Mindtronic AI OMNI Three-In-One Device User Manual

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Contents

Thank you!

Thank you for choosing Mindtronic AI Omni.
This User Manual will provide you with information on the various functions of the Mindtronic AI Omni series. For additional information, please visit our website:
https://www.mindtronicai.com/.
Thank you for your use, pay attention to traffic safety.

Revision History

Security: C

Revision	Revision Date	Contents of Revision	Author
V1.0	*2022.8.10*	First creation	Rigel Chen
V2.0	*2022.10.03*	Second creation	Alex Lai
V3.0	*2022.10.20*	Update ADAS Calibration guide	David Chan

About this Guide

Purpose

OMNI is a three-in-one device that combines DMS (Driver Monitor System), ADAS (Advanced Driver Assistance Systems), and DVR (Digital Video Recorder) driving recorder. This document describes the OMNI hardware, installation methods, and operating instructions.

Product Disclaimer

The information in this document is a trade secret and is provided only to partners of Mindtronic AI, Inc (MAI), and any use, publication or distribution is prohibited without the written permission of Mindtronic AI, Inc (MAI).

FEDERAL COMMUNICATION COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example – use only shielded interface cables when connecting to computer or peripheral devices).

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

CHAPTER 1 PREFACE

Section 1.1 Glossary

ADAS: Advanced Driver Assistance Systems, the full name of Advanced Driver Assistance Systems, is one of the main functions of OMNI. The ADAS camera installed in the front detects the state in front of the vehicle. When an event is detected, an audible warning is issued. At present, OMNI The supported functions are FCWS and LDWS.

DMC: Driver Monitor Camera, the full name of the driver monitoring camera, is a camera installed in front of the driver to obtain the driver's face image for the DMS to identify the driving state.

DMS: Driver Monitor System, the full name of the driver monitoring system, is one of the main functions of OMNI. It uses the images provided by DMC to detect whether the driver is in a state of fatigue or concentrates on driving. When an event is detected, it will emit sounds and lights. warning.

DVR: Digital Video Recorder, the full name of the car digital video recorder, commonly known as the driving recorder, is one of the main functions of OMNI, equipped with three-way camera lenses: front, rear and cockpit.

FCWS: Forward Collision Warning System, the full name of the forward collision avoidance system, when the system expects that the vehicle will collide with the vehicle ahead after a few seconds (the number of seconds can be set), it will issue a warning to remind the driver to brake or avoid obstacles in front.

LDWS: Lane Departure Warning System, the full name is Lane Departure Warning System, when the system detects that the vehicle deviates from the lane, it will issue a warning to remind the driver that the vehicle has left the lane.

CHAPTER 2 PACKAGE CONTENTS

Section 2.1 product summary

PACKAGE CONTENTS

OMNI

DMC

Rear Camera

Power Cable

DMC Cable

3M Stand

SPECIFICATIONS

Camera	**DVR-F**	SONY IMX307-1920*1080p30, FOV=151/125/65, MIPI
	DVR-C	SONY IMX307-1920*1080p30, FOV=151/125/65, MIPI
	DVR-R	SONY IMX307-1920*1080p30, FOV=152/124/64, AHD

	ADAS	SONY IMX307-1920*1080p30, FOV=46/40/22, MIPI
	DMC	OV2735 – 1920*1080p30, FOV=59.46/52/28.66, USB2.0
OMNI	**SoC**	Dual CA53 w/ IPU, encoder, ISP
	Memory	DDR3 – 512MB
	Flash	Nand 4Gb (512MB)
	Panel	2″ color LCD – 480 x 360
	Super Cap.	Series 10F x 2
	G-sensor	6-axis
	GPS	Built-in
	WiFi	Dual mode – host & client
	LTE-4G	Cat.4
	Micro-SD	Socket, up to 128GB (Not included in the product)
	Communication	Serial port for external device data exchange
	Speaker	8Ω/0.5W
	Mic	ECM Microphone
	Button	Menu/up/down/enter
DMC	**Camera**	OV2735 – 1920*1080p30, FOV=59.46/52/28.66, USB2.0
	IR	940nm IR-LED x 2
	PMMA – Brown	90% IR transparency; cover DMC, IR, but leave holes for indicator
	Indicator LED	Event indicator LED x 1; Face presence indicator LED x 1
Product C ontents	**OMNI**	Computing, A/V encoder, GPS, G-sensor, speaker/mic, and LCD, LTE, Wi-Fi
	DMC	DMC box and IR/LED w/ PWM control via USB type-C
	Rear Camera	6M AHD Camera
	Power Cable	12V/24V input regulating to 5V/2.5A
	DMC Cable	2.5M USB-C Cable

