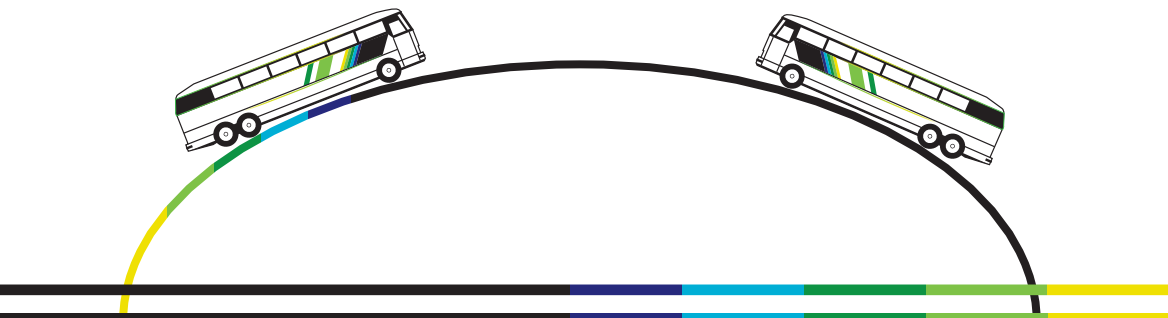
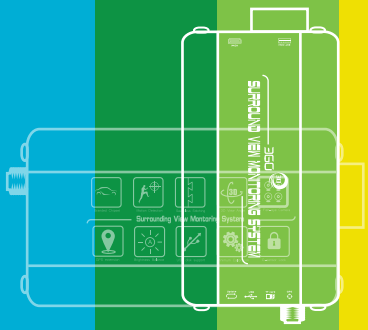
Surround View Monitoring System

User's Manual for Buses & Trucks





CONTENTS

1 Safety Tips and Brief Introduction

2 Main Features

3 Camera Location & Installation Angle

- 3.1、Wire Routing
- 3.2、Cameras Installation
- 3.3、Host Device Installation

4 Camera Calibration

- 4.1、Calibration Parameters Setting
- 4.2、Calibration Tape Sticking
- 4.3、Cameras Angle Adjusting
- 4.4、Placing Packing Box
- 4.5、Calibration Points Marking
- 4.6、Image Calculation

5 User settings

- 5.1、Working Modes
- 5.2、Parameters Setting and Menu Description
- 5.3、Video Recording Functions

6 Specification

7 FAQ

8 Service Promise

Safety Tips

Please read this manual carefully before using and pay attention to this section for the safety Instructions.

Serious traffic accidents may be caused by keeping watching on the screen or operating the system during driving. It is strong recommended that do not operate this system while driving.

SVM is a parking and driving assistant system which offers the road situation around the vehicle to eliminate blind spots and thus works perfectly as a visual guide for safe parking and driving. It may bring inconsistence between the screen image content with actual surroundings of the vehicle. Please handle this case according to actual situation.

Never hotplug the host device when power is connected. The host device can't be sinked in any kind of liquid. Please kindly pay attention to heat dissipation.

Please contact professional installation service providers in case of any abnormal situations.

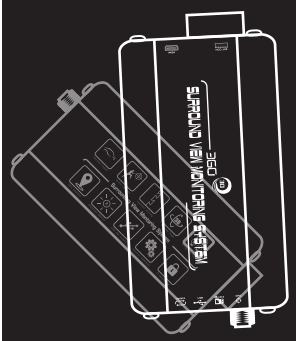
Brief Introduction

Guide

This guide is to provide the basic illustration for topological structure of the SVM system, operating principle and basic concept to help users to understand the whole system installation procedure, camera calibration steps, and how to interact with the system menu.

Brief Introduction of System

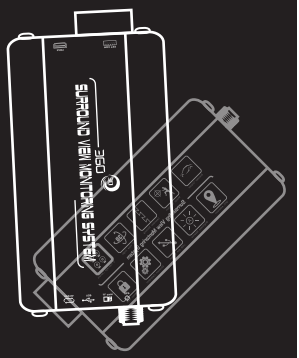
The SVM 3D Around View Monitoring Technology synthesizes images from four cameras to create a true 3D sophisticated view of a vehicle's surroundings. The technology enables flexible omni-directional monitoring around a vehicle from a dynamically definable perspective or "free eye point." Such kind of technology can display the complete vision of the positioning and moving path of the vehicle, it covers blind spot and thus works perfectly as a safe parking and driving guide even when restricted by adjacent vehicles and objects, parking line, etc. The system offers various SVM system configurations like -HDMI/LVDS/AV with alternative version of 2D or 3D, and what's more, this system also integrated four channel car DVR function with 24 hours videos loop recording supported.



Product Features

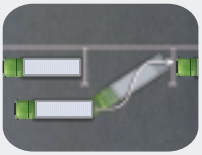
Product Features

- Four 180 degrees ultra wide fish-eye cameras
- Seamless video merging based on dual core ARM CPU and hardware high efficiency acceleration engine.
- Arbitrary and dynamic 3D mode view angle switching for better surrounding environment observation
- Independent Fish-eye calibration parameter and algorithm for each camera.
- Pixel statistic engine for realfime brightness balance among four channels outside cameras.
- 3D video de-interlacing and noise reduction technology for CVBS signal decoding.
- Support alternative recording media for TF card or USB disk
- The simplest calibration steps with calibration tape and packing box,and system applicable for almost all types of vehicle which including Buses, Trucks, Lorries, Limousines, Tanksand even Jumbo Jets. Typical length of the vehicle is 5.5m, 6.5m, 10m&13m.
- Smart power managements to save automobile's battery
- High video recording resolution up to 1440*960.
- OE quality for main chipset with well protected circuit and devices in order to achieve the best system performance and stability.



Product Features

Main application scenarios

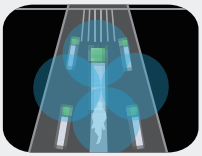


Side Parking

Reverse Parking

Narrow Road/Lane

Slope sections



Blind Spots Coverage

Turning assist

Security&Surveilance

Car DVR

Crowed Road

Features Profile

3D & 360° Seamless Merging

360° Blind Spots Coverage

Dynamic & Intelligent View Angle Switching

Flexible Omni-directional Monitoring

Exclusive Fish-eye Distortion Correction

Guided Camera Calibration

Driving Video Recording

G-sensor Triggered Recording

Optional Function

a.24 Hour Parking Monitoring

b.Visual Radar Extension

Note:

This manual gives a basic and general feature description of the system, but it may vary from specific product model and application case. Please consult sales team for detail specifications before ordering.

System Hardware Installation

Installation Steps

1 Wire routing inside the car

Please refer to wiring diagram for more details.
Please also be alert for the color and connector size of each extending cable.
Wire routing should be from cameras to the host device side.
All the cables should be gathered to the host device side

2 Cameras Installation

Please refer to the corresponding section for detail installation steps.
Embedded or out-cell installation for side cameras depends on the size of the side mirrors and also depends on the space available for installation especially for large vehicles.
Glass lens need to pay specific attention when disassemble the side mirrors to protect it from being broken, and please also be careful when drill installation holes under the plastic cover of the mirrors.

3 Host Installation

It is strong recommended that the host be installed inside/behind the tool cabinet which is much easier to take out the TF card or USB disk than behind the DVD monitor(central control panel)

4 Wiring Test

Do not turn on the power before all the wire connection is double checked. Do Hot-plug the host device is prohibited.

5 Functional Test

To test the main functions and settings of the host device.

6 Side Camera ' s Angle Adjusting

Rolling the camera to select a proper angle which can make the side calibration tap be overlapped with the reference guide line on the screen.

7 Camera Calibration

Camera calibration can be guided step by step with the help of system menu, once the calibration data is completely collected, system software will complete the video merging automatically.

