

## 360-Degree 3D SVM Camera System with DVR

### INTERFACE COMPONENTS

- TE-360-3D Interface
- TE-360-3D interface harness
- Remote control
- Remote control IR receiver
- Cameras (4)
- Camera extension cables (4)
- 22mm hole-saw
- Calibration tape
- Side camera adjustment tool



### INTERFACE FEATURES

- Includes (4) high resolution 180-degree “fish-eye” cameras
- Exclusive “fish-eye” distortion correction
- Seamless 3D & 360° video merging
- Dynamic & intelligent view angle switching
- Includes calibration tools
- Independent camera calibration

- 3D video de-interlacing and noise reduction technology for CVBS signal decoding
- Digital 1080p recorder supporting up to 32GB USB flash drive or SD card
- Smart power management to preserve battery power
- Automatic recording for up to 28 hours
- No guidelines for reverse, option cannot be turned on

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### TOOLS REQUIRED

- Wire cutter • Crimp tool • Solder gun • Tape
- Connectors (example: butt-connectors, bell caps, etc.)

**CAUTION!** All accessories, switches, climate controls panels, and especially air bag indicator lights must be connected before cycling the ignition.

## INTRODUCTION

The I-Beam TE-360-3D is a 360-degree 3D Surround-View-Monitor (SVM) camera system that utilizes the latest high resolution 180-degree “fish-eye” cameras to monitor and digitally record a 360-degree surrounding view of the vehicle. Coupled with the latest software technology, all cameras are seamlessly merged to form a single real-time image.

Activating the turn signals will show the respective left-side or right-side camera image. The front camera image can be shown by a quick flash of the high-beams. While in reverse gear the rear camera image will be shown, and will supersede all other cameras. All camera images shown will be through either an aftermarket radio, or a stand-alone monitor (not provided).

Supporting up to a 32GB USB flash drive or SD card (both not included), the TE-360-3D can record up to 28 hours of continuous 1080p recording, automatically while you are driving, and also while the vehicle is parked (24-hr. video loop). Recorded videos can be easily retrieved and played back, and used as evidence if need be.

## SAFETY TIPS

- Serious traffic accidents may be caused by viewing or using the system while driving. It is strongly recommended to not operate this system while driving.
- The TE-360-3D is a parking and driving assistant system which monitors the road situations around the vehicle to eliminate blind spots, thus functioning as a visual guide for safe parking and driving. There may be differences between what is being showed on the display screen, and with the actual real surroundings of the vehicle. Please use the TE-360-3D for what it is designed for, a tool to aid in safe parking and driving.

## INSTALLING THE TE-360-3D

It is best to read the following steps beforehand to clearly understand what is to be expected, before permanently modifying the vehicle. Also, when unpacking the TE-360-3D, do not damage the box it came in as it will be used as a tool to calibrate the cameras.

### Cameras:

If possible, try to keep all the cameras at the same vertical height to maintain the same image aspect. The closer you can get to the same vertical height, the better the image will look when it is seamed together.

- **Front Camera:** Using (2) stainless steel Phillips screws provided, install the camera labeled “front” to a location that is in the center of the front of the vehicle. Leave the adjustment screws loose until the camera has been adjusted. Once the camera has been adjusted, tighten the screws. Route the cable into the vehicle, and then to the location where the TE-360-3D interface will be installed at. Use caution not to run wires next to places that will be hot, and also moving mechanisms.
- **Rear Camera:** Using (2) stainless steel Phillips screws provided, install the camera labeled “rear” to a location in the center of the rear of the vehicle. The license plate area in most vehicles is a good location. Leave the adjustment screws loose until the camera has been adjusted. Once the camera has been adjusted, tighten the screws. Route the cable into the vehicle, and then to the location where the TE-360-3D interface will be installed at.
- **Side Cameras:** Install the cameras labeled “left camera” and “right camera” to the bottom of the left and right mirrors, preferably near the outside edge of the mirror. (Figure A) Once a suitable location has been found, ensure that there are no obstructions inside the mirror, and that the camera cable can be routed into the inside of the door. Using the 22mm hole-saw provided, drill a hole in the mirror. Attach the rubber washer onto the camera,

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## INSTALLING THE TE-360-3D (CONT.)

then Insert the camera through the hole, but do not clip the camera into the hole just yet. Route the cable into the door, and then to the location where the TE-360-3D interface will be installed at. Leave the connector accessible inside the mirror to be able to disconnect the camera if ever need be.

