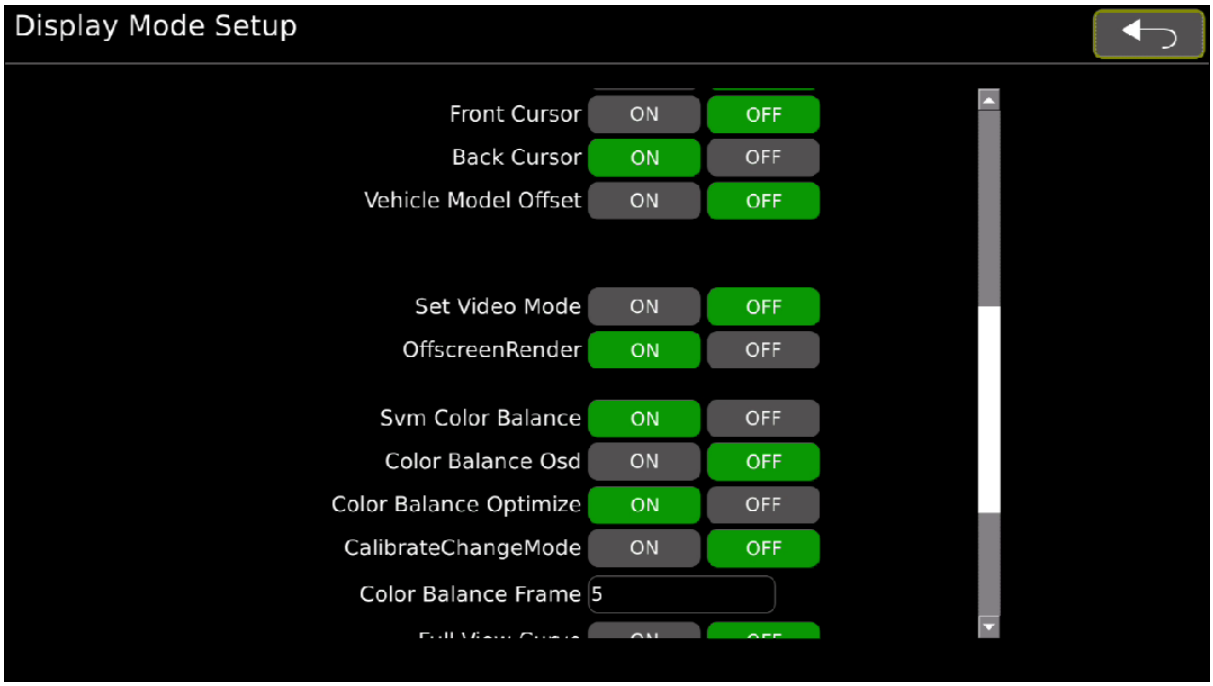
Display Direction: The display can be mounted in either Horizontal or Vertical orientation. The default setting is **Horizontal**, if you install the monitor in a Vertical orientation, change this setting to Vertical the ECU will adjust all menu options and views so they display correctly.

View Ratio: The setting of surround view and single view/3D image ratio on the monitor display, the default is **1:2**. When set to 1:2, surround view occupies 1/3 of the entire screen, single view/3D occupies 2/3 of the entire screen; set to 2:3, surround view occupies 2/5 of the entire screen, single view/ 3D occupies 3/5 of the entire screen; set to 1:1, surround view occupies 1/2 of the entire screen, and single view/3D occupies 1/2 of the entire screen.

Compatibility Mode: Default is **ON**. When set to ON, the system will work with a wide variety of monitors, when set to OFF, the screen display effect is better, but the system will work with less monitors. High is a very wide range of monitors but again performance may be affected.

Instant Rear View: Default is **OFF.** When set to off, as the system starts, the startup logo will be displayed followed by the panoramic screen. When set to on, a single view (back view) will be displayed after 3 secs of powering on before the panoramic screen is displayed. In other words, the back view will be displayed instead of the startup logo.

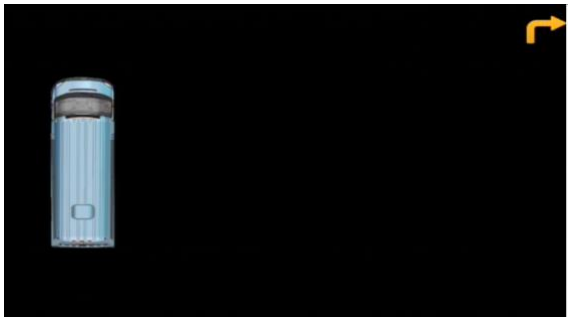
Display Mode Setup Continued



Front Cursor: Default is **OFF**. When set to **ON**, the front single view displays Parking Lines; when set to **OFF**, the front single view does not display the parking lines.

Back Cursor: Default is **OFF**. When set to **ON**, the front single view displays Parking Lines; when set to **OFF**, the front single view does not display the parking lines.

Vehicle Model Offset: Default is **OFF**. When set to ON The vehicle Model is moved to the side of the screen showing more of the camera viewing area.



Vehicle Model Offset: **OFF**

Vehicle Model Offset: **ON**

Set Video Mode: Default is **OFF,** select the video format suitable to your region, Default is 1080P 30f, other options are 1080P25f, 720p30f & 720P25f

Off Screen Render: Default is **ON** this improves the smoothness of the 3D vehicle rotation view.

SVM Colour Balance: Adjustment for the brightness balance.

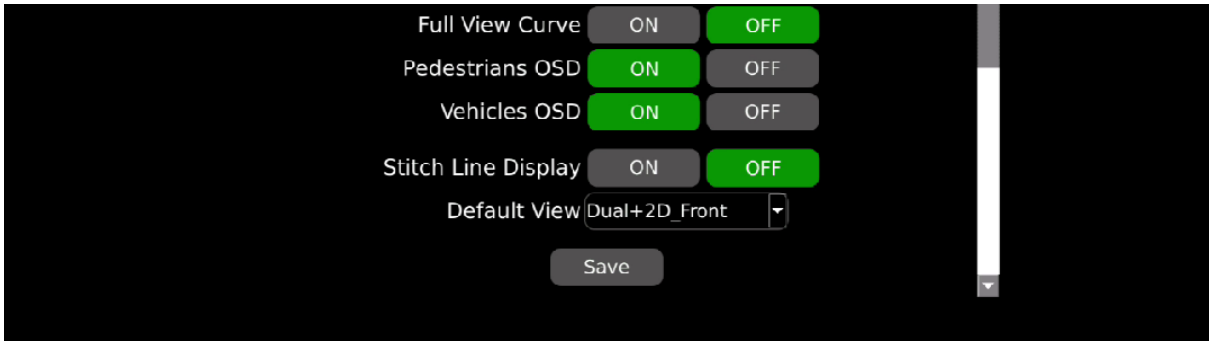
Colour Balance Osd: Colour adjustment for the OSD

Colour Balance Optimize: Optimisation setting for colour balance.

Calibrate Change Mode: Default is **OFF,** When set to **OFF** the Auto Calibration is set to 4 camera calibration, when set to BONB the Auto Calibration is set to 3 camera calibration. For more information see Section 10.

Colour Balance Frame: Colour Balance frame setting, default is 5

Display Mode Setup Continued



Full View Curve: Default is **ON**. Displays the Detection zones on the overhead view in the main display view.

Pedestrians OSD: Default is **ON** when a person is detected the person will be indicated in both the aerial view as well as the main camera view, when set to OFF the detected person will only be indicated in the aerial view