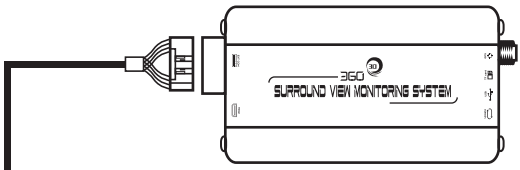
8 Device Fixing

Fixing the wire connections, cameras and host device

9 Reconversion

To recover all the parts of the vehicle

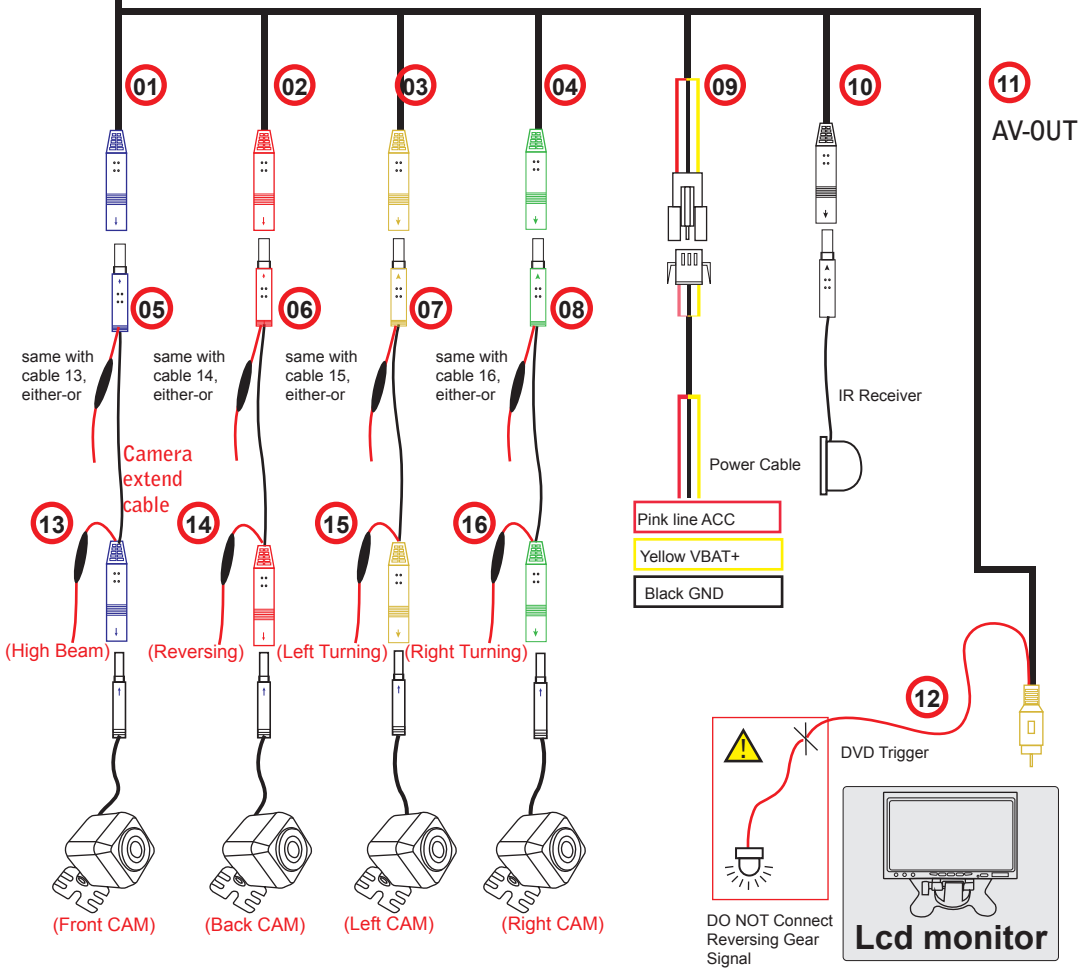
Wiring Diagram



Host Device

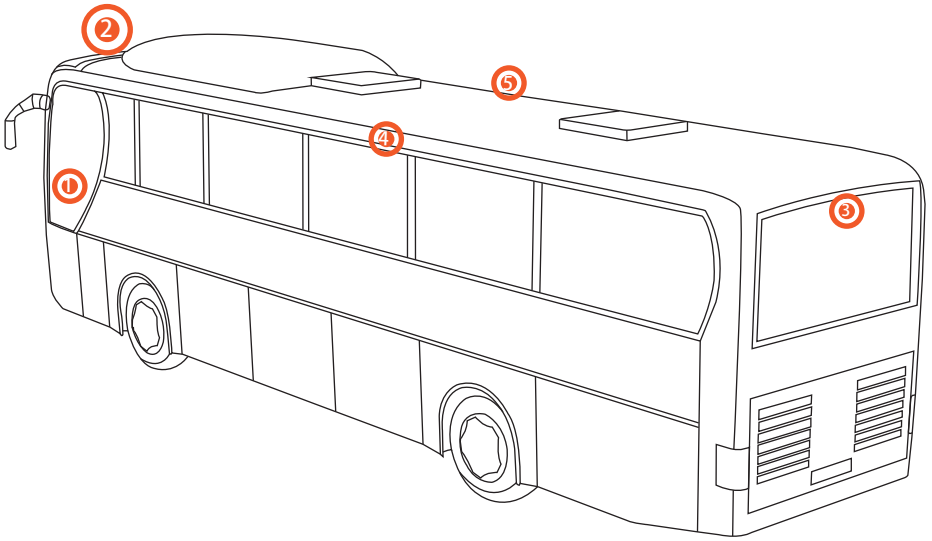
Notes: Please make a proper order for cable extension kit according to the vehicle length, standard extension cable length is list below:

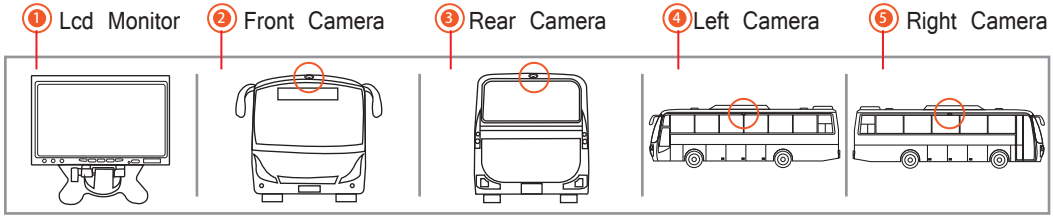
Front Camera: 4M*2
Rear Camera: 6.45M*2
Left Camera: 3.45M*2
Right Camera: 3.45M*2



Cameras Location For Buses

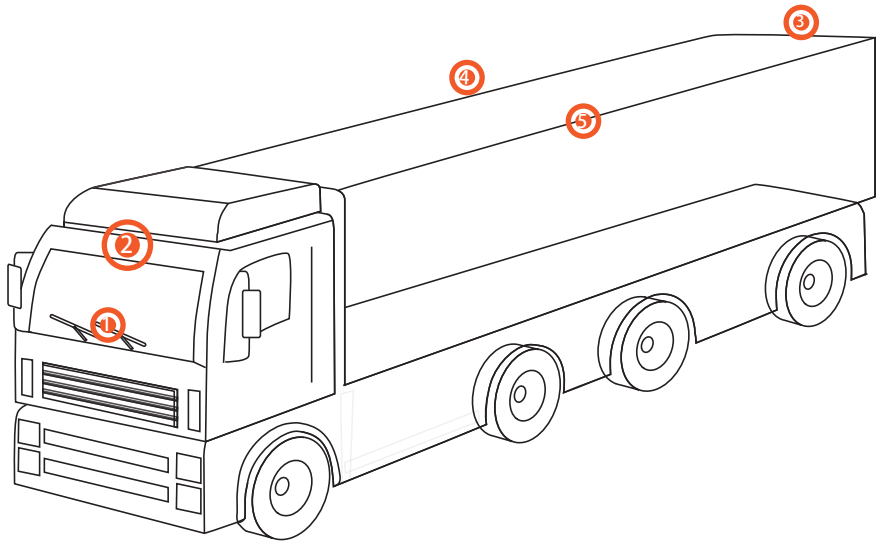
Perspective Drawing

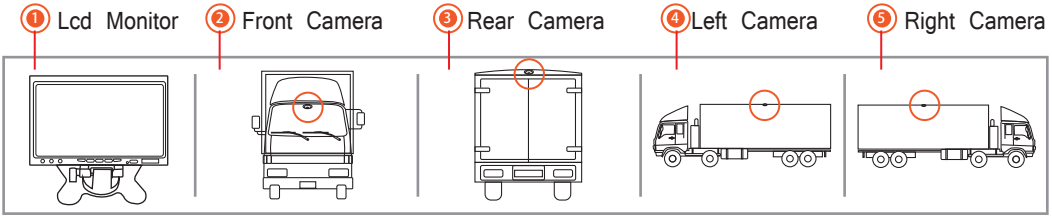




Cameras Location For Trucks

Perspective Drawing

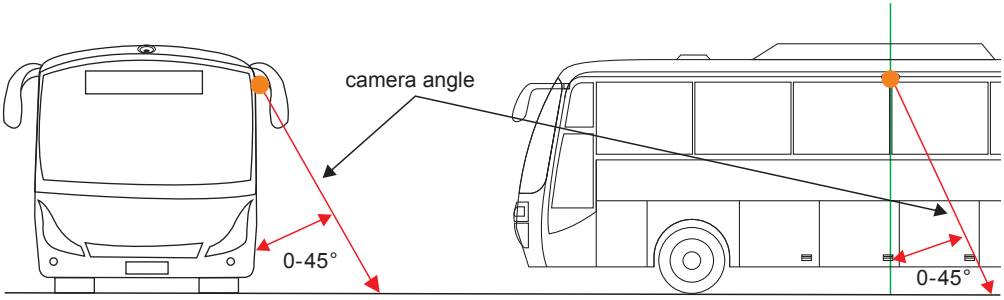




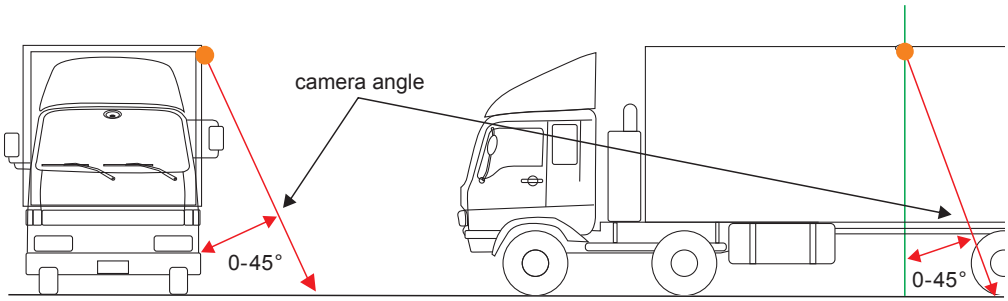
Cameras Installation Angle For Buses/Trucks

