



Instruction Book of ROADEFEND RDT-300B

Driver Fatigue Surveillance System

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I. Product Synopsis

RDT-300B is a brand-new driver fatigue surveillance system that gives a warning of fatigue drive by means of image recognition and driving behavior analysis to decrease accidents caused by fatigue drive. Furthermore, RDT-300B is also capable of setting abnormal data and images via 3G network to an end-user device to avoid occurrence of accidents by immediately taking effective measures.

1. Value of fatigue warning

Fatigue has long been an inevitable problem that is controlled to an extent for drivers, for example, when driving two hours at a speed of 100km/h, the driver has to struggle to stay awake on account of his lower levels physiological functions followed by inattention. In general, accident rates are extremely high when the driver drives more than 6 hours a day or is lack of proper rest, for example, only having a rest of less than four or five hours last night.

A set of terrible statistics has already been reported, indicating that 72% of all accidents occur due to drivers themselves and 25~30% thereof are caused by fatigue drive; that 40% of all serious and fatal accidents are fatigue related; that 70% of all drivers will fall asleep at the wheel on the highway.

Therefore, it is a great value to eliminate fatigue at driving for sake of the drivers, families, companies, as well as the society.

2. Host introduction

- Power supply and signal line interface
It works when power connectors are connected to corresponding power interfaces on the RDT-300B device; the signal line includes video cable, test mode button, etc.
- SD card slot
- SIM card slot
- Fatigue detection camera
- Holder
- Reflective mirror



Figure 1. Appearance of RDT-300B fatigue surveillance system

3. Product specifications

RDT-300B product specifications							
Basic information	Type	RDT-300B	Functional information	Fatigue warning Function	Working-hours	Daylight ●Yes	Night ●Yes
	Size (mm)	95x90x35			Glasses support	Near-sighted eyeglass ●yes	Sun-glass ●yes
	Weight (g)	400			Sensitivity settings	Automatic adaptability	
	Camera	High-sensitive night vision camera (capture)			Volume adjustment	SD card configuration adjustment	
	Analog image output	Yes		Other function	3G Communication	Image upload*	
	Power supply	DC 9V~36V				Fatigue state video upload	
	Power	7W			GPS	Vehicle localization	

4. Function instruction

1) Fatigue warning

As driver begin to fall asleep, the warning system will trigger a “wake-up call” in time and store the image that the driver fall asleep, then controlling other sleepy reminder accessories (such as vibration cushions, refreshing smell generator) via configurable output interfaces, and finally can sent fatigue information and images to managers through the 3G network. Factors

such as weather, light, complexion, clothing, have no impact on fatigue warning function of this product even glasses the driver wears.

2) Adaptable adjustment of sensitivity

RDT-300B can automatically adjust its early warning sensitivity according to vehicle speed, the basic logic is that the faster the speed, the higher the sensitivity: when the vehicle speed is higher than the predetermined speed of 15Km/h, the early warning function is activated and the sensitivity is set to "Low"; when the vehicle speed is higher than 30Km/h, the early warning sensitivity is adjusted to "Medium"; when the vehicle speed is higher than 50Km/h, the early warning sensitivity is up to "High". Correspondence relationship between the vehicle speed and the sensitivity are as follows:

speed /Km/h	Sensitivity
<15	Stopping working
15~30	"Low"
30~50	"Medium"
>50	"high"

3) Driver features self-calibration

Starting RDT-300B, the early warning system enters a period of 30-second self-calibration with the vehicle speed exceeding the predetermined vehicle speed. During this period, the system core parameters will be calibrated according to individual characteristics of the driver. After this process, the system enters a normal operating state. Please keep a normal driving state when the system is in the normal operating state, and do not simulate sleepy state.

4) Analog image output

RDT-300B provides real-time analog image output via PAL (Phase Alternating Line) system or NTSC (National Television System Committee) system. The signal can be used to calibrate the orientation of installation, and can also be connected with almost all the popular Car DVR (Digital Video Record) on the market to store the video the driver drove.

5) 3G communication

RDT-300B can transmit alarm information and fatigue images data via 3G communications for easy supervision and management.

6) Input interface

RDT-300B supports two-way switch signal input.

7) Output interface

RDT-300B has three-way switch signal output to control auxiliary equipments such as vibration cushions and refreshing smell generator which start to work when the fatigue drive warning is issued.