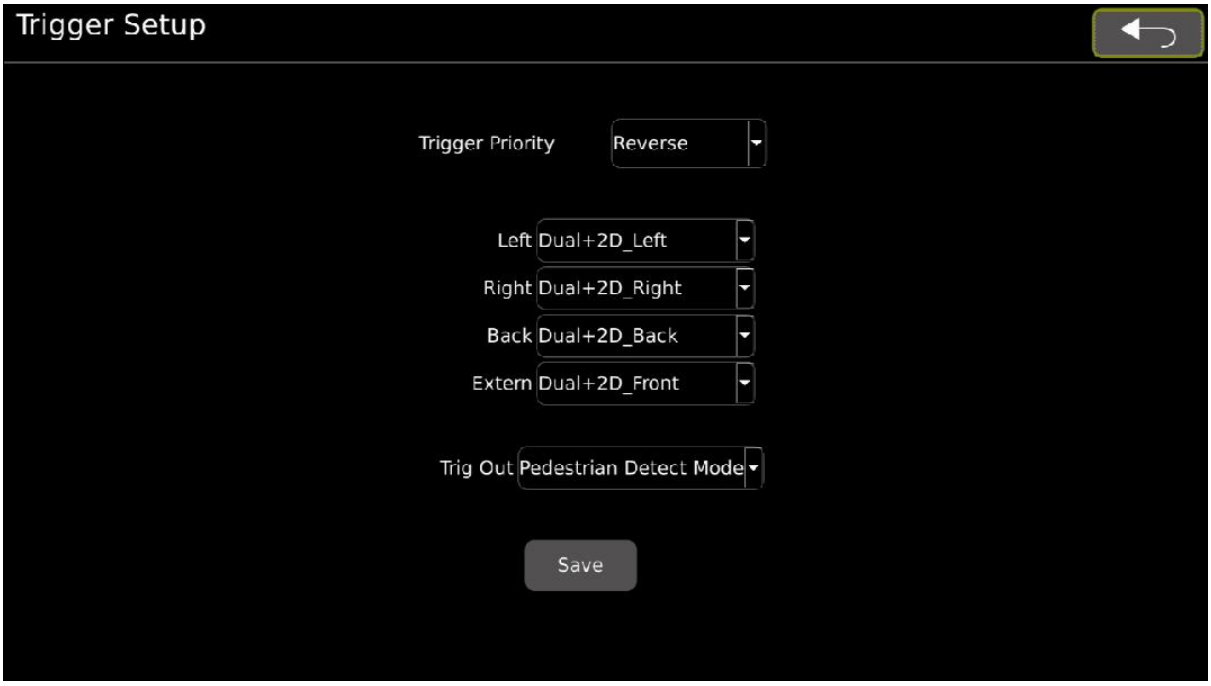
Vehicles OSD: Default is **ON**, when a vehicle is detected the vehicle will be indicated in both the aerial view as well as the main camera view, when set to **OFF** the detected vehicle will only be indicated in the aerial view

Stitch Line Display: Default is **OFF**, when set to ON the aerial view will display the split line between each of the cameras

Default View: Default setting is **Dual +Front,** when the system is powered on, this option sets the default display view, other options are;
Dual + 2D Left, Dual +2D Right, Dual + 2D Back, Quad, Full Dual, Horizontal Full dual, IPC View, Dual + Quad, Single Left, Single Right, Single Front, Single Back
Dual + IPC

Save your settings then select  to go back to the previous menu, (depending on which settings you select, the system may need to restart)

9.4. Trigger Setup



Feature Description:

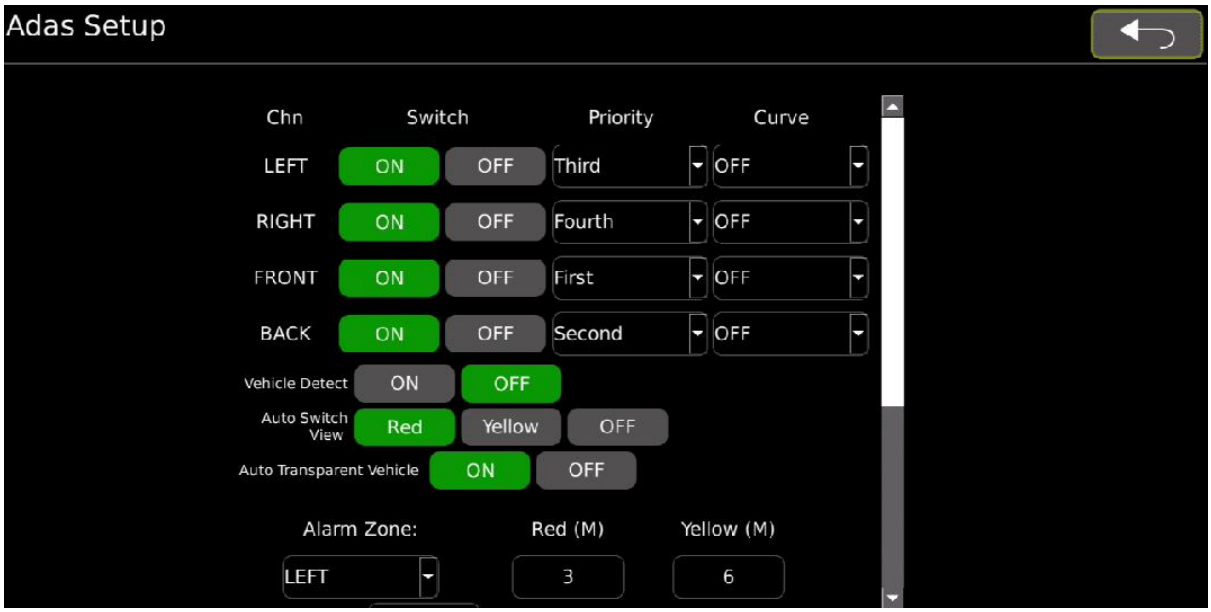
Trigger Priority: Default value is **Reverse**. When set to None; the 360 view will be displayed as the first triggered view, for example, when the rear line is triggered the rear view camera is displayed in a 360 view. At this time, if the left trigger is also triggered, the rear camera is still displayed in the panorama. The left side camera will not be displayed until the rear trigger is deactivated. When set to Reverse; When the rear trigger line is triggered, the panorama will always display the rear camera view. If the current other camera is triggered, the rear camera is also triggered, and the panorama will give priority to displaying the rear camera picture. Set to Left/Right in the same way.

Left, Right, Back & Extern: These settings control the view you see when each of the triggers are activated.

Trig Out: Default value is **Pedestrian Detect Mode**, If you change this setting you will not get any external trigger out alerts when a person is detected.

Save your settings then select  to go back to the previous menu, (depending on which settings you select, the system may need to restart)

9.5. ADAS Setup



Feature Description:

Left, Right, Front, Back: Default for all is **ON**, this section sets the priority for detection. Set a priority for each camera view using the **Priority** drop down menu and decide if you want to see the curve, (parking line).

If you have the following settings:

If the front and back cameras both detect a person at the same time, the system will display the **Front** camera as it has the highest priority, if the person moves out of the cameras detection area the system will automatically display the **Back** camera as it has the next priority.

Vehicle Detect: Default is **OFF**, This setting is a very basic method of detecting vehicles, the algorithm has not been programmed to recognise all vehicles/ machines that are used, so it should only be used with caution.

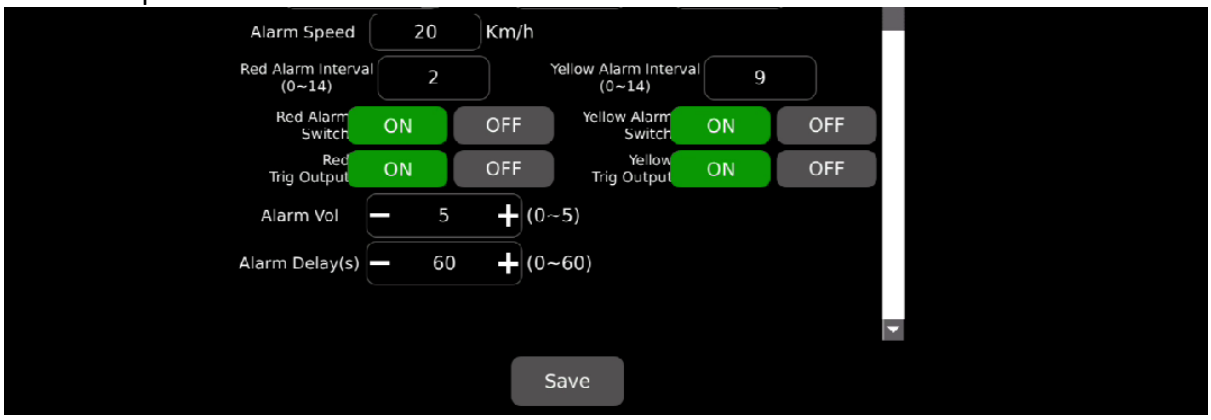
Auto Switch View: Default is **ON**,
When switched on, the system will automatically switch to a camera if it detects a person.

Auto Transparent Vehicle: Default is **ON**,

Alarm Zone: Default settings **Red 3M, Yellow 6M, c**ontrol the Red and Yellow detection zones for each camera, set a detection zone distance in Metres for both the Red and Yellow zones.

Note: The detection range is between 0.5M- 8M from the camera.

ADAS Setup Continued



Alarm Speed: Default **20km/h** If you have connected a speed switch this setting will allow you to set an upper limit for detection, when the vehicle reaches this speed detection will stop.

Red/ Yellow Alarm Interval: Defaults **Red 2, Yellow 9**, set a different alert frequency for the red and yellow zones to make them easier to distinguish from each other.

