

Operating Instructions



Bra Vision
Scandinavia AB



1080P 360° Around View System (VGA /AHD)
Please read this manual thoroughly before operating the unit,
and keep it for future reference.
V1.0

Artnr 93914

Contents

1. Precautions.....	1
2. Product Features.....	3
2.1 Basic Features.....	3
2.2 Application.....	3
2.3 Features.....	4
3. Standard Configuration.....	4
4. Specification.....	5
5. Parts Identification.....	6
6. Wiring Diagram.....	7
7. Operation Instruction.....	8
7.1 Remote Control.....	8
7.2 User Interface.....	9
8. System Hardware Installation.....	24
9. Image Stitching Calibration.....	27
9.1 Steps for manual Calibration using PC tool.....	27
9.2 Single-step Calibration.....	35
10. Web APP Instruction.....	40
10.1 Preparation.....	40
10.2 Description of Functions.....	41
11. FAQs.....	45

1. Precautions

● Storage and Keeping

1. Do not expose the System to excessive heat or cold. The storage temperature of this device is -40~+85°C, and the operating temperature is -20~+70°C. The humidity is RH90%.
2. Never use this device near a bathtub, wash basin, kitchen, damp basement, swimming pool or similar places.
3. Never use this device in environments with excessive moisture, dust or smoke.
4. Avoid dropping or striking this device.
5. Avoid using this device in enclosed spaces, areas with excessive vibration or subject to severe impacts.
6. Never puncture, scratch or use abrasive cleaning materials on this device.
7. Do not place cables where they may be pinched or stepped on.
8. The Control Box 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. 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.





Warning!

1. The opening of the case should be by professionals.
2. Do not watch the video while driving unless you are monitoring the rear view camera display.

● Maintenance

1. Remove all the cable connections from the control box before cleaning the device.
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 device.

	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 could void your warrantee and neccessitate expensive repairs.

2. Product Features

2.1 Basic Features

1. 4 pcs 190° 1080P wide-angle fisheye cameras, horizontal view angle $> 170^\circ$, Max.8CH inputs.
2. Techniques of dual-core ARM Cortex-A9 and SOC development of built-in high performance H.264 video encoding / decoding engineer core make it efficient to composite high accuracy seamless images.
3. Support 4 pcs x 128G SD cards for storage.
4. Low-cost calibration tools, simplified calibration procedures.
5. Maximum 4CH 1080P / 30 frames video resolution.
6. High definition 1080P video output.
7. Simplified installation steps, easy auto stitching.

2.2 Application



Reverse Parking



Side Parking



Narrow Road



Congested Road



Blind Area



Diversion Assistance



Steep Slope



Road Trap



Driving Record

2.3 Features

1. Panoramic image.
2. Blending seamless stitching.
3. 360° view.
4. Auto switch to reversing image when reverse wire is triggered.
5. Auto switch to left / right image when left / right wire is triggered.
6. Installation guide with pictures.
7. Automatic plane correction.
8. Support Recording.

3. Standard Configuration

Item	Configuration	Quantity
1	Main control box	1
2	1080P eye-fish camera	4
3	Remote control	1
4	Infrared extension cable	1
5	Main harness	1
6	Power Cable	1
7	20M extension cable for HD camera	4
8	Cable for VGA interface	1
9	Cable for AHD interface	1
10	Monitor (optional)	1

4. Specification

1. Main Control Box

Panoramic video parameter	Input video		Max.8CH×1080P@25 / 1080P@30
	Display mode		Panoramic bird-view + single channel video
	High definition (VGA/HD)	Resolution	1080P
		Refresh rate	50 / 60
	High definition (AHD)	Resolution	1080P
		Refresh rate	25 / 30
	CVBS	Resolution	D1
Refresh rate		25 / 30	
Recorder parameter	Storage		Max. 4×128G SD card
	Compressed encoding		Max. 8CH×1080P H.264 encoding
	Depression decoding		Max. 8CH×1080P H.264
	Video stream		4M / 8M
Working Voltage			8-32V
Working voltage range for external trigger signals			8-32V
working electric current			<2A / 12V
Working temperature range			-20℃ ~ +70℃
Storage Temperature			−40℃ ~ +85℃
Working humidity			10%-95%

2. Camera parameter

Image Device	1/2.9" SONY CMOS
Frame Rate	25 / 30
Effective Pixels	1920 (H) x 1080 (V)
Pixel Size	2.8 μm x 2.8 μm
Resolution	1080P
Video Output	1.0Vp-p, 75Ohm
White Balance	Auto
Viewing Angle	>170(H)
Power Supply	12V
Working temperature range	-20°C ~ +70°C, RH95%MAX.
Storage Temperature	-40°C ~ +85°C, RH95%MAX.
Waterproof rating	IP69K

5. Parts Identification

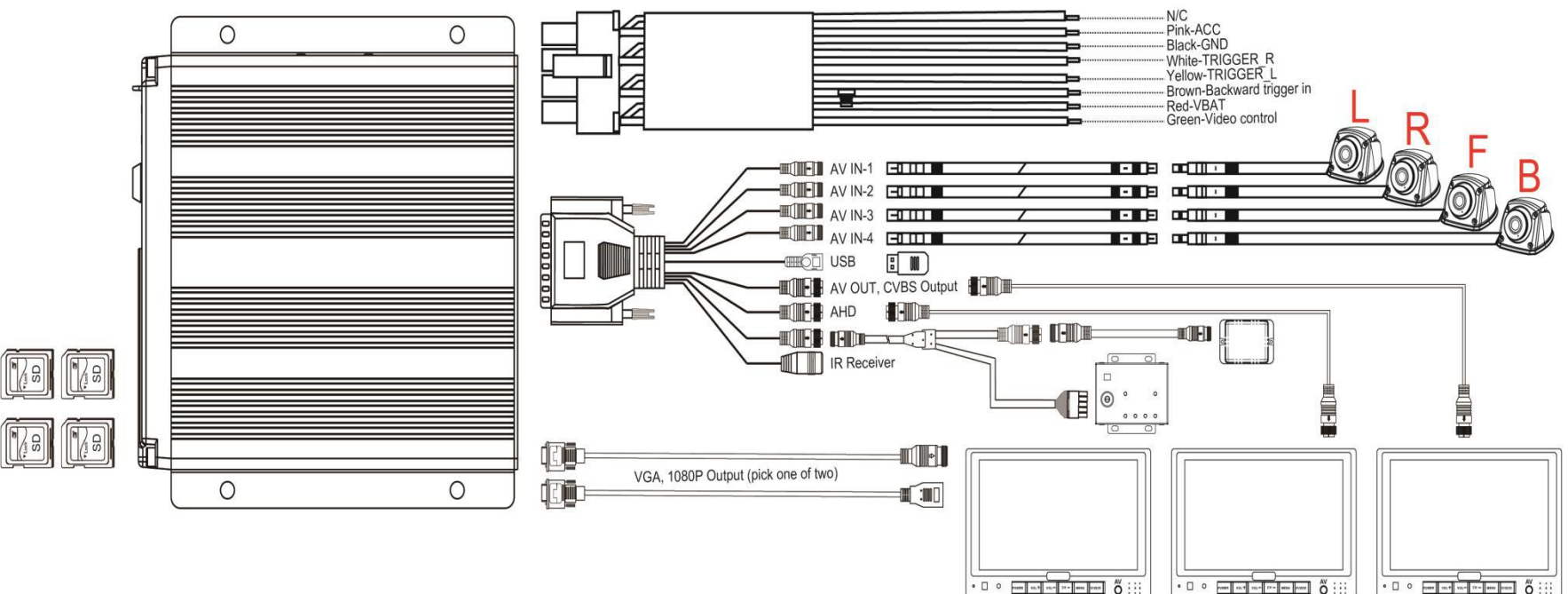


- ① Switch to D for HD output. Switch to A for VGA output.
- ② Power.
- ③ The DVI adapter outputs HD or VGA. The standard configuration is VGA.
- ④ The main harness interface is for connecting cameras, USB, external radar/GPS, remote control sensor extension, CVBS output and AHD output
- ⑤ Interface for internal Wi-Fi antenna.
- ⑥ Interface for internal GPS antenna.
- ⑦ Unavailable.







- ① SD cards holder and the lock.
- ② Network port for LAN connection.
- ③ The electronic lock for the SD card holder: unlock to slide the cover and insert/pull out SD cards. It is not allowed to slide the cover if it is locked.
- ④ The indicators for device status.

6. Wiring Diagram



7. Operation Instruction

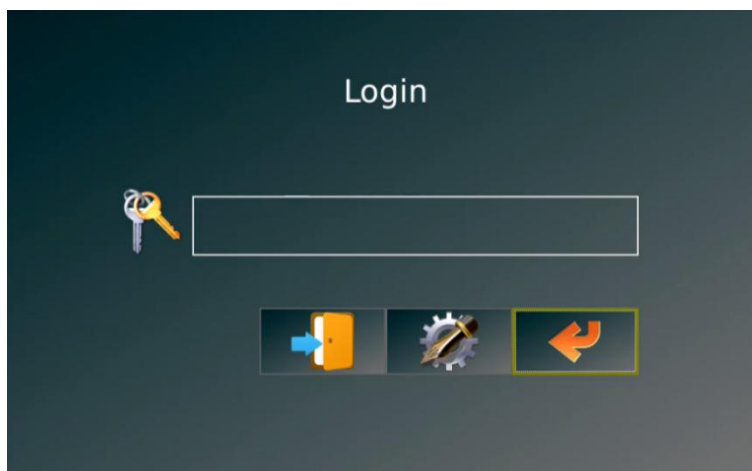
7.1 Remote Control

- MENU: (ENTER / MENU)
Enter into main menu or confirm menu selection.
- SYS: (ESC)
Exit main menu interface / return to main menu interface.
- V- / V+: (LEFT, RIGHT)
Left, right / Decrease, Increase button.
Shift image channel to left / right view, or operate plus / minus in main menu interface.
- P+ / P-: (UP, DOWN)
Front / back button. Shift image channel to front / back view.
- VIEW MODE: (SHIFT)
Same function as Tab button to shift current channel to full screen display or exit from full screen display. It's used for switching menu selection in main menu interface.
- ON / OFF: (POWER)
Turn on / off video display.
- Number button 0-9: (0-9)
Input numbers.
- - / --: (CLEAR)
Back space button: Delete a character.
-  : ()
Press to pause recording.
-  : ()
Press to start recording.







7.2 User Interface

7.2.1 User Administration



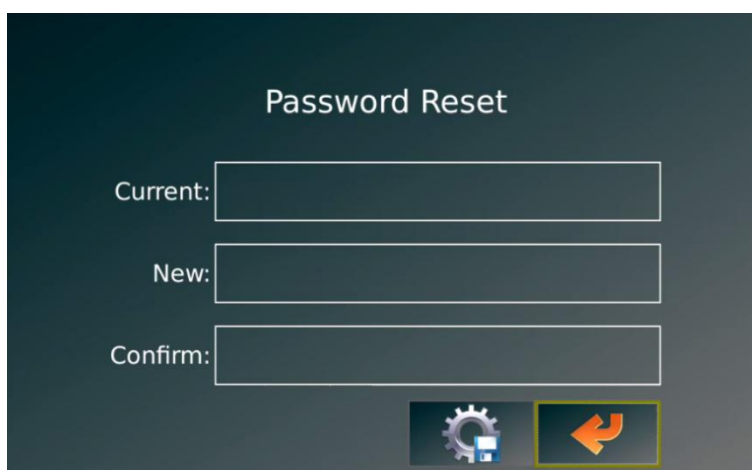
Feature Description:

- 1)  : Input password.
- 2)  : Login confirmation.
- 3)  : Modify password.
- 4)  : Return to last menu



Note:

- 1) Initial password: 000000. Please modify password after stitching finished. The password can be only composed of numbers and letters with max. 16 characters. If you forget the password, please contact the manufacturer.
- 2) Ten-minute password login: if user returns to the interface in 10 minutes, there is no need to re-enter the password. Otherwise, it is necessary to input the password again, so as to reboot the device and come back to normal from sleep mode.

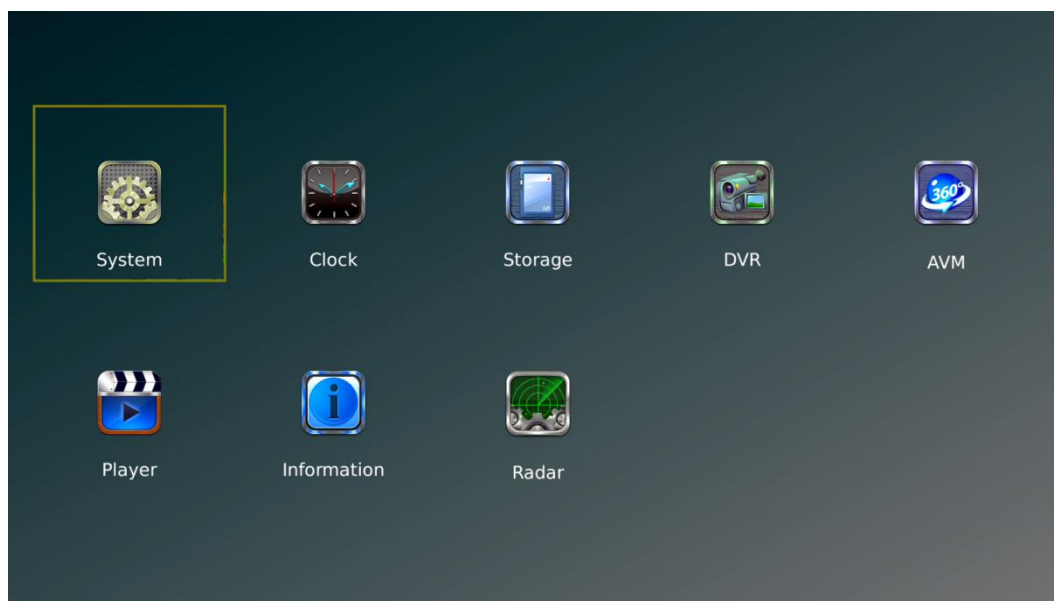
- Password reset



Setting Description:

- 1) **Current:** : Current password.
- 2) **New:** : New password.
- 3) **Confirm:** : Input new password again.
- 4)  : Save password.
- 5)  : Return.