8) Camera occlusion reminder

Once the camera is deliberately obscured, the system will issue a "ding – ding–" beeping sound with the vehicle speed exceeding the predetermined vehicle speed.

9) Warning image can be stored in local

RDT-300B will create a folder with year.month.day in SD card and store the warning images sorted by type of fatigue warning(asleep, face exception). The during time can be set by SD card config and default for 10 days.

10) Exchange data with DFSS management platform

RDT-300B can uploads all the status information to DFSS management platform, supporting for managers to monitor and manage the relating cars; at the same time,DFSScan sends config file of RDT-300B to RDT-300B in order to set it`s operating mood.

II. Installation Instruction

1. Installation requirements

Use screws to fix RDT-300B leaning to right side (10~30 degrees) in front of the driver and tilting up at the angle of 5~30 degrees;

Connect the lead terminal with the power supply wiring harness; Connect GPS antenna as well as 3G antenna.

According to the distance between the installation location and the driver, RDT-300B can fit two kinds of lenses.

- 1) corresponding to 6.0mm lens, the distance between the installation location and the driver is 60cm~95cm;
- 2) corresponding to 7.5mm lens, the distance between the installation location and the driver is 75cm~115cm.

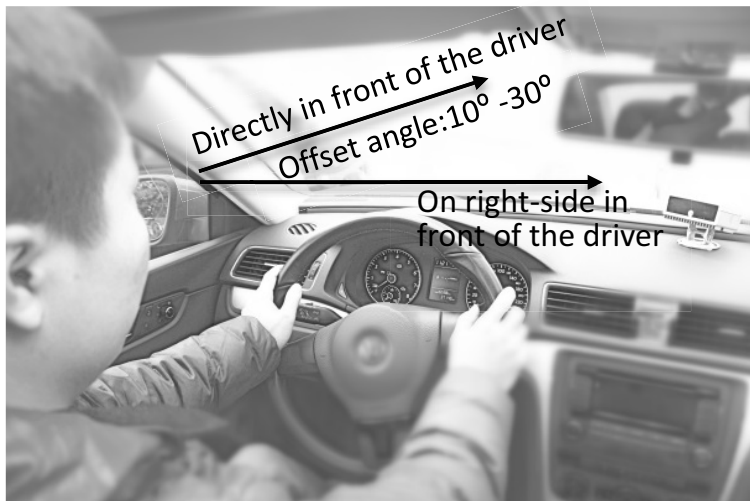


Figure 2. A top view of Installation



Figure 3 A side view of Installation

2. Product list

Product list		
Serial No.	Parts name	Quantity
(1)	Round-head screw	4
(2)	Disc base	1
(3)	Host	1
(4)	Long screw	2
(5)	Locking screw	4
(6)	Bracket	1
(7)	Wing harness	1
(8)	GPS antenna	1
(9)	3G antenna	1
(10)	Instruction book	1

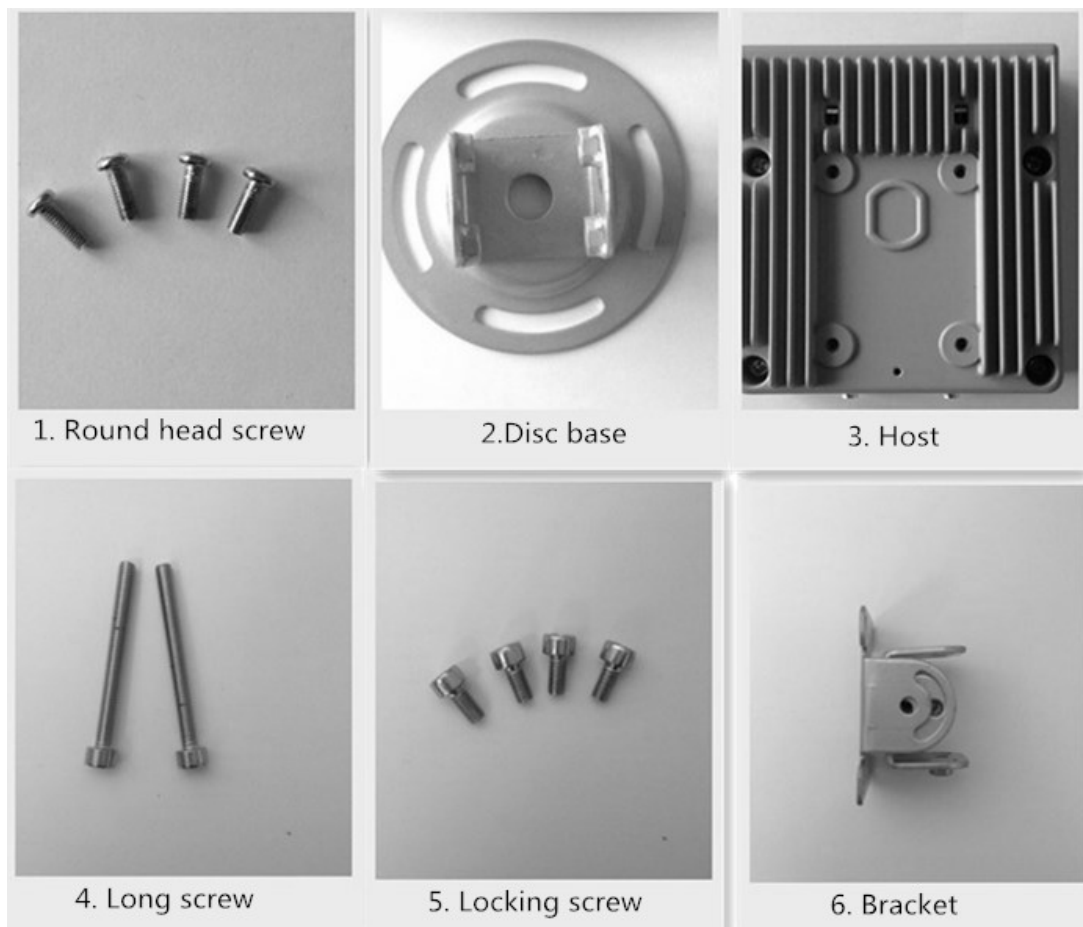


Figure 4. A schematic diagram of parts

3. Calibration

Adjust the angle of RDT-300B up and down to ensure that the driver's face is in the center of the reflective mirror or in the center of the external displayer screen (**it is recommended to use an external displayer for the calibration**).

4. Work status

- 1) After the vehicle starts, RDT-300B starts immediately, after about 16 seconds, two fill lights in front of this product flash followed by a machine startup sound, indicating that the product is ready for work;
- 2) After the vehicle speed exceeds the predetermined speed, the product monitor the driver in real-time in the preparation for triggering fatigue early warning system in time, and will ***send the fatigue state of the driver and the corresponding images to the end user.***
- 3) After the vehicle speed exceeds the predetermined speed , Once the driver is prone to a mild fatigue, the system will send a first-level warning: ***"ding-dong, please pay attention to your safety"***
- 4) After the vehicle speed exceeds the predetermined speed ,Once the driver is prone to be sleepy, the system will send a second-level warning: ***"ding-dong, it is a dangerous driving, beep-beep-beep"***
- 5) After the vehicle speed exceeds the predetermined speed ,Once this product is blocked or the driver is absent for more than 10 seconds, the system will issue a ***"ding-ding"*** sound, and the abnormal information will be sent to the end user. The system will repeat this sound at one-minute interval until the block is removed.

*Nota: Once the vehicle predetermined speed exceeds **15Km/h**, RDT-300B fatigue warning function states.*

5. Test mode

Turning on the product, it utilizes buttons to enter into the test mode **within 10 minutes**, and the testing operations are as follows:

- 1) First, connect the test button well;
- 2) Press button for two seconds and release the button until you hear the notice that "Please make sure whether you are ready to enter the test mode or not";
- 3) Press the button for one second, and release the button until you hear the notice "Please make sure you are ready to enter test mode", at this time the front-located fill light flashes, then you can simulate sleepy state in the test mode;
- 4) Press the button for one second, and release the button until you hear the notice "Please make sure you are ready to exit test mode", at this time the front-located fill light goes off, then you can exit test mode;
- 5) This product will automatically exit the test mode 10 minutes after entering the test mode.

6. SD(TF) card configuration

Adjust volume of the abnormal events prompt/warning by dfsscfcg.xml and webclient.xml files on the SD card, including :

- 1) volume adjust;
- 2) dynamic sensitivity adjust
- 3) over-speed setting
- 4) increase phone number of terminal client to receive message
- 5) speed ratio setting (as you need)
- 6) LDW's parameters setting
- 7) Online platform parameters setting

Dfsscfig.xml and Webclient.xml file created by RoaddefendTools.exe needs to be copied to SD card, which is stick into our device. When you restart the machine and hear “ setting completed ”, RDT-300B init was completed.

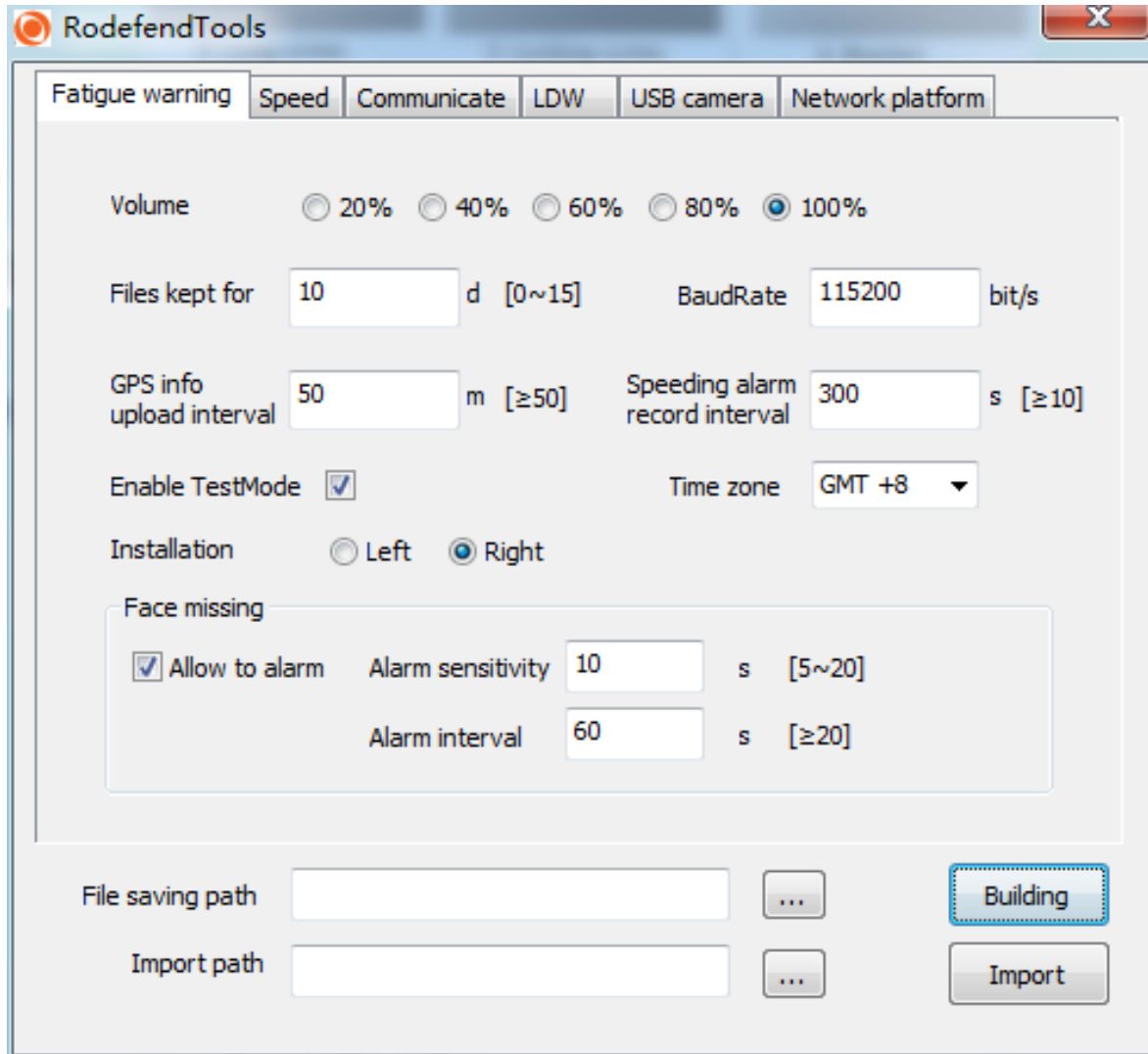


Figure 5. A screenshot of SD card configuration file

III. Electrical Properties

RDT-300B Electrical Properties	
Operating Voltage	+9V ~ +36V
Rated Power	7W
Antenna with RF cable Max. gain	-1dBi
Operating Temperature Range	-20℃ ~ 60℃
Storage Temperature Range	-30℃ ~ 85℃
Humidity	0 ~ 90 RH%±5%

IV.Failures and Solutions thereof

If you encounter the following questions at using the product, please resolve the failures with the aid of the following countermeasures.

The general questions that may have an impact on this product are as follows:

Failures	Possible causes	Solutions
No warning sounds when eyes close for a long time	The driver's face is out of visible scope of the camera	Adjust the product to a position where the complete face of the driver is reflected in <u>the reflective mirror</u>
	The low speed of the vehicle	The fatigue warning function is activated when the vehicle speed exceeds the predetermined speed value
	Failure of GPS satellite search	Connect GPS antenna well without obstructions over the antenna or the vehicle
Cannot boot up	Failure of power supply	Connect the power supply wiring harness well
Insensitiveness of the fatigue warning system with the notice that "the driver has left"	The black Plexiglas in front of this product is dirty	Clean this Plexiglas

Precautions:

1) Clean the black Plexiglas in front of this product for sake of the video capture and the product performance;

2) Make sure that the product is located at appropriate angle and is fixed firmly for the sake of the product performance.

V. Applicable Vehicle

Passenger and cargo transport vehicles, dangerous goods transport vehicles, mining vehicles, taxis and school buses and other vehicles.

VI. Friendly Reminder

1. Will you drive when you are fatigue?

Fatigue driving is different from drunk driving, and people always choose to or have to drive even though they feel fatigue because they claim they are alert to fatigue or they are in a hurry sometimes. So the inevitable questions are as follows: The first problem: people will still choose to drive even though they are fatigue because they have to do so; the second problem: the driver acclaims they can control the fatigue. When having a sense of fatigue, they argue that they can eliminate it through conventional methods such as, having a cup of coffee and other refreshing drinks, smoking, turning music volume up, opening windows, scratching his head, twisting his neck.

However, we should accept the fact that fatigue cannot be eliminated by means of relying on subjective thoughts of the driver with the aid of applying the above-mentioned methods to avoid falling asleep. Those irritating behaviors, such as smoking, increase the volume of the radio, drinking coffee, opening windows cannot actually prevent "drowsiness –induced substance" from influencing the brain, and conversely, they cause paralysis of the driver.

Do you know? Drinking excessive coffee can cause insomnia, headaches, allergies and anxiety.

Do you know? It takes more than 10 minutes for caffeine to get into your blood system to finally generate a stimulus, so a cup of coffee would not have such a quick play as required but you have already fallen asleep. Also, if you have become accustomed to effects of caffeine, stimulating effects will be weaker.

Do you know? Opening the window and increasing the volume of the radio can indeed increase your alertness in a short time, but it will not last long.

2. RDT-300B benefits

RDT-300B employs the method of combining the image recognition with the driving behavior analysis to give a well-intentioned warning when you are tired and inattentive. Once serious fatigue occurs, the system will give you a wakeup call in time, which is a critical moment between life and death.

What a critical moment between life and death, seizing this moment, the wife can give her rushing husband a reminder;

What a critical moment between life and death,
seizing this moment, the driver will not worry about his safety;

What a critical moment between life and death,
seizing this moment, the passenger will not worry about his safety.

Hindsight is not our aim, what is important is to reduce tragedy.

VII. Security Warning

Before using the product, please be sure to carefully read the following precautions to ensure safety.

Warning 1: In order to put the fatigue warning system to good account,

users of this product are responsible for the proper installation and the safe utilization of the system so as to ensure this product will not interfere with the normal operation of the vehicle and other vehicle safety devices, for example, this product shall not obstruct the driver's driving vision, which may causes accidents and injury.

- Do not install this product in a position where the driver's driving vision is obstructed.
- Do not install this product on top of airbag dashboard or at the area where the airbag deploys.
- Do not install this product in the position where passengers are prone to bump into the product.

Warning 2: This fatigue warning system is just an ancillary product for safety aiming to reduce probability of accidents caused by driver fatigue, thereby reducing losses caused by driver fatigue. Drivers themselves are still responsible for the normal operation of the vehicle, so they shall not rely on this product to keep driving in the case of severe fatigue.

VIII. User Notice

- The product works only when in an energized state.
- The product can greatly reduce the probability of accident happenings caused by driver fatigue, but can't absolutely eliminate fatigue.
- The user needs to cooperate and approve that our product needs to access the signal, such as power supply, the speed signal.

To maintain compliance with the requirements, keep the device's antenna 20cm or more away from your body to ensure exposure levels remain at or below the maximum levels.

A HUMAN SAFETY

A HAPPY FAMILY

