

# IBOX-500

NXP® i.MX 8QuadXPlus Automotive Grade SoC/ On-board LPDDR4 3GB/ On-board eMMC 5.1 32GB/ 1 x GbE / 2 x RS-232/ 1 x DVI-D Single-Link/ 2 x USB 3.2

## Features

- NXP® i.MX 8QuadXPlus Automotive SoC (AEC-Q100 Grade 3)
- On-board LPDDR4 3 GB and eMMC 5.1 32 GB
- Built-in Accelerometer, Gyroscope, and Magnetic Sensor
- 3 x CAN/ CAN FD
- 1 x DVI-D Single-Link (SINTRONES proprietary pin define)
- 8 x DI, and 4 x DO and 2 x RS-232
- 1 x M.2 3042/3052 Key B, 1 x M.2 2242 Key B, 1 x M.2 Key A-E
- 1 x Micro-SD Slot
- 9-60V DC Power Input
- Operating Temp.: -40~70°C



## Introduction

IBOX-500 is an ultra-compact fanless in-vehicle Computer with 5G or LTE connectivity. It utilizes NXP® i.MX 8QuadXPlus Automotive AEC-Q100 Grade 3 Processor up to 1.2 GHz. IBOX-500 features an ultra-compact design which can easily fit into restricted spaces. As robust connectivity, the system can select 5G, LTE, GPS, and Wi-Fi / Bluetooth by M.2 modules. It is the perfect solution for digital cluster and intelligent cockpit, and fleet management. Furthermore, it features smarter vehicle power Ignition and it can also effectively support cars in extreme weather and operating conditions, such as snowplows, Trucks, Buses, taxis, and Forklifts.

## Specifications

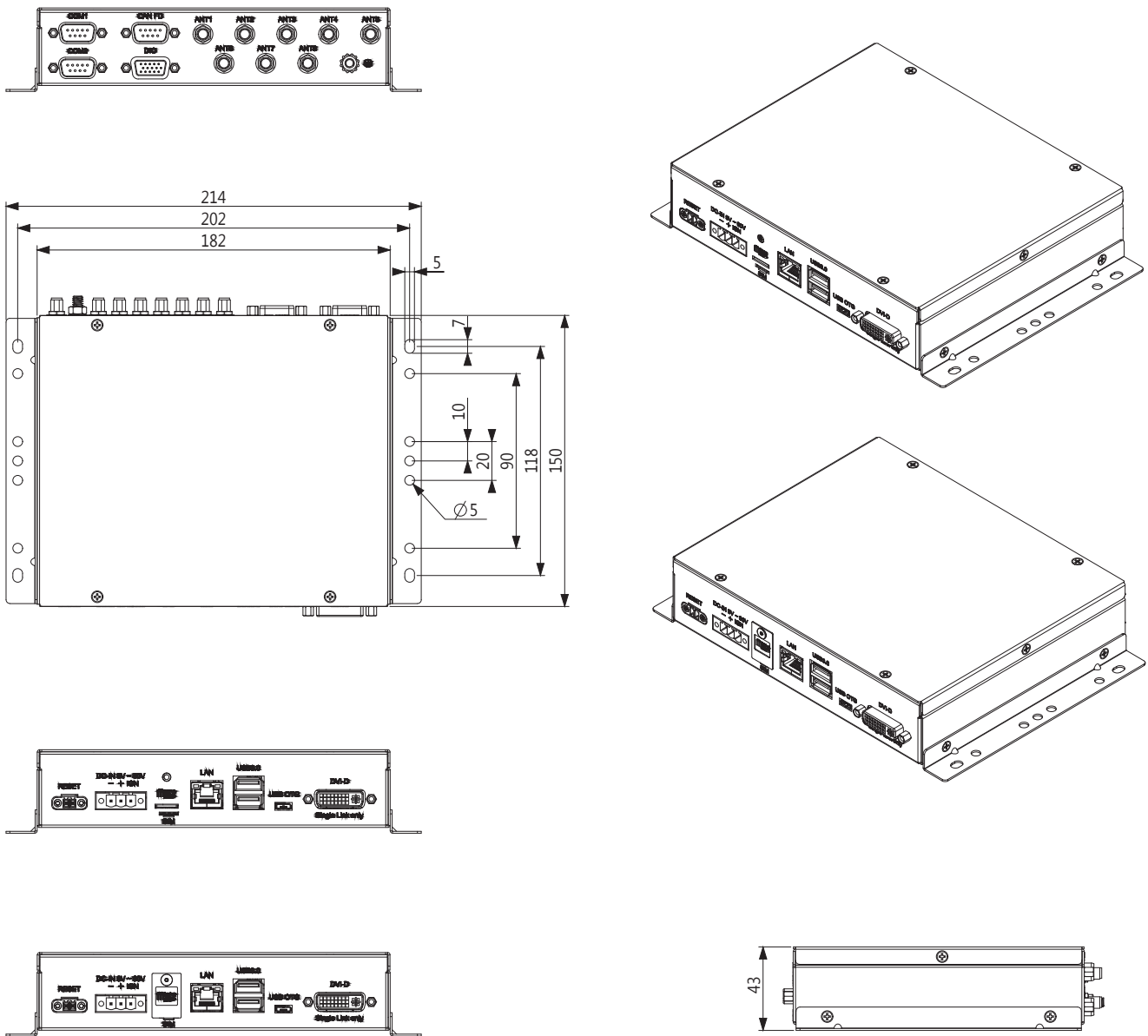
System	
CPU	NXP i.MX 8QuadXPlus Automotive SoC (AEC-Q100 Grade 3)
	Integrated 4 x Arm Cortex®-A35 Cores Up to 1.2 GHz
	1 x Arm Cortex®-M4F Core Up to 264 MHz
Memory	On-board LPDDR4 3 GB
Sensor	Built-in Accelerometer, Gyroscope, and Magnetic Sensor
Watchdog	1 ~ 255 Level Reset
Graphics	
CPU Built-in Graphics	1 x GC7000Lite with 4 x Vec4 shader cores (16 execution units) Max Resolution (DVI-D Single Link) : 1920 x 1080 @ 60Hz
I/O	
USB	2 x USB 3.2 5 Gbps
	1 x USB 2.0 OTG
LAN	1 x RJ-45 for GbE
Video	1 x DVI-D Single Link (SINTRONES proprietary pin define)
DIO	8 x DI (5~60VDC) 4 x DO (5VDC, 100mA)
CAN Bus	3 x CAN / CAN FD
Expansion Bus	1 x M.2 3042/3052 Key B for WWAN w/ 1 x nano SIM Slot
	1 x M.2 2242 Key B for GPS
	1 x M.2 Key A-E for Wi-Fi
Serial Port	2 x RS-232
Storage	
Type	Onboard eMMC 5.1 32 GB 1 x Micro SD Slot
Software	
Operating System	Yocto Linux