Red/ Yellow Alarm Switch: Default is **ON**, with these set to ON, if a person is detected in the red or yellow zone the alarm will sound, if set to off, no alarm will sound

Red/ Yellow Trig Output: Default is **ON**, If these settings are ON, when a person is detected in either the **Red** or **Yellow** detection zones the pink Trigger output wire will emit a 12V signal that can be connected to an external light beacon or alarm.

Alarm Vol: Change the volume of the alarm, ranging from 0-5

Alarm Delay(s): Default is **60**, set a delay before the alarm is sounded between 0-60

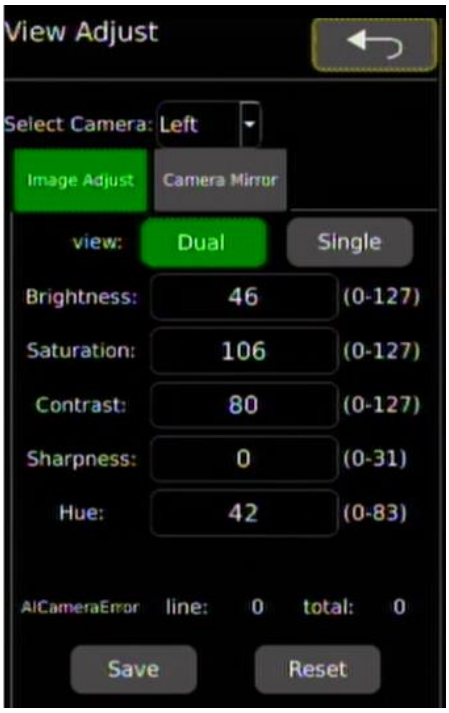
Filter Switch: Default is **ON**, If you have items on the vehicle/ machine that due to their shape could be detected as a person, using the Setting option you can set a Min/ Max height to help filter out the object.

Save your settings then select  to go back to the previous menu, (depending on which settings you select, the system may need to restart)

9.6. View Adjust

Image Adjust: Change the image characteristics of each camera.

Default settings:



Using the **Select Camera** drop down menu you can select the individual camera and adjust Brightness, Saturation, Contrast, Sharpness & Hue.

The results can be viewed as a single camera or in the aerial view.

You can change the camera to show a mirror image

When you have set the cameras to show your desired result, select 

9.7. Colour Adjust

Screen Colour Adjustment: Change colour characteristics of the monitor.

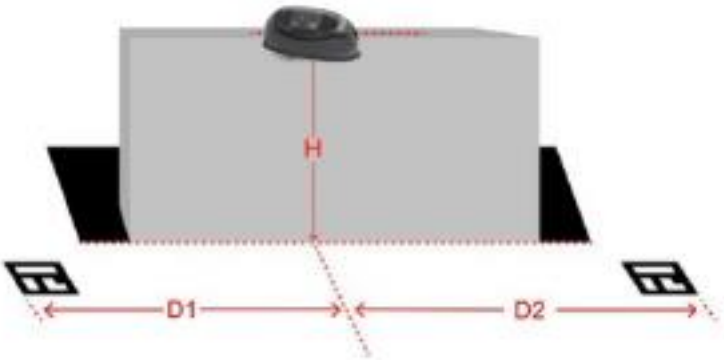
10. System Calibration

10.1. Read before Calibration

Once the system has been correctly installed and the camera angles have been adjusted as described in section 6.4 you can move onto calibrating the system.

4x Calibration mats are required to continue with setting the system up, the calibration mats have the following pattern printed on them:

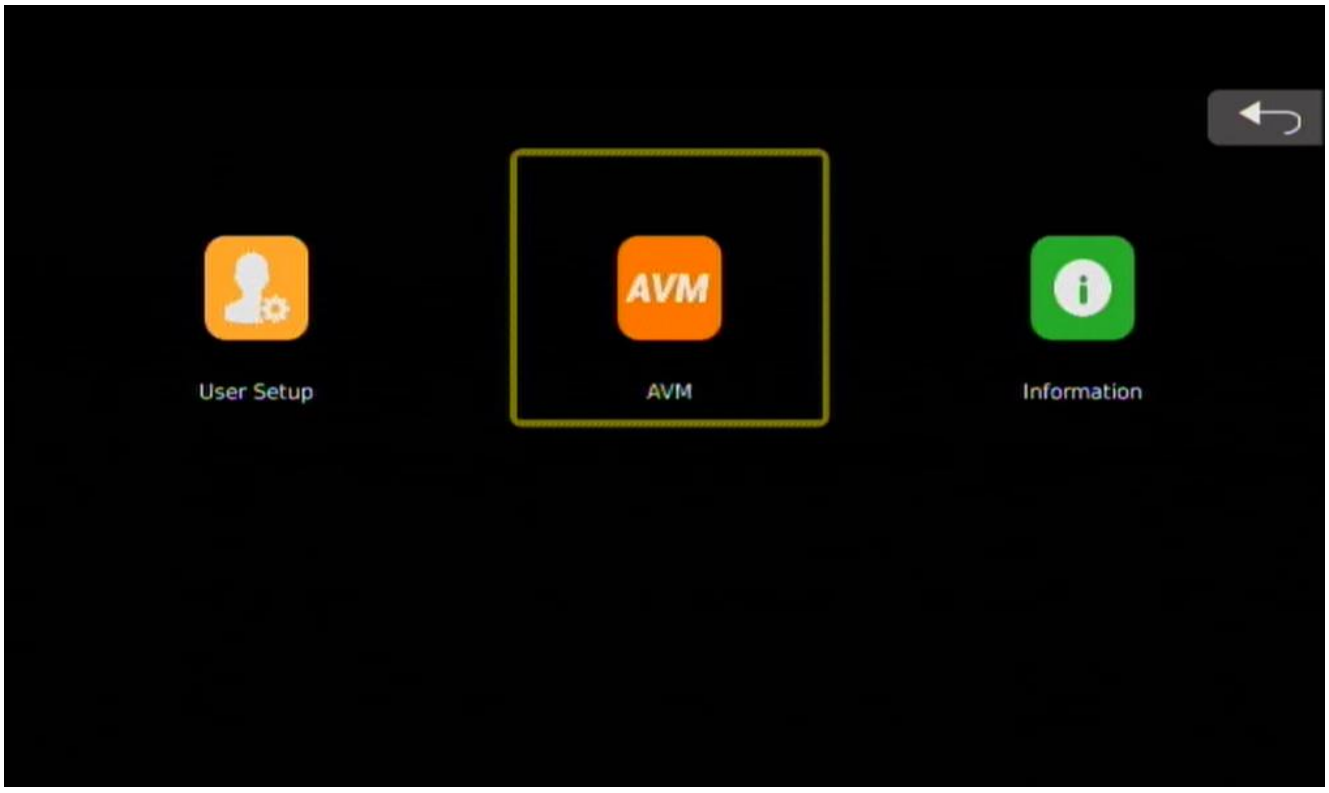
The 4 mats need to be placed at each corner of the vehicle/ machine, ideally the cameras would be installed at the mid-point along the face of the vehicle, the mats can then be positioned at the same distance either side of the camera.



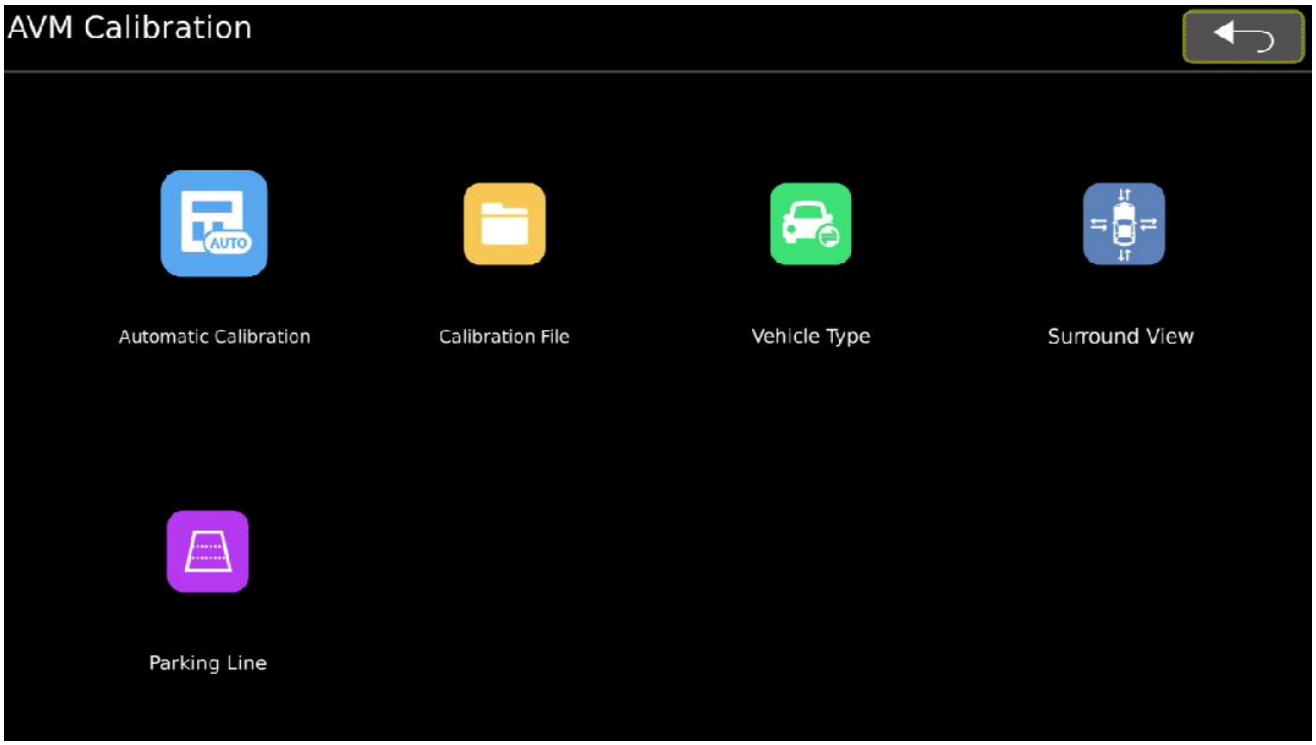
Notes:

- Each camera should see the 2 closest mats and cannot be blocked by objects.
- The calibration mats shown in the camera image should be flat and cannot be severely distorted.
- Lighting should be even, bright spots may affect the calibration success.

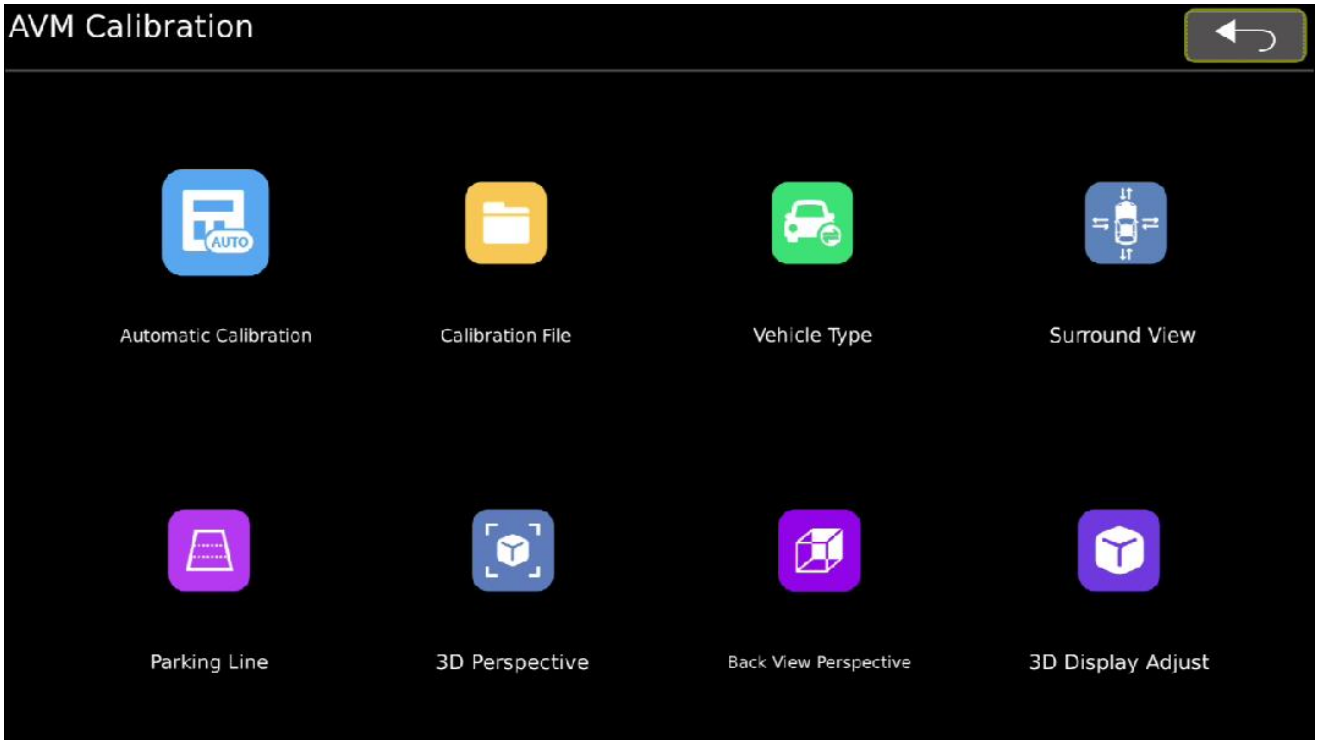
Once you have laid the mats out correctly, please proceed with the calibration which is carried out using the AVM menu.