7.2.2 Main Menu Interface



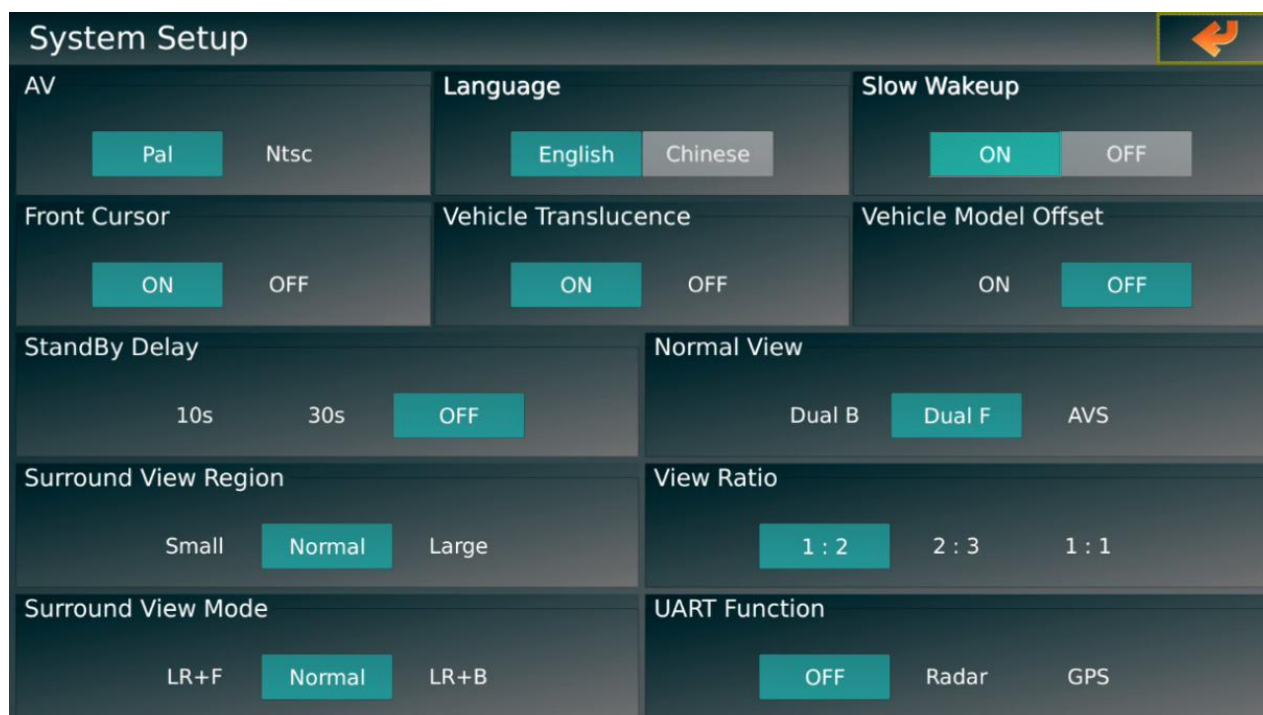
Feature Description:

- 1) System: Basic function setting.
- 2) Clock: System time setting.
- 3) Storage: Storage function and system log management.
- 4) DVR: Recording function configuration.
- 5) AVM: 360 panorama calibration and related operation.
- 6) Player: Video file playback and processing.
- 7) Information: Upgrade operation and local IP setting.
- 8) Radar: Radar configuration.

Note:

- 1) When UART is configured as non-Radar, the Radar icon on the main interface will be hidden.
- 2) Recording is not allowed when the device is playing back.
- 3) 0-9 Numeric Keys on remote control support Quick Positioning Function: 1 -9 stands for each menu in sequence, e.g., press 5 to select AVM.

7.2.3 System Setup



Feature Description:

- 1) AV: PAL / NTSC. Correspondent video output format is 1080P / 50 frames or 1080P / 60 frames.
- 2) Language: Language setting. Temporarily unavailable.
- 3) Slow Wake up: Slow speed wake-up. Temporarily unavailable.
- 4) Front Cursor: Front camera grid switch.
- 5) Vehicle Translucence: Switch for zooming the vehicle model and viewing transparent vehicle model.
- 6) Vehicle Model Offset: Vehicle model offset switch when the turning is triggered.
- 7) Standby Delay: Time frame can be set for standby.
- 8) Normal View: 360 Default setting of display mode. The icon represents 360 vision + back camera, 360 vision + front camera and 360 vision in full screen from left to right.
- 9) Surround View Region: Surround view size selection.
- 10) View Ratio: Display ratio between Bird View and Single View.
- 11) Surround View Mode: Surround view mode selection.
- 12) UART Function: UART function selection. The default setting is "OFF". If radar is applied, please set as "Radar".



- 13) : Exit the current interface and return to the main menu interface.

Operation description:

- 1) SHIFT key: Shift in menu.
- 2) Left / right: Change the selected function item parameters.
- 3) ESC key: Shortcut key for exit, return to the main menu.




Note:

Menu setting change will be valid after reboot. When the UART Function is set as OFF, the radar settings icon will be hidden and the function is not available.

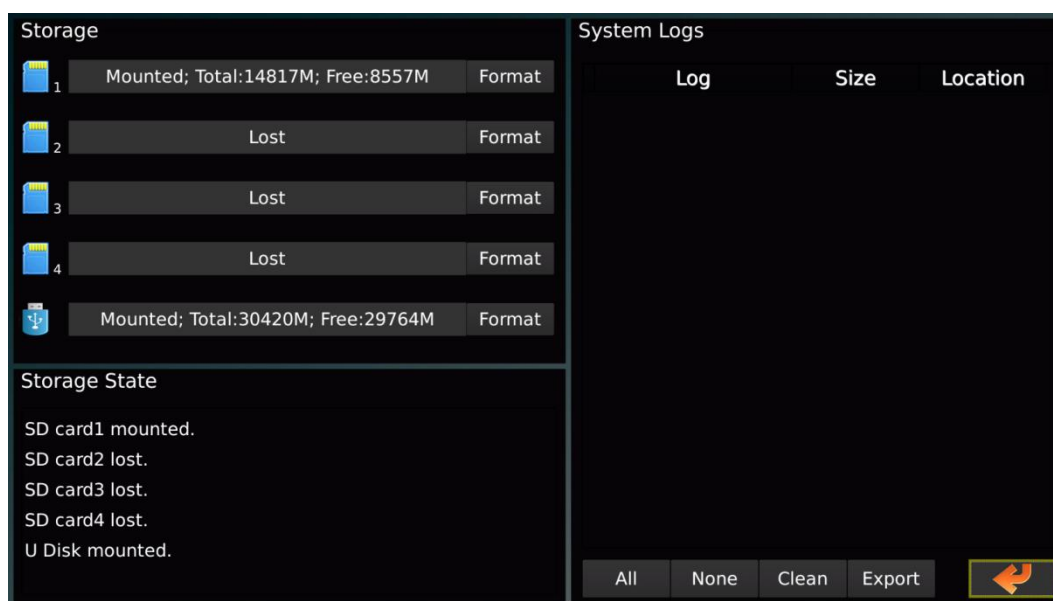
7.2.4 Clock Setup





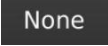
Feature Description:


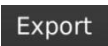

- 1)  : Set calendar time.
- 2)  : Save setup time.
- 3)  : Exit the current interface and return to the main menu interface.

7.2.5 Storage



Feature Description:

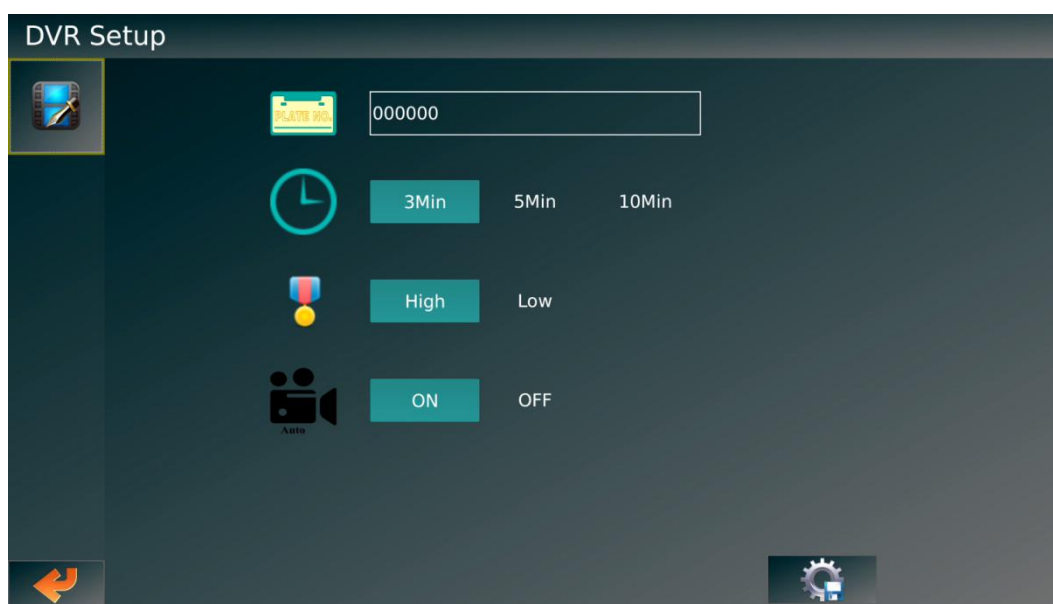
- 1)  : Format SD Card or U Disk.
- 2)  : Select all system log files.
- 3)  : Unselect all system log files.

- 4)  : Clear all old system log files.
- 5)  : Export the selected system log file.
- 6)  : Exit the Storage interface and return to the main menu.





Note:




- 1) When the U Disk and SD Card work abnormally, there will be a cursor prompt on the panorama display interface and Storage menu interface. See the Storage State menu under the Storage Menu for specific error reasons.
- 2) Do not remove the U Disk when performing U Disk related write operations, such as U Disk formatting, exporting system logs, and exporting stitching results.
- 3) Do not remove the SD Card when performing an SD Card-related write operation, such as when the recording is not stopped, the SD Card is formatted, or the system log is cleared.
- 4) The recording supports cyclic recording. When the free space of all SD Cards in the system is less than 512M, 16 video files which are earliest created will be deleted in order to record normally.

7.2.6 DVR Setup



Feature Description:

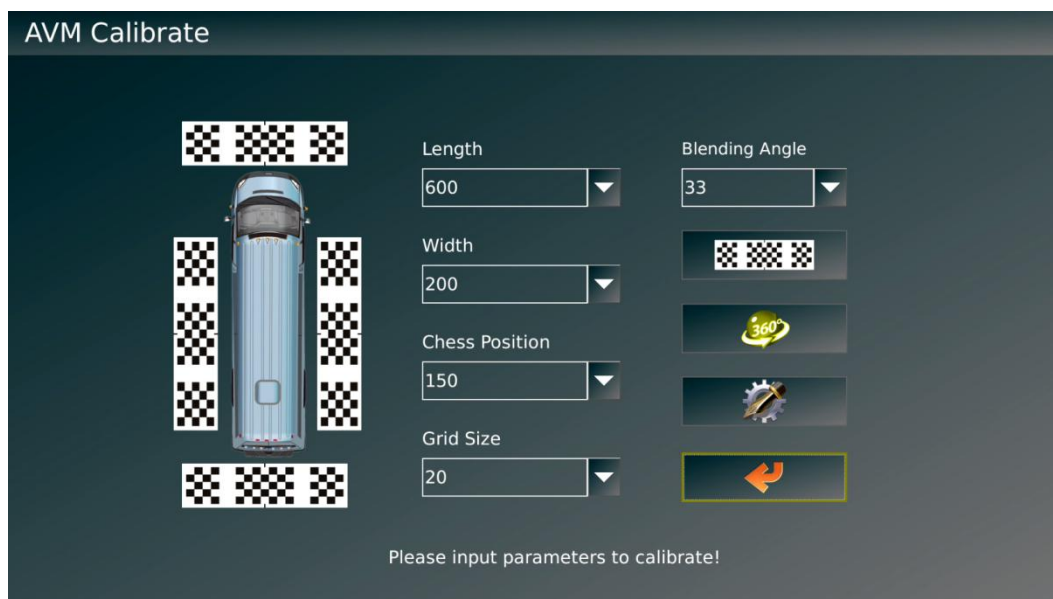
- 1)  : Recording parameter settings.
- 2)  : User-defined vehicle number or license plate number
- 3)  : Single video file recording time setting.
- 4)  : Video file resolution setting.

- 5)  : Power on automatic video recording function setting.
- 6)  : Save setting parameters.
- 7)  : Exit the DVR interface and return to the main menu. If any parameter is modified, it must be saved before exit, otherwise the modification is invalid.






Note:

When parameters are modified, saving or exit will prompt to restart.

7.2.7 AVM Calibration



Feature Description:

- 1) Length / Width / Chess Position / Grid Size: Panoramic stitching parameters.
- 2)  : Enter chessboard setting.
- 3)  : Enter image stitching menu.
- 4)  : Enter AVM Option Setup.
- 5)  : Back to parent menu.
- 6)  : Adjust the stitching angle in the panoramic image. The effective value range is 0-90.






Note:

Gauge is in CM by default. The stitching result will be prompted by the pop up window.

● Soft Keyboard



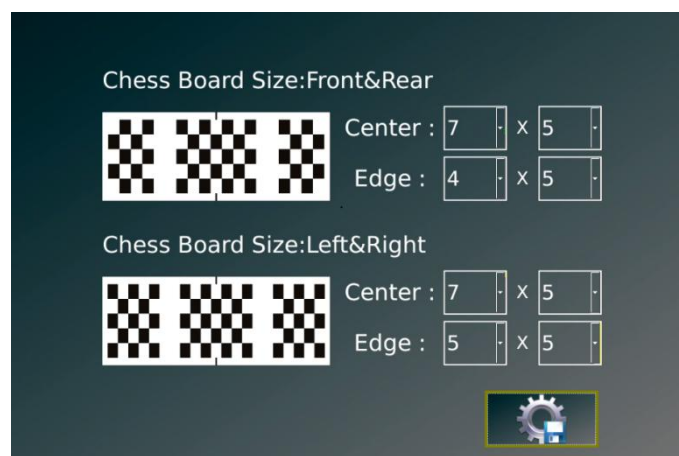
Feature Description:

- 1)   : Exit editing.
- 2)  : Delete input.
- 3)  : Capital shift.
- 4)  : Letter lock.



Note:

- 1) Letter lock is locked by default. Unlock to input characters.
- 2) Letter can only be input via soft keyboard.

● Chess Board



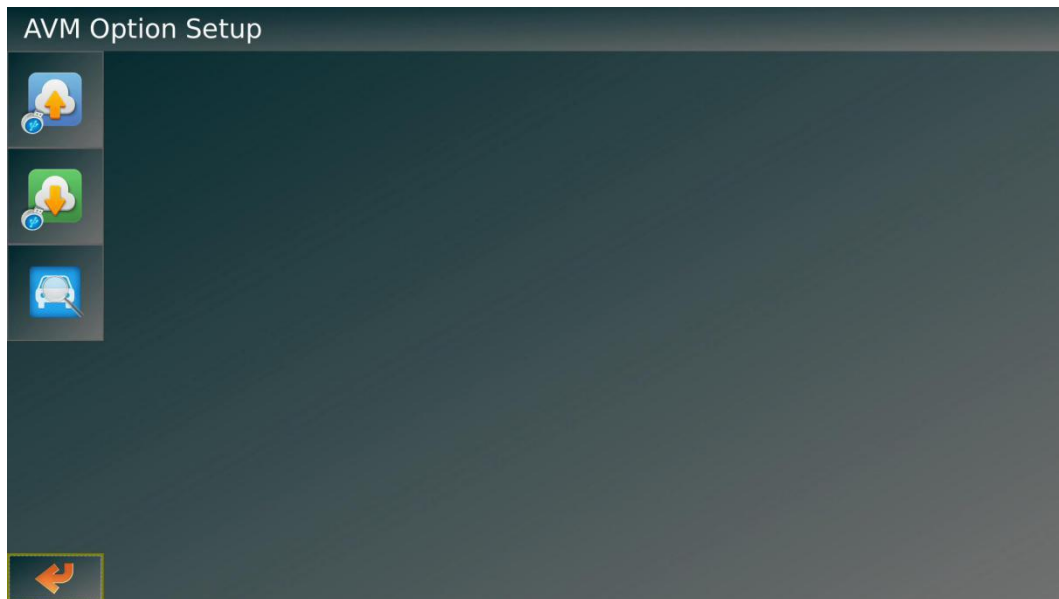
Feature Description:

- 1)  : Layout setting of calibration cloth.
- 2)  : Save.


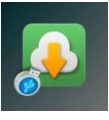
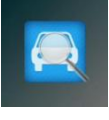

Note:

Layout setting should be compliant with real calibration cloth.

- AVM Option Setup



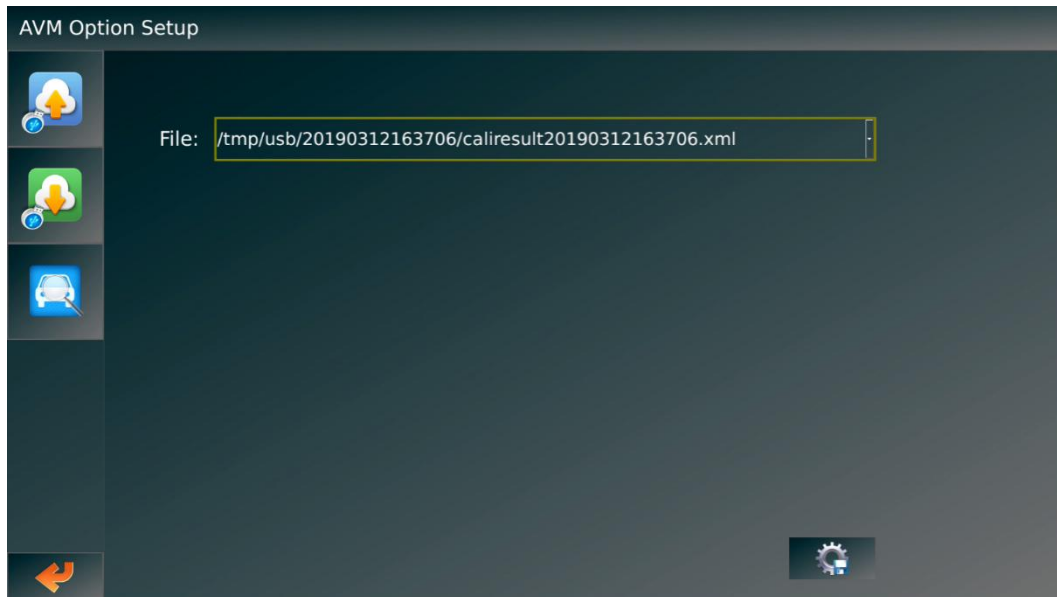
Feature Description:

- 1)  : Upload calibration files from USB Disk to the system.
- 2)  : Output saved calibration files and 4CH single-view to U Disk.
- 3)  : Change vehicle models.
- 4)  : Exit Key: Get back to AVM Calibrate interface.

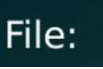

Note:

Calibration file applies XML extension.

- Upload Calibration Files



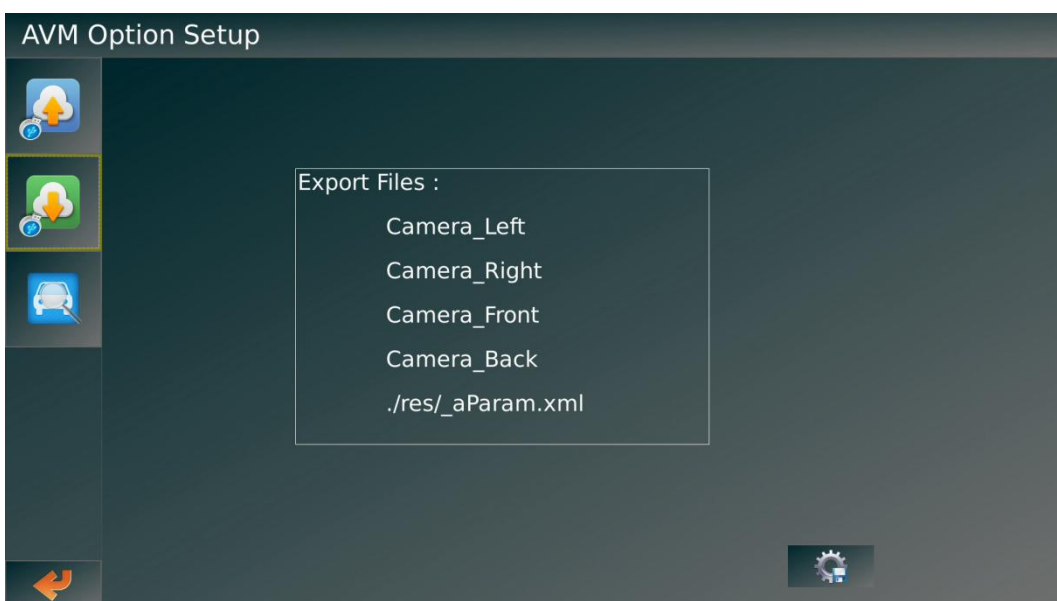
Setting Description:

- 1)  : Select uploaded files with XML extension.
- 2)  : Confirm selected files with XML extension.


Note:

If the preference of uploaded file is empty, please select files with XML extension from the expand list. Once the change of XML files confirms, you are to be prompted to restart the system either save or exit.

- Output Calibration Files and 4CH Single-view Images



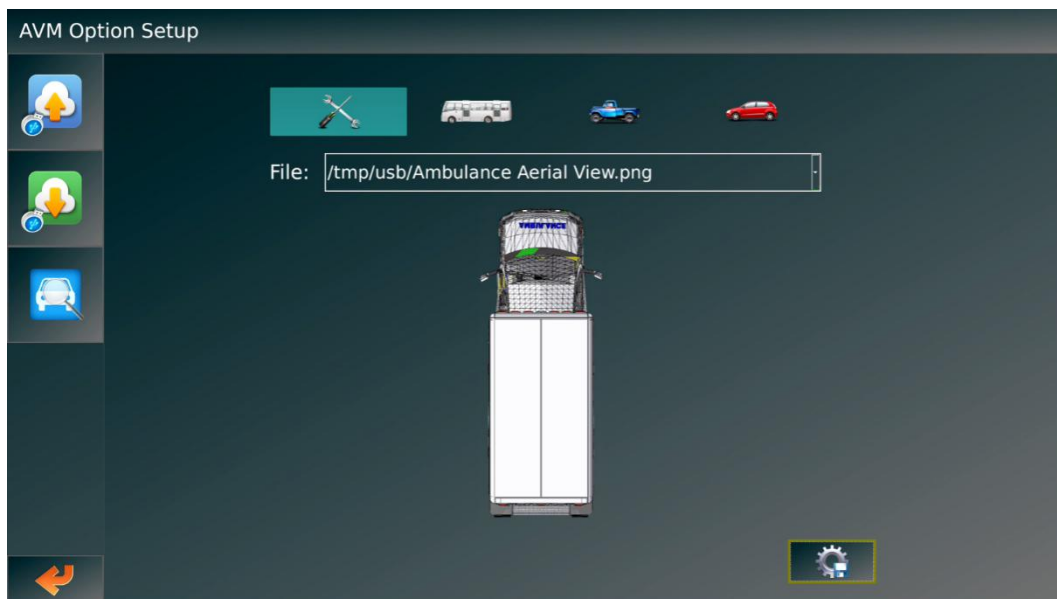
Setting Description:

- 1)  : Confirm output files.





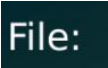

Note:

- 1) Before output, make sure U Disk is connected and functioning normally. U Disk shouldn't be pulled out during processing.
- 2) After successfully output files, name it with the time and date of the system.

● Change Vehicle Models



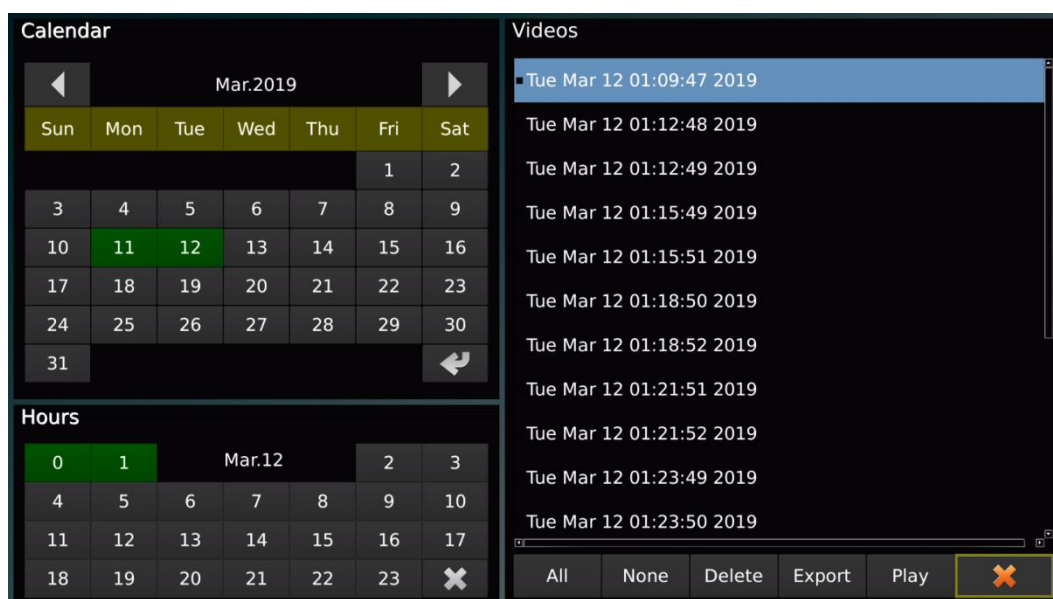
Setting Description:

- 1)     : Select vehicle models. (Left to right: user-defined vehicle models, bus model, truck model, car model.)
- 2)  : User-defined vehicle model picture.
- 3)  : Save selected vehicle model. If changes, will be prompted to restart the system.