Please keep in mind that choosing a proper camera installation position to get as many pixel contents as possible while keeping the body of the vehicle visible. The camera optical axis should keep a vertical angle of 45 degree appropriately corresponding to vehicle body. For buses and trucks camera installation, it is strong recommended to install all the cameras in the middle point of each top side which illustrated as follows:

Camera Installation Angle For Buses

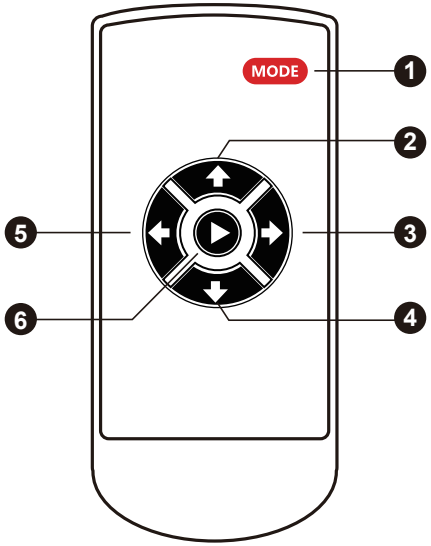


Camera Installation angle For Trucks



Remote Controller Introduction

Perspective Drawing



Key Number	Description	Function
[1]	MODE	Enter Setting Menu
		In 3D Mode, long press 2 seconds enter into 4CH recording mode
[2]	UP	While in MENU screen, toggle through the icons
		In SVM Mode, short press enter high beam mode, press again back to SVM mode
[3]	RIGHT	In SVM model, long press enter into right 360 rotatable mode
[4]	DOWN	In SVM mode, long press enter into reversing gear mode
		In menu setting, select next menu option
[5]	LEFT	In SVM model, long press enter into 360 rotateable mode
[6]	Confirm	Confirm selected option

Host Device Installation

Host Device Installation Steps

1. Disassemble the panel of central control unit, and connect the reversing video channel of Lcd monitor or other display screen(AV in).

2. **The host control unit installation:**

IR Mode: Put the infrared receiver in a proper position.

3. Please connect the anode of the left/right turning signal from the fuse box to host wire harness, or from side mirror turning LED indicator to the camera side of the extending cable.

4. Connect the power cable to batter supplier line and connect the wire harness to the host device..

5. Fix the host device in the tool cabinet or the space behind the central control panel.

6. Connect all the cables for the coming function testing and debugging procedure, and assemble the panel back to the control unit.

Camera Calibration

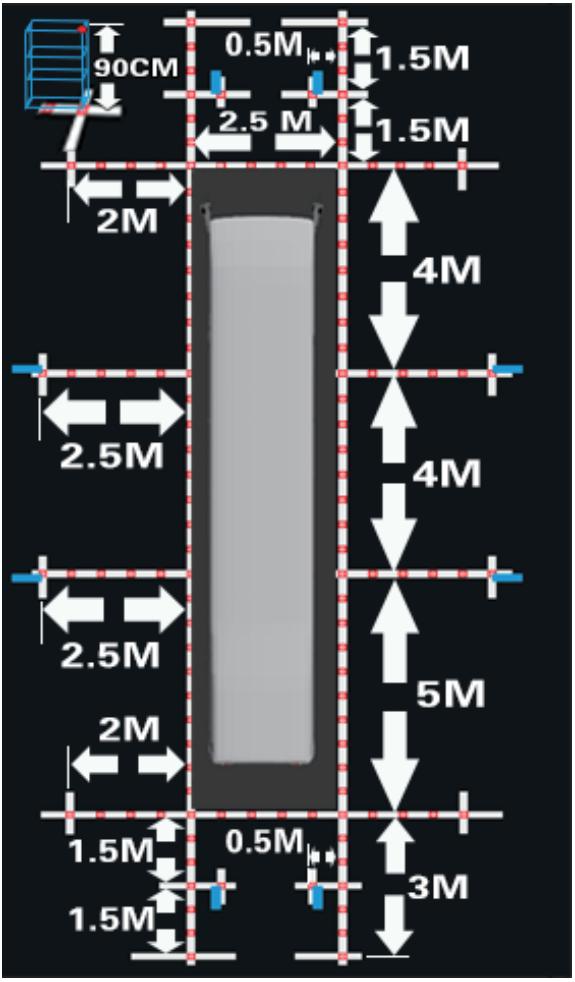
Calibration Parameters Setting

First of all, please short press the "MODE" button on the remote controller enter system menu settings.

Second, please select the correct calibration size for the applied vehicle model, set the shadow area and each step of the shadow setting is 5cm, please keep it as the default if you are not sure with the sensor type.

Camera Calibration For Buses - S

Calibration Tape Sticking



Note:

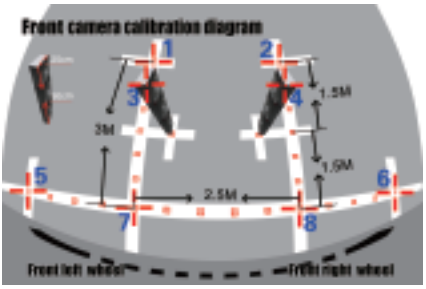
As the menu diagram shows, pasting the calibration tape around the vehicle.

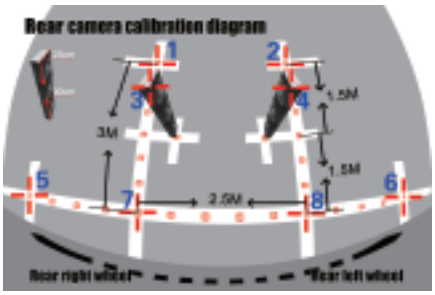
Please refer to the calibration pictures of different vehicle models and sizes to select the correct one for matching your vehicle.

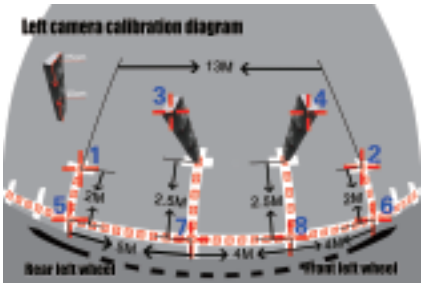
Camera Calibration For Buses - S

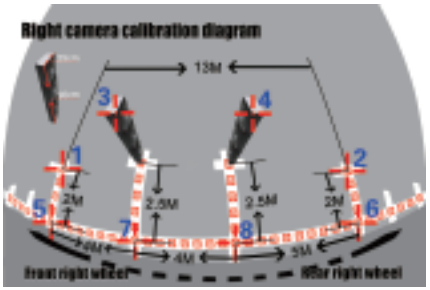
Placing Packing Box

There are always 8 calibration points for each camera which need to be marked in the screen, the third pixel point and forth calibration point are always special points which are actually the diagonal corner of the packing box. The packing boxes can be divided into outer and inner one so that each packing box can be used for calibration 1 camera each time.







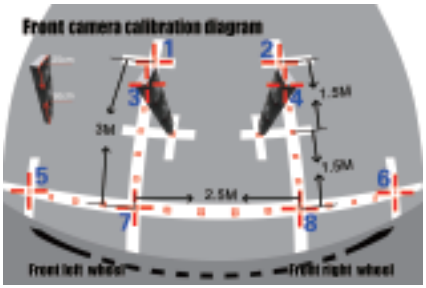


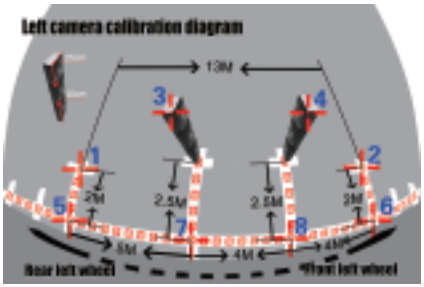
Notes: Put the 3 packing boxes in the correct position separately as the pictures above illustrated. You can also use other boxes instead as a calibration reference objects, the dimension requirements of the box must be 90cm in height.