Menu options seen in 2D display mode



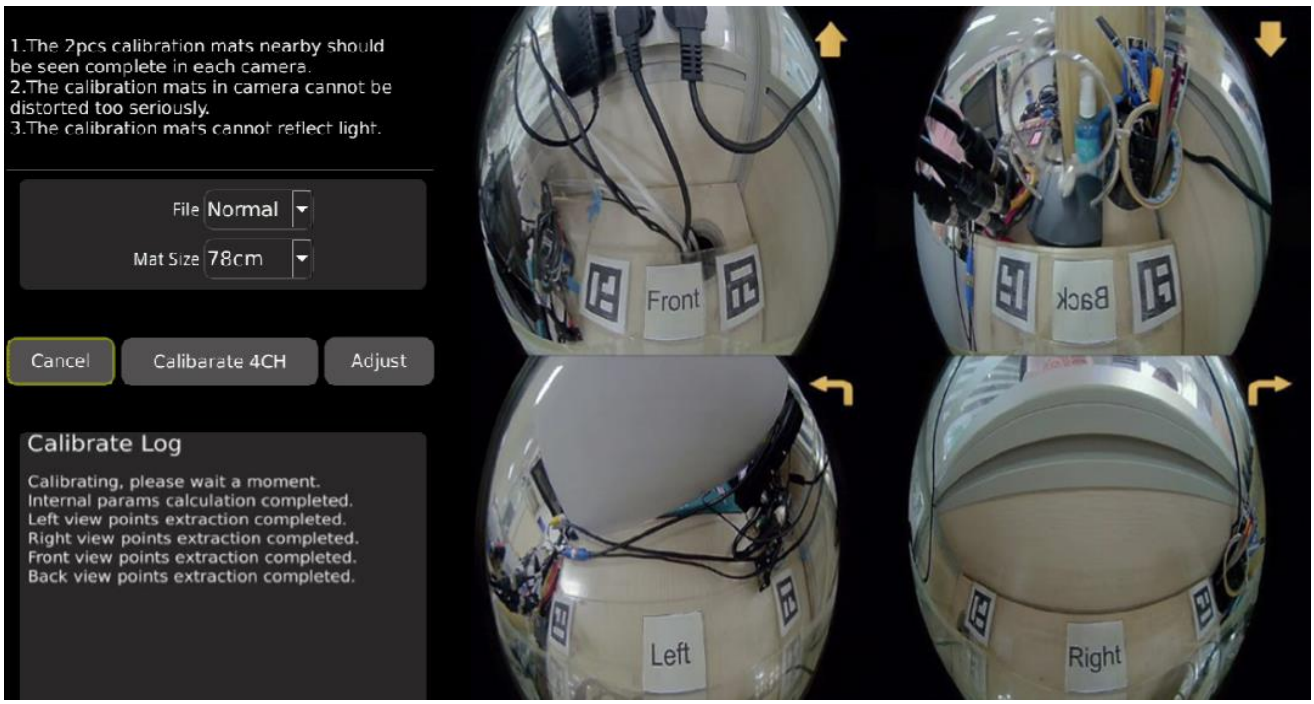
Menu options seen in 3D display mode



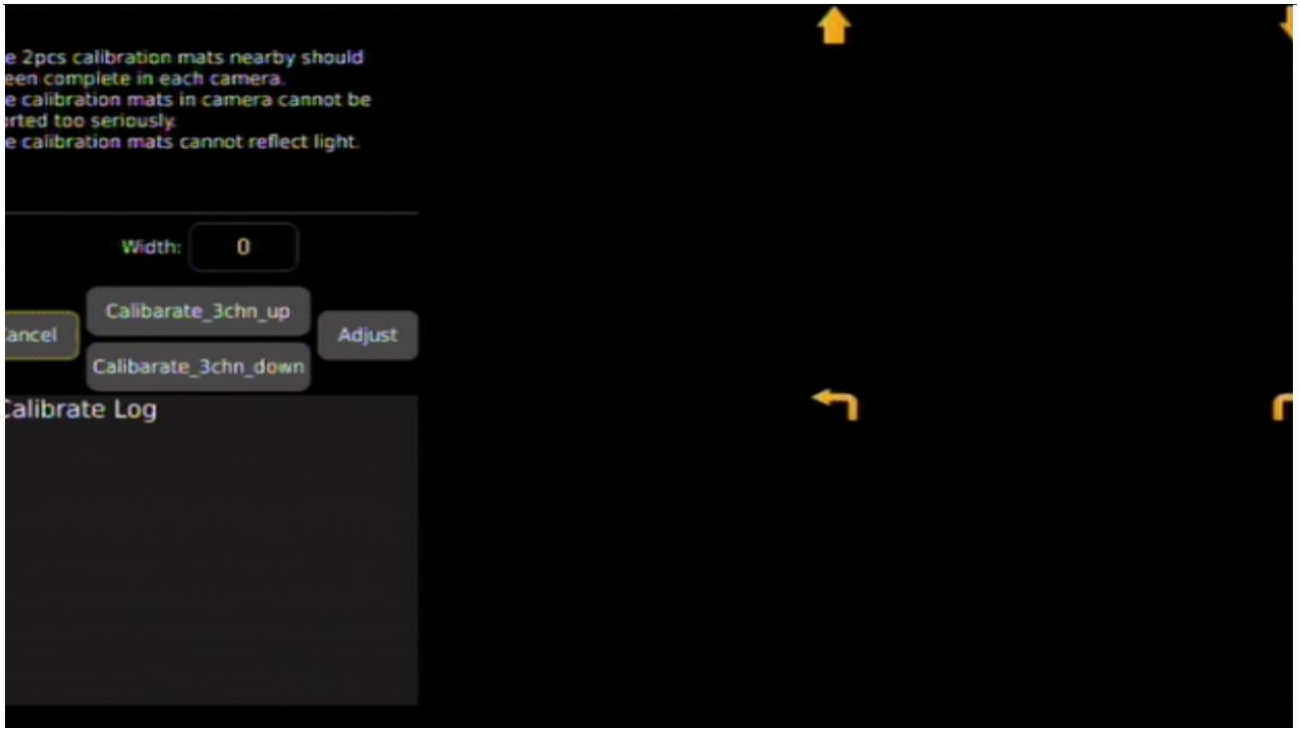
10.2. Automatic Calibration

Initial Calibration and settings

4 Camera Calibration



3 Camera Calibration



Feature Description:

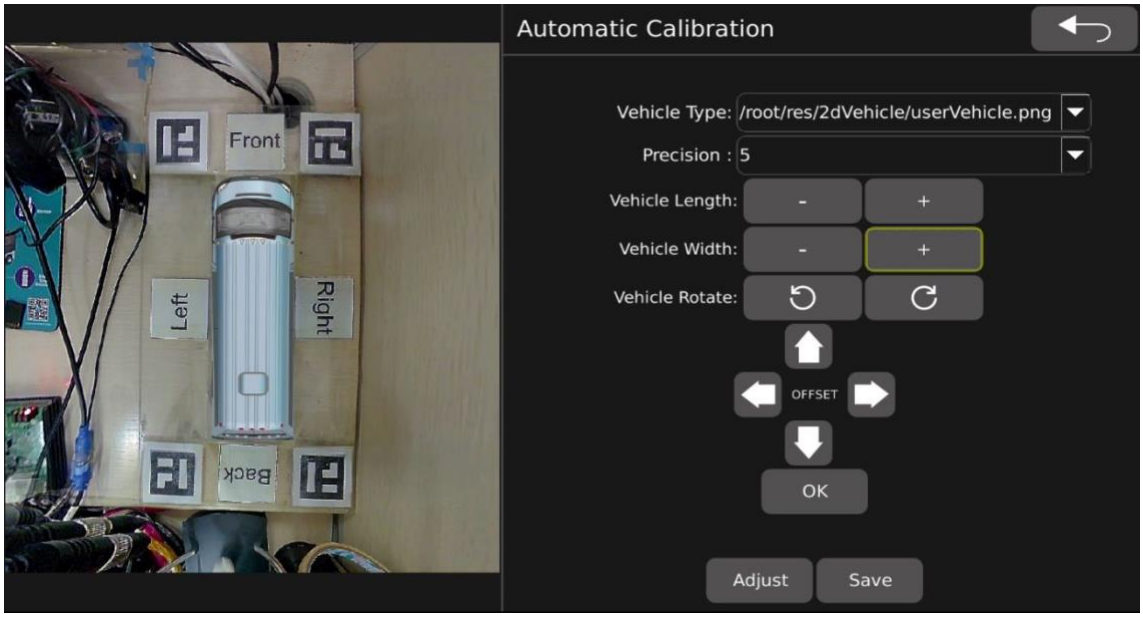
File: Options are Normal and Extra, Default is **Normal**, in most circumstances you would use **Normal**, Extra is used for factory support only.

Mat Size: Default is **78cm**, Other options are 78cm, 135cm & 112.5cm

Cancel: Navigates back to the previous menu

Calibrate 4CH: Select this when you are ready to calibrate the system

Adjust: After calibration you may want to make some adjustments selecting **Adjust** will take you to the next menu.



Feature Description:

Vehicle Type: Used to modify the type of vehicle, (note that the vehicle model here is only for auxiliary calibration reference and does not need to be saved)

Precision: Accurate adjustment of vehicle length, width and model movement, default is **1**. (optional values 1, 5, 10, 15 pixels), changing the Precision number will change the amount of adjustment each press of the +/- or arrow keys makes.

Vehicle Length: Used for vehicle length adjustment. Click “-”to decrease vehicle length, click “+”to increase vehicle length

Vehicle Width: Used for vehicle width adjustment, click “-”to decrease vehicle width; Click “+”to increase vehicle width

Vehicle Rotate: Used for vehicle model rotation (rotate left or right).

For vehicle model movement (up/down/left/right).

Used to update the calibration effect button after adjusting the overall effect.

Adjust: Used to jump to the calibration internal parameter adjustment interface.

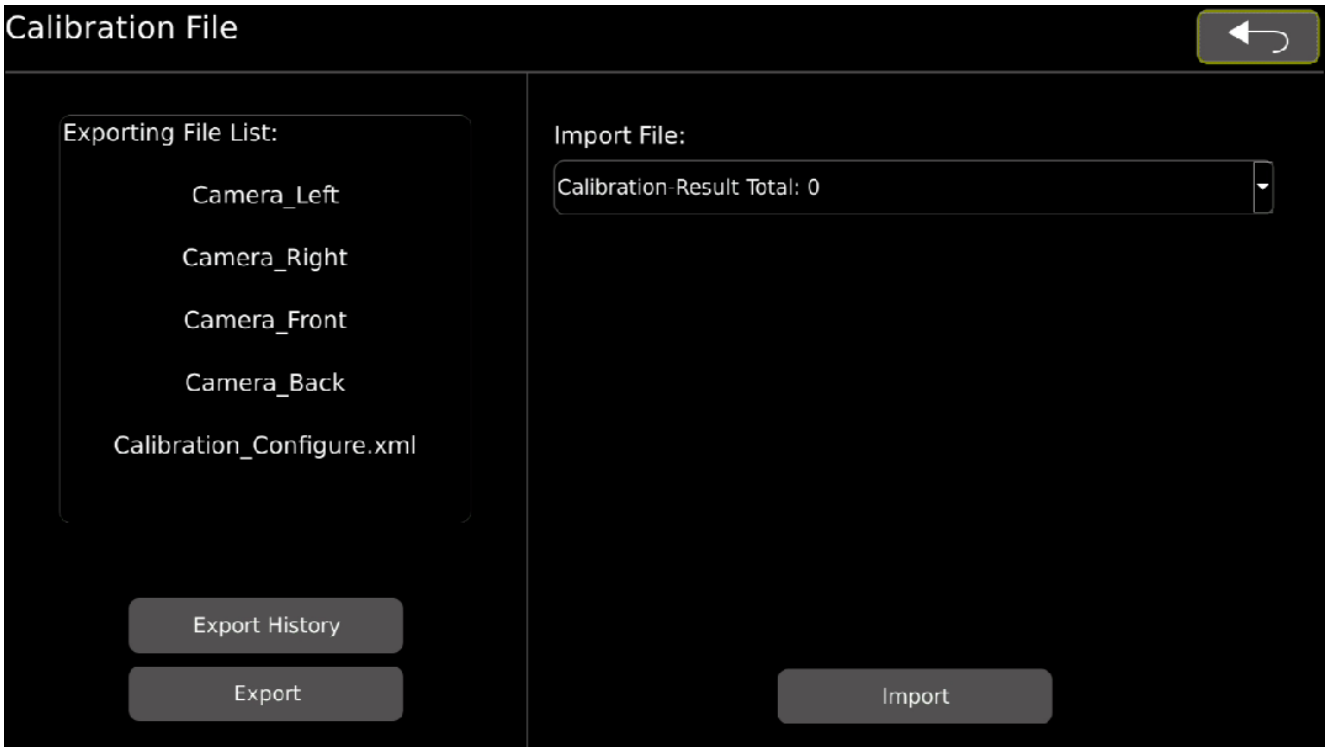
Save: Save the calibration results.