**Note:** A metal “U-shaped” adjustment tool is included with each camera. Make sure not to accidentally throw this tool away while unpacking the cameras.

### Remote control IR receiver:

- Install the IR receiver to a location where the remote control has a clear line of sight, and also no more than 48-inches away from where the TE-360-3D will be installed at. Route the cable to the location where the TE-360-3D interface will be installed at.

### TE-360-3D interface:

#### From the cameras:

- Connect together the appropriately colored connectors by lining up the arrows and pushing in.
- From the front camera, connect the **Red** wire to the positive trigger wire from the high beam light.
- From the left-side camera, connect the **Red** wire to the positive trigger wire from the left-side turn signal indicator.
- From the right-side camera, connect the **Red** wire to the positive trigger wire from the right-side turn signal indicator.
- From the rear camera, connect the **Red** wire to the positive trigger wire from the reverse light.

#### From the remote control IR receiver:

- Connect together the appropriately colored **Black** connectors by lining up the arrows and pushing in.

### From the TE-360-3D interface:

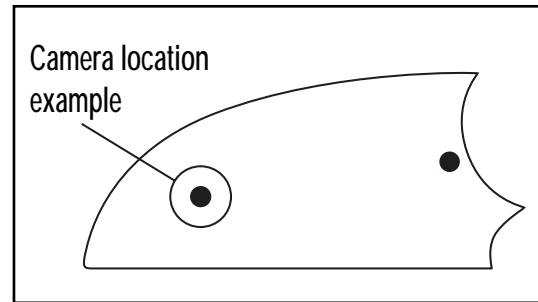
- Connect the **Yellow** RCA jack labeled AV-OUT to the aftermarket radio or stand-alone monitor providing the camera image. Connect the **Red** wire to the reverse trigger wire from the radio/monitor.

**Note 1:** If using a radio as a display screen, this wire must be connected to trigger the radio to display an image.

**Note 2:** If using a stand-alone monitor as a display screen which has an HDMI input, use the HDMI output instead for a better image.

### With the key in the off position:

- Connect the **Black** wire to chassis ground.
- Connect the **Yellow** wire to battery power.
- Connect the **Red** wire to accessory power.
- Connect the interface harness into the TE-360-3D.
- Install the interface to a location that is hidden, yet accessible to the owner of the vehicle. The USB flash drive and SD card (not provided) will connect directly into the interface.



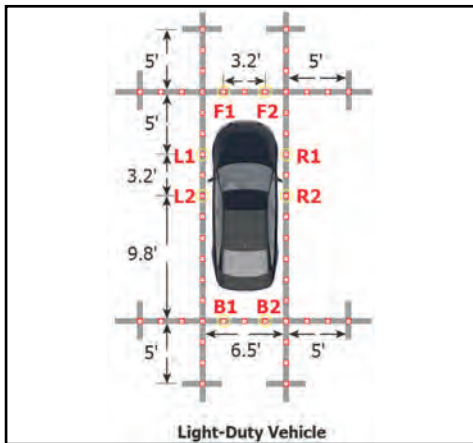
(Figure A)

# CAMERA CALIBRATION

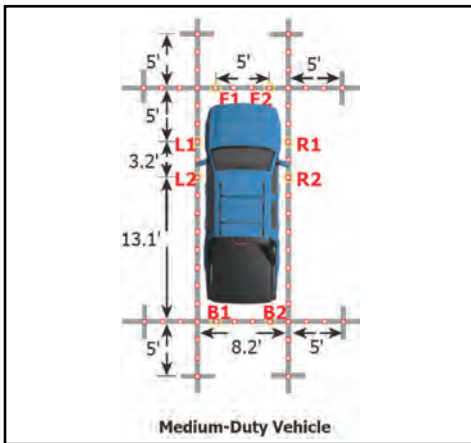
## Applying the calibration tools:

- Park the vehicle in a flat location, away from all obstacles. Apply the tape to the ground as shown. This is a very important step and the tape must be placed as accurate as possible to create a distortion free, seamless image. Have patience with this step. (Figure A, B, C)
- Separate the TE-360-3D product box. The product box has an inner and outer shell. Each shell should be placed at one of the (2) reference points shown. Either B1 and B2 for the back camera, F1 and F2 for the front camera, L1 and L2 for the left camera, or R1 and R2 for the right camera. Whichever reference points are chosen will dictate the first camera to be calibrated. It would be best if the boxes were weighted down to avoid the wind from blowing them over. (Figure D)

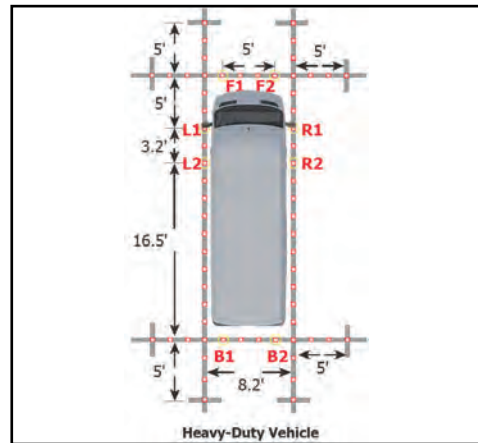
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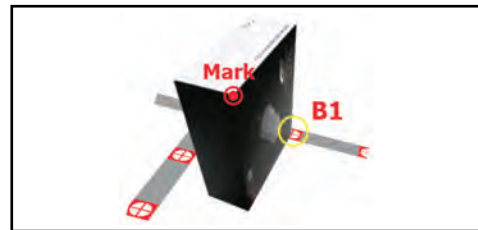
(Figure A)



(Figure B)



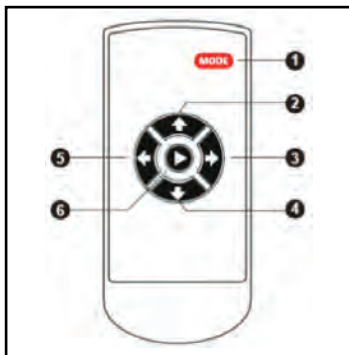
(Figure C)



(Figure D)

## CAMERA CALIBRATION (CONT.)

### Remote control functions:



Button	Description	Function
(1)	Mode	Enter settings menu. In SVM Mode, long press for 2 seconds to enter 4-channel recording.
(2)	Up	In Menu Mode, selects last menu option. In SVM Mode, short press enters front camera mode. Press again to get back to SVM mode.
(3)	Right	In SVM Mode, long press to enter right camera mode.
(4)	Down	In Menu Mode, selects next menu option. In SVM Mode, long press to enter reverse camera mode.
(5)	Left	In SVM Mode, long press to enter left camera mode.
(6)	Confirmation	Confirm selected option.

### Camera adjustment:

Having a Helper to help aid in adjusting the cameras is highly advisable, but not required. While adjusting the front cameras, ensure both front doors are fully shut. Also note, having the front windows down would make it to where adjustments can be made from inside the vehicle.

- Turn the key (or push to start button) to the accessory position to power on the TE-360-3D.
- Press and hold the “Left-Arrow” button on the remote control until the left camera comes on.
- Rotate the left camera so it will show an image from the rear of the vehicle. Clip the camera in.
- Insert the metal “U-shaped” tool provided into the front and rear holes in the bezel of the camera. (Figure A)
- Pull the tool and camera towards the left rear of the vehicle. The image on the screen should not show the vehicle. It should be just slightly away from the vehicle. Looking at the camera it should appear to be aiming between the front and rear tires, away from the vehicle. Keep adjusting the camera as needed to ensure the best image possible. The goal is to be able to view traffic in the vehicles blind spot. Once a satisfactory image is provided, continue onto the right camera. Once the right camera has been adjusted, ensure that both the left and right cameras have an equal looking image.
- After the side cameras have been adjusted, continue on to the front and rear cameras. The front camera can be activated by pressing the “Up-Arrow” button on the remote control. The rear camera can be activated by pressing and holding the “Down-Arrow” button on the remote control until the rear camera is displayed.