Camera Calibration For Buses - S

Calibration Points Marking

You can start calibrating the four cameras one by one when the cursor is twinkling. Moving the cursor to the corresponding locations by the remote controller buttons of up/down/left/right, then press the “ok” button to mark the current calibration point in the screen and then the system menu will guide you to the next calibration pixel point in order from 1 to 8 one by one, please see the correct location and sequence of the calibration points as bellow pictures:



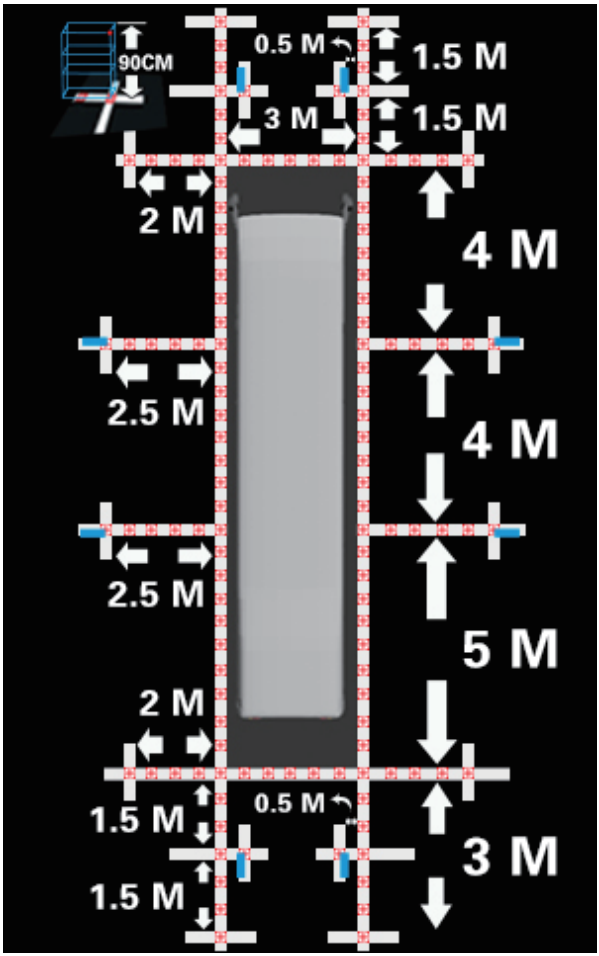


Press the red “Mode” button to toggle to previous calibration point selection when needed.

Notes: The calibration locations of No.7 calibration pixel point and No.8 calibration pixel point between the front&rear cameras and the sides cameras are totally different. The more accurate calibration points you mark, the better quality of the panoramic image merging will be.

Camera Calibration For Buses - M

Calibration Tape Sticking



Note:

As the menu diagram shows, pasting the calibration tape around the vehicle.

Please refer to the calibration pictures of different vehicle models and sizes to select the correct one for matching your vehicle.

Camera Calibration For Buses - M

Placing Packing Box

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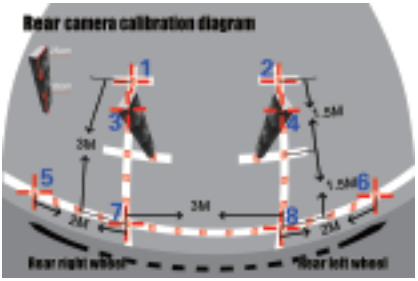
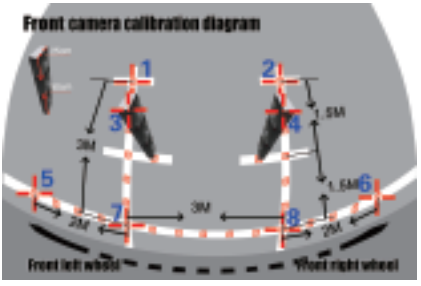
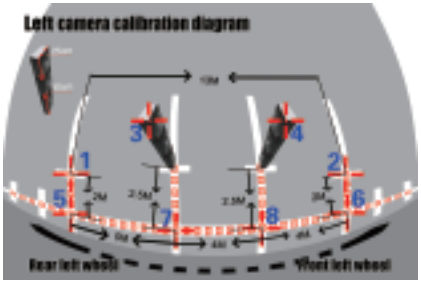
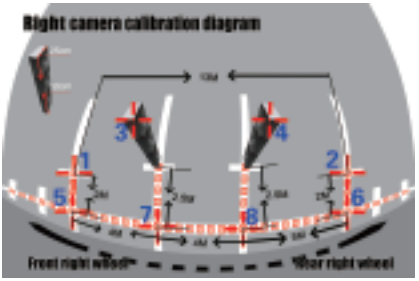






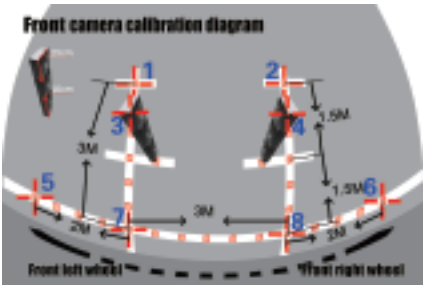


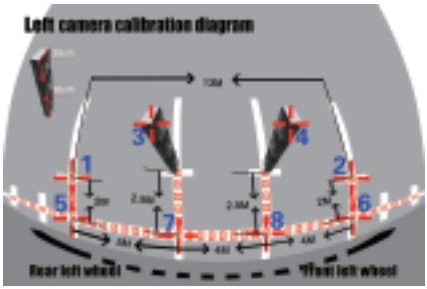
Notes: Put the 3 packing boxes in the correct position separately as the pictures above illustrated. You can also use other boxes instead as a calibration reference objects, the dimension requirements of the box must be 90cm in height.

Camera Calibration For Buses - M

Calibration Points Marking

You can start calibrating the four cameras one by one when the cursor is twinkling. Moving the cursor to the corresponding locations by the remote controller buttons of up/down/left/right, then press the “ok” button to mark the current calibration point in the screen and then the system menu will guide you to the next calibration pixel point in order from 1 to 8 one by one, please see the correct location and sequence of the calibration points as bellow pictures:



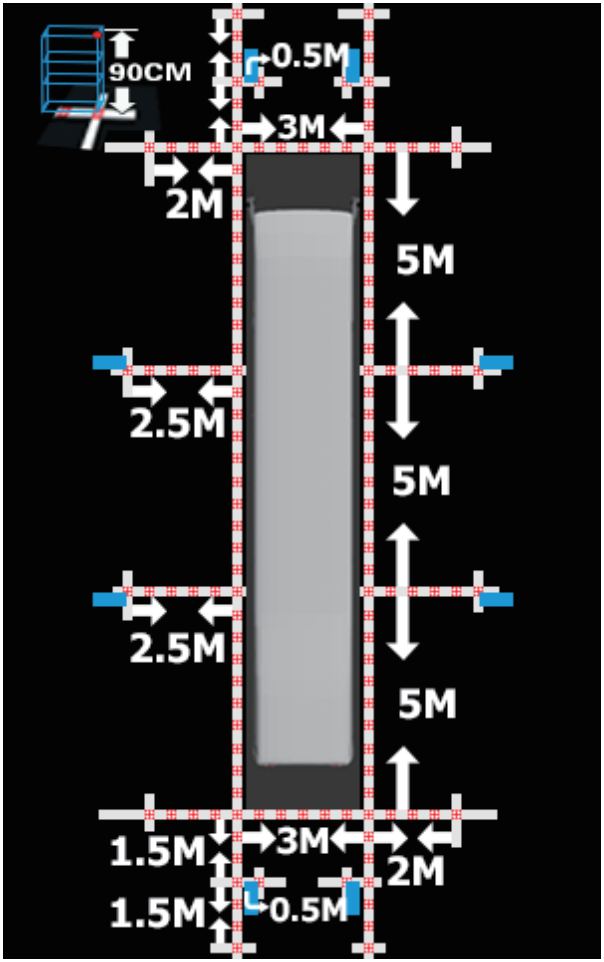


Press the red “Mode” button to toggle to previous calibration point selection when needed.

Notes: The calibration locations of No.7 calibration pixel point and No.8 calibration pixel point between the front&rear cameras and the sides cameras are totally different. The more accurate calibration points you mark, the better quality of the panoramic image merging will be.

Camera Calibration For Buses - L

Calibration Tape Sticking



Note:

As the menu diagram shows, pasting the calibration tape around the vehicle.

Please refer to the calibration pictures of different vehicle models and sizes to select the correct one for matching your vehicle.