Notes:

- It is recommended to use the quad screen display to monitor the installation effect in real time when the camera is installed. It is required that the car body can still be observed at the centre of each screen.
- When calibrating, it is recommended to stick zebra tape (or other marks) close to the periphery of the vehicle and adjust the parameters of the vehicle model until you can see the zebra tape all around.

10.3. Calibration File

Export calibration picture resources and import calibration files.



Feature Description:

Export History: Exports information regarding calibration history.

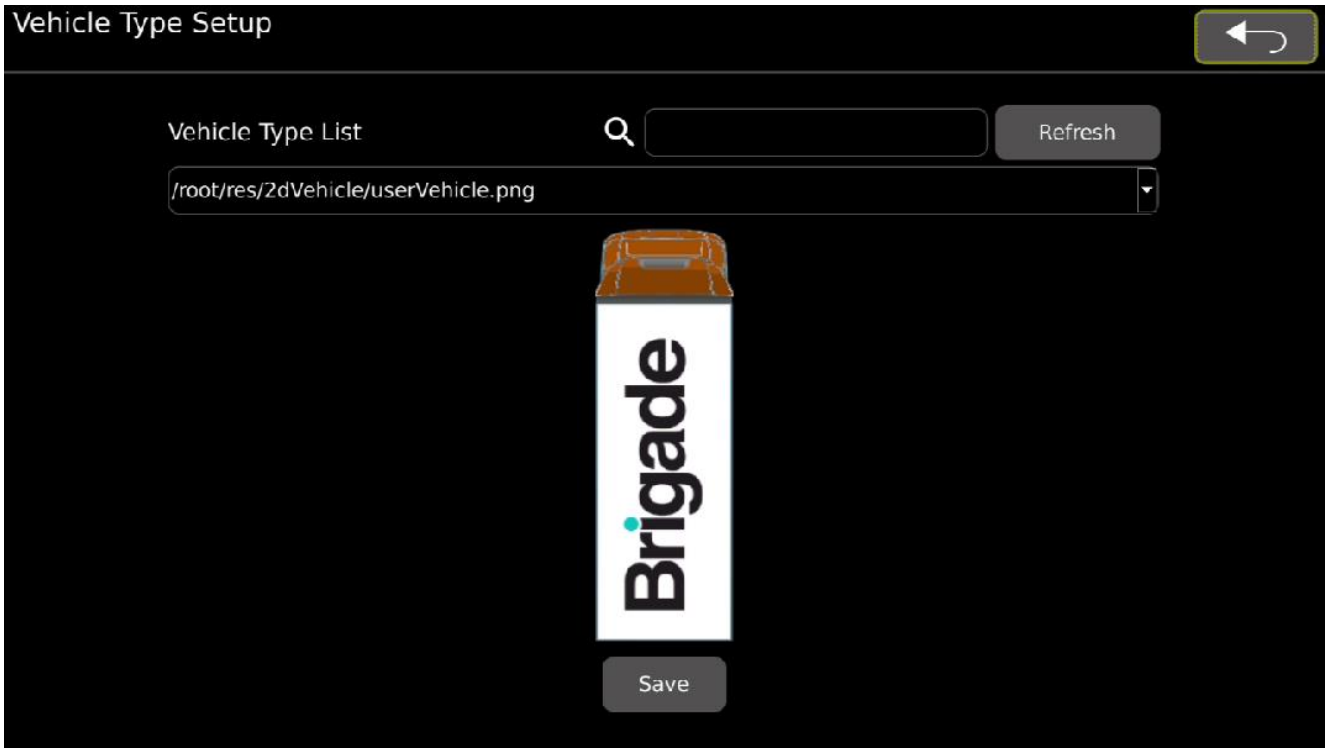
Export: Export the calibration picture file to a USB memory drive, the resources include 4-channel image, (if you have already finished the calibration the resources will also include a .XML file).

Import File: To import a previously used calibration file that you have previously saved to a USB memory stick, insert the USB memory stick into the USB port. Use the drop-down menu to select the required file

Import: Once you have used the **Import File** drop down menu use the **Import** button to import the calibration file, this will upload the calibration data to the ECU.

10.4. Vehicle Type

The Brigade AI360 has a library of vehicles and machines for you to choose from, to select a different template, select the drop-down menu and choose a new vehicle or machine.



Feature Description:

Vehicle Type List: Use the drop-down menu to select the vehicle/ machine type for your environment.

Search Box: Use basic search terms such as cement, truck, bin etc. then select **Refresh** to refine the drop-down menu selection.

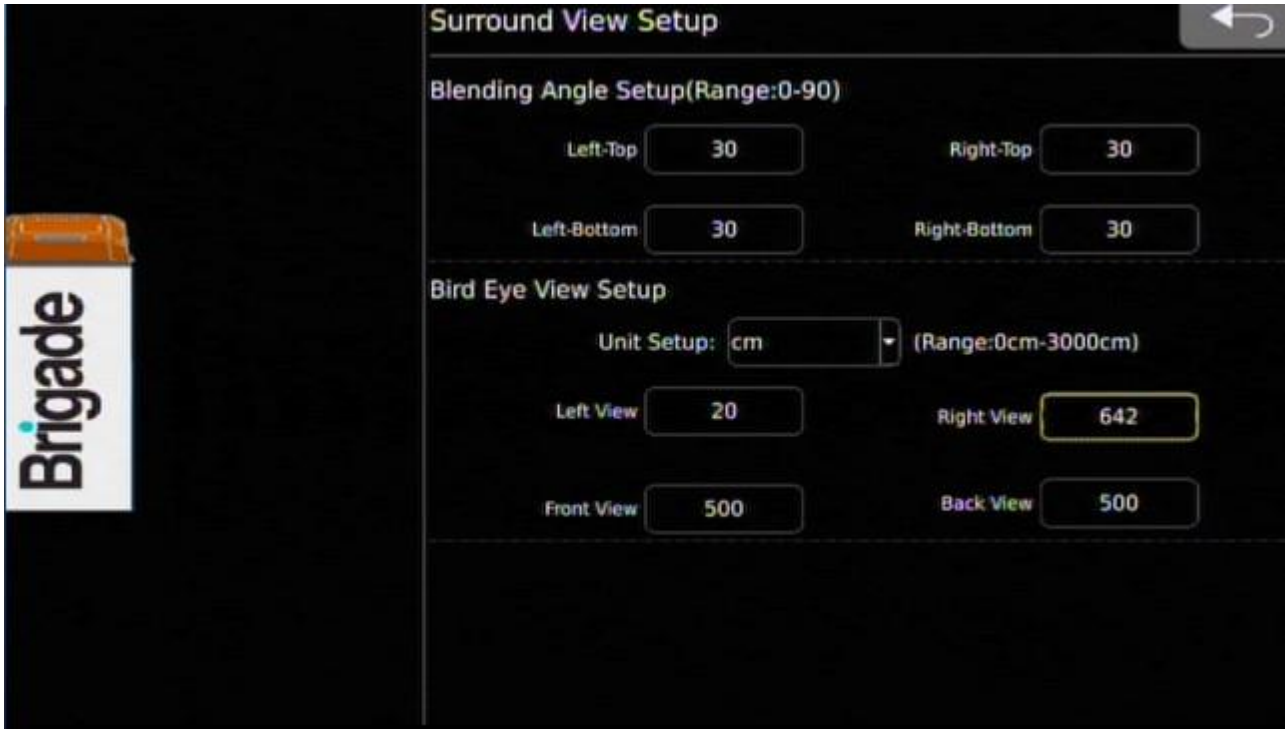
10.5. Surround View

These options allow you to fine tune the calibration by changing the blending angle and the aerial birds eye view setup.