(Figure A)

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## CAMERA CALIBRATION (CONT.)

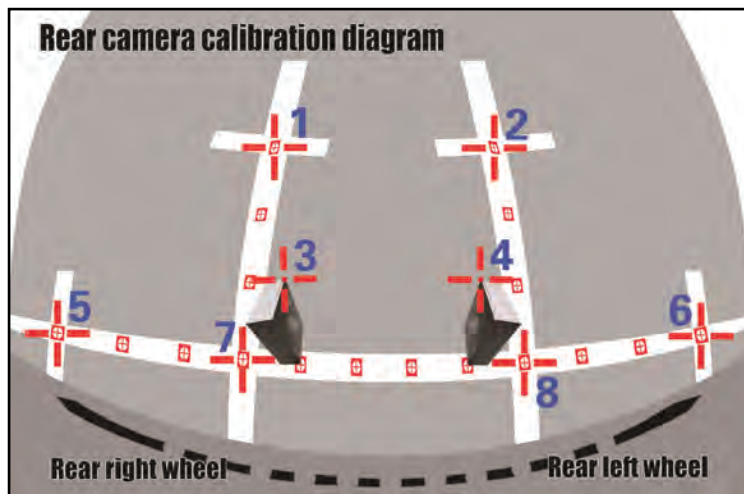
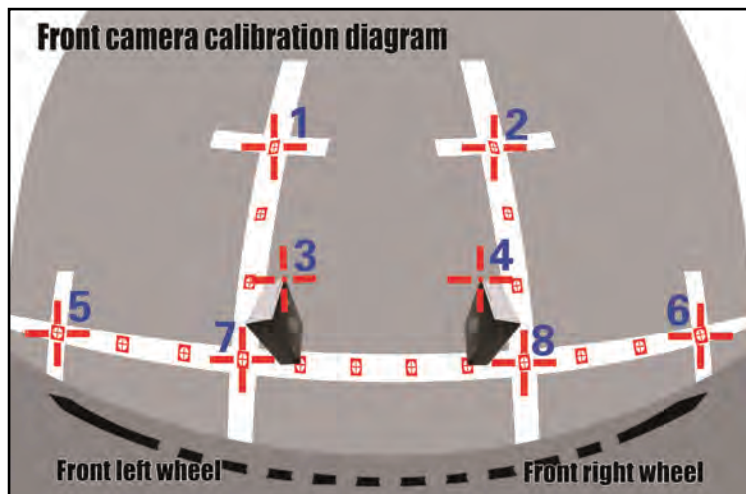
### Camera calibration parameter settings:

- Press the “Mode” button to access the settings menu. The default password is “360”.
- Enter the Camera Calibration menu.
- Enter 360 Tuning to access the parameter settings.
- Select the correct size of the vehicle and adjust the vehicle position as needed.
- Adjust the shadow area for each of the cameras as needed. Each increment is equal to 2-inches. The shadow area will help to eliminate the vehicle from being portrayed in the final image for

applications where it is not possible to angle the cameras away from the vehicle.

- Adjust the merging angle and range as needed. Try to keep this setting as close to default as possible. Adjusting this too much will distort the seamed image. The merging angle is to be used for instances where the front or rear camera image does not meet up with the side camera image. The merging range is for adjusting the side cameras.