Camera Calibration For Buses - L

Placing Packing Box

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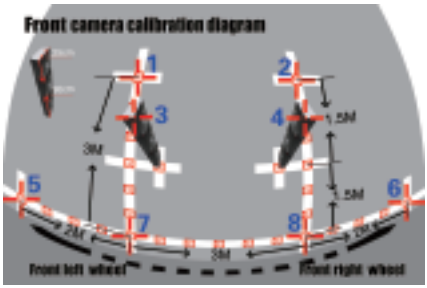

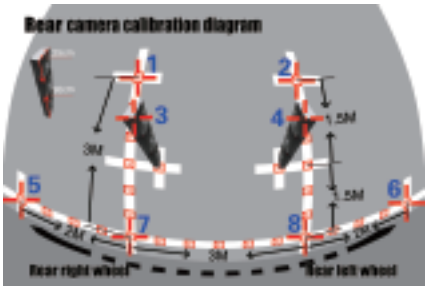

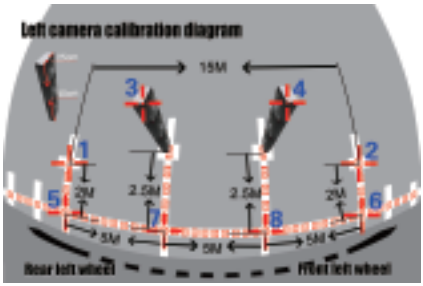

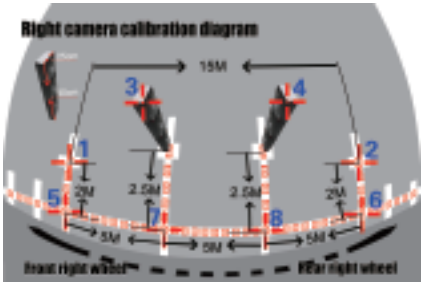

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Camera Calibration For Buses - L

Calibration Points Marking

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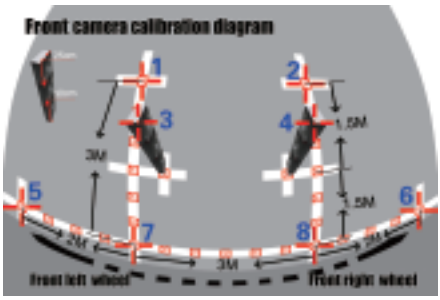

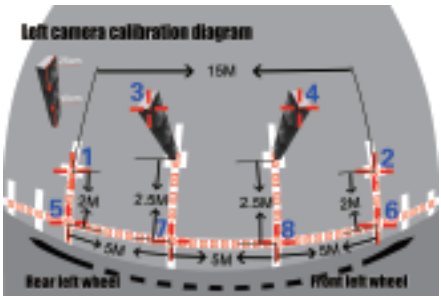

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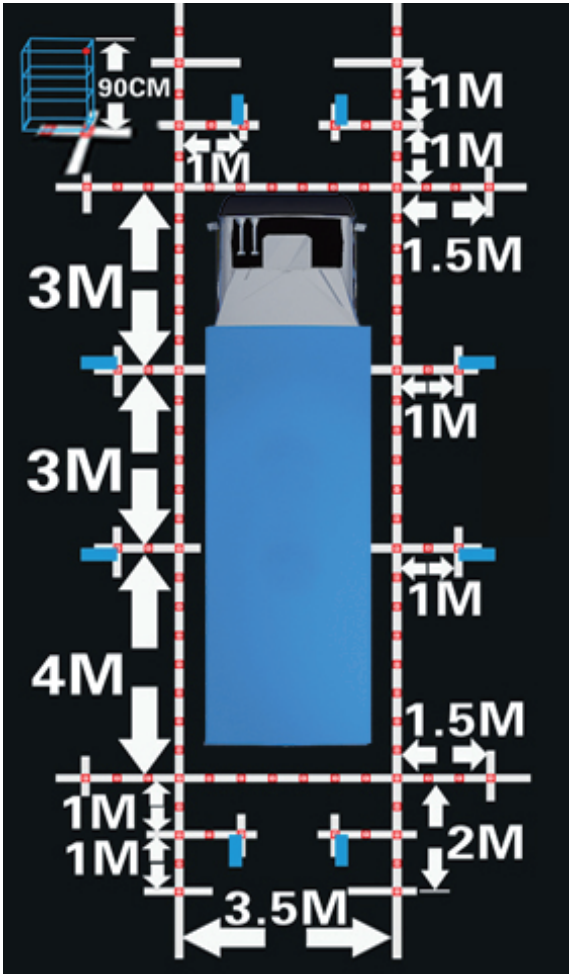
Camera Calibration For Trucks

Calibration Tape Sticking



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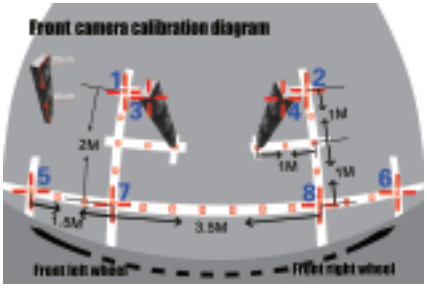
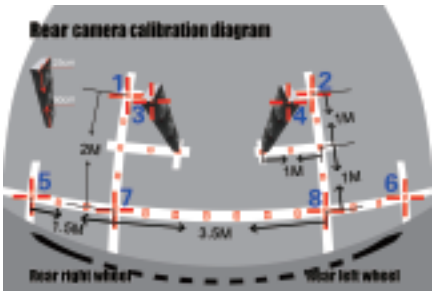
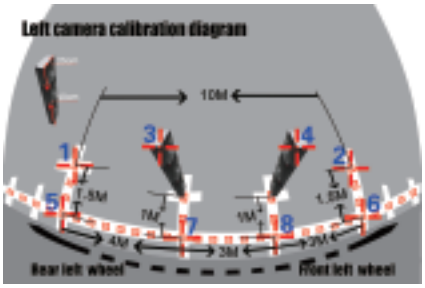
Camera Calibration For Trucks

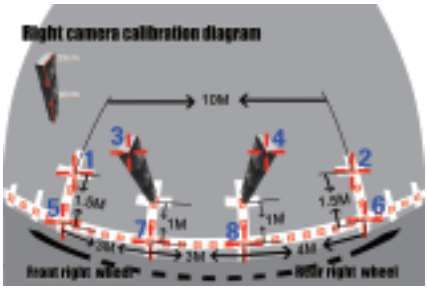
Placing Packing Box

There are always 8 calibration points for each camera which need to be marked in the screen, the third pixel point and forth calibration point are always special points which are actually the diagonal corner of the packing box. The packing boxes can be divided into outer and inner one so that each packing box can be used for calibration 1 camera each time.







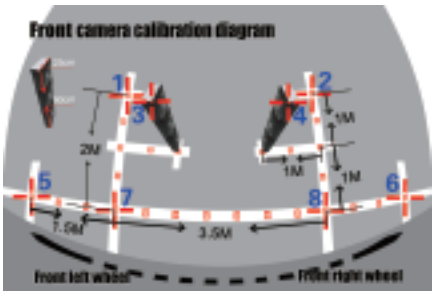


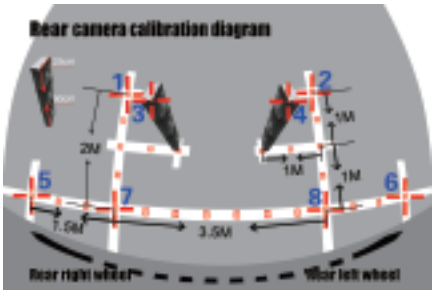
Notes: Put the 3 packing boxes in the correct position separately as the pictures above illustrated. You can also use other boxes instead as a calibration reference objects, the dimension requirements of the box must be 90cm in height.

Camera Calibration For Trucks

Calibration Points Marking

You can start calibrating the four cameras one by one when the cursor is twinkling. Moving the cursor to the corresponding locations by the remote controller buttons of up/down/left/right, then press the “ok” button to mark the current calibration point in the screen and then the system menu will guide you to the next calibration pixel point in order from 1 to 8 one by one, please see the correct location and sequence of the calibration points as bellow pictures:





Press the red “Mode” button to toggle to previous calibration point selection when needed.

Notes: The calibration locations of No.7 calibration pixel point and No.8 calibration pixel point between the front&rear cameras and the sides cameras are totally different. The more accurate calibration points you mark, the better quality of the panoramic image merging will be.