	Stand	OMNI Stand and DMC Stand
General	**Temperature**	Operating temperature -20°C – 65°C

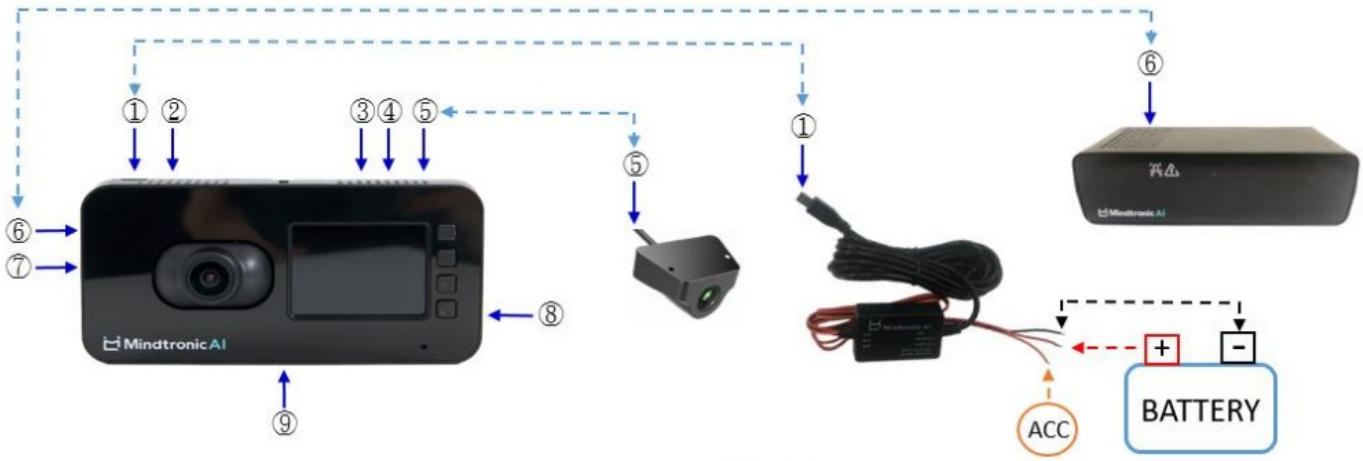
OMNI
OMNI includes three cameras ADAS DVF-F DVR front camera DVR-C DVR cabin camera Monitor and four control buttons

DMC
DMC includes a DMC Camera two infrared source(IR) and two LED indicator

DVR-R
External DVR rear Camera

CHAPTER 3 PRODUCT INSTALLATION

Section 3.1 Omni installation



1. ① Power
   Mini USB 5V/2.5A
2. ② Vibrator
   DC Jack 5V/200 mA output
3. ③ Ext-GPS

Micro USB / External GPS Input

4. ④ Cellular

   Micro SIM Card

5. ⑤ Rear Camera

   USB-C Rear Camera Input

6. ⑥ DMC Camera

   USB-C DMC Camera Input

7. ⑦ Button

   Power ON/OFF

8. ⑧ Communication

   Micro USB / UART Communication

9. ⑨ Storage

   Micro SD Card

Section 3.2 DMC installation

SECTION 3.3 ADAS CALIBRATION

ADAS calibration is the key to secure the system accuracy. Calibrate your ADAS camera before the first run, after the device shifted or when the ADAS not working properly. This section explain the process of ADAS camera calibration.

Before start

Park your car at flat ground. Best to install at a location that you can observe the horizon. Prepare a horizontal/vertical level tool if horizon is not visible. Prepare a ruler for measuring the location of camera within vehicle.

To setup ADAS camera, you need to measure the location of the ADAS camera in car. The location of ADAS camera is defined by the camera to bumper, left, right, and ground. Measure the camera height from the ground to the center of the camera in meter, e.g., 1.30 m. Please note that the ADAS camera is the right one when facing front. The left camera is for DVR application. Measure the distance to the right and left boundary in meter, e.g., 0.8 m.