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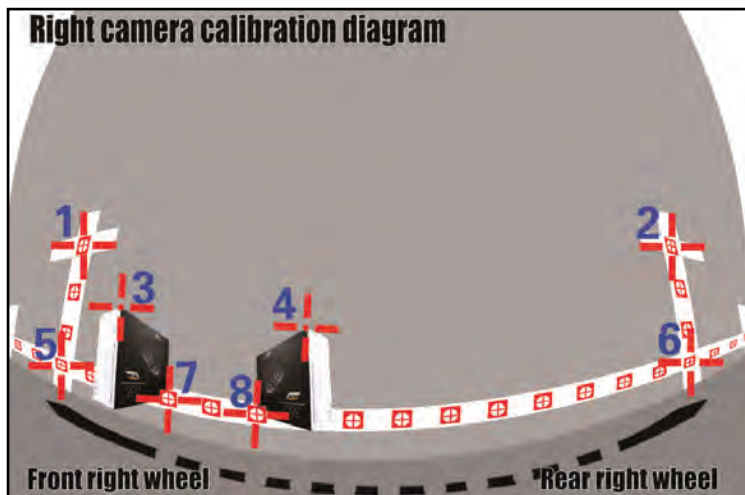
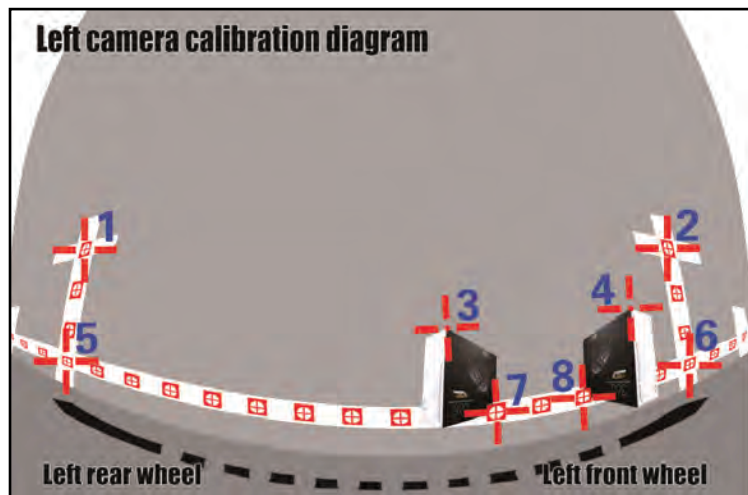
## CAMERA CALIBRATION (CONT.)

### Camera calibration:

**Tip!** The use of an HDTV, 32" and higher, will improve the ease and accuracy of the calibration process.

- From the Camera Calibration menu, enter the desired camera to be calibrated.
- The calibration process will start when the cursor starts blinking.
- Move the cursor to location 1 via the remote control. Press and hold to move quickly.
- Once at location 1, press "OK" to mark the calibration point in the screen.
- Continue onto the next calibration point, in order, 2 through 8.

- Press the "Mode" button to go back to the previous calibration point if need be.
- Once done, proceed onto the next camera to be calibrated. The TE-360-3D product box shells will need to be moved to the reference points for the next camera to be calibrated.
- Continue the process until all cameras have been calibrated. Once completed, press "Merging Computation", then "OK", to begin the merging process. The merging process will take approximately 2 minutes to complete. The system will reboot automatically after the merging process is complete.