Camera Calibration

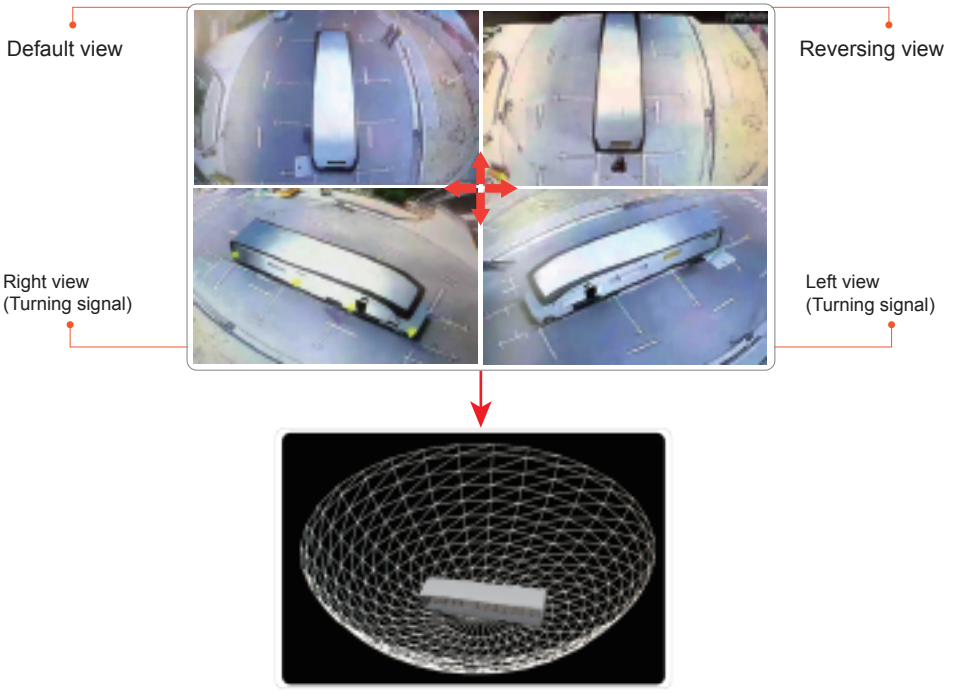
Merging Calculation

Press “OK” to start image merging.
Do not shut down during this operation, System will reboot automatically after image merging finished.

User Settings

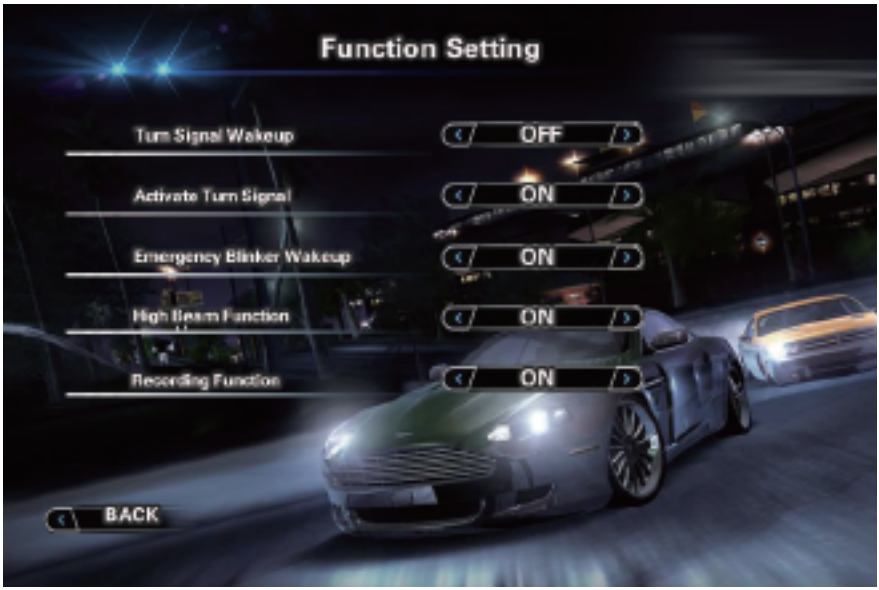
3D Full Screen Display Mode

Full Screen



Function Settings

Parameters Setting and Menu Description

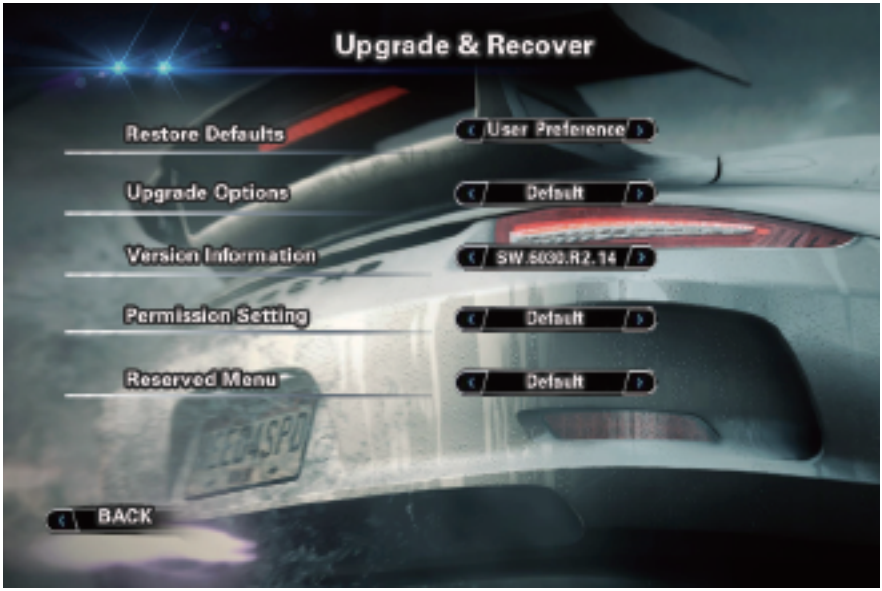


Menu Item	List Options	Description
Turn Signal Wakeup	ON / OFF	Turning Signal is optional after engine is fired, this option is a global switch for left and right turning indicator, when this option is set to ON, when the turning event is triggered, the SVM system will response to this event, and vice, versa.
Activate Turn Signal	ON / OFF	When the SVM is going to standby mode, this option is use to control whether the SVM system can be activated through turning signals.
Emergency Blinker Wakeup	ON / OFF	When the SVM is going to standby mode, this option is use to control whether the SVM system can be activated from Emergency Blinker, and you can also use Emergency Blinker to set it back to standby mode again when this option is set to ON.
High Beam Function	ON / OFF	Just like the turning signal, high beam signal is useful to toggle the free-eye point and change the view angle for surround safety.
Recording Function	ON / OFF	This is also a global switch to control whether the recording function is ON or OFF.

Interface Settings

Menu Item	List Options	Description
Language Setting	English/ Simplified Chinese	
Vehicle Brand Setting	Vehicle Type 1...3	
System Mode Setting	Full Screen	
Adjust The Screen Y Position	-9 ~ +9 Pixel	Screen TCON horizontal front porch and back porch control.
Adjust The Screen X Position	-9 ~ +9 Pixel	Screen TCON vertical front porch and back porch control.

Upgrade & Restore



Menu Item	List Options	Description
Restore Defaults	Default/ User Preference	Default is not functional at this moments, and choose user preference to restore user preference of video settings/window configurations etc.
Upgrade Options	Default / Upgrade 3D Mode / Upgrade All / Import Calibration Data / Export Calibration Data	Default is not functional at this moments, and choose firmware when you are about to update the firmware for the core board and choose Car 3D Model if you are about to change another Car Model for better match with the car brand.
Version Information	HW.6030.R2.80 SW.6030.R2.14 FW.6030.R2.04	
Permission Setting	Default	
Reserved Menu	Default	

Other Settings

Menu Item	List Options	Description
Emergency Blinker Wakeup Duration	30S/1Min/ 3Min/5Min/	Since the system can be activated through external Emergency Blinker, you can also set the duration time, but do remember to turn ON the Emergency Blinker Activation function first in Function Settings Menu.
DVD Toggle Output Delay	0S/10S/15S/30S Infinity	Since some specific DVD model will have a problem with AV-IN signal is coming at the early phase during system boot. Please set this option to 10s~15s if this kind of DVD you are using have such problem.
Trigger Delay	0S/3S/5S/ 10S/30S	Screen saver mode after turnning/reversing trigger
Reversing/Turning Wakeup Duration	0S/3S/5S	This option is similar as Emergency Blinker Wakeup Duration, you can adjust the duration time for Turning/Reversing signal here also.
Standby Duration	0H/0.5H/1H/3H/ 5H/12H/24H	Standby duration after ACC is off.