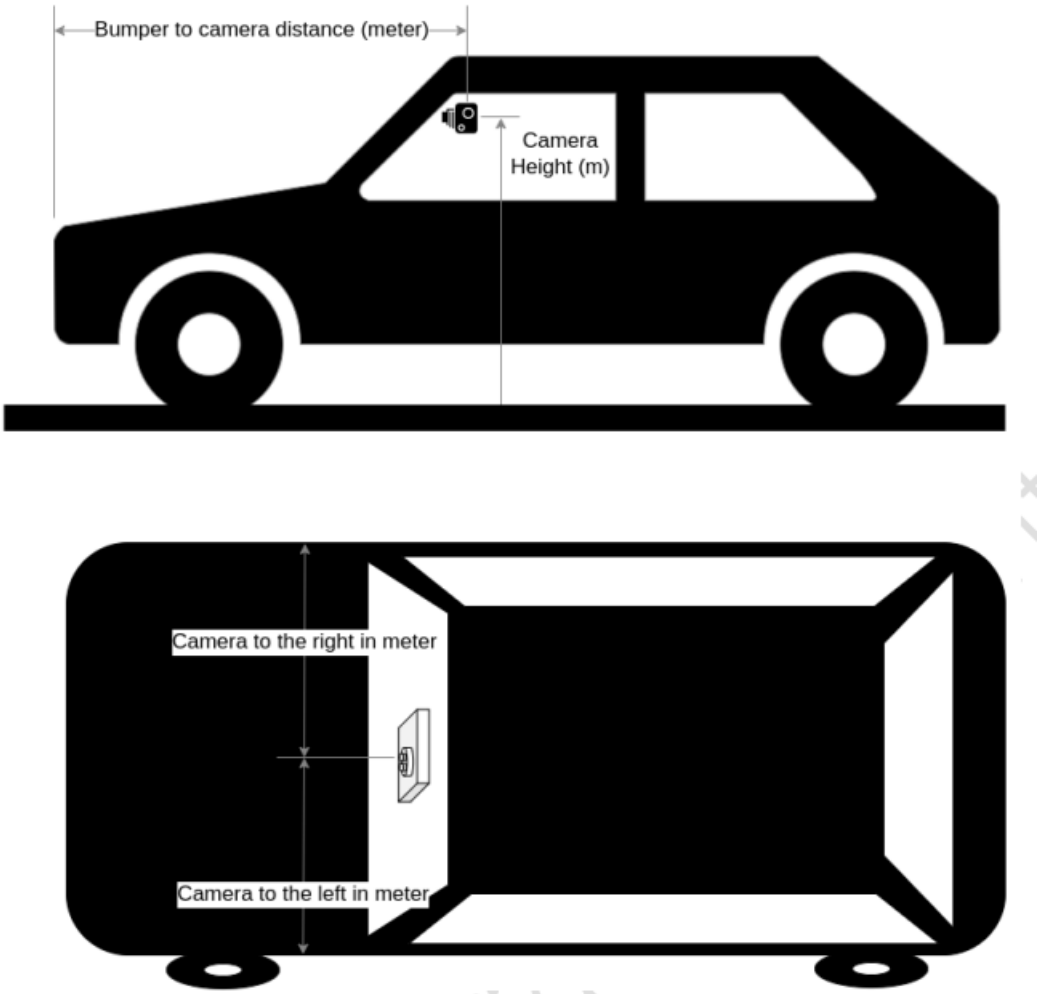
The illustration of the camera location is shown as bellow:

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.



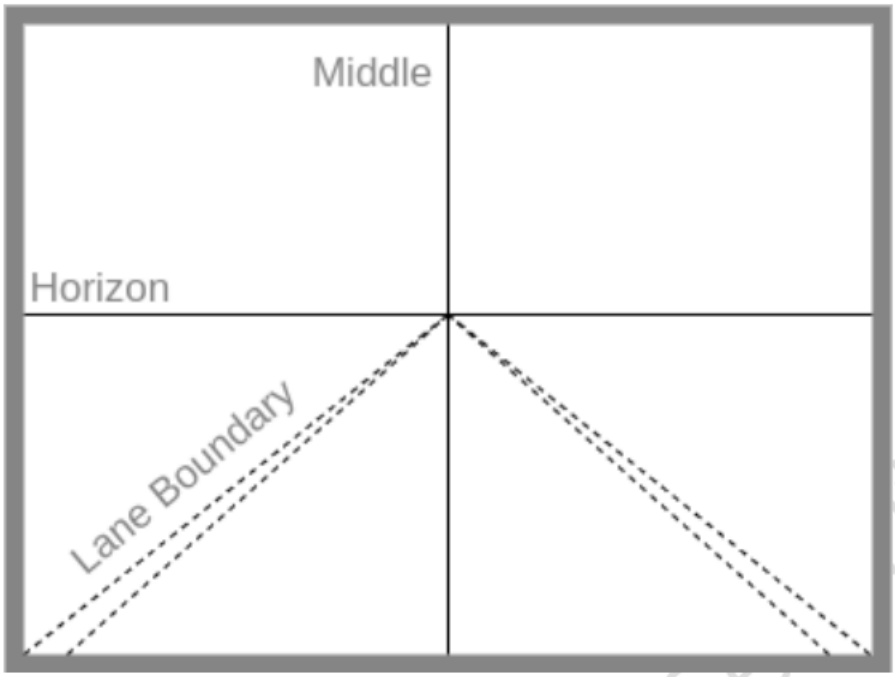
Camera location. Please note that the right camera is the ADAS camera. The distances are measured from the center of the ADAS camera to the boundary.

Before the first use, change of vehicle, or after device shifted by force, ADAS calibration is required to be conducted to let the device full functional. Here is the calibration steps:

1. Press “menu” button, select “ADAS Settings” by up/down button, then press “enter”. Select “Calibration” to enter ADAS calibration mode.

   In camera calibration mode, there is one vertical and horizontal guide line for you to align the ADAS camera.

   Remember to align your camera only when car is locate at a flat ground.



Alignment Guide Lines in Calibration mode. Middle vertical line is the center of the bumper location. Horizontal guide line is for alignment of the horizon.

2. Adjust “Camera Height” by up/down button. The unit is meter. Press “enter” after finish to adjust the next parameter.
3. Adjust ”Pitch”. The unit is degree. Press up/down to adjust the horizon guide line. Align the horizon with the guide line by rotating the device. Press “enter” to select next parameter.
4. Adjust “Bumper” by pressing up/down button. The unit is meter. Press “enter” to select the next parameter.
5. Adjust ”Left Boundary” by pressing up/down button. The unit is meter. Press “enter” to select the next parameter.
6. Adjust ”Right Boundary” by pressing up/down button. The unit is meter. After the adjustment of step 4~6, align the middle guide line to the center of bumper by rotating the device. Make sure to keep the horizon guide line align with the horizon at the same time.
7. Press ”menu” to exit calibration mode.
   Caution: OMNI will not detect ADAS event or trigger alarm in the calibration mode. Press “menu” to exit calibration mode before use.

CHAPTER 4 FUNCTION AND FEATURES

Section 4.1 Introduction

OMNI has three main functions DVR DMS and ADAS According to previous chapter and finish installation these three functions can operate correctly Users can view the real-time image , play the DVR video and modify user settings by using the Main Unit monitor and buttons.

Section 4.2 Operation Instructions

There are four buttons on the OMNI Main Unit, from top to bottom are “Menu”, “Up”, “Down” and “Confirm”, users can operate the Main Unit by using these four buttons. There are two different operation Modes, it can be switch by using “Menu” button.

Preview Mode

Users can preview all camera image in Preview Mode, switch to “Menu Mode” by pressing the “Menu” button

Menu Mode
Users can modify the settings, play video and do ADAS initial calibration in Menu Mode Users can go back to the upper layer Menu by pressing the “Menu” button, press the “Menu” button in the Main menu can switch to the Preview Mode

PREVIEW MODE
The OMNI monitor can preview the DVR image, press the “Up” or “Down” button can switch the camera image in the Preview Mode. The order of switching is Front, Rear, Cabin.

MENU MODE
Users can modify the OMNI settings and play the video in the Menu Mode, the operation detail and function features are listing in the following chapters.

Section 4.3 Event
DMS EVENT
DMS Support following events

Event Name	**abbreviation**	**Explanation**
No detect	DA	Trigger alert event while DMS cannot detect Driver
Sleep	SL	Trigger alert event while Driver close eyes exceed 1 second.
Drowsy	FT	When PRECLOS is within 20 seconds> 50%trigger alarm
Yawning	YW	Trigger event while Driver yawn No a lert
Attention	OR	The alarm is triggered when the drive r’s eyes look away the windshield are a for more than 1 second or when it is over 2 seconds
Smoking	SM	Trigger alert event while Driver is smo king
Phone talking	PH	Trigger alert event while Driver answe r the phone call

When event occurs, OMNI will make voice , the DMC alert light will turn on at the same time to remind Driver aware the safety

ADAS EVENT
ADAS Support following events

Event Name	abbreviation	Explanation
FCWS	FCWS_TTC	Triggered when the vehicle detects th e collision within 2 seconds
LDWS	LDWS	Triggered when a lane departure is d etected.

HAW/HDW DETECTION
OMNI can detection vehicle accelerate and deceleration

Event Name	abbreviation	Explanation
HAW	HARSH_ACC	While acceleration > 300 mg, it will tri gger event (g = 9.8m/s^2)
HDW	HARSH_BRAKE	While Deceleration > 1100 mg, it will t rigger event (g = 9.8m/s^2)

COLLISION DETECT
OMNI can detect Collision event

Event Name	abbreviation	Explanation
Collision Detect	COLLISION	While acceleration >= 2800 mg, it will trigger the event (g = 9.8m/s^2)

Section 4.4 DVR Function and Configuration

DVR RECORDING
The DVR recording file will be saved into the “Normal” directory of the SD card automatically, the recording time length of each recording file is 10 minutes

DVR SETTINGS
Press the “Menu” button on the Monitor it will display the main Menu Selecting the “DVR Settings” by using the Up and Down buttons press the Confirm button it will enter the “DVR settings” Menu
In the DVE settings Menu, users can Switch ON/OFF the DVR camera by pressing the Confirm button, details are listing in the following table.

Item	Options	Explanation
DVR-Front	ON/OFF	Switch ON/OFF the recording functio n of front DVR camera
DVR-Rear	ON/OFF	Switch ON/OFF the recording functio n of rear DVR camera
DVR-Cabin	ON/OFF	Switch ON/OFF the recording functio n of DVR-cabin camera
Format SD Card	N/A	Format SD Card

DVR PLAYER
OMNI can play the recording video saved in the SD card. Press the “Menu” button on the Monitor it will display the main Menu Selecting the “DVR Player” press the Confirm button to enter the next page Menu OMNI has three ways DVR camera there are three options, “Front”, “Rear” and “Cabin”, these options indicate the Front camera, Rear camera and Cabin camera users can select one of the camera, then press the Confirm button to select the video from list, after selecting users can press Confirm button to play the video

Section 4.5 DMS Function and configuration

DMS EVENT DETECT
See Chapter 4.3

DMS FACIAL DETECT
The DMS facial detecting light will turn on, when the DMS detecting the Driver’s face. Instead, The DMS facial detecting light will turn off, when the DMS cannot detect the Driver’s face

DMS SETTINGS
Press the “Menu” button on the Monitor it will display the main Menu Selecting the “DMS Settings” press Confirm button it will enter the DMS setting Menu In the DMS settings Menu, users can press the Confirm button to configure the event detecting threshold or event alerting options The details are listing in the following table

Item	Options	Explanation
DA	ON/OFF	Switch ON/OFF DA Alert
SL	ON/OFF	Switch ON/OFF SL Alert
FT	ON/OFF	Switch ON/OFF FT Alert
OR	ON/OFF	Switch ON/OFF OR Alert
SM	ON/OFF	Switch ON/OFF SM Alert
DA Threshold	1~3	Unable to detect how long driving last s before triggering the alarm
SL Threshold	1~3	How long does it take to close the ey es before triggering the alarm
OR Threshold	1~3	How long does it take for the driver’s view look away the windshield area b efore the alarm is triggered

Section 4.6 ADAS

ADAS EVENT DETECT

See Chapter 4.3

ADAS SETTINGS

Press the “Menu” button on the Monitor it will display the main Menu Selecting the “ADAS Settings” then Click the Confirm button it will enter the ADAS settings Menu In the ADAS settings Menu, users can press the Confirm button to configure the event detecting threshold or event alerting options The details are listing in the following table

Item	Options	Explanation
ISA	ON/OFF	Switch ON/OFF ISA Alert
LDWS	ON/OFF	Switch ON/OFF LDWS Alert
FCWS	ON/OFF	Switch ON/OFF FCWS TTC Alert
TTC Threshold	1~3	Set how many seconds it will be trigg ered before the vehicle will collide
Calibration	N/A	Calibration Mode See Chapter 3

Section 4.7 Others

TIME SETTINGS

Press the “Menu” button on the Monitor it will display the main Menu Selecting the “Time Settings” it can modify the System time after pressing the Confirm button 4.7.2 UPLOADING CLOUD SETTINGS

Press the “Menu” button on the Monitor it will display the main Menu Selecting the “Cloud Settings” pressing the Confirm button can modify the setting about Uploading the data to Cloud server

Item	Options	Explanation
Cloud	ON/OFF	Uploading the data to Cloud server or not

Documents / Resources

	Mindtronic AI OMNI Three-In-One Device [pdf] User Manual 2BBAB-MAI-OMNI, 2BBABMAIOMNI, OMNI Three-In-One Device, OMNI, Three-In-One Device

References

- Home | Mindtronic Ai