

Anti Collision Warning System BX650
User Guide

1. Introduction

The anti collision system BX650 is TTI's sophisticated front anti collision, lane departure warning, over speed warning solution. BX650 is used to alert the driver of certain potentially hazardous situation, however, the system does not replace any function in normal driving. Please follow all safe driving standards and practices, comply with all traffic regulations and drive carefully.

Since anti collision warning system BX650 is machine vision, not one hundred percent to recognize all dangerous, it will effect by road situation, weather etc, it is limited. Therefore, the driver can not be over-reliance on the system, but should maintain good safe driving habits. BX650 is only a supporting tools to minimize the risk.

2. Product Functions

2.1 Lane Departure Warning Function (abbr. LDW)

It takes the foresee camera as mainly sensor, detects and trails the lane line upon the machine's visual technology, combining driver's characteristic to judge whether the vehicle has out-lane dangerous, providing sound and lamplight warning for drivers.

The detail function instruction is as followed:

Lane Departure Warning (LDW)	
When the vehicle is unconsciously departure the driving lane, it will provide the visual and audio alarming for the driver, until the driver redress the driving direction, its purpose is to avoid the accident which caused by the driver's fatigue or distraction to unconsciously departure the lane.	
Principle	Recognize and follow up the front lane's position via the front camera, real-time calculating the distance between right lane & left lane and vehicle's front wheel.
Alarming condition	The driving speed is above start up speed, on the condition of the vehicle does not make the turn signal light, the vehicle front wheel has exceeded the normal lane, or has the possibility to exceed.
Alarming way	When the product alert, system will send out the voice alert, and left or right warning light will be blinking at the same time.
When the product alert	<ol style="list-style-type: none"> 1. Heavy Rain, Heavy fog, snowy weather etc. Horizontal visibility is less than 1 km. 2. Lane mark is dim or don't meet GB5768 standard. 3. Don't meet GBT26773-2011 environmental condition.

2.2 Forward Anti Collision Warning Function: (abbr. FCW)

It takes the camera as mainly sensor, detects and trails the front vehicle upon machine vision technology, combining driver's characteristic to judge whether the vehicle is too close to front vehicle, or has collision dangerous, providing sound and lamplight warning for drivers.

The detail function instruction is as followed:

Forward Anti Collision Warning (FCW)	
When the vehicle is too close to the front vehicle or has anti collision danger, it will provide the visual and audio alarming, to warn the drivers take actions to avoid the accident, reduce the accident's lost.	

Principle	Recognize and follow up the closest front vehicle via the front camera, real-time calculating two vehicle's distance and the danger reaction time.
Alarming condition	The driving speed reach start up driving speed, the safety time distance is less than 1.3s or danger reaction time is less than 2.7s (When the vehicle speed is 50KM/H, the safety distance is about 18m).
Alarming way	When the product alert, system will send out the voice alert, and display the time of collision, number blinking at the same time.
System failure	1.Heavy Rain, Heavy fog, snowy ect. weather, Horizontal visibility is less than 1 km. 2. Lane mark is dim or don't meet GB5768 standard. 3. don't meet GBT26773-2011 environmental condition.

3. Product Composition

Anti collision warning system include components: controller, alarm displayer, camera



3.1 Camera and controller

Camera is for acquiring video signal of the pavement condition and transmit it back to controller, the controller identify obstacles and lane through software algorithms, detect if there's any dangerous and make warning.

3.2 Alarm displayer

The alarm displayer has visual alarm and voice alarm function, user can get vehicle speed, front distance, lane identification and other information from displayer.

4. Specification parameter

Complete specifications

Electrical characteristics	
Input voltage	DC9V - DC36V
Input current	400MA(12V) / 260MA(24V)
Average power consumption	6W
Signal input high voltage	12V/24V
Signal input low voltage	<0.7V
Signal output high voltage	12V
signal output Low voltage	0V
IO Input	3 (H:12V/24V L: < 0.7V)
IO Output	3 (H:12V/24V L: 0V)

Controller	
Physical features	
Size	100mm * 71.5mm * 25.5mm
Weight	205g
Color	Black
Housing material	Aluminum alloy
Electrical characteristics	
Input voltage	DC9 - DC36V
Input current	220MA (12V) / 110MA (24V)
Environmental characteristics	
Working temperature	-20°C-80°C
Storage temperature	-40°C-80°C
Camera	
Sensor	1/3" CCD
Pixel	752 (H) * 582 (V)
Signal format	PAL
Resolution	700TVL
Minimum illumination	0.1Lux(Color) / 0.001Lux (Black) of F1.2
SNR	48db (Minimum) / 54db (Maximum)
Display	

Size	97mm * 55mm * 10 mm
Housing material	Plastic
Display color	Green

IO alarm output format:

When alarm IO outputs 0V signal, it indicates alarm is trigger, the 0V level lasts 2 seconds



5. Display element

The following picture shows the BX650 alarm displayer's interface



7.1 Lane Departure Warning

When the system detects the lane departure, the system will send out voice warning, and the left or right departure warning indicator light will flash.

7.2 Over speed alarm

When the speed exceeds the over speed setting value, the system will issue a warning of the speed limit.

7.3 Forward Collision warning

When the vehicle is detected, collision warning indicator will display green, yellow, red light according to the severity of safety distance alarm. When it display red light, it means possible of collision, system will issue a warning voice, the digital tube

digital display will flash and show collision time.

7.4 System sound switch

When the system alarm voice is opened, the system sound indicator light on, otherwise it's off.

7.5 GPS indicator

After integrating the AVL system, if the AVL system locate successfully, it's on, otherwise it's off.

7.7 System startup

Speed display (0) indicates that BX650 has been started.

6.Video output function:

TTI's commercial vehicle BX650 system can output the landline recognition effect, vehicle recognition effect, vehicle signal and other information by overlaying them to original image through OSD function; enable car video to record directly.

Equivalently appreciate other secondary function like the high-performance foreseen camera, black box, points record and so on.



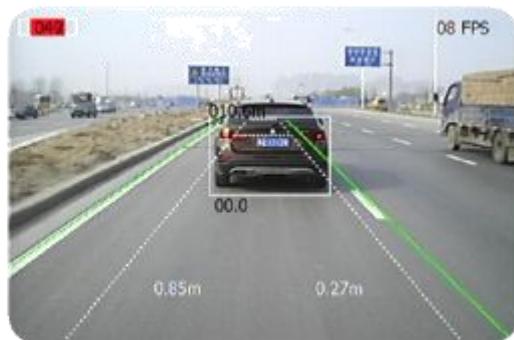
(a) do not reach activate speed



(b) lane tracking



(a) alarm reminder



(b) front vehicle tracking