Video Settings

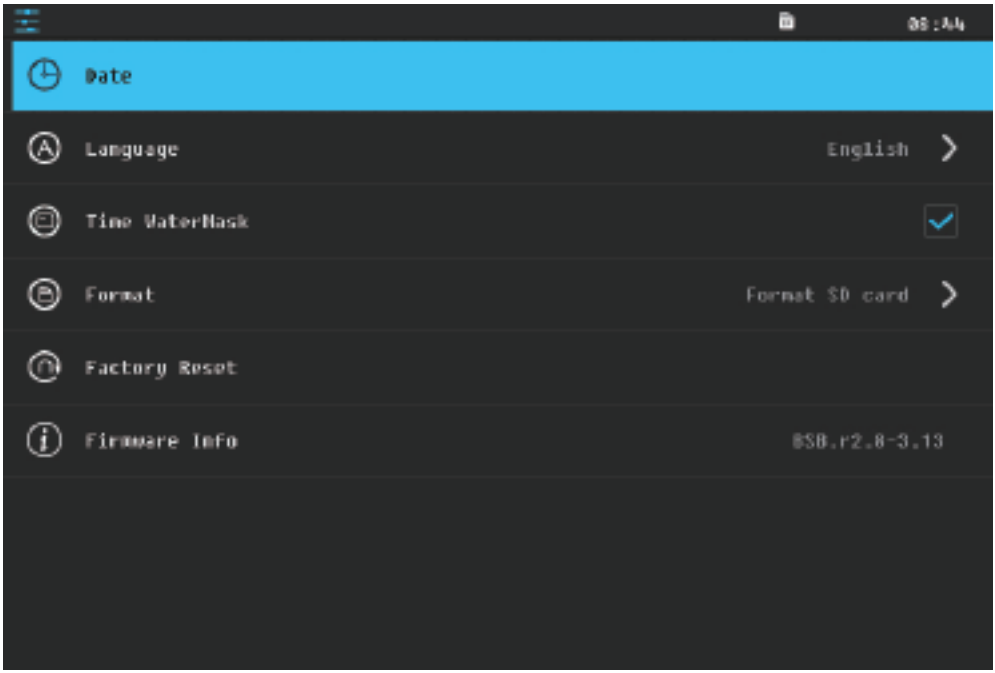
Menu Item	List Options	Description
Saturation	-9 ~ +9	Adjust input video saturation
Brightness	-9 ~ +9	Adjust input video brightness
Contrast	-9 ~ +9	Adjust input video contrast
Reserved Rod Setting		

Video Recording Functions

1. Long press “Mode” button to switch to recording system menu.
2. Press the “OK” button to stop current recording.
3. Using “Up/Down” button to navigate between recorded files as per date and timeline.
4. Press “OK” button again if the current recording file is just the right one you want to playback, and you can enlarge any of the 4 cameras to full screen mode by pressing left /right/up/down Button.

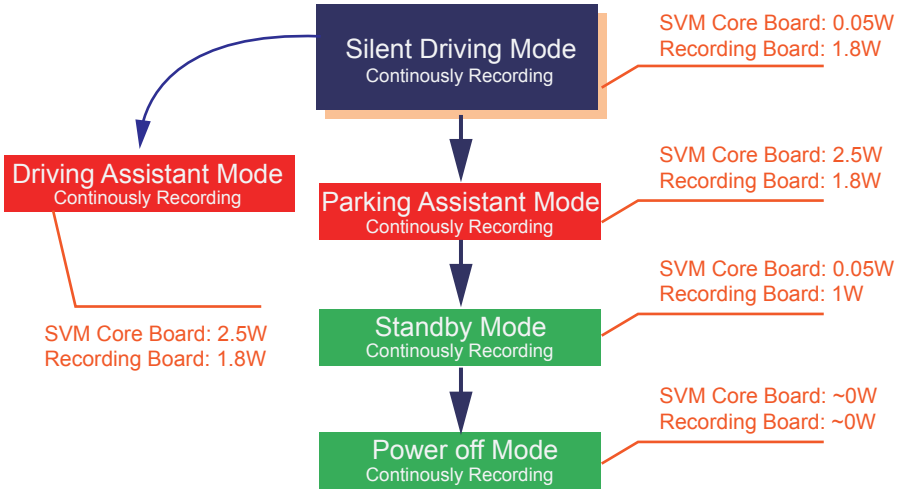
Recording Menu

Basic Settings



Menu Item	List Options	Description
Date		Change system time
Language	English/Chinese	
Time Watermark	ON/OFF	
Format		Format the TF Card or USB Disk
Factory Reset		
Firmware Info		

Smart Power Management Strategy



Silent Driving Mode

Silent Driving Mode is the most frequency used while driving, the recording system will continuously take the outside video and record the compressed video on the recording media such as TF card or USB disk. Note that USB disk have a higher priority over TF card.

Driving Assistant Mode Parking Assistant Mode

During this mode, maximum power is expected to consume, since both the recording board and SVM core board is full functional. But this mode will never last for a long time, driving assistant mode is usually last for several seconds, and parking assistant mode usually work for 1~2 mins.

Standby Mode

At this mode, the recording system is standby, and if any vibration is detected by the G-sensor, our SVM system will power up the external Cameras and LEDs immediately and start video recording.

Power Off Mode

The system is power off except for the Real Time Clock chip and G-sensor, and the whole system is also capable to awake from the vibration events. But under some special case such like the battery is lower than 11V, and system will never be awaked except for the event of engine start.

Packing List

Packing List


Host


Front Camera


Rear Camera


Left Camera


Right Camera


Remote Controller


Main Wire Harness


Front Extend Cable


Rear Extend Cable


Left Extend Cable


Right Extend Cable


IR Receiver

Note:

The configuration may generate differences due to different vehicle size or product model


Calibration Tape

Specification

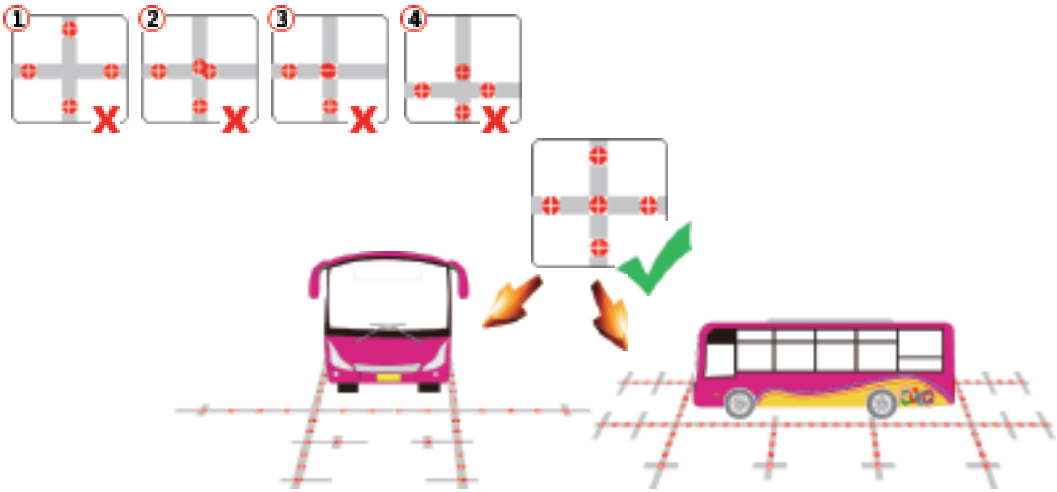
Datasheet

Type	Specification	
Video	Video Interface	Mini plug connector
	Input / Output Impedance	75Ω
	Amplitude	Typical 1Vpp, 1.2Vpp Maximum
	Bandwidth	8MHz
	Sampling Frequency	13.5MHz
	DP(Differential Phase)	<0.8° TYP
	DG(Differential Gain)	<3%TYP
	SNR	70dB
Indicator Lamp /Blinker	High beam	Optional
	Left/Right Turning Blinker	Yes
	Reversing Lamp	Yes
G-sensor	BM250E	Bosch
Compression	Algorithm	H.264 Baseline@L3.1
	Resolution	1440*960@30fps
	Bitrates	5Mbps，3Gbyte/Hour
	Recording Media	USB Disk(High Priority)/TF
Disk Capacity	TF CARD	32G SDIO3.0/SDIO2.0
	USB Disk	32G USB2.0
Power Consumption	4-CH DVR + SVM mode	600mA
	4-CH DVR mode	440mA
	Sleep Mode	<10mA
Dimension	L*W*H	123*81*25mm(Host Metal box)
Weight		220g
Environments	Normal Working	-20℃~+85℃
	Storage	-40℃~+105℃
	Relative Humidity	0~95%
Voltage Tolerance	Working Voltage	9.5V~36V