Feature Description:

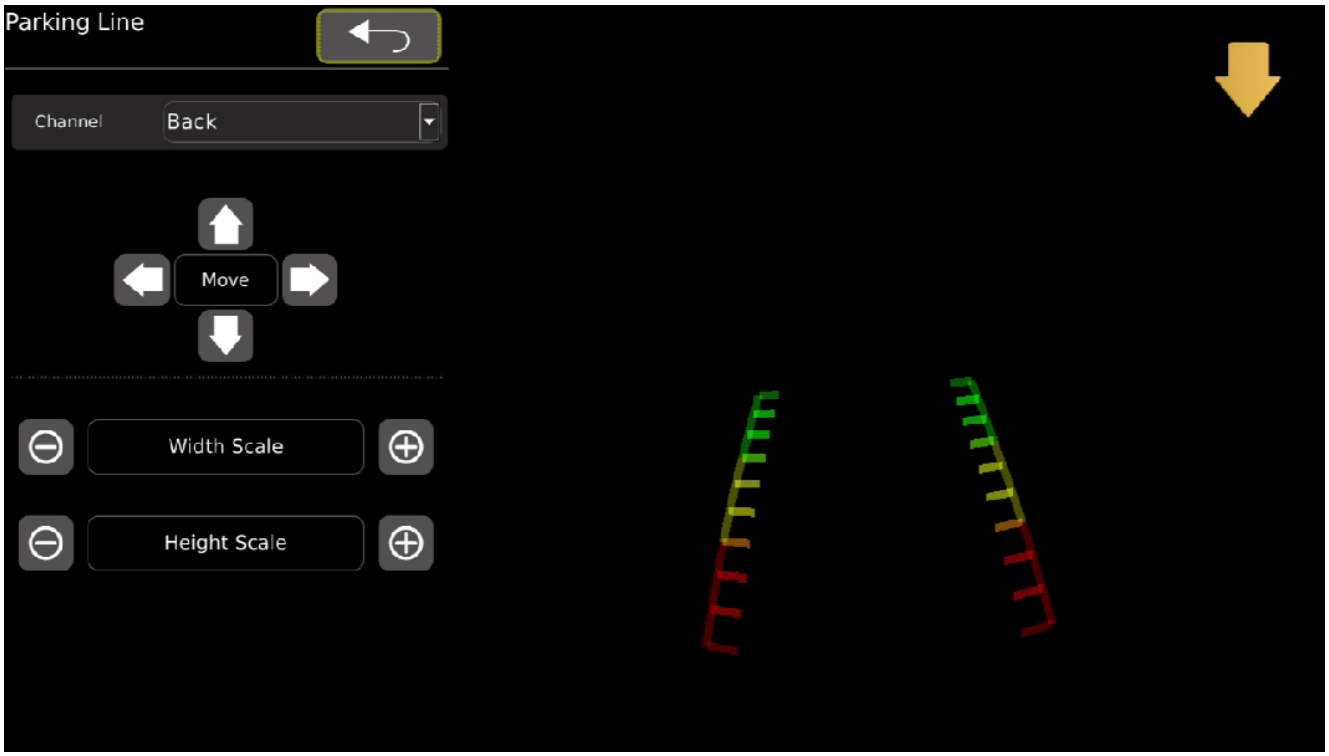
Blending Angle Set: up allows you to adjust the angle of blend seen at each corner of the vehicle on the overhead view

Birds Eye View: setup allows you to move the vehicle model around on the screen, e.g. If it is critical to see more of the area on the right-hand side of the vehicle decreasing the number in the **Left View** box will move the vehicle model to the left of the aerial view displaying more of the right side of the vehicle, see example below;



10.6. Parking Line

This menu allows you to adjust the parking lines by moving the lines and changing their width and height.



Feature Description:

Channel: Default is **Back** using the drop-down menu to select between Back and Front, this will change between the front and rear cameras.

Move: Using the arrow keys, you can re-position the parking lines.

Width Scale: Increase the width of the parking lines using the "+" key reduce the width using the "–"key.

Height Scale: Adjust the height/ length of the parking lines using the "+" key, reduce the height/ length using the "–" key.

Note:
The following 3 Menu items will only be seen when in 3D display mode

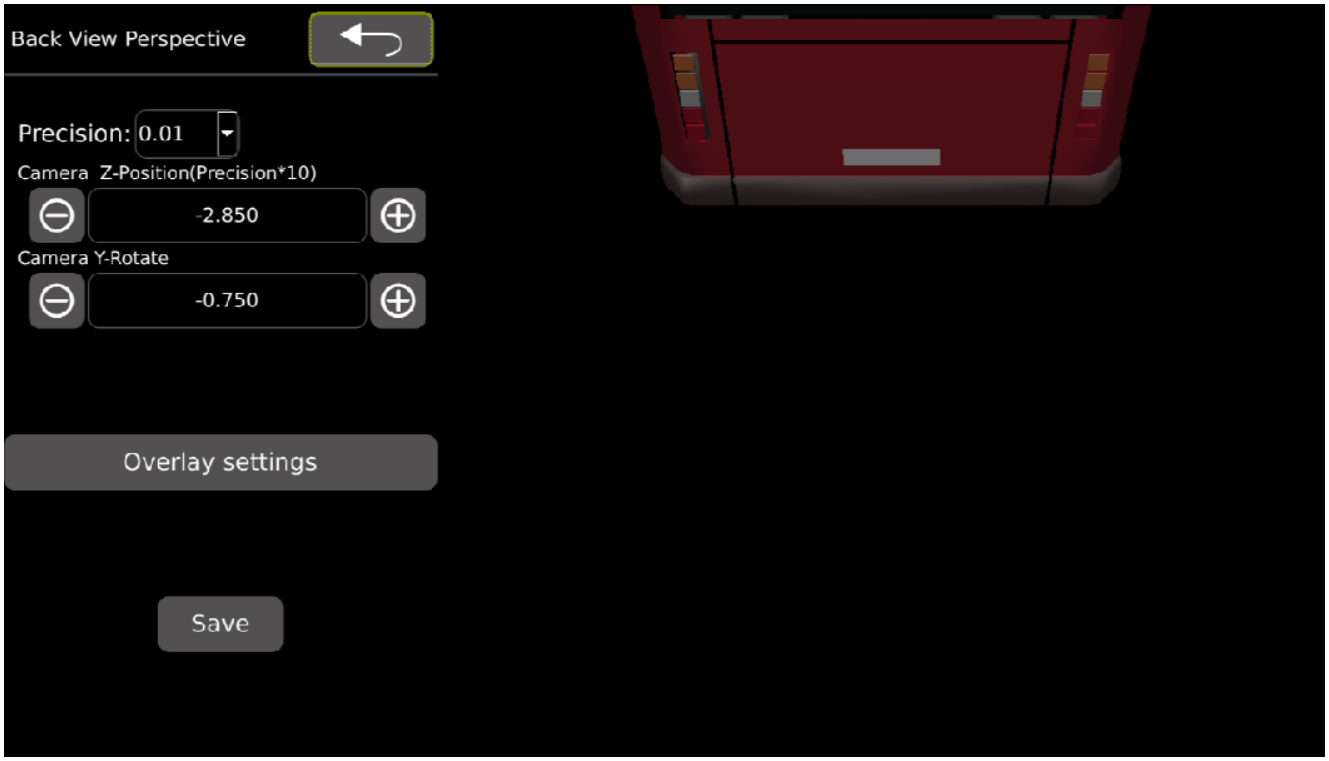
10.7. 3D Perspective

Feature Description:

3D Perspective: 3D perspective view point setting

- **Vehicle Bottom:** Default is **Black** this controls the colour you see at the bottom of the vehicle 3D model, **Other** changes this colour to grey
- **Vehicle Transparency:** Using the +/- buttons you can change how transparent the vehicle 3D model appears in the main screen
- **Speed 3D Rotate:** Change the automatic 3D vehicle rotation speed
- **Precision:** Using the drop-down menu change the amount of adjustment used when changing the camera Z/Y settings
- **Camera Z-Position:** Adjust the Z axis viewing position
- **Camera Y-Position:** Adjust the Y axis viewing position