Environmental	
Operating Temp.	-40 ~ 70°C, ambient w/ 0.6m/s airflow *Operating temp. varies by accessories installed.
Storage Temp.	-40 ~ 80°C
Relative Humidity	10% RH – 90% RH (non-condensing)
Vibration (with SSD)	IEC 60068-2-64, Random, 2.5G@5~500Hz, 1hr/axis MIL-STD-810G, Method 514.6, Procedure I, Cat.4, Operating
Shock	Operating: MIL-STD-810G, Method 516.6, Procedure , Trucks and semi-trailers=15G (11ms) with SSD
Certifications	CE, FCC Class A, E13, ECE R118
Power Requirement	
Power Input	9V - 60V DC Power Input
Power Protection	Automatics Recovery Short Circuit Protection
Power Mgmt.	Vehicle Power Ignition for Variety Vehicle
Power Off Control	Power off Delay Time Setting by Software
Mechanical	
Construction	Steel
Mounting	Wall-mount
Weight	1,000g (Barebone)
Dimensions	214(L) x 150(W) x 43(H) mm

All specifications are subject to change without notice.

## Dimensions

Unit : mm



## Ordering Information

Part Number	IBOX-500
Description	NXP i.MX 8QuadXPlus Automotive Grade SoC/ Onboard LPDDR4 3GB/ Onboard eMMC 5.1 32GB/ 1 x GbE / 2 x RS-232/ 1 x DVI-D Single Link / 2 x USB 3.2
State of Origin	Made in Taiwan

## Optional Accessories

Storage	MicroSD Card 64/128/256GB 3D TLC WT
Wi-Fi	M.2 2230 Key A-E / IEEE 802.11 a/b/g/n/ac, Wi-Fi 6E
Modem	M.2 3042 Key B 5G & LTE Module
GPS	M.2 GPS Module

All specifications are subject to change without notice.



# **IBOX-500 Series Sales Kit**

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Jan. 19<sup>th</sup> 2024

# IBOX-500 Series Feature Highlight

## Built-in Features

- LPDDR4 3GB & eMMC5.1 32GB
- 9-axis sensors – Accelerometer, Gyroscope, and Magnetic sensors
- 3 x CAN/CAN FD



## Efficiency

- Barebone power consumption under 10W. (100% CPU & 75% RAM loading)
- Lower total cost for x86 system
- Compact size and light weight – 214 x 150 x 43 mm, 550g

## Effortless Installation

- One cable connection to VDM

## Longevity

- 15 years until May 2035

9-60  
VDC

EV Ready

E-Mark

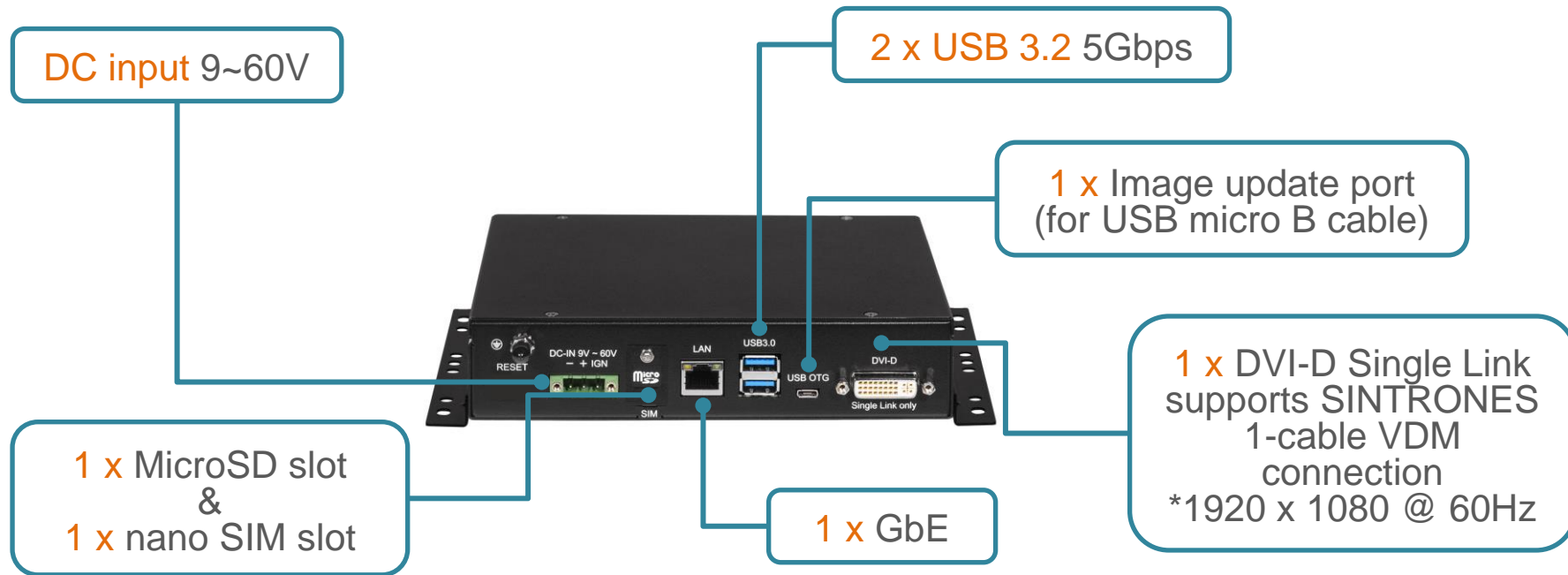
E-Mark



One Cable  
for VDM

# IBOX-500 Series Front I/O

NXP i.MX 8QuadXPlus – 4 x Cortex-A35 cores, 1 x Cortex-M4F core  
Automotive AEC-Q100 Grade 3 Operating Temp. (-40° to 125° C Tj)

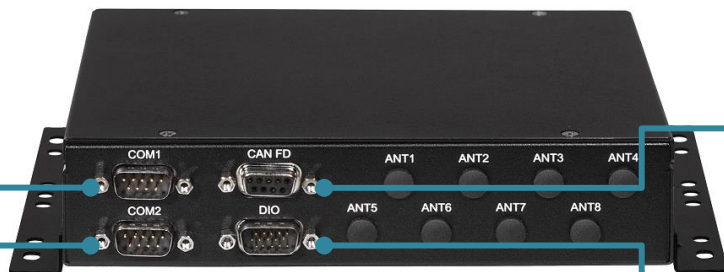


# IBOX-500 Series Rear I/O

NXP i.MX 8QuadXPlus – 4 x Cortex-A35 cores, 1 x Cortex-M4F core  
Automotive AEC-Q100 Grade 3 Operating Temp. (-40° to 125° C Tj)

COM1 - RS232

COM2 - RS232



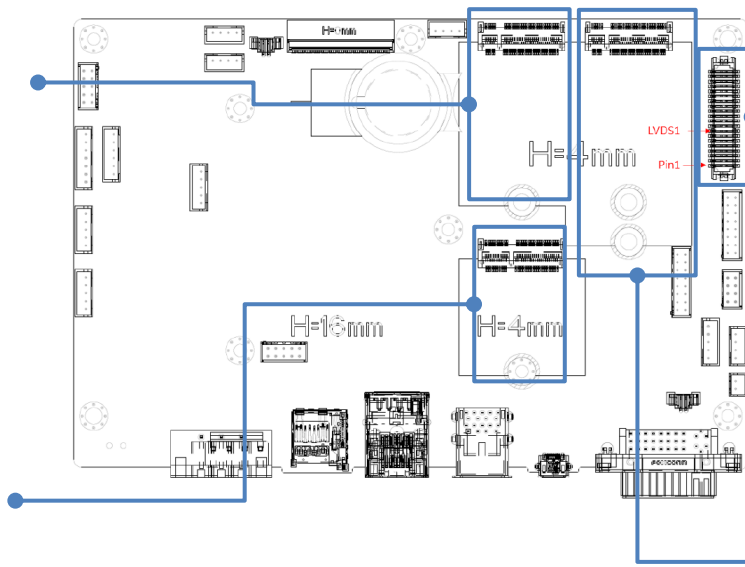
3 x CAN / CAN FD

8 x DI, 4 x DO

# IBOX-500 Expansion -

M.2 2242 B-Key GNSS  
Innodisk ANNA-M01U1

M.2 2230 AE-Key WiFi  
Intel AX210



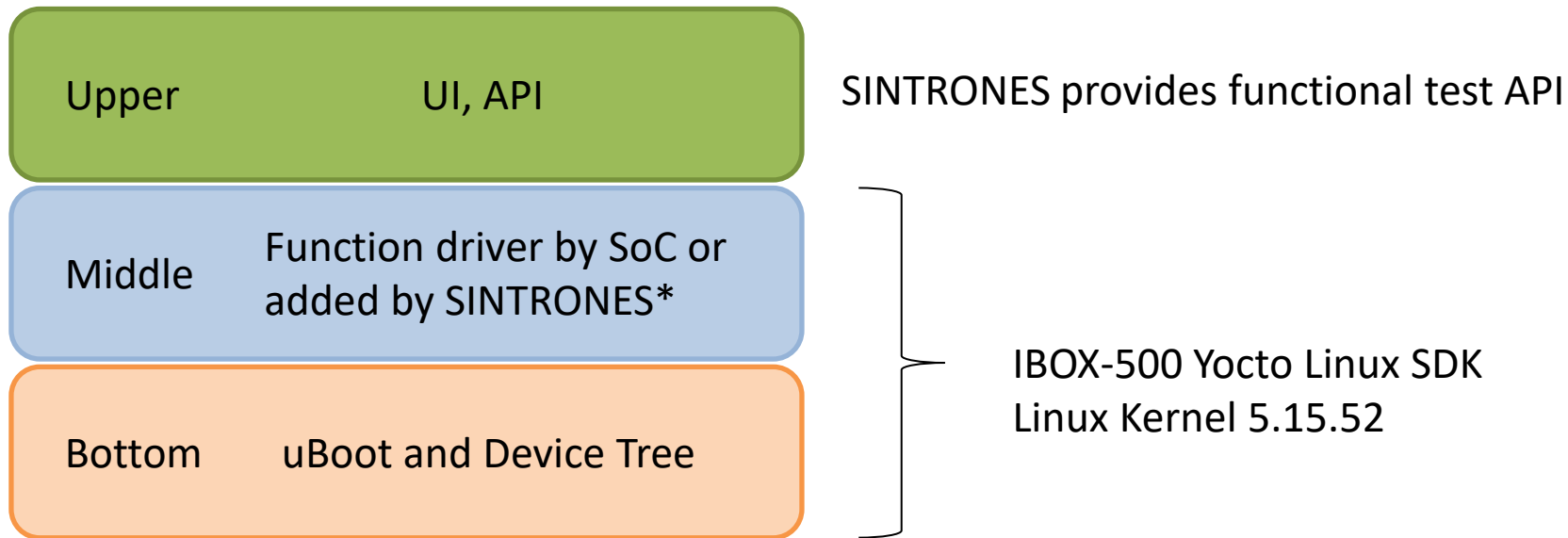
2 x LVDS  
Each up to 1920\*1080@60Hz

M.2 3042/52 B-key WWAN  
5G – Compal RXM-E2  
LTE – SIMCOM 7906E

\*additional heatsink required for 5G module

# OS Support and Software Architecture

Supports Yocto Linux only



\*Functions added by SINTRONES –

1. Ignition control 2. COM1 RS232/422/485 adjustment 3. Specific GNSS/WWAN/WiFi driver 4. DIO 5. ADC



# Functional Test API

**SINTRONES TEST DEMO**

HW Version : -----  
Package : R01  
OS Version : 5.15-kirkstone (kirkston  
Commit ID : \*\*\*\*66a63e20  
Build Time : 2023-12-21-12:56:05  
MCU Version : 0.0.0-0.4  
Serial Number : r123456789  
S/N Write/Read :    
CPU Usage : 0.3%  
MEM Usage : 28.7%  
Physical Address : d0:4c:c1:07:bf:75  
Physical Link Speed : Unknown - Unknown

**DEVICES**

- LSM6DSRTR : **PASS**
- LIS2MDLTR : **PASS**
- ETHERNET(eth0) : **PASS**
- WIRELESS(wlan0) : **PASS**
- LTE MODULE : **PASS**
- SIM CARD : **PASS**
- GPS MODULE : **PASS**
- AUDIO : **PASS**
- USB HUB : **PASS**
- COM1/COM2 : **PASS**
- CAN0/CAN1/CAN2 : **PASS**
- RTC : **PASS**
- MCU : **PASS**

**COM PORT**

COM1 : RS232  
COM2 : RS232

**DIO**

DO1(H)	DI1(H)	DI5(H)
DO2(H)	DI2(H)	DI6(H)
DO3(H)	DI3(H)	DI7(H)
DO4(H)	DI4(H)	DI8(H)

**ADC**

ADC1	ADC2	ADC3
1.27	1.26	1.25

**IGNITION**

	hh	mm	ss
ON	0	0	1
OFF	0	0	1

Sample code of functional test API provides fast software deployment.

# Targeting Application

Fleet Management / Driver's Terminal / In-vehicle IoT Gateway / EV Charging



# Successful PoC

## Digital Cluster / Driver's Terminal for EV Buses

- CAN bus – vehicle status reading and instruments controlling
- 9-axis sensor – abnormal status detection



# Ordering Information

## System

Item	Ordering P/N	Description
IBOX-500	760500060010	NXP i.MX 8X Quad Plus SoC/LPDDR4 3GB/eMMC 5.1 32GB

## Accessories for assembling

Item	Ordering P/N	Description
Wifi kit	580001042000	WIFI+BT 6E AX210 M.2 Card WT Kit w/ ANTx2 Pig tail F-M x2
LTE kit	587906140010	LTE 4G Kit SIM7906E M.2 Card w/ 4G Antenna*1, pig tail F-F*1
GNSS kit	580008042001	GNSS M.2 2242 B key USB ANNA-M01L1 WT Kit w/ ANT*1, pig tail F-F*1

## Accessories w/o assembling

Item	Ordering P/N	Description
uSD	521206410020	uSD CARD, 64GB -20~85°C
uSD	521212810020	uSD CARD, 128GB -20~85°C
uSD	521225610020	uSD CARD, 256GB -20~85°C

# Thank you