FAQ

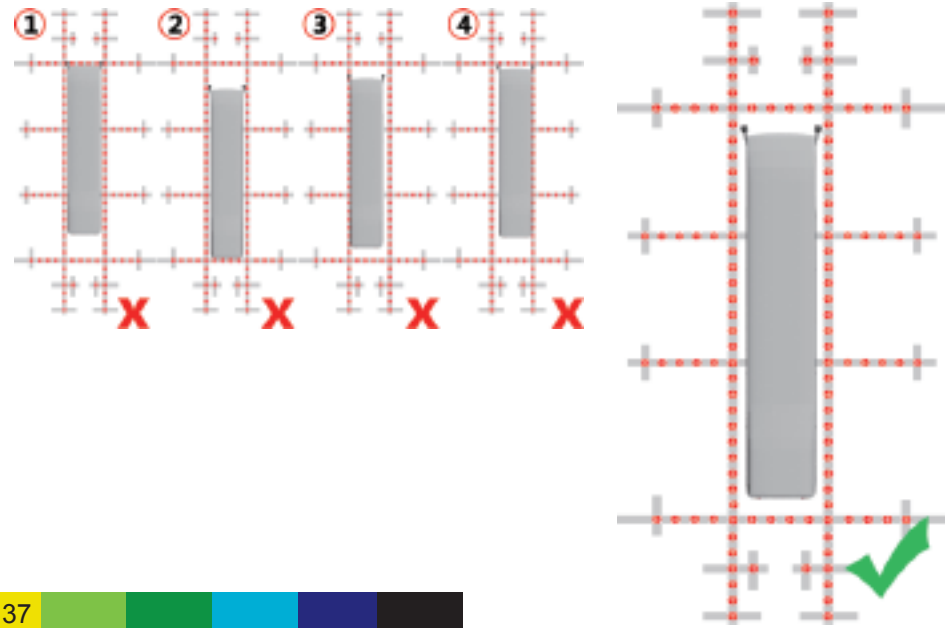
Trouble 1

Paste the calibration tape

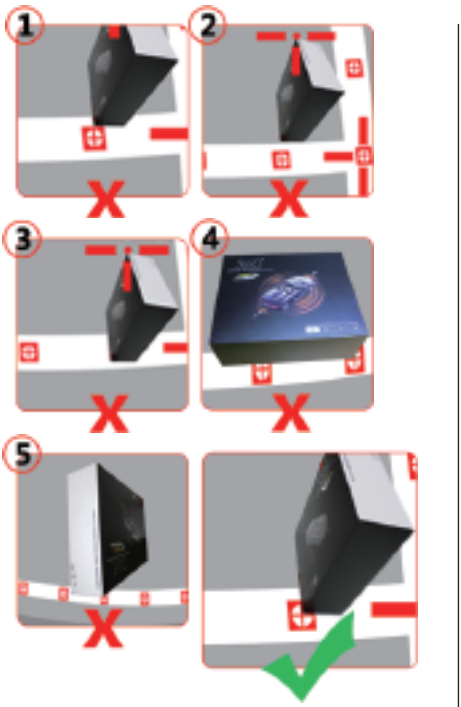


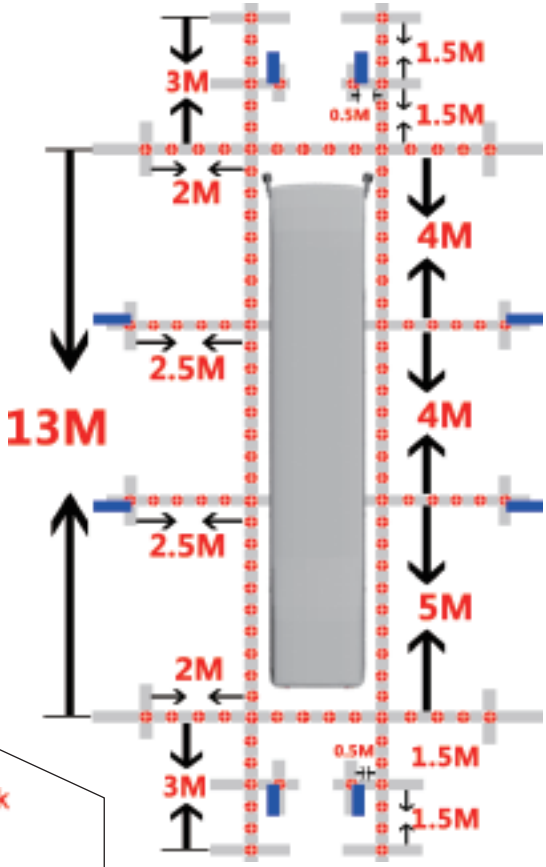
Trouble 2

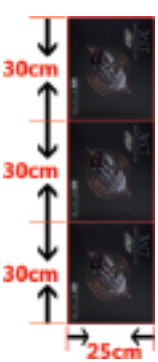
Vehicle parking

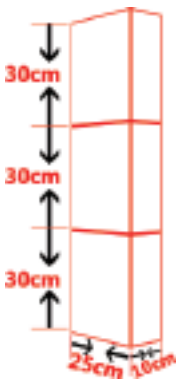


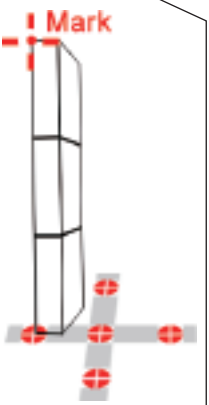
Trouble 3 Put the gift boxes







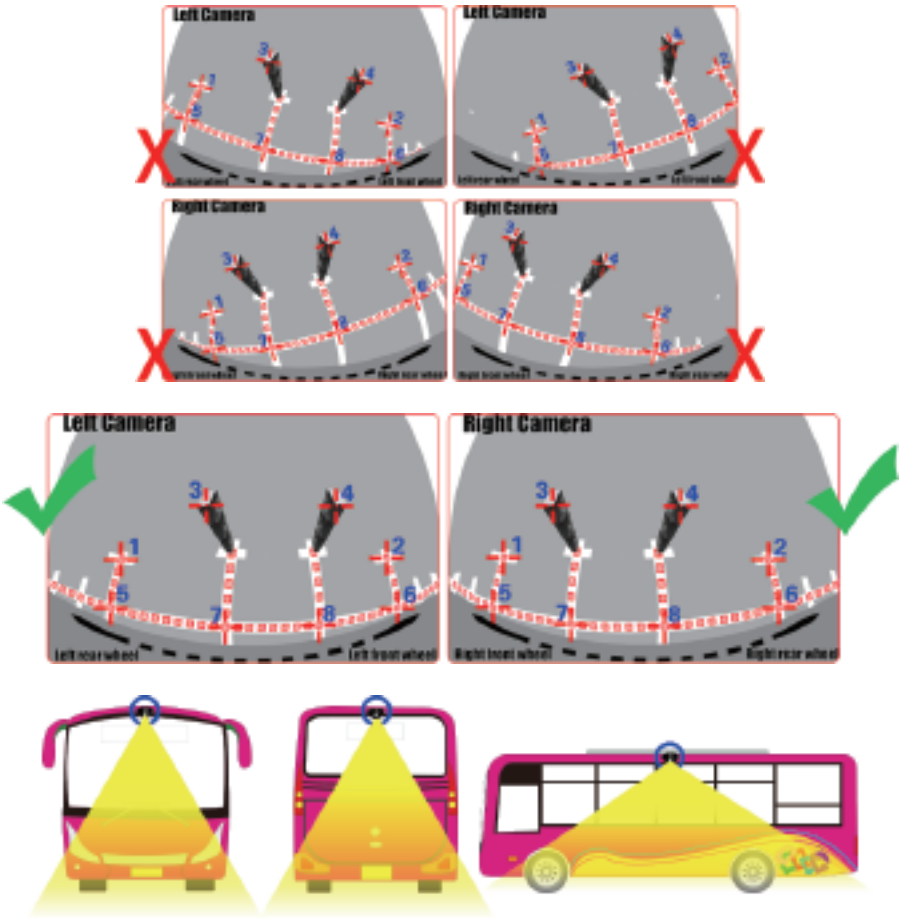




FAQ

Adjusting camera angle & Mark calibration points

Trouble 4



The camera axis should keep avertical angle of 45°appropriately with vehicle body. with the help of guided preview window provided in system software menu, please keep in mind to keep the whole cabibration tape and all 8 calibration points visible while keep as many pixel as possible.

Service Promise

As a leading R&D enterprise in the Automobile industry, we are committed to engineering and manufacturing our products to the highest standards of quality, perfo-rmance, and value. From our advanced product design, manufacturing and quality control procedures to our friendly and knowledgeable support teams, our commitment to satisfy you is paramount. In every interaction with us, you can be confident you will receive our commitment to Service, Support, and Solutions. For 7 years, our objec-tive has been to ensure that every customer is completely satisfied with every purchase. To underscore this commitment, we offer our Satisfaction Guaran-tee. This means we will work diligently to resolve any issue you have with your purchase until you are completely satisfied. Our employees are prepared to do whatever it takes to make certain that the entire process of doing business with us is a positive and professionally rewarding experience for you. We greatly appreciate your business. It is our intent to keep you as a customer for life.

Surround View Monitoring System