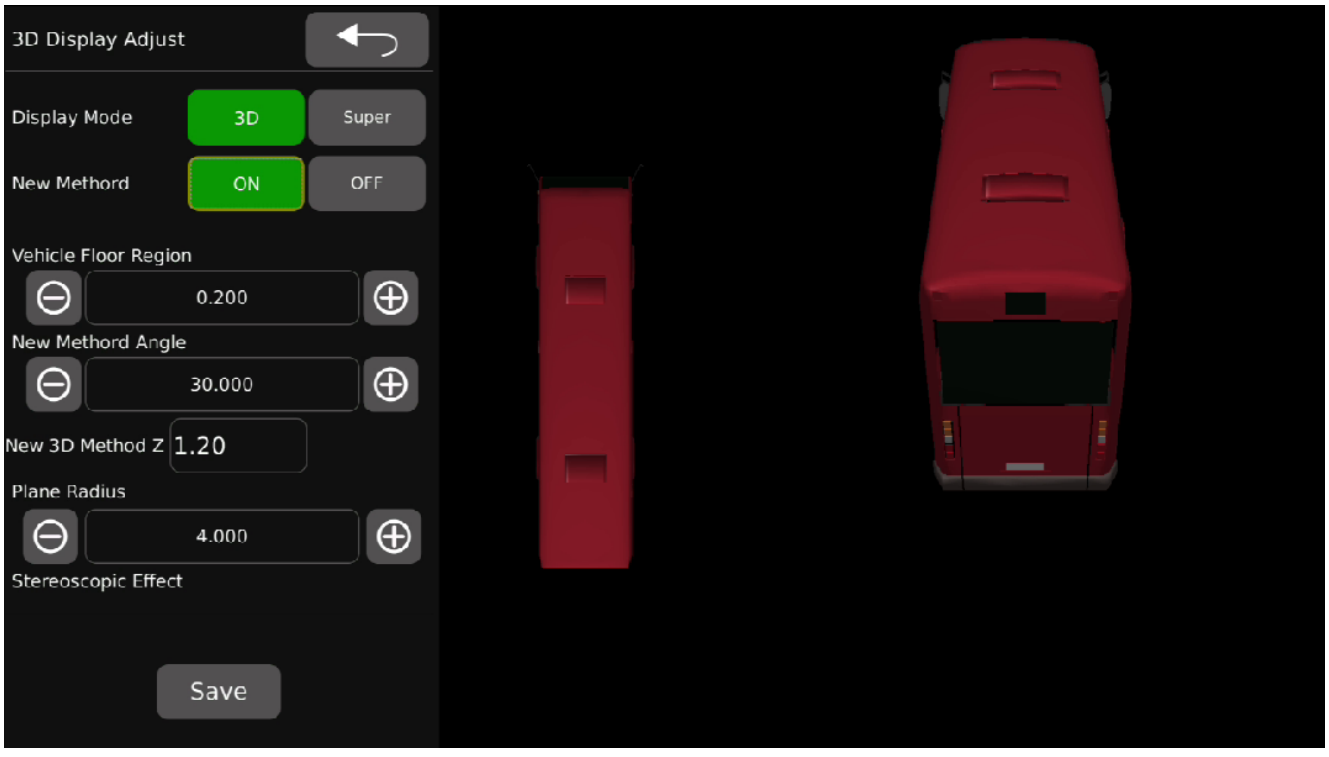
10.8. Back View Perspective



Feature Description:

- **Precision:** Using the drop-down menu, change the amount of adjustment used when changing the camera Z/Y settings
- **Camera Z-Position:** Adjust the Z axis viewing position
- **Camera Y-Position:** Adjust the Y axis viewing position
- **Overlay Settings:** Fine tuning for the 3D model area

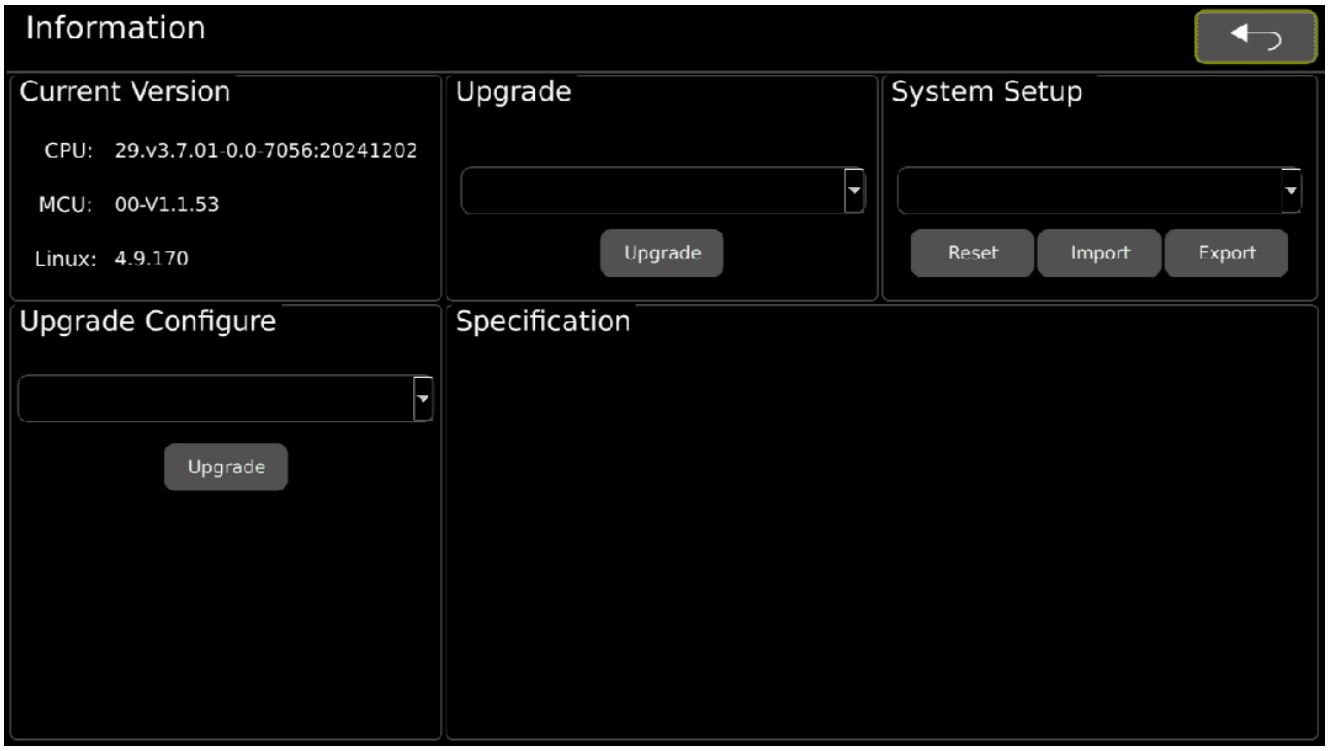
10.9. 3D Display Adjust



Feature Description:

- Make various adjustments to the 3D view and model position

11. Information



Notes:

- Do not remove the USB Stick during the upgrade process. Do not power-off system during the upgrade.

Feature Description:

- **Current Version:**
  - **CPU:** Current CPU flash version information
  - **MCU:** Current MCU version information
  - **Linux:** Current Linux system version information
- **Upgrade Configure:**
  - Upgrade Configuration
- **Upgrade:**
  - Firmware version upgrade, using the drop-down menu, select the version that needs to be upgraded and click button

- **System Setup:**
  - **Reset:** Resume to default setting
  - **Import:** Import the configuration file
  - **Export:** Export the configuration file

11.1. Camera Firmware Update

To update the camera firmware, you will require a USB-Adapter and a USB memory stick, (not supplied in the kit)

Update Procedure to be carried out on each camera individually:

- Ensure the AI360 system is not powered
- Load the new Firmware onto a USB memory stick
- Connect the USB memory stick to the USB adaptor located between the camera and ECU
- Power the AI360 system, you will see a boot logo where the camera image is displayed
- The update will now be carried out and a status bar will be displayed
- Once the update is successful, the camera will restart

Important Note: Do not remove the USB memory stick or power during the update procedure.

11.2. ECU Update

To update the ECU firmware, you will require a USB memory stick, (not supplied in the kit)

Update Procedure to be carried out on each camera individually:

- Load the new Firmware onto a USB memory stick
- Connect the USB memory stick to the USB adaptor located on the ECU harness
- Navigate to the **Information** menu
- Using the drop-down menu within the **Upgrade** window section select the new firmware
- Select **Upgrade**
- The update will now be carried out and a status bar will be displayed
- Once the update is successful, the system will restart
- It is recommended that you now reset the system using the reset option in the **System Setup** window

Important Note: Do not remove the USB memory stick or power during the update procedure.

12. Disclaimer

Our products are supplied to serve as situational awareness and/or warning systems and thus as aids to safety. They DO NOT replace the operator's and/or driver's obligation to ensure the safety of the vehicle or machine, the proper and safe operation of the vehicle or machine and nor do they replace your obligations to ensure the safety and suitability of the vehicle or machine.
Please visit the support section of our website to find more information regarding Brigade Warranties:
https://brigade-electronics.com/warranties/
Specifications subject to change.