



NEXCOM International Co., Ltd.

Mobile Computing Solutions
Vehicle Telematics Computer
VTC 210 Series
User Manual

CONTENTS

Preface

| | |
|--|------|
| Copyright | iv |
| Disclaimer | iv |
| Acknowledgements | iv |
| Regulatory Compliance Statements | iv |
| Declaration of Conformity | iv |
| RoHS Compliance | v |
| Warranty and RMA | vi |
| Technical Support and Assistance | ix |
| Conventions Used in this Manual | ix |
| Global Service Contact Information | x |
| Package Contents | xii |
| Ordering Information | xiii |

Chapter 1: Product Introduction

| | |
|---------------------------------------|---|
| Overview | 1 |
| Key Features | 1 |
| VTC 210 Physical Features | 2 |
| Front View | 2 |
| Rear View | 2 |
| VTC 210 Hardware Specifications | 3 |
| Mechanical Dimensions: VTC 210 | 5 |
| Knowing Your VTC210 | 6 |
| Front Panel | 6 |
| Rear Panel | 7 |

Chapter 2: Jumpers and Switches

| | |
|---|----|
| Before You Begin | 8 |
| Precautions | 8 |
| Jumper Settings | 9 |
| Locations of the Jumpers and Connectors | 10 |
| Top View | 10 |
| Bottom View | 11 |
| DIP Switch Settings | 12 |
| MCU Input Voltage | 12 |
| Connector Pin Definitions | 13 |
| External I/O Interfaces | 13 |
| LAN1 Port | 13 |
| LAN2 Port | 13 |
| M12 LAN Connector | 14 |
| M12 LAN Connector | 14 |
| HDMI1 Connector | 15 |
| HDMI2 Connector (BOM option VGA) | 15 |
| VGA Connector (BOM option HDMI2) | 16 |
| Reset Button | 16 |
| Power Button Connector | 17 |
| Channel Switch | 17 |
| Flash Button | 18 |
| Connector location: SW5 | 18 |
| SARADC Button | 18 |
| Connector location: SW6 | 18 |
| PMIC Reset Button | 19 |

| | |
|------------------------------|----|
| Connector location: SW7..... | 19 |
| PMIC Power On Button | 19 |
| Connector location: SW8..... | 19 |
| USB2.0 Connector | 20 |
| Audio Connector | 20 |
| Internal Connectors..... | 21 |
| DC IN Connector..... | 21 |
| DC OUT Connector..... | 21 |
| RTC Battery Connector..... | 22 |
| COM Connector | 22 |
| USB OTG Wafer | 23 |
| Micro SIM Slot | 23 |
| SD Card Slot | 24 |
| SOC Debug Port..... | 24 |
| GPS Signal Connector | 25 |
| WLAN Module | 25 |
| MCU DEBUG Port | 26 |
| MCU Download Port..... | 26 |
| M.2 3042 Key B Socket | 27 |
| Connector location: CN2..... | 27 |

Chapter 3: System Setup

| | |
|--|----|
| Removing the Chassis Cover | 28 |
| Installing a WLAN Module..... | 29 |
| Installing a WWAN Module (Mini-PCIe) | 30 |
| Installing a SIM Card and MicroSD Card | 31 |

Appendix A: GNSS Feature

| | |
|--------------------------------|----|
| uBlox-NEO M9N Overview | 32 |
| Technical Specifications | 32 |

PREFACE

Copyright

This publication, including all photographs, illustrations and software, is protected under international copyright laws, with all rights reserved. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written consent from NEXCOM International Co., Ltd.

Disclaimer

The information in this document is subject to change without prior notice and does not represent commitment from NEXCOM International Co., Ltd. However, users may update their knowledge of any product in use by constantly checking its manual posted on our website: <http://www.nexcom.com>. NEXCOM shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of any product, nor for any infringements upon the rights of third parties, which may result from such use. Any implied warranties of merchantability or fitness for any particular purpose is also disclaimed.

Acknowledgements

VTC 210 is a trademark of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance



NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force in to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

How to recognize NEXCOM RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

NEXCOM manufactures products that are new or equivalent to new in accordance with industry standard. NEXCOM warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NEXCOM.

NEXCOM Return Merchandise Authorization (RMA)

- Customers shall enclose the “NEXCOM RMA Service Form” with the returned packages.
- Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the “NEXCOM RMA Service Form” for the RMA number apply process.
- Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.
- Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as “Out of Warranty.”
- Any products returned by NEXCOM to other locations besides the customers’ site will bear an extra charge and will be billed to the customer.

Repair Service Charges for Out-of-Warranty Products

NEXCOM will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

System Level

- Component fee: NEXCOM will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- Items will be replaced with NEXCOM products if the original one cannot be repaired. Ex: motherboard, power supply, etc.
- Replace with 3rd party products if needed.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Board Level

- Component fee: NEXCOM will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety Information

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needlenose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.
3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.
4. SIM: Do not insert or remove the SIM card when the **system is powered** on. Always **power** off the **system** before inserting or removing the SIM card.