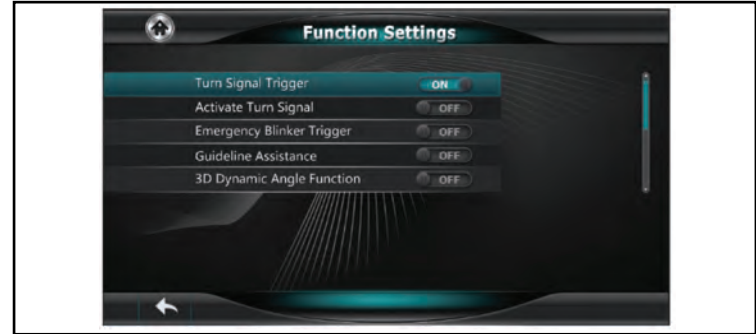
# USER SETTINGS

## Viewing Modes

Menu → User Settings → Window Configuration



## Function Settings



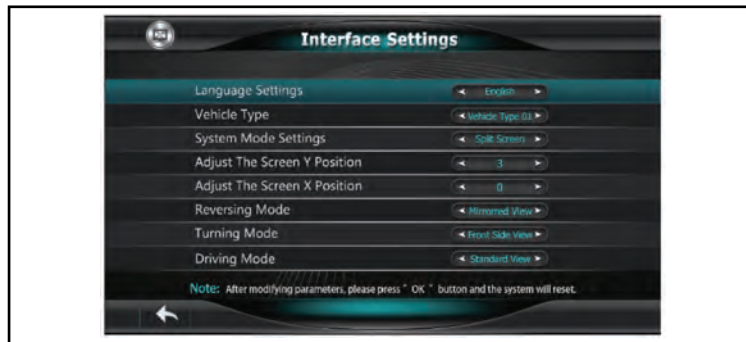
Menu Item	List Options	Description
Turn Signal Trigger	ON / OFF	Will activate the appropriate left or right camera once a turn signal has been activated
Activate Turn Signal	ON / OFF	Allows the turn signals to trigger the radio/monitor to display an image, if it is not already displaying the TE-360-3D image
Emergency Blinker Trigger	ON / OFF	Allows the hazard switch to override the display on the radio/monitor
Guideline Assistance	OFF	This option is not available
3D Dynamic Angle Function	ON / OFF	Sets either a dynamic or static angle image

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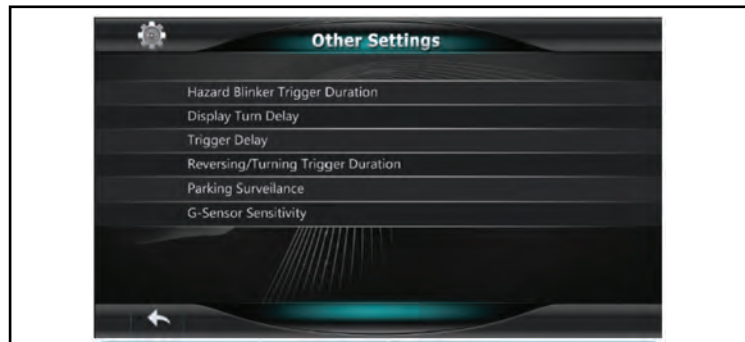
## USER SETTINGS (CONT.)

### Interface Settings:



Menu Item	List Options	Description
Language Setting	English / Chinese	Set desired language
Vehicle Type	Vehicle Type	Set 3D car model
System Mode Setting	Split Screen	
Adjust The Screen Y Position	-9 - +9 Pixel	Adjusts the horizontal position
Adjust The Screen X Position	-9 - +9 Pixel	Adjusts the vertical position
Reversing Mode	Mirrored View	Set a different view while in reverse gear
Turning Mode	Front Side View	Set a different view while turning
Driving Mode	Standard View	Set a different view while driving

### Other Settings:



Menu Item	List Options	Description
Hazard Blinker Trigger Duration	1Min/3Min/5Min/ 3S/5S/30S	Sets the Emergency Blinker duration time once the Emergency Blinker Trigger feature has been turned to "On"
Display Turn Delay	30S/1Min/3Min/5Min	For setting the delay to the radio/monitor
Trigger Delay	30S/1Min/3Min/5Min	To delay the turn signal and reverse trigger
Reversing / Turning Trigger Duration	30S/1Min/3Min/5Min	Sets the duration time for the radio/monitor after a trigger event
Parking Surveillance	Disabled/Delayed/ 3/Min/5Min	Surveillance mode after vehicle has been parked
G-Sensor Sensitivity	Middle/High/Low	Adjust sensitivity for the G-Sensor

## USER SETTINGS (CONT.)

### Video Settings:



Menu Item	List Options	Description
Saturation	-9-+9	Adjust video saturation
Brightness	-9-+9	Adjust video brightness
Contrast	-9-+9	Adjust video contrast
Sharpness	-7-+8	Adjust video sharpness