Note:

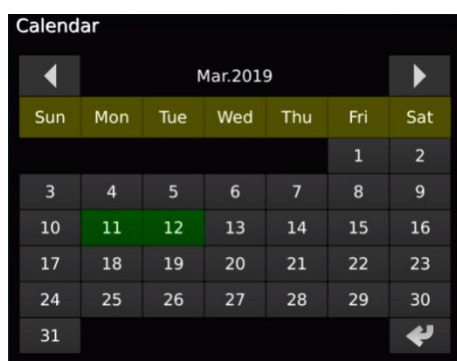
User-defined vehicle model should be in format of PNG.

7.2.8 Player Interface



Feature Description:

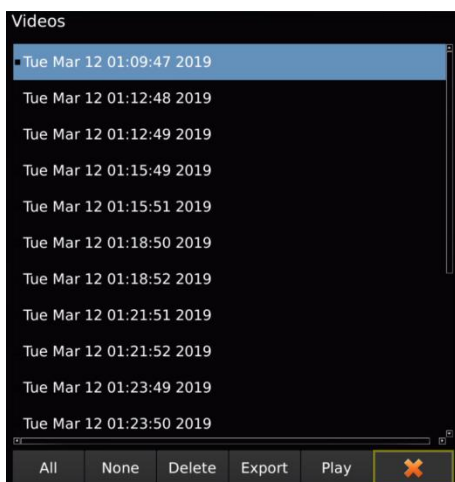
- 1) Calendar list: Green highlighted dates represent video files of current date. Press return key to get back to player interface.



- 2) Time list: Green represents video files of current time. Press cancel key to get back to calendar list.



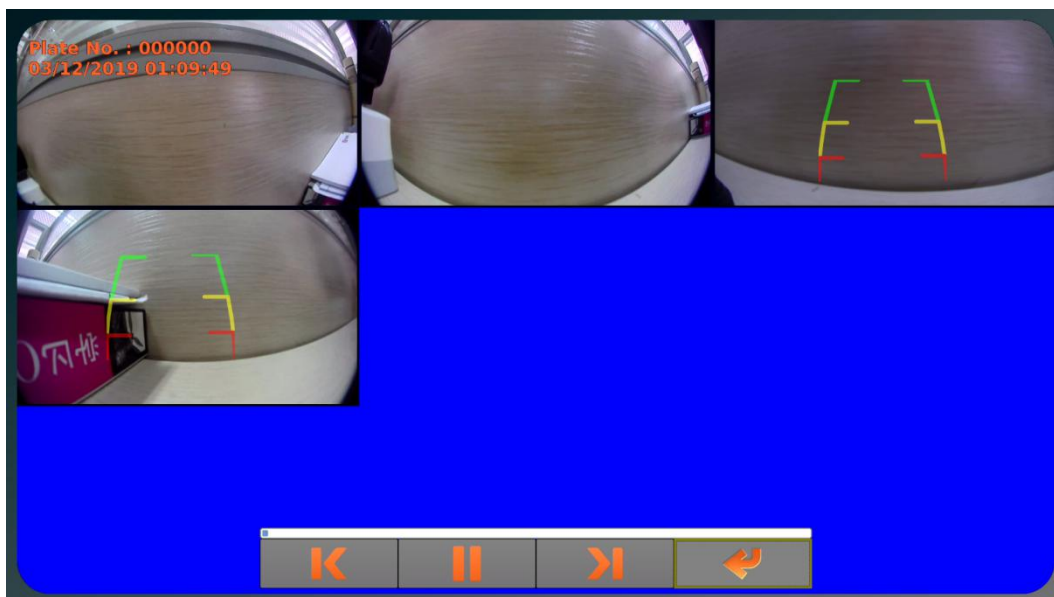
- 3) Video list and control key: All / none / delete / export / play key to operate video settings.



Note:

- 1) If the system is recording video, you will be prompted to close the recording before entering player. Please note the timing for player. Recording will be automatically recovered once exits the player.
- 2) System can only search and play videos recorded 3 months before the system's current date.

● Playback Interface



Feature Description:

- 1)  : Control button and progress bar for playback.

Note:

- 1) Page Up / Page Down can only switch playback videos among the selected.
- 2) CLEAR Key support Hide/show icon of playback control button.

7.2.9 Information

The screenshot shows the 'Information' screen of the Bra Vision interface. It is divided into several sections:

- App Version:** Displays 'Current: 00.v1.1.10:20190307' and an 'Update:' dropdown menu with the same value. A green gear icon is at the bottom right.
- Firmware Version:** Displays 'Current: 00-V1.1.15' and an 'Update:' dropdown menu with the same value. A green gear icon is at the bottom right.
- System Information:** Displays 'Linux Version : 3.10.0' and a dropdown menu showing 'Setup20190312032308.xml'. Two small icons (a person and a gear) are at the bottom right.
- Libraries:** A list of library versions:
 - libgloablxml Version : 00.v1.1.00:20190307
 - libsv_Radio_uart Version : 00.v1.1.01:20190307
 - libsv_avs_Alg Version : 00.v1.2.02:20190307
 - libsv_avsdataflow Version : 00.v1.2.01:20190307
 - libsv_dvr Version : 00.v1.1.01:20190307
 - libsv_gui Version : 00.v1.2.03:20190307
 - libsv_network Version : 00.v1.1.00:20190307
 - libsv_storage Version : 00.v1.1.02:20190307
 - libsv_vi Version : 00.v1.1.00:20190307
 - libsv_wbc Version : 00.v1.1.00:20190307
- IP:** Four input fields containing '192', '168', '24', and '124', followed by a green gear icon.
- Wireless:** A section header with no visible content below it.

Feature Description:

- 1) **APP Version:** Current APP Flash version information / upgrade files list / upgrade confirmation key. This function is activated only when there's APP upgrade file HD360-CPU-APP-00-Vx.x.xx.tar.gz under U Disk root file.

This screenshot shows the 'App Version' section. It displays 'Current: 00.v1.1.10:20190307' and an 'Update:' dropdown menu with the same value. A green gear icon is at the bottom right.

- 2) **Firmware Version:** Current MCU Firmware version information / upgrade files list / upgrade confirmation key. This function is activated only when there's MCU upgrade file HD360-MCU-APP-00-Vx.x.xx.bin under U Disk root file.

This screenshot shows the 'Firmware Version' section. It displays 'Current: 00-V1.1.15' and an 'Update:' dropdown menu with the same value. A green gear icon is at the bottom right.

- 3) **System Information:** It shows the current version of software, and also exporting and importing function of the updated system configuration

This screenshot shows the 'System Information' section. It displays 'Linux Version : 3.10.0' and a dropdown menu showing 'Setup20190312032308.xml'. Two small icons (a person and a gear) are at the bottom right.

- 4) **IP Setup:**

This screenshot shows the 'IP Setup' section. It displays four input fields containing '192', '168', '24', and '124', followed by a green gear icon.

Note:

- 1) Do not pull out U Disk during system upgrade.
- 2) There will be a indication red dot on upgrade key if there's new APP software or MCU firmware version under U Disk root file.

7.2.10 Radar Setup

- Page one




Function Description:

- 1) Category: There are two types of radars: ultrasonic sensors and microwave radar. For the moment, only ultrasonic sensors are supported. The microwave radar is not compatible.
- 2) Unit: The detection distance unit is available in both inches and meters.
- 3) Sensor per channel: The maximum number of sensors supported each channel. Only ultrasonic sensors can be applied.
- 4) Reverse Control: The trigger for sensors. When it is set as ON, the sensors would work when the trigger is activated. Otherwise sensors would not be controlled by the trigger.
- 5) Speed Control: The sensors will be activated by GPS speed. As the above shows, when the speed trigger is ON, the sensors would be activated by GPS speed less than or equal to 10 Km/h. Otherwise sensors would not be controlled by the speed.
- 6) Priority: Priority setting. Only ultrasonic sensors can be applied. When the detection range is less than 0.6m, the accuracy is pending. In this case, once detection range of multiple sensors is less than 0.6m, single camera view in full screen can only be triggered by priority. The priority sequence is: 1st > 2nd > 3rd > 4th.

● Page two



Function Description:

- 7) **Left · Sensor_1** : Set the sensor with corresponding channel. There are 4 channels as left, right, front and back, while 2 types of sensor as 3-sensor and 4-sensor, which is defined by the setting of Sensor per Channel on page one. When the channel and sensor are changed, the corresponding indicator will flash.
- 8) **· OFF · 1.00** : Select on to enable sensor to work and off to disable. Detection range is configurable from 0.6m to 5m.
- 9)  : Save settings of selected radar sensors.
- 10)  : Restore to the initial default setting.
- 11)  : Exit to get back to Page one

Note:

- 1) UART interface will display in menu when select Radar in system setup.
- 2) Single-view will shift according to the priority degree of radar orientation set in System Setup if the multi-sensor radar detects obstacles within dangerous range (0.6m).

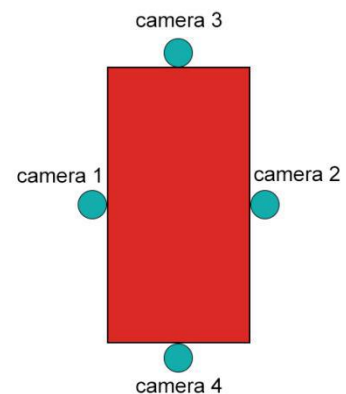
8. System Hardware Installation

Step 1: Wiring of the Vehicle Body

1. Please notice the definition of camera extension cable connector, and not to connect reversely.
2. Wires should be gathered from cameras to the main unit for installation.

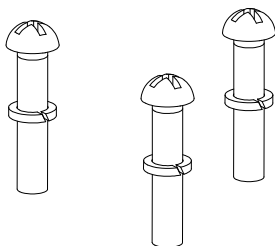
Step 2: Camera Installation

1. Camera Installation Position



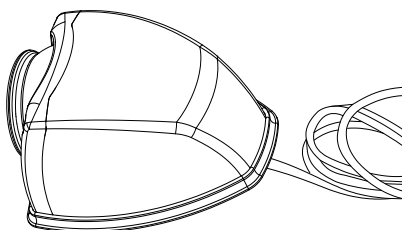
2. Assembly

1) Regular assemblies



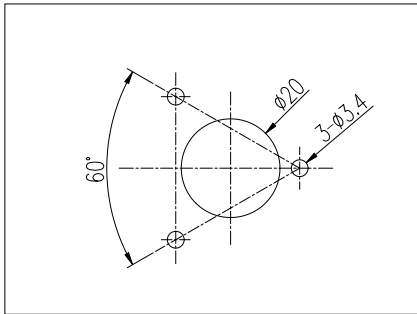
- (a) Spring washer M4*1
- (b) Cross recessed pan head screw ST4*20

2) Camera

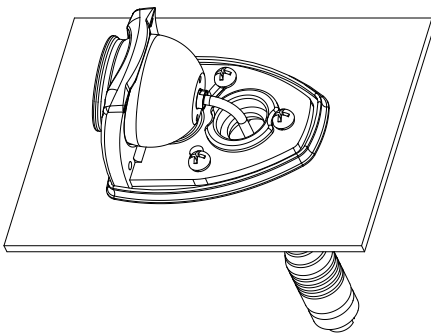


3. Installation

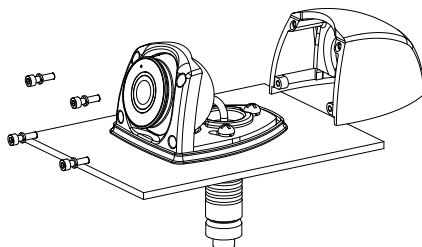
- 1) Choose proper positions for camera installation.
- 2) Drill holes that fit the size of regular assemblies.



- 3) Fix the front housing.



- 4) Fix the back and front housing together. (Slightly fix for easy adjustment of camera angles afterwards.)

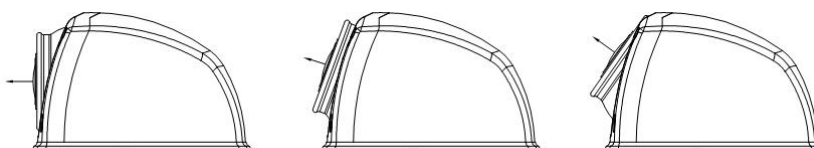


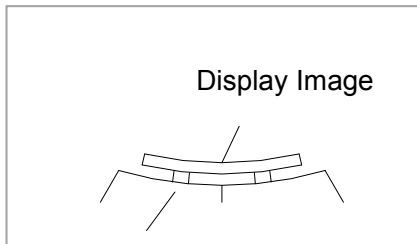
Step 3: Main Unit Installation

1. In general, the main unit is stalled in the central control room or behind the tool kit.
2. Connect the main unit. For more details, please see the "5.Wiring Diagram".
3. Power on to test wiring connections.
4. Undertake fundamental function tests. For more details, please see the "6.Operation Instruction".

Step 4: Camera Angles Adjust

1. Adjust the camera angles and make sure that the normal image mark (white dot on cameras) is placed outward.

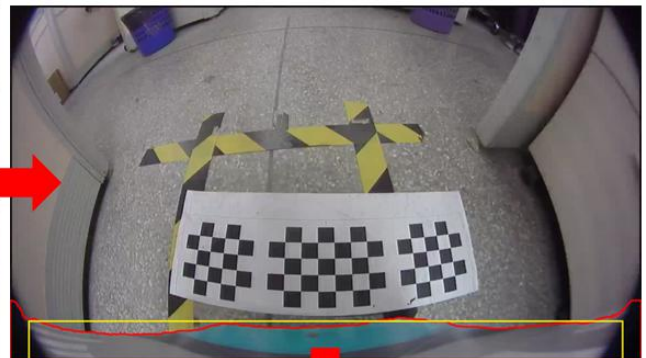




Best

Vehicle Region

Examples for adjustments



2. Steady camera installation.

Step 5: Set Image Stitching

1. Please refer to Step 3 for cameras angle adjustments before calibration.
2. For more details, please see the "8. Image Stitching Calibration".

Step 6: Fix Equipment

1. Fix the main unit and cables in order to steady camera installation.

9. Image Stitching Calibration

9.1 Steps for manual Calibration using PC tool

Step 1: First of all, lay down the zebra tape as a rectangular frame.

Note:

- 1) Each rectangular edge should appear completely in every single view.
- 2) We suggest using zebra-strip tapes or rectangular laser gradiometer to lay the rectangular frame.

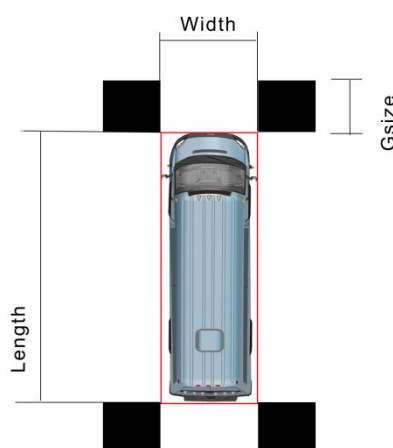


Step 2: Put 4pcs square mats on the four corners of rectangular frame as below. There are two options for mats dimension, 1.2M*1.2M or 1.8M*1.8M.

(P.S.: Generally speaking, we suggest that 1.2M*1.2M mats be used for vans, box trucks, pickup trucks and passenger vehicles; and 1.8M*1.8M be used for trailers and long trucks.)

Note:

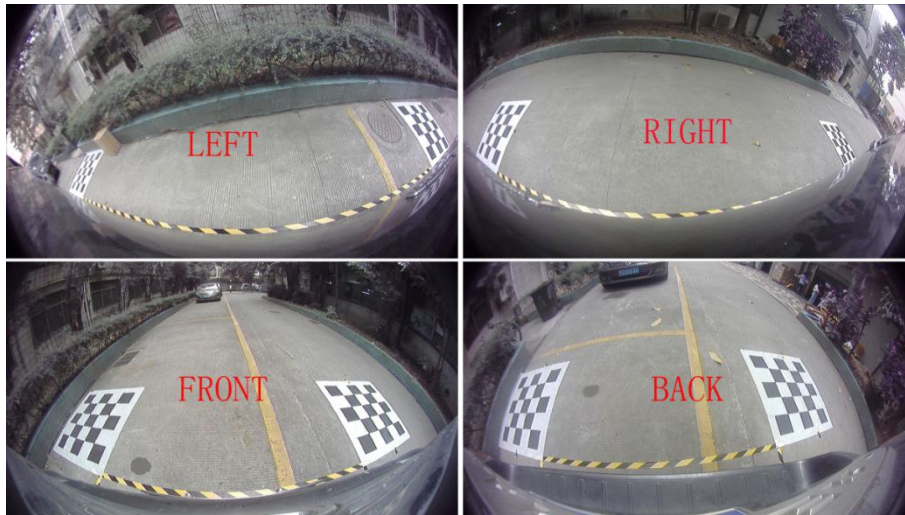
Record the length and width of the vehicle body and the size of the calibration mat as below, which need to be input in the calibration menu later.



Step 3: Press SHIFT on the remote control and enter the quad view interface (as below). Make sure two complete calibration mats could be seen from each video channel.

Note:

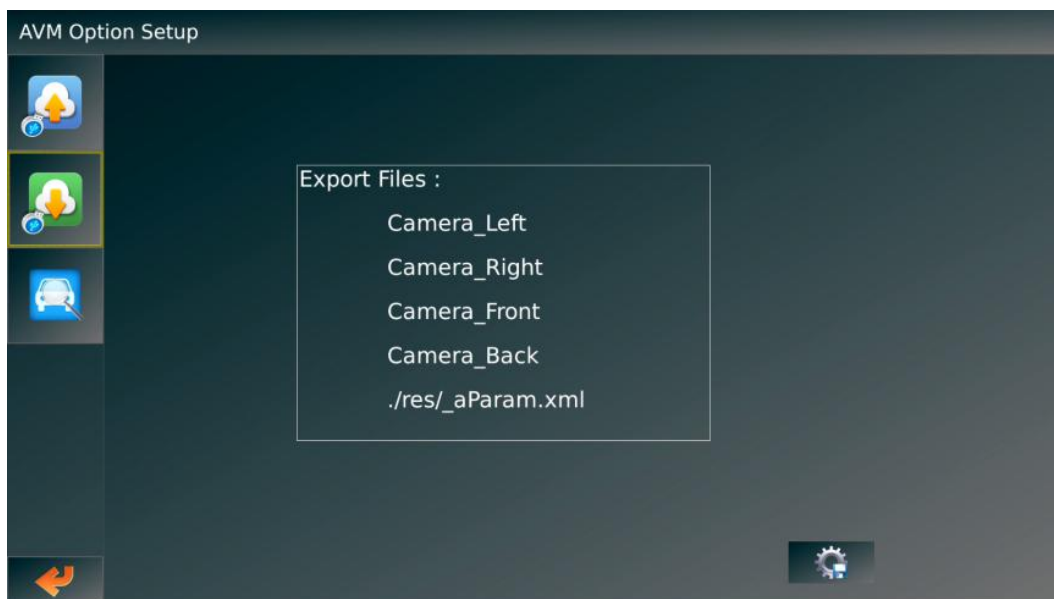
Pay special attention to the left and right channels. If the vehicle is too long, the cameras may not catch the complete calibration mats on the left and right sides. Then users need to adjust the camera angle and increase the installation height to ensure that the two calibration mats could be seen completely. In extreme cases, users may need to add extra cameras, such as 2 cameras at both right and left side, which is a different solution unexplained here.



Step 4: Go to 360 system main menu and choose AVM, and then export calibration pictures & xml file to a USB disk as below.

Note:

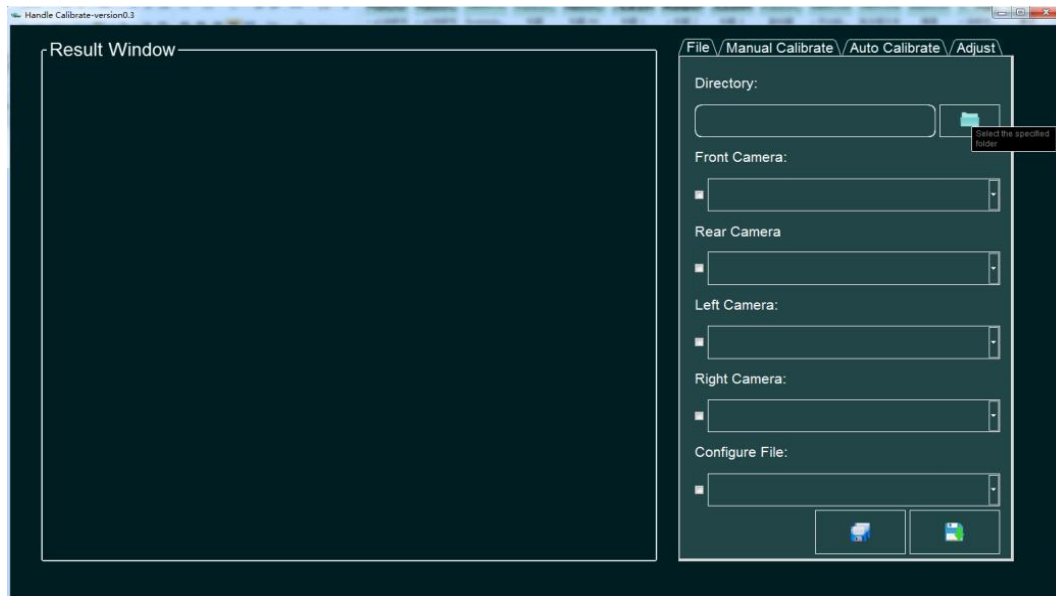
Before the export is completed, please do NOT pull out the U disk. Otherwise some export files may be lost.



Step 5: Cut the pictures & xml file from the USB and paste them to your computer. Please remember

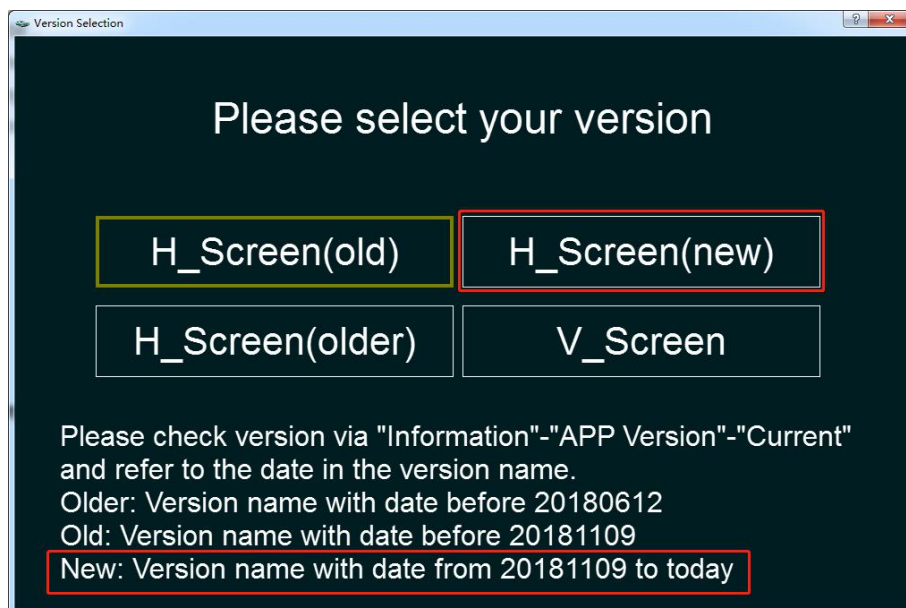
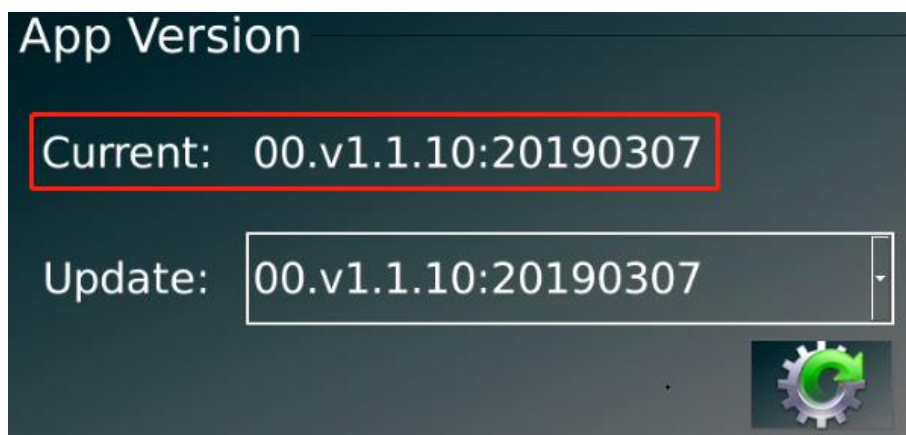
the location of the files in your computer. Then open the PC-end calibration tool "CalibrationTool.exe", import the pictures & xml files saved in your computer earlier.



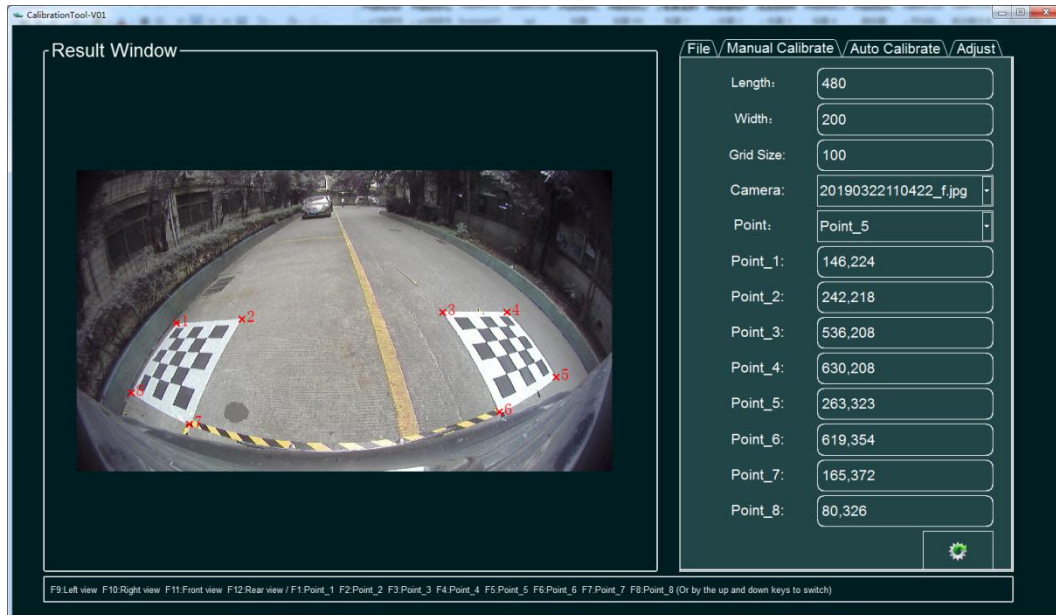


Note:

When the pictures & xml file are imported to the CalibrationTool, the interface of control box programming version may pop up. Please confirm the software version information is right, and then proceed for calibration E.g:

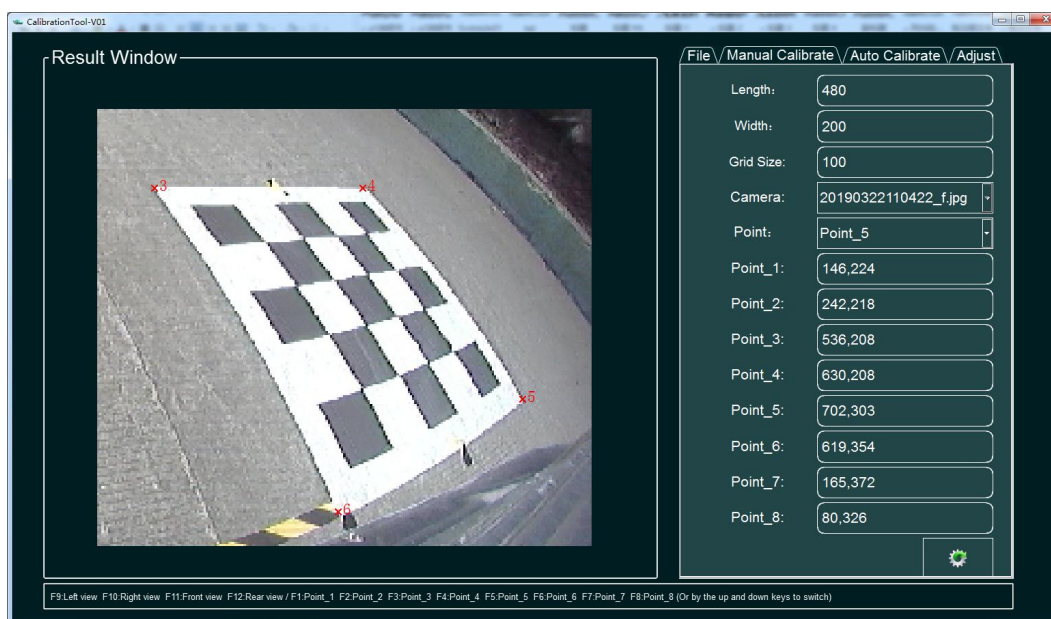


Step 6: Select the Manual Calibration page and start to calibrate. Please fill in the parameters recorded in Step 2 for Length, Width, and Grid Size. Select different cameras, and click point 1, 2, 3, 4, 5, 6, 7, 8 in clock way from the up left for each camera, which is necessary.



Note:

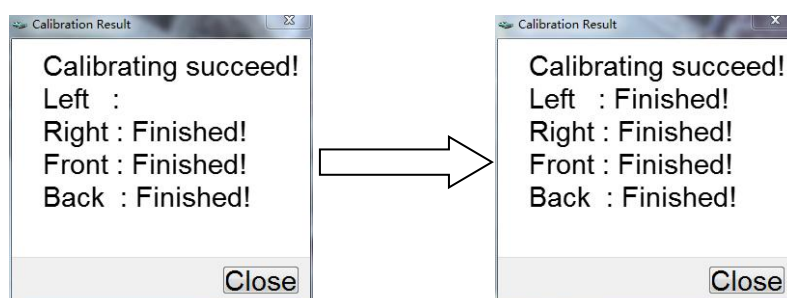
- 1) Unit of the Length, Width and Grid Size must be same, while the unit can be in CM, MM or inch decided by the customer.
- 2) When the calibration mat is too small to select the point in the figure, users could zoom out by pressing Ctrl on the keyboard and left button of the mouse. After the selection is completed, press ESC on the keyboard to exit.



Step 7: After completion of 8 points for each left, right, front and rear channel, please click this icon

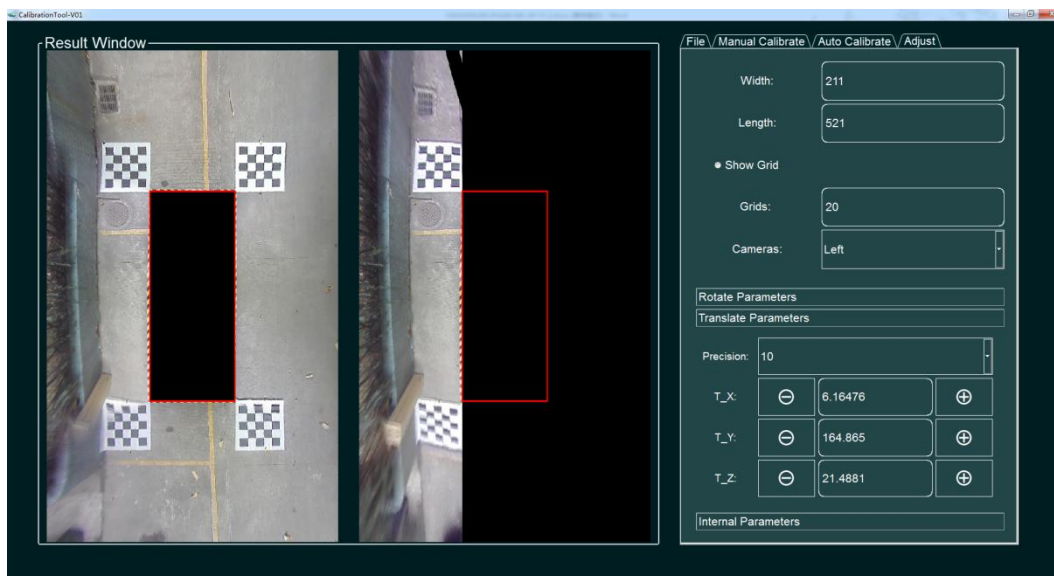


to calibrate, which would take 1 second. Pop-up window will show the following information after successful calibration. If “finished” is not showed, that means the corresponding camera/channel is not well stitched and users need to adjust the point selection and recalibrate.

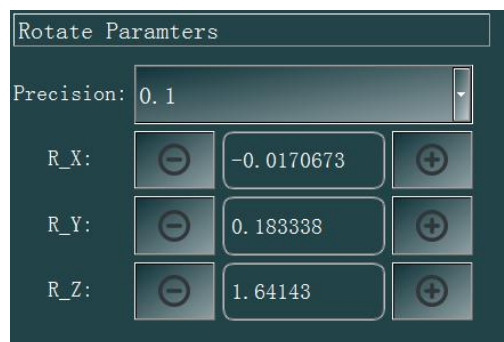


Note:

Once the calibration is successful, the screen will automatically go to “**Adjust**” page and show the calibrated around-view as below. If users are not satisfied with the stitching result, Rotate Parameters, Translate Parameters and Internal Parameters on the following page could be adjusted for an even perfect view.



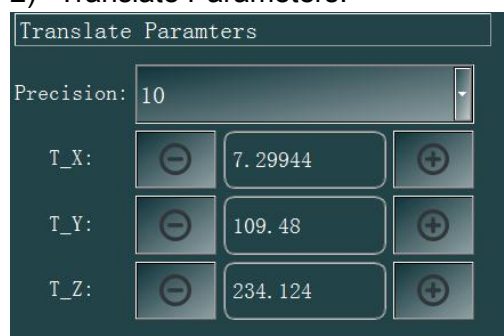
1) Rotate Parameters:



Precision is the adjustment precision scale that you'd like to use to adjust. It varies from 0.00001 to 0.1.

R_X, R_Y, R_Z is to simulate the movement of the camera lens in three dimensions, X, Y & Z. It is just like to rotate the camera lens slightly by up and down.

2) Translate Parameters:



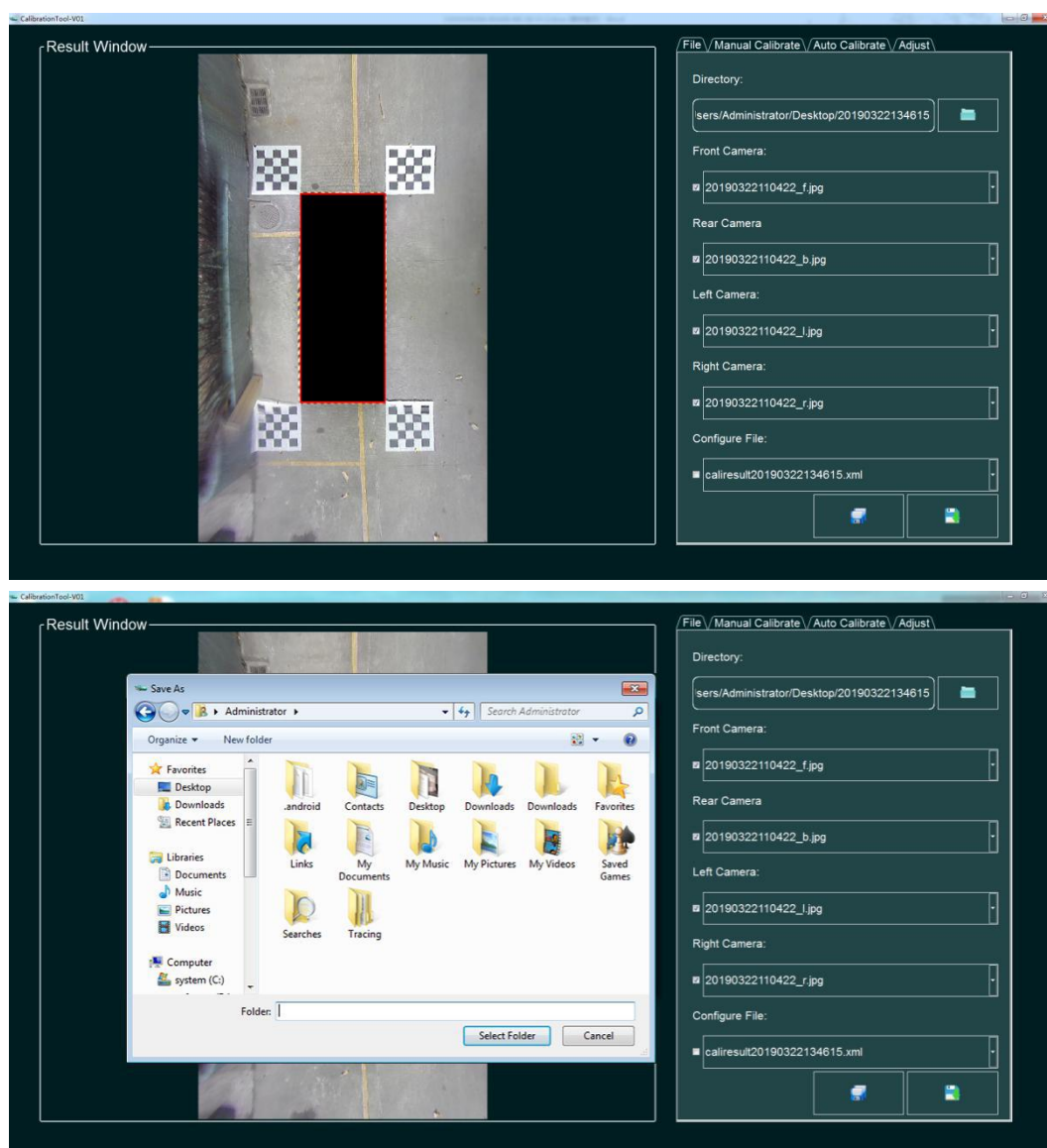
Precision is the adjustment precision scale that you'd like to use to adjust. It varies from 0.001 to 10.

T_X, T_Y, T_Z is to simulate the movement of the camera lens in three dimensions, X, Y & Z. It is just like to move the camera lens slightly by left or right, zoom in or zoom out.

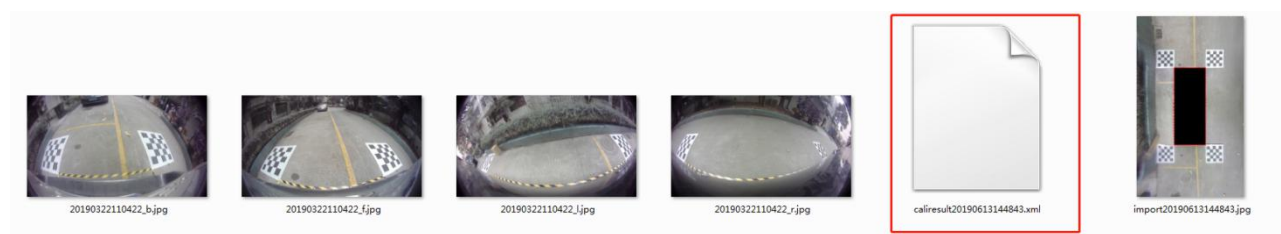
Tips:

- A) You need to check the around view on the left side while you are adjusting the parameters.
- B) Try to adjust with the minor precision, so the change will not be too drastic.

- 3) Once the stitching result (as below) is confirmed, go to “file” page and **save it** or **save as another calibration results file**.

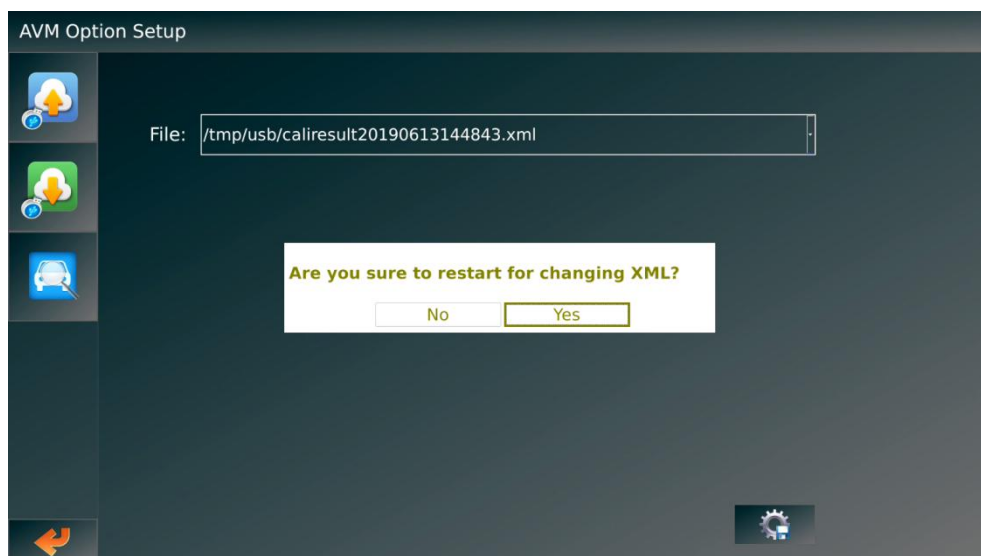
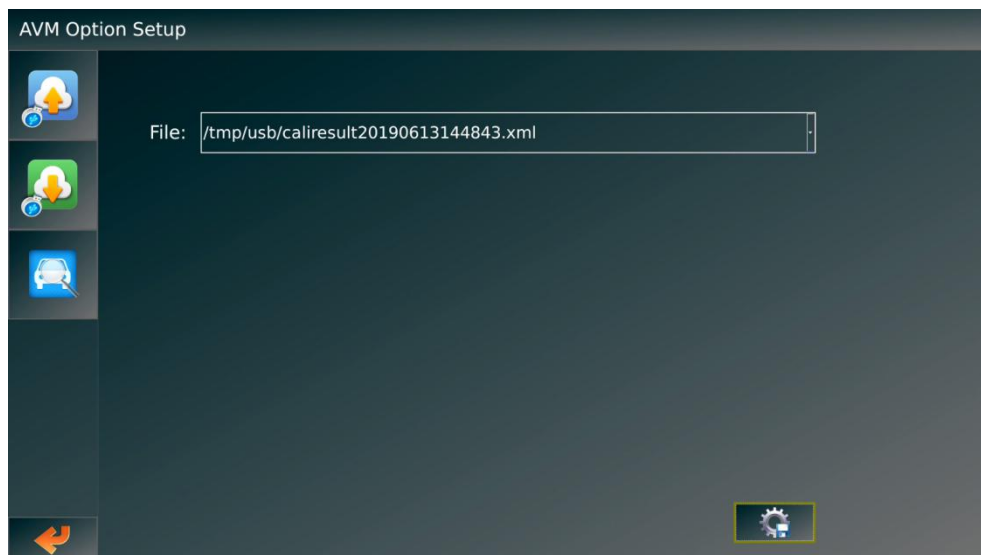
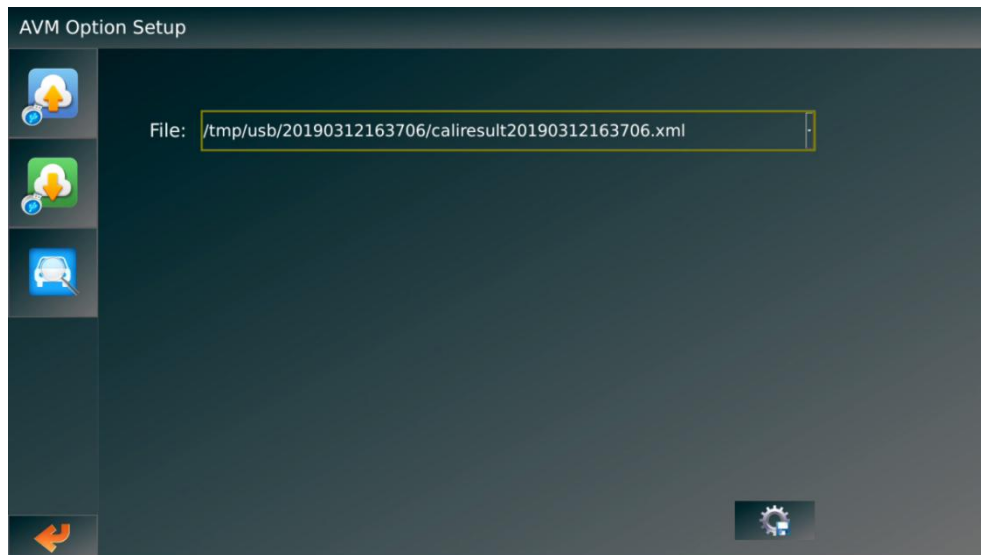


Step 8: The file named in “**caliresult....xml**” is the calibration result that you have saved, then copy the .xml file to a USB disk and insert the USB to the 360 system control box. Finally go to the 360 system menu AVM and click the icon to import the calibration result.



Note:

Please click the File box to select the caliresult xml file that you’ve just saved and then click it. It will start to import to the control box after you click the button “Yes”.



9.2 Single-step Calibration

Step 1: Lay rectangular frames with tapes around the vehicle body.

Note:

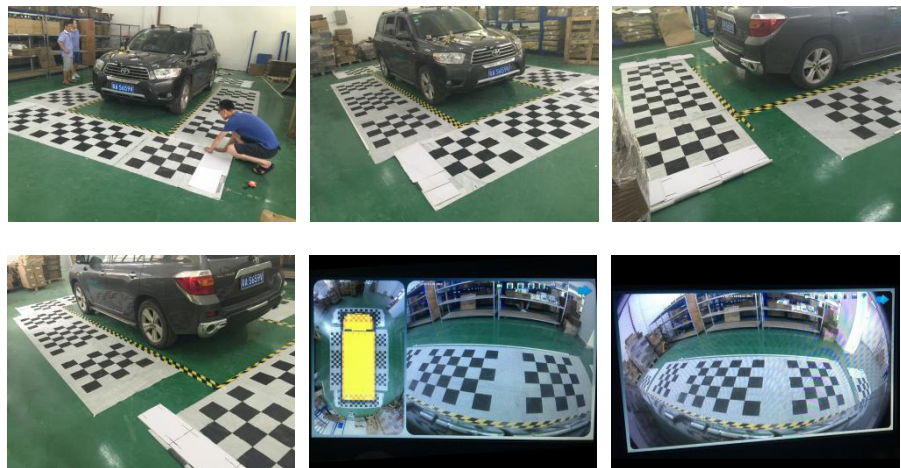
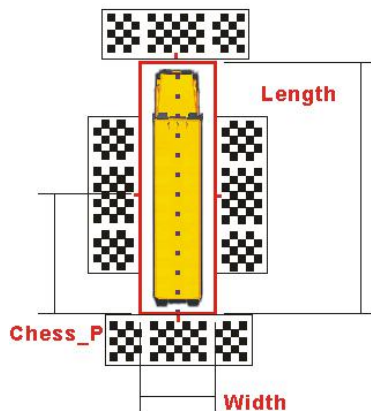
- 1) Each rectangular edge should appear completely in every single view.
- 2) We suggest using zebra-strip tapes or rectangular laser gradienter to lay the rectangular frames.



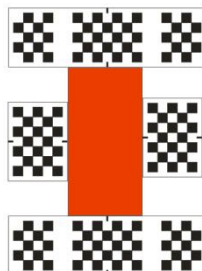
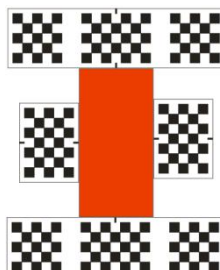
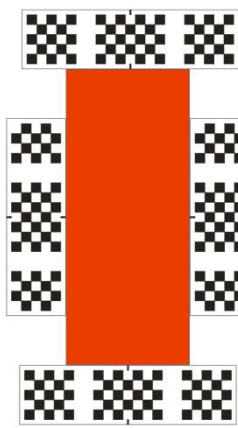
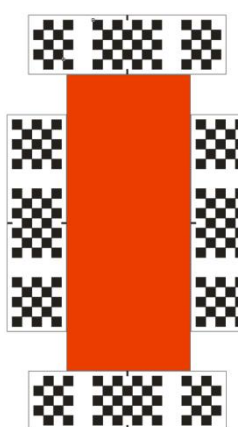
Step 2: Lay calibration cloths with reference to the guide shown as the picture.

Note:

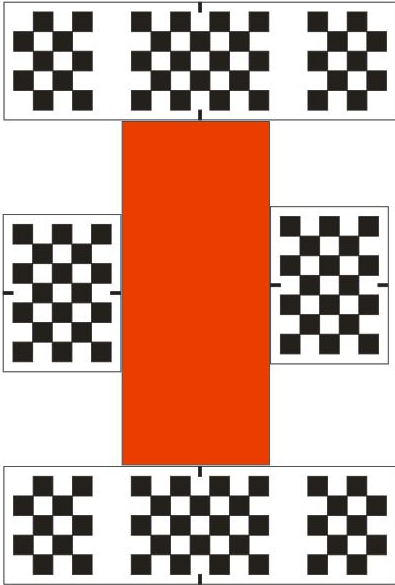
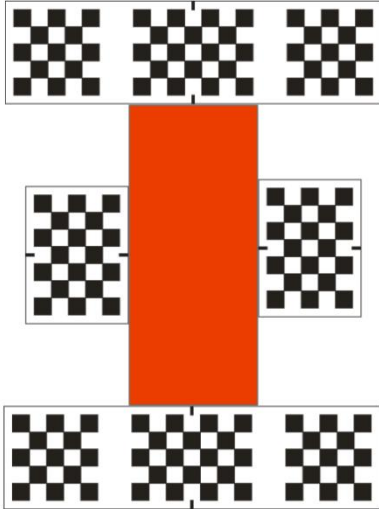
- 1) Each calibration cloth should appear completely in each single view, shown as pictures below.
- 2) Front and back calibration Mats should be laid in the middle while the distribution of right and left ones in conformity with the right / left cameras. If the right / left camera is installed in the middle, then right / left calibration cloths should be laid in the middle.





3) Calibration Mats option

Vehicle Size		Camera Height	Example (L=3m, W=1.5m)	
Length	Width			
L<4m	Premise is W<2m	H<1.5m is acceptable. And the higher the better.		Grid Size: 20cm Chess Board Size: L&R: 7x5 4x5 F&R: 7x5 4x5
				Grid Size: 20cm Chess Board Size: L&R: 7x5 5x5 F&R: 7x5 5x5
Vehicle Size		Camera Height	Example (L=6m, W=2.5m)	
Length	Width			
4m<L<8m	Whatever	H<1.5m is acceptable. And the higher the better.		Grid Size: 20cm Chess Board Size: L&R: 7x5 4x5 F&R: 7x5 5x5
				Grid Size: 20cm Chess Board Size: L&R: 7x5 5x5 F&R: 7x5 4x5


Calibration Mats option (Continued Table 1)

Vehicle Size		Camera Height	Example (L=7m, W=3m)	
Length	Width			
4m<L<8m	Premise is W<4m	H>1.5m at least. H>3m is recommended. And the higher the better.		<p>Grid Size: 40cm Chess Board Size: L&R: 7x5 4x5 F&R: 7x5 4x5</p>
				<p>Grid Size: 40cm Chess Board Size: L&R: 7x5 5x5 F&R: 7x5 5x5</p>

Calibration Mats option (Continued Table 2)

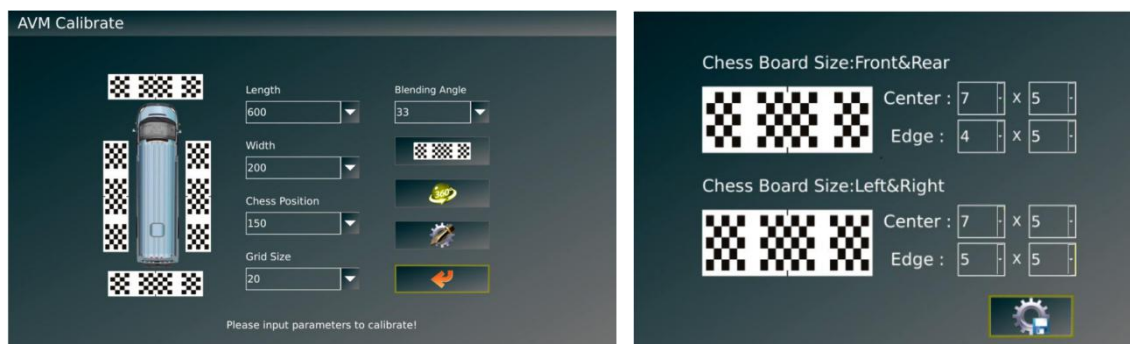
Vehicle Size		Camera Height	Example (L=10m, W=4m)	
Length	Width			
L>8m	Whatever	H>1.5m H>3m is recommended. And the higher the better.		<p>Grid Size: 40cm Chess Board Size: L&R: 7x5 4x5 F&R: 7x5 5x5</p>
				<p>Grid Size: 40cm Chess Board Size: L&R: 7x5 5x5 F&R: 7x5 4x5</p>

Step 3: Enter into AVM Interface

Input calibration figures of Length / width / chess Position, choose , entering the procedure of automatic calibration.

Note:

- 1) Length and width should be those of the rectangular frames instead of the vehicle.
- 2) Before entering the automatic stitching procedure, we suggest you go to chess board first to check if the settings of calibration cloths are the same as the actual ones. They should be compatible with each other.



Information for calibration completion.

Information format: Success / Failure.

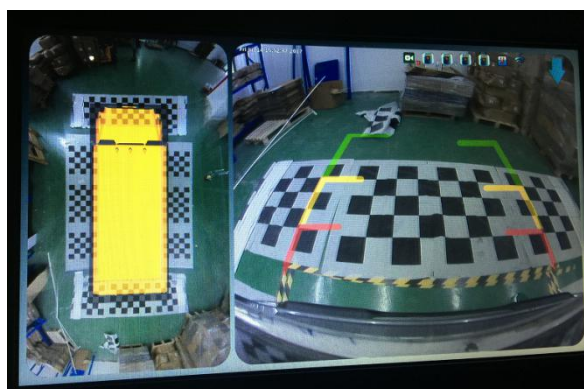
Left: Three Chess board found, calibrate one step / One chess board found, calibrate exit only / No chessboard found.

Right: Three Chess board found, calibrate one step / One chess board found, calibrate exit only / No chessboard found.

Front: Three Chess board found, calibrate one step / One chess board found, calibrate exit only / No chessboard found.

Rear: Three Chess board found, calibrate one step / One chess board found, calibrate exit only / No chessboard found.

If any channel indicates calibrate exit only or no chess board found, please check the correspondent calibration cloth to see if it has been laid smoothly or if the black and white grids have got blurred due to lighting issues. Repeat the automatic stitching procedure after adjustment.



10. Web APP Instruction

10.1 Preparation

- Wi-Fi must be built in the 360 control box, and a Wi-Fi antenna should be connected too.
- Access is available by using the Google browser or any other browser supporting html5.
- There is no limitation of operating system to use the Web UI, but recording files would not be able to export with IOS system.
- Connection

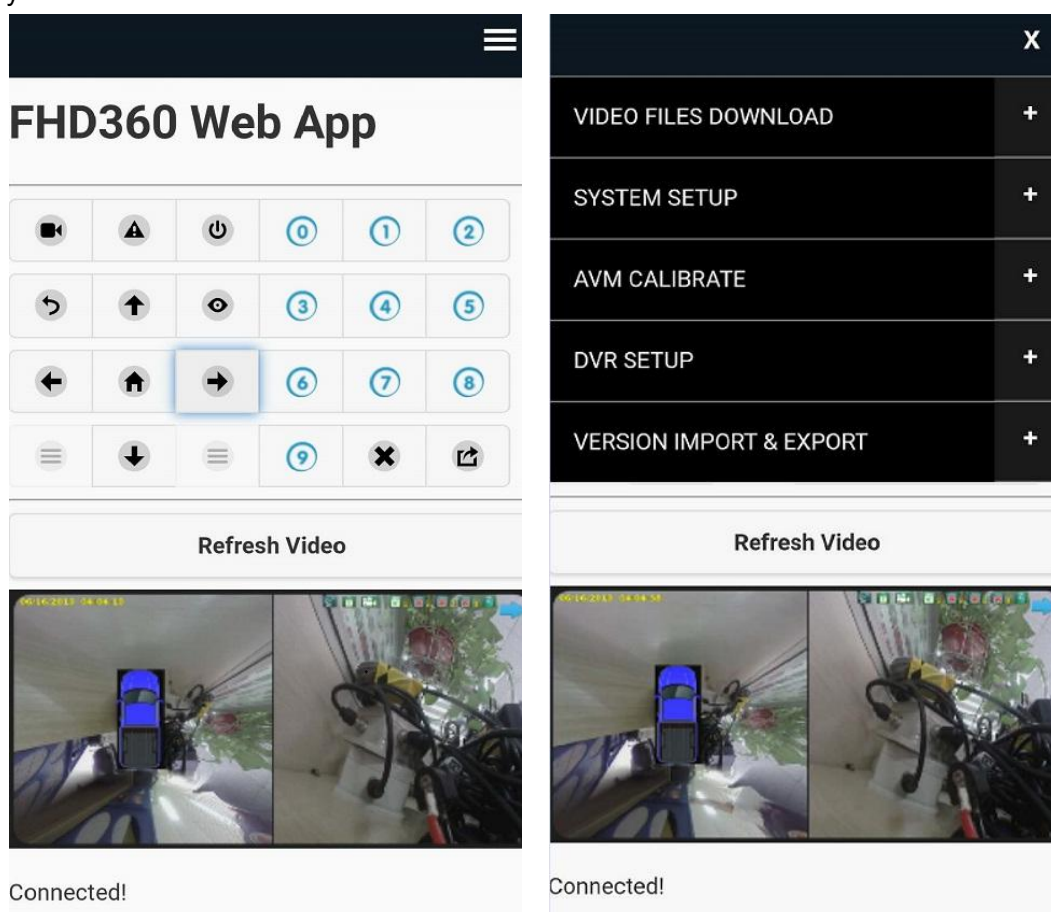
Step 1: After the 360 control box is powered on, open the mobile phone WLAN and search for the connection "FHD360". The connection password is "12345678".

Step 2: Open the browser, enter "192.168.30.1" in the address bar and then access the WebAPP

operation interface as below. More application functions can be found by the icon .

Note:

There may be some delay using the webAPP, please do not press the control buttons quickly and frequently.



10.2 Description of Functions

10.2.1 Video Files Download

VIDEO FILES DOWNLOAD


June 2019

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00
 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00
 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 24:00

pickTime ... Download

Feature Description:

- 1)  : Download the video files. Select the "+" or "-" icon at the up right of the menu bar to open or close the video download page.
- 2) Calendar list: Yellow highlighted dates represent video files available. Only dates in yellow could be selected. Also dates could be switched by clicking the ">" or "<" icon.

June 2019

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

- 3) Time list: Yellow represents video files available.

00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00
 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00
 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 24:00

- 4)  : Retrieve all valid video files for the selected time.

- 5) : Select all the video files in the list.
- 6) : Download all selected video files.

Note:

The download function is only available when there are video files. In other words, the SD card must be inserted and there is video file in the SD card.

10.2.2 System Setup

SYSTEM SETUP

AV

Vehicle Model Offset

Front Cursor

Vehicle Translucence

StandBy Delay

Surround View Region

Surround View Mode

Normal View

View Ratio

UART Function

System Setup

AV

Language

Slow Wakeup

Front Cursor

Vehicle Translucence

Vehicle Model Offset

StandBy Delay

Normal View

Surround View Region

View Ratio

Surround View Mode

UART Function

Feature Description:

: System setup. Select the corresponding configuration in the system, and click the submit button at the bottom of the page to submit the configuration.

Note:

The device must be reboot after the configuration is submitted.

10.2.3 AVM Calibration

AVM CALIBRATE

Length(Unit:cm)

850

Width(Unit:cm)

550

Chess Position


300

Grid Size

55

submit

AVM Calibrate



Length

600

Width

200

Chess Position

150

Grid Size

20

Blending Angle

33

360°

⚙️

↩️

Please input parameters to calibrate!

Feature Description:

AVM CALIBRATE

+

: The parameter settings of the panoramic stitching. The operation is the same as 6.2.7.

10.2.4 DVR Setup

DVR SETUP

OFF

Video Resolution

High Low

Video Duration

3min 5min 10min

licence plate(not more than 10 characters)

20190612

submit

DVR Setup

000000

3Min

5Min

10Min

High

Low

ON

OFF

⚙️

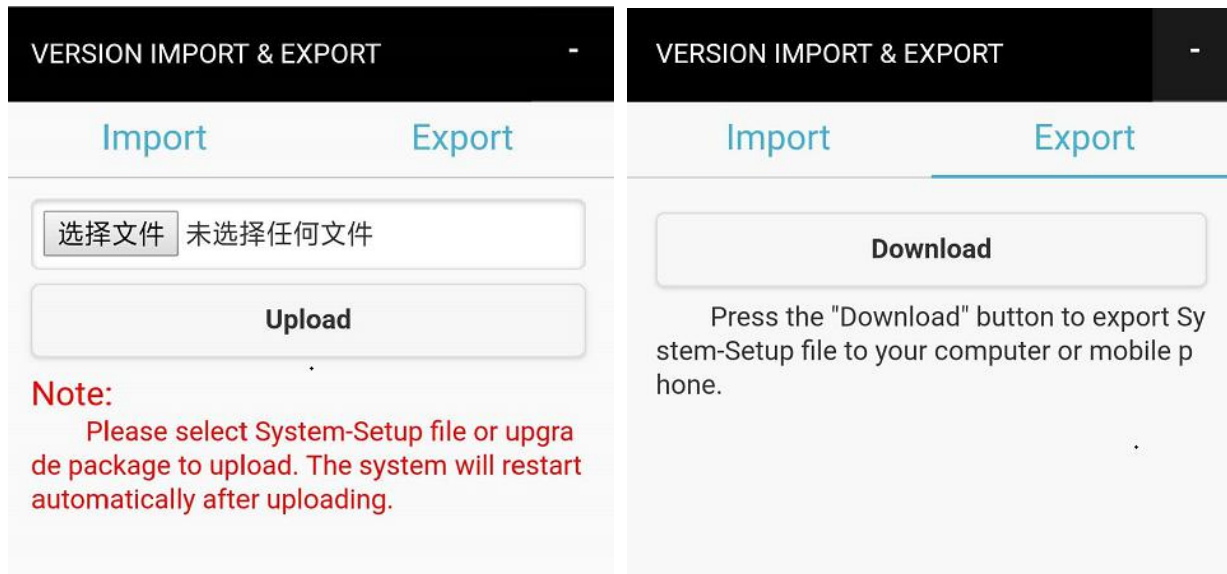
Feature Description:

DVR SETUP

+

: Recording function setup. The operation is the same as 6.2.6.

10.2.4 Version Import And Export



Feature Description:

- 1) **Import** : Import the system configuration file. The import will restart and take effect upon success.
- 2) **Export** : Export the configuration file of current system.

Note:

- 1) The SD card must be inserted on the 360 round view system. Otherwise the import function cannot be performed successfully.

11. FAQs

- Q1: After the stitching, why doesn't certain area in front / back / left / right area show any image?
 1. Please make sure the calibration lines and cloths are laid properly.
 2. Press up / down / left / right button to shift single-view channel and make sure that all cameras are functioning normally and surrounding landscapes don't turn upside down or left / right reversion.

- Q2: Part of images can't be seamlessly stitched.
 It's usually caused by accumulative errors. Please measure the calibration parameter to see if it's accurate, make sure that the calibration cloths are laid smoothly enough, and check if the procedures of laying calibration cloths meet the requirements of chapter 6.1.

- Q3: Some camera appears upside down or left / right reversion.
 It's mainly caused by having selected wrong directions during camera installation. Please check if the camera is installed correctly and re-calibrate if needed.

- Q4: After stitching, edges of surrounding view image appear large scale of blank pixel area (Black area).
 It appears more to vehicles with low chassis. In that situation, cameras are installed in low positions, thus the effective pixel collected by cameras is too little to compose clear images. We suggest you adjust the installation positions of cameras.