Safety Precautions

- Read these safety instructions carefully.
- Keep this User Manual for later reference.
- Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
- Keep this equipment away from humidity.
- Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
- Do not leave this equipment in either an unconditioned environment or in a above 40°C storage temperature as this may damage the equipment.
- The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
- All cautions and warnings on the equipment should be noted.
- If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- Never pour any liquid into an opening. This may cause fire or electrical shock.
- Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
- If one of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
- Do not place heavy objects on the equipment.
- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
- CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.
2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
 - Product name and serial number
 - Detailed information of the peripheral devices
 - Detailed information of the installed software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wordings of the error messages

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

Conventions Used in this Manual



Warning:

Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.



Caution:

Information to avoid damaging components or losing data.



Note:

Provides additional information to complete a task easily.

Global Service Contact Information

Headquarters

NEXCOM International Co., Ltd.

9F, No. 920, Zhongzheng Rd.,
Zhonghe District, New Taipei City, 23586,
Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
www.nexcom.com

Asia

Taiwan

NexAIoT Headquarters

Industry 4.0 and Cloud Services

13F, No.922, Zhongzheng Rd.,
Zhonghe District, New Taipei City,
23586, Taiwan, R.O.C.
Tel: +886-2-8226-7796
Fax: +886-2-8226-7926
Email: jacobhuang@nexaiot.com
www.nexaiot.com

NexAIoT Co., Ltd.

Taichung Office

16F, No.250, Sec. 2, Chongde Rd.,
Beitun District,
Taichung City, 406, Taiwan, R.O.C.
Tel: +886-4-2249-1179
Fax: +886-4-2249-1172
Email: jacobhuang@nexaiot.com
www.nexaiot.com

NexCOBOT Taiwan Co., Ltd.

13F, No.916, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7926
Email: jennyshern@nexcobot.com
www.nexcobot.com

GreenBase Technology Corp.

13F, No.922, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7900
Email: vivianlin@nexcom.com.tw
www.nexcom.com.tw

DivioTec Inc.

19F-1A, No.97, Sec.4, ChongXin Rd.,
Sanhong District,
New Taipei City, 24161, Taiwan, R.O.C.
Tel: +886-2-8976-3077
Email: sales@diviotec.com
www.diviotec.com

AIoT Cloud Corp.

13F, No.922, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
Email: alantsai@aiotcloud.net
www.aiotcloud.dev

EMBUX TECHNOLOGY CO., LTD.

13F, No.916 Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
Email: info@embux.com
www.embux.com

TMR TECHNOLOGIES CO., LTD.

13F, No.916 Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
Email: services@tmrtek.com
www.tmrtek.com

China

NEXSEC Incorporated

201, Floor 2, Unit 2, Building 15, Yard 3,
Gaolizhang Road, Haidian District,
Beijing, 100094, China
Tel: +86-10-5704-2680
Fax: +86-10-5704-2681
Email: marketing@nexsec.cn
www.nexsec.cn

NEXCOM Shanghai

Room 406-407, Building C, No 154, Lane 953,
Jianchuan Road, Minhang District,
Shanghai, 201108, China
Tel: +86-21-5278-5868
Fax: +86-21-3251-6358
Email: sales@nexcom.cn
www.nexcom.cn

NEXCOM Surveillance Technology Corp.

Floor 8, Building B3, Xiufeng Industrial Zone,
GanKeng Community, Buji Street,
LongGang District,
ShenZhen, 518112, China
Tel: +86-755-8364-7768
Fax: +86-755-8364-7738
Email: steveyang@nexcom.com.tw
www.nexcom.cn

NEXGOL Chongqing

1st Building No.999,
Star Boulevard, Yongchuan Dist,
Chongqing City, 402160, China
Tel: +86-23-4960-9080
Fax: +86-23-4966-5855
Email: sales@nexgol.com.cn
www.nexcom.cn

Beijing NexGemo Technology Co.,Ltd.

Room 205, No.1, Fazhan Rd.,
Beijing International Information Industry Base,
Changping District,
Beijing, 102206, China
Tel: +86-10-8072-2025
Fax: +86-10-8072-2022
Email: sales@nexgemo.cn
www.nexgemo.com

Japan

NEXCOM Japan

9F, Tamachi Hara Bldg.,
4-11-5, Shiba Minato-ku,
Tokyo, 108-0014, Japan
Tel: +81-3-5419-7830
Fax: +81-3-5419-7832
Email: sales@nexcom-jp.com
www.nexcom-jp.com

America

USA NEXCOM USA

46665 Fremont Blvd.,
Fremont CA 94538, USA
Tel: +1-510-656-2248
Fax: +1-510-656-2158
Email: sales@nexcom.com
www.nexcom.com

Europe

United Kingdom NEXCOM EUROPE

10 Vincent Avenue,
Crownhill Business Centre,
Milton Keynes, Buckinghamshire
MK8 0AB, United Kingdom
Tel: +44-1908-267121
Fax: +44-1908-262042
Email: sales.uk@nexcom.eu
www.nexcom.com

Package Contents

Before continuing, verify that the VTC 210 package that you received is complete. Your VTC 210 package should have all the items listed in the following table.

| Item | Part Number | Description | Specification | Qty |
|------|---------------|--|---------------------------------------|-----|
| 1 | 4NCPF00334X00 | Terminal Blocks 3P DECA:MC421-35003Z-1 | 3.5mm Female 180D Assy Green | 1 |
| 2 | 50311F0127X00 | (H) Round Head Screw Long Fei:P3*6ISO+ Nylok | P3x6 Black Nylok | 2 |
| 3 | 5060700035X00 | HDMI Wire Mount Kang Yang:SWCM-1VB | 13.85x11x7.8mm Nylon 66 UL94V-0 Black | 2 |
| 4 | 603ANT0115X00 | GPS/GLONASS Antenna Unicon:SM-76G | SMA Male L=5000mm | 1 |

Ordering Information

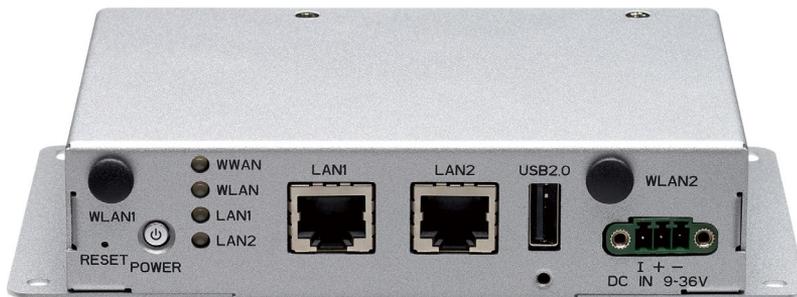
The following provides ordering information for the VTC 210 series.

- **VTC 210 (P/N: 10V00021000X0)**

Qual-core ARM® Cortex-A53 processor, 2GB DDR4, 16GB eMMC, U-blox NEO-M9N GNSS module, HDMI output, 2 x LAN, 1 x USB, 1 x RS232, 9~36VDC input

CHAPTER 1: PRODUCT INTRODUCTION

Overview

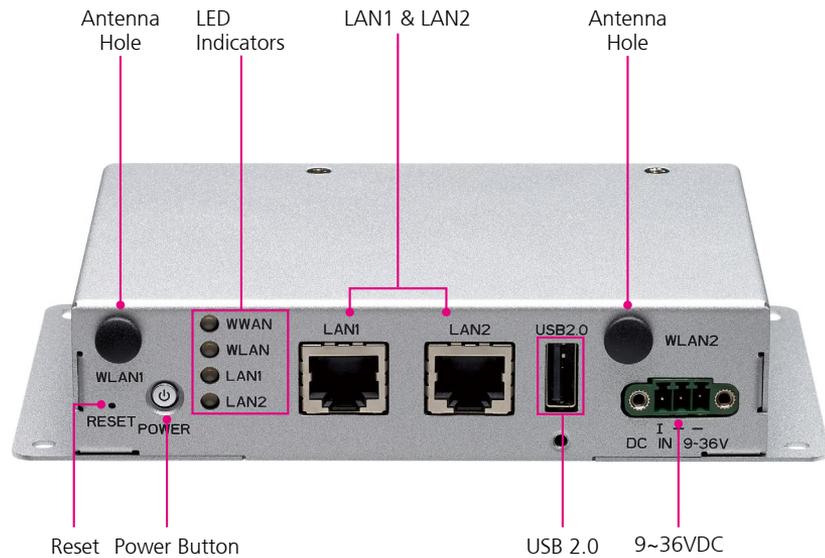


Key Features

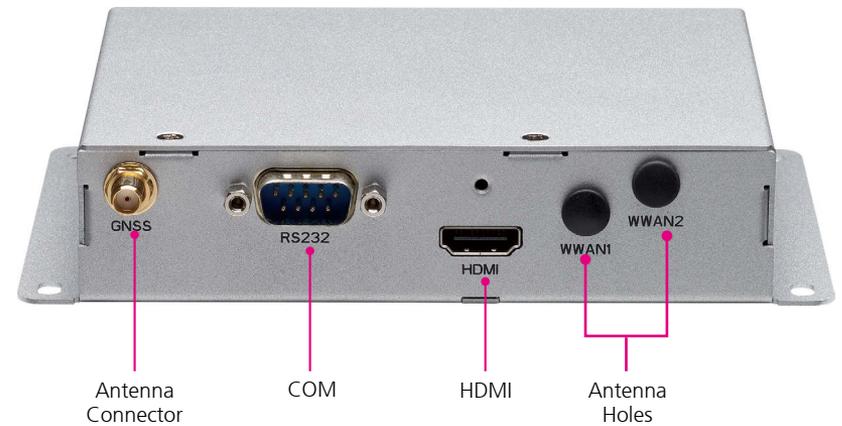
- Built-in Rockchip RK3328 Qual-core ARM® Cortex-A53 processor
- Built-in u-blox-M9N GNSS
- 1 x DB9 for full RS232
- 1 x HDMI, (BOM option VGA + Audio)
- WLAN module option (USB interface)
- 1 x M.2 B Key for WWAN with 1 x internal Micro SIM slot
- SDK for power/reset/WDT/IGN/UVP threshold/GNSS on/off control
- Wide operating temperature -20°C~70°C
- Wide range DC input from 9V ~ 36V
- Certified by CE/FCC/E13

VTC 210 Physical Features

Front View



Rear View



VTC 210 Hardware Specifications

CPU

- Rockchip RD3328 Qual-Core ARM® Cortex-A53 processor

Memory

- DDR4 2GB on board (BOM option 4GB)

Storage

- eMMC 16GB on board
- 1 x internal microSD slot

Expansion

- 1 x M.2 3042 Key B (USB 2.0, USB 3.0) for WWAN with 1 x internal Micro SIM
- 1 x USB 2.0 wafer for WiFi module

GNSS and Onboard Sensor

- 1 x Default U-blox NEO-M9N GNSS module for GPS/Glonass/QZSS/Galileo/Beidou
- G Sensor and gyroscope

I/O Interface-Front

- 1 x Power button with LED
- 4 x LED for WWAN, WLAN, LAN1, LAN2
- 2 x RJ45 10/100/1000 fast Ethernet with LED
- 1 x USB 2.0 Type A
- 1 x Reset button
- 2 x Antenna holes for WLAN
- 1 x Phoenix connector for power (9~36VDC)/GND/ignition input

I/O Interface-Rear

- 1 x HDMI for 1920x1080@60Hz output (BOM option 2nd display, 1 x VGA output + 1 x audio jack output (L/R))
- 3 x Antenna holes for WWAN and GNSS

Power Management & Software Support

- System power On/Off by ignition signal

Operating System

- Linux

Dimensions

- 130 x 100 x 31 (W x D x H) (mm)

Weight

- 0.5kg

Environment

- Operating temperatures: -20°C~70°C
- Storage temperatures: -40°C~85°C
- Relative humidity: 90% (non-condensing)

Vibration & Shock

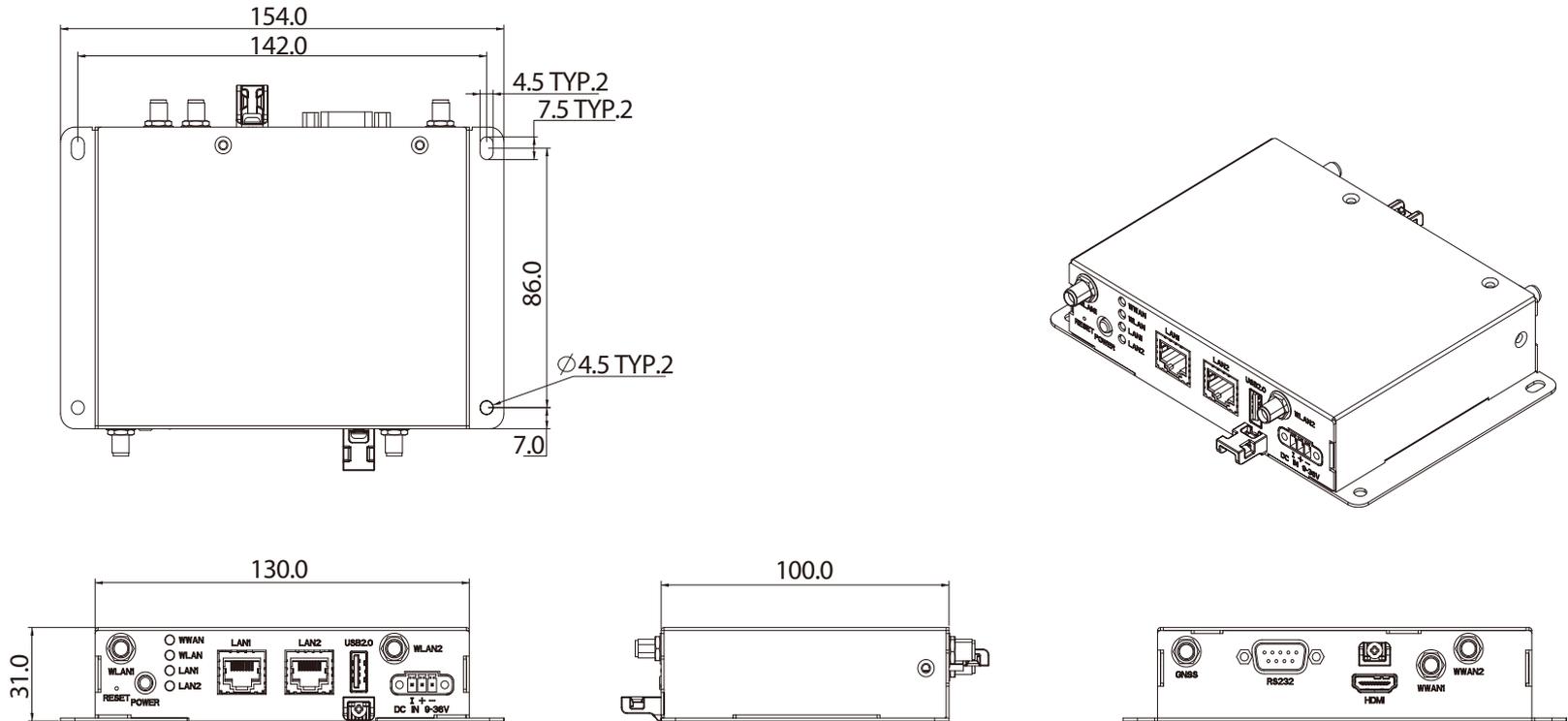
- Vibration
 - Operating: MIL-STD-810H, Method 514.8, Category 4, common carrier US highway truck vibration exposure

- Storage: MIL-STD-810H, Method 514.8, Category 24, minimum integrity test
- Shock
 - Operating: MIL-STD-810H, Method 516.8, Procedure I, functional shock=40g
 - Non-operating: MIL-STD-810H, Method 516.8, Procedure V, crash hazard shock test=75g

Certifications

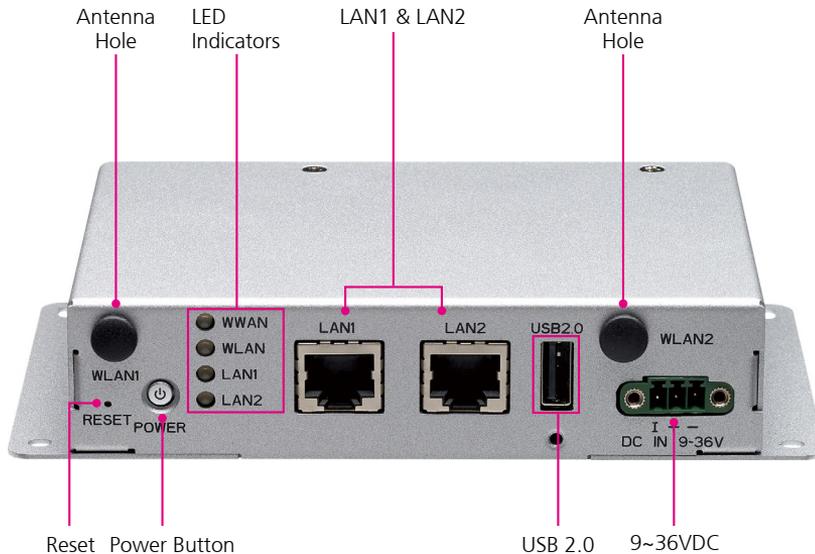
- CE approval
- FCC Class A
- E13 mark

Mechanical Dimensions: VTC 210



Knowing Your VTC210

Front Panel



Reset Button

Press to restart the system.

Antenna Hole

Used to install external antennas.

Power Button

Press to power-on or power-off the system.

LED Indicators

Indicates the data activity and link status of WWAN/WLAN/LAN1/LAN2 ports.

LAN 1 to LAN 2 Ports

Used to connect network devices.

USB 2.0 Port

Used to connect USB 2.0 devices.

9~36V DC Input

Used to plug a DC power cord.

Rear Panel

COM

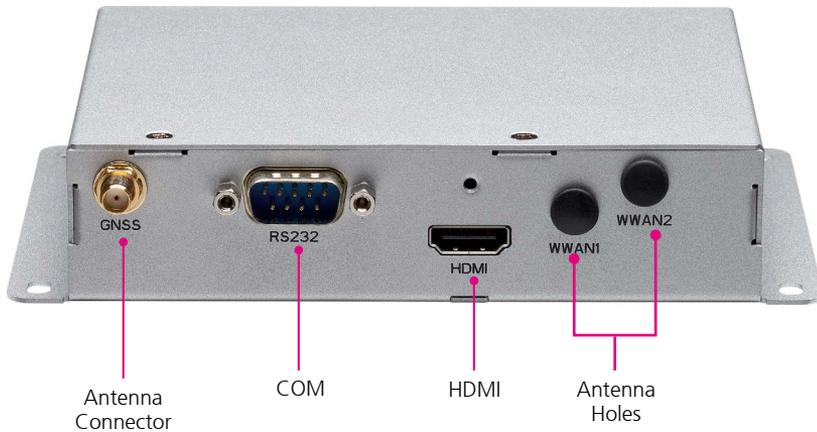
DB9 port used to connect serial devices. (Full RS232 signal)

HDMI

Used to connect an HDMI interface monitor.

Antenna Holes

Used to install external antennas.



CHAPTER 2: JUMPERS AND SWITCHES

This chapter describes how to set the jumpers on the VTC 210 motherboard.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
 - A Philips screwdriver
 - A flat-tipped screwdriver
 - A set of jewelers screwdrivers
 - A grounding strap
 - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

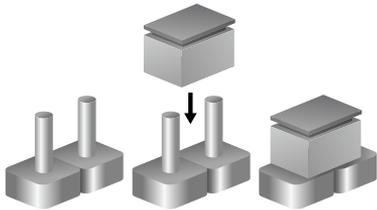
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper Settings

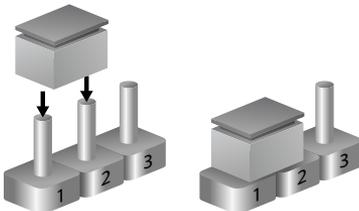
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)

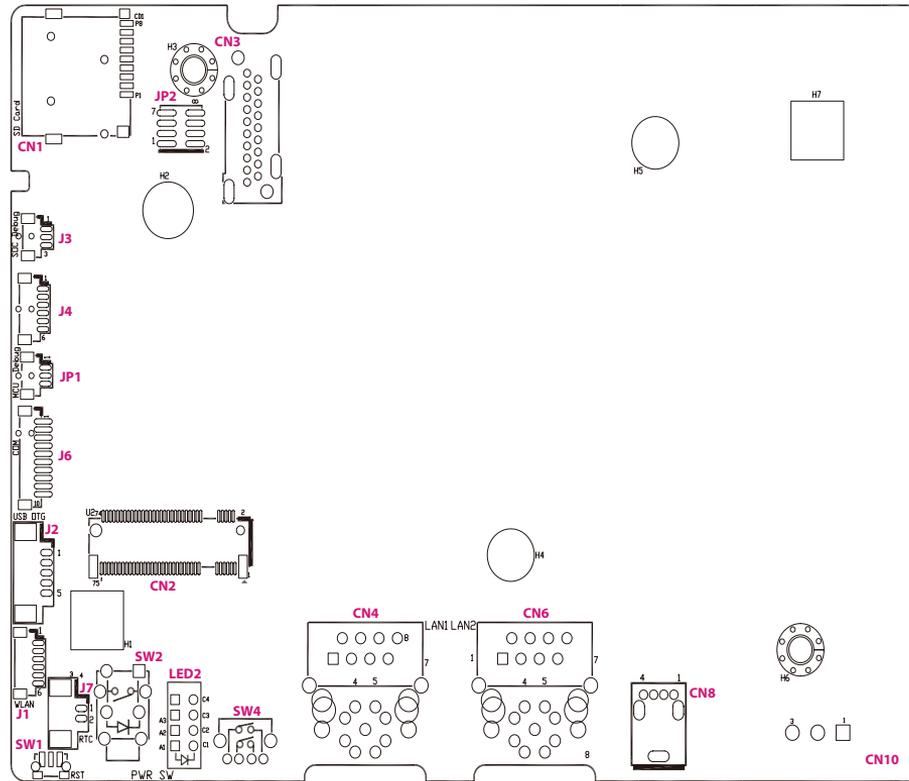


Three-Pin Jumpers: Pins 1 and 2 are Short

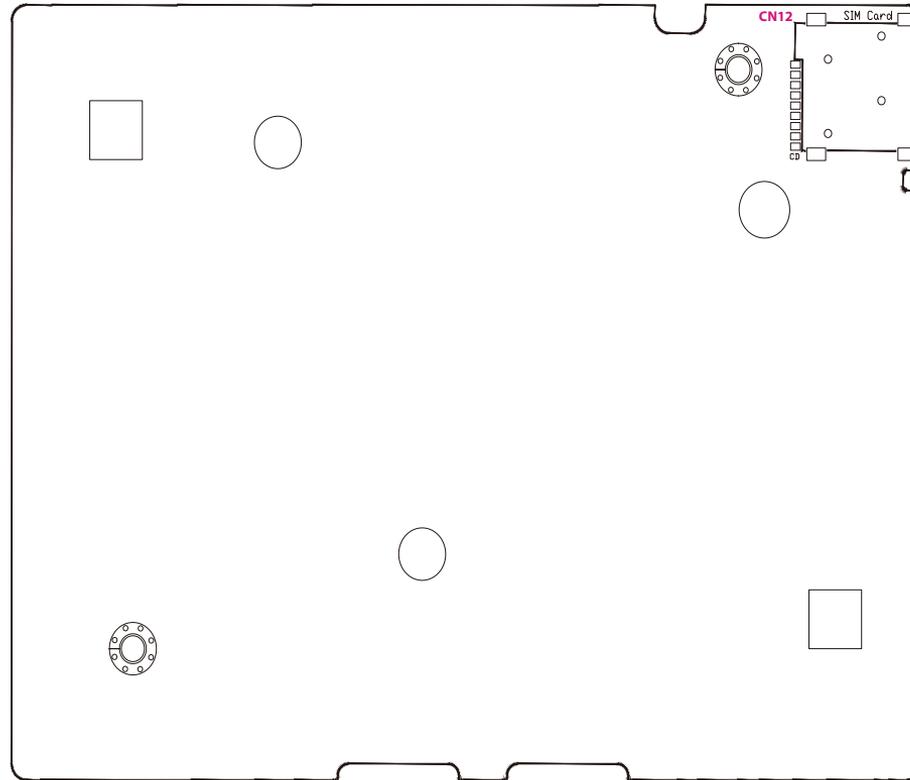


Locations of the Jumpers and Connectors

Top View



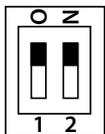
Bottom View



DIP Switch Settings

MCU Input Voltage

Connector location: SW3



| POWERSW (Pin1) | 12V24V (Pin2) | Result |
|----------------|---------------|--------|
| OFF | OFF | 12V |
| OFF | ON | 24V |
| ON | ON | 9~36V |

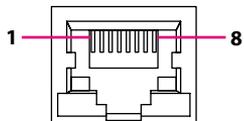
Connector Pin Definitions

External I/O Interfaces

LAN1 Port

Connector type: RJ45 Port

Connector location: LAN1

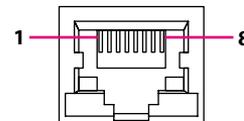


| Pin | Definition | Pin | Definition |
|-----|-------------|-----|-------------|
| 1 | LAN-1_MDI0P | 2 | LAN-1_MDI0N |
| 3 | LAN-1_MDI1P | 4 | LAN-1_MDI2P |
| 5 | LAN-1_MDI2N | 6 | LAN-1_MDI1N |
| 7 | LAN-1_MDI3P | 8 | LAN-1_MDI3N |

LAN2 Port

Connector type: RJ45 Port

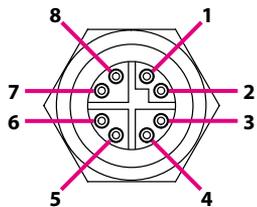
Connector location: LAN2



| Pin | Definition | Pin | Definition |
|-----|-------------|-----|-------------|
| 1 | LAN-2_MDI0P | 2 | LAN-2_MDI0N |
| 3 | LAN-2_MDI1P | 4 | LAN-2_MDI2P |
| 5 | LAN-2_MDI2N | 6 | LAN-2_MDI1N |
| 7 | LAN-2_MDI3P | 8 | LAN-2_MDI3N |

M12 LAN Connector

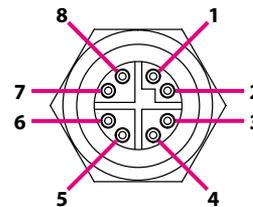
Connector location: CN4



| Pin | Definition | Pin | Definition |
|-----|-------------|-----|-------------|
| 1 | LAN-1_MDI0P | 2 | LAN-1_MDI0N |
| 3 | LAN-1_MDI1P | 4 | LAN-1_MDI1N |
| 5 | LAN-1_MDI3P | 6 | LAN-1_MDI3N |
| 7 | LAN-1_MDI2N | 8 | LAN-1_MDI2P |

M12 LAN Connector

Connector location: CN6

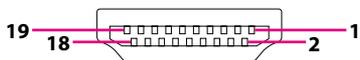


| Pin | Definition | Pin | Definition |
|-----|-------------|-----|-------------|
| 1 | LAN-2_MDI0P | 2 | LAN-2_MDI0N |
| 3 | LAN-2_MDI1P | 4 | LAN-2_MDI1N |
| 5 | LAN-2_MDI3P | 6 | LAN-2_MDI3N |
| 7 | LAN-2_MDI2N | 8 | LAN-2_MDI2P |

HDMI1 Connector

Connector type: HDMI Port

Connector location: CN3

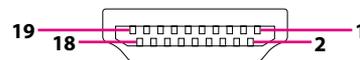


| Pin | Definition | Pin | Definition |
|-----|------------|-----|-----------------|
| 1 | HDMI1_TX2+ | 2 | GND |
| 3 | HDMI1_TX2- | 4 | HDMI1_TX1+ |
| 5 | GND | 6 | HDMI1_TX1- |
| 7 | HDMI1_TX0+ | 8 | GND |
| 9 | HDMI1_TX0- | 10 | HDMI1_CLKD+ |
| 11 | GND | 12 | HDMI1_CLKD- |
| 13 | HDMI1_CEC | 14 | NC |
| 15 | HDMI1_SCL | 16 | HDMI1_SDA |
| 17 | GND | 18 | HDMI_PWR (VCC5) |
| 19 | HDMI1_HPD | | |

HDMI2 Connector (BOM option VGA)

Connector type: HDMI Port

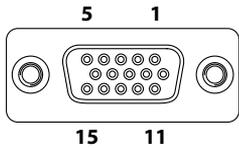
Connector location: CN5



| Pin | Definition | Pin | Definition |
|-----|------------|-----|-----------------|
| 1 | HDMI2_TX2+ | 2 | GND |
| 3 | HDMI2_TX2- | 4 | HDMI2_TX1+ |
| 5 | GND | 6 | HDMI2_TX1- |
| 7 | HDMI2_TX0+ | 8 | GND |
| 9 | HDMI2_TX0- | 10 | HDMI2_CLKD+ |
| 11 | GND | 12 | HDMI2_CLKD- |
| 13 | HDMI2_CEC | 14 | NC |
| 15 | HDMI2_SCL | 16 | HDMI2_SDA |
| 17 | GND | 18 | HDMI_PWR (VCC5) |
| 19 | HDMI2_HPD | | |

VGA Connector (BOM option HDMI2)

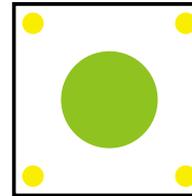
Connector type: DB-15 port, 15-pin D-sub
Connector location: CN7



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | VGA_R | 2 | VGA_G |
| 3 | VGA_B | 4 | NC |
| 5 | VGA_GND | 6 | VGA_GND |
| 7 | VGA_GND | 8 | VGA_GND |
| 9 | VGA_+5V | 10 | VGA_GND |
| 11 | NC | 12 | VGA_SDA |
| 13 | VGA_HSYNC | 14 | VGA_VSYNC |
| 15 | VGA_SCL | | |

Reset Button

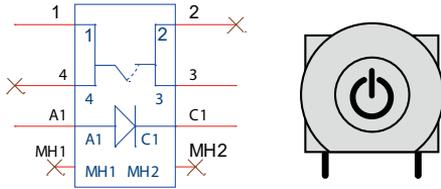
Connector location: SW1



| Pin | Definition |
|-----|------------|
| 1 | GND |
| 2 | RSTBTN-IN# |
| 3 | GND |

Power Button Connector

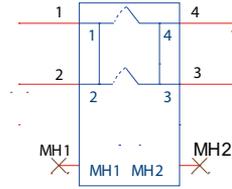
Connector location: SW2



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | GND | 2 | PWRBT_IN# |
| 3 | PWRBT_IN# | 4 | GND |
| A1 | LEDPWR_A1 | C1 | LEDPWR_C1 |

Channel Switch

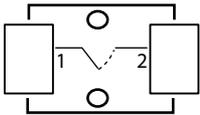
Connector location: SW4



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | UP_SW | 2 | DOWN_SW |
| 3 | GND | 4 | GND |
| MH1 | GND | MH2 | GND |

Flash Button

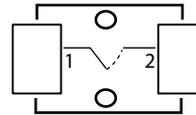
Connector location: SW5



| Pin | Definition |
|-----|------------|
| 1 | FLASH_SW |
| 2 | GND |

SARADC Button

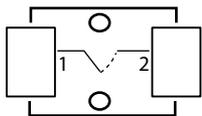
Connector location: SW6



| Pin | Definition |
|-----|------------|
| 1 | SARADC_SW |
| 2 | GND |

PMIC Reset Button

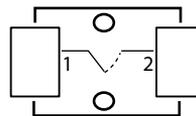
Connector location: SW7



| Pin | Definition |
|-----|-------------|
| 1 | PMIC_RESET# |
| 2 | GND |

PMIC Power On Button

Connector location: SW8

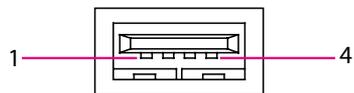


| Pin | Definition |
|-----|-------------|
| 1 | PMIC_PWRON# |
| 2 | GND |

USB2.0 Connector

Connector type: USB 2.0 ports, Type A

Connector location: CN8



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | VCC5 | 2 | USB_DN |
| 3 | USB_DP | 4 | GND |

Audio Connector

Connector type: Earphone jack single port

Connector location: CN9



| Pin | Definition | Pin | Definition |
|-----|----------------|-----|----------------|
| 1 | AGND | 2 | LINE2_OUT_L_CA |
| 3 | LINE2_OUT_R_CA | 4 | NC |
| 5 | AGND | 6 | NC |

Internal Connectors

DC IN Connector

Connector size: 1 x 3 = 3-pin header

Connector location: CN10



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | GND_IN | 2 | V_IN |
| 3 | IGNITION | | |

DC OUT Connector

Connector size: 1 x 2 = 2-pin header

Connector location: CN11

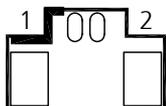


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | VCC12 | 2 | GND |

RTC Battery Connector

Connector size: 1 x 2 = 2-pin header

Connector location: J7

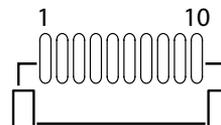


| Pin | Definition |
|-----|------------|
| 1 | GND |
| 2 | VBAT1 |

COM Connector

Connector size: 1 x 10 = 10-pin header

Connector location: J6

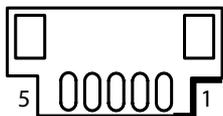


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | COM1_GND | 2 | COM1_GND