### Upgrade & Restore



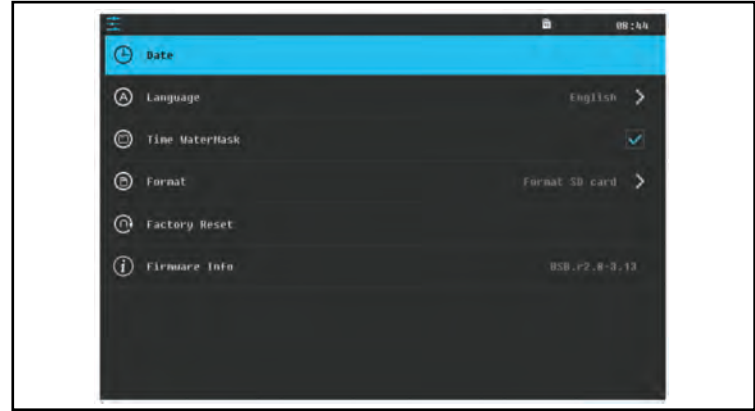
Menu Item	List Options	Description
System Restore	Default or User Preference	Default - N/A User Preference - To restore user preferences
Upgrade Options	Upgrade 3D Mode	For upgrading firmware in the TE-360-3D
Version Information	-9-+9	Check Hardware / Firmware / Software version

# DIGITAL VIDEO RECORDING (DVR)

## Recording Functions

1. Long press the “Mode” button to switch to the recording system menu.
2. Press the “OK” button to stop the current recording.
3. Use the “Up/Down” buttons to navigate between the recorded files.
4. Press the “OK” button to select the recorded file to playback.
5. The (4) cameras can be enlarged to full screen mode by pressing the “Left /Right/Up/ Down” buttons.

## Recording Settings



Menu Item	List Options	Description
Date		To change system time
Language	English / Chinese	To change system language
Time Watermark	ON / OFF	To apply a time stamp on the recorded video
Format	Format SD card	To format SD Card
Factory Reset		To reset the default settings
Firmware Info		To check firmware version

## SPECIFICATIONS

Type	Specifications	
<b>Camera</b>	Video Interface Input / Output Impedance Amplitude Bandwidth Sampling Frequency Resolution Signal Standard SNR	BMW Mini Connector 75Ω Typical 1Vpp. 1.2Vpp Maximum 27M 74.52MHZ 1280x720 @ 30fps AHD2.0 (Nextchip) 83.5dB
<b>Trigger Input</b>	High Beam Left/Right Turn Reverse	Optional Yes Yes
<b>G-sensor</b>	BM250E	Bosch
<b>Recording</b>	Algorithm Resolution Bitrates Recording Media	H.264 Baseline @ L3.1 1080p @ 15fps 5MBPS, 3GBYTE / Hour USB / SD Card
<b>Disk Capacity</b>	SD Card USB	32G SDIO2.0 / SDIO3.0 64G USB2.0
<b>Power Consumption</b>	4-CH DVR + SVM mode Sleep Mode	490mA <3mA
<b>Dimension</b>	L X W X H	5 x 3 1/4 x 1 (interface)
<b>Weight</b>		.49lb
<b>Environments</b>	Normal Working Storage Relative Humidity	-86 ° F- +185 ° F -104 ° F- +221 ° F 0-95%
<b>Voltage Tolerance</b>	Working Voltage	9.5V DC- 36V DC

## TROUBLESHOOTING

### Picture after merging is not accurate or seamless

- This problem is usually caused by the installation position of the cameras, and can happen more often with smaller size vehicles. The picture captured by the cameras will be poor, and so the calibration error will magnify this. This issue could also be the result of not enough care taken while calibrating the cameras. Recalibrate the cameras to possibly solve this problem.

### A portion of the picture after merging is mirrored

- If a factory camera will be used with the TE-360-3D, please confirm whether the image from the sensor is mirrored or not. If mirrored, please choose the mirror function in the menu.

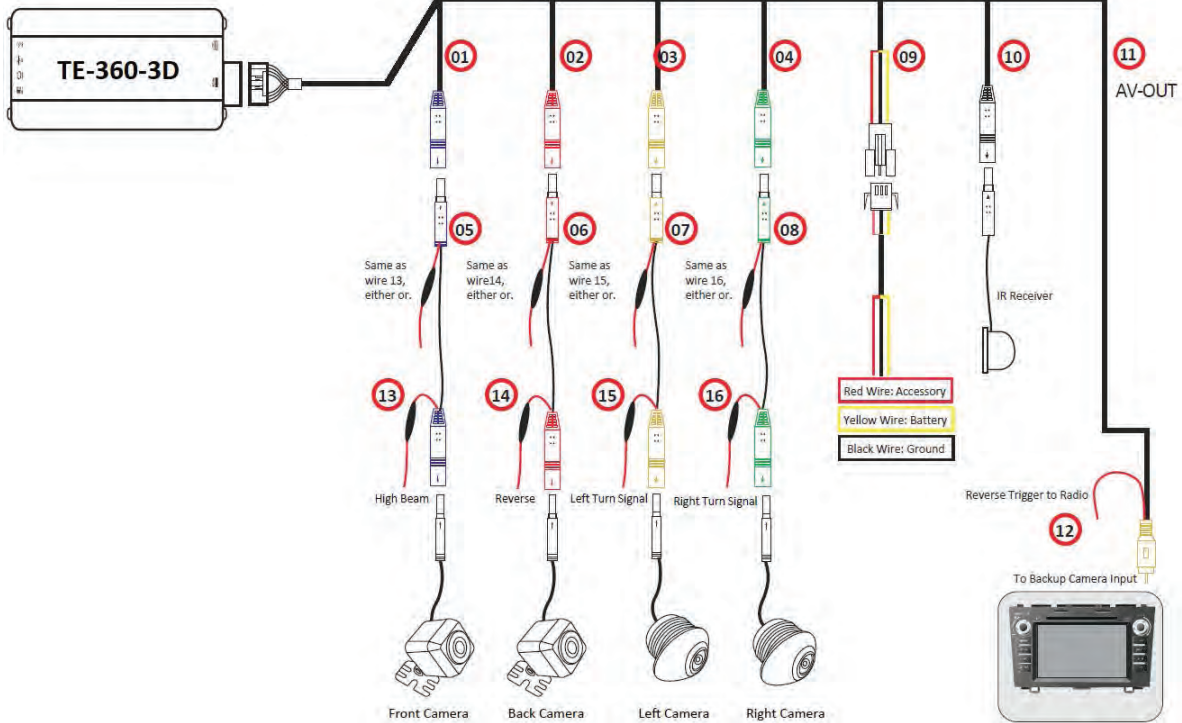
### The corner portion of the display is blank

- This problem may be caused by the location of the camera. The camera may be too close to the ground. Move the camera to a higher position.

### The merging result has failed

- Ensure the proper vehicle size has been selected before starting the camera calibration. The vehicle type parameter must be set according to the size of the vehicle. A vehicle mismatch could be the result of such an issue.
- Ensure the proper camera being calibrated has been chosen. While calibrating the rear camera, the front camera could have been mistakenly chosen, or opposite. Likewise for the side cameras.

# LAYOUT











# TE-360-3D

## INSTALLATION INSTRUCTIONS



### IMPORTANT

*If you are having difficulties with the installation of this product, please call our Tech Support line at 1-800-253-TECH. Before doing so, look over the instructions a second time, and make sure the installation was performed exactly as the instructions are stated. Please have the vehicle apart and ready to perform troubleshooting steps before calling.*



### KNOWLEDGE IS POWER

Enhance your installation and fabrication skills by enrolling in the most recognized and respected mobile electronics school in our industry. Log onto [www.installerinstitute.com](http://www.installerinstitute.com) or call 800-354-6782 for more information and take steps toward a better tomorrow.



**Metra recommends MECP certified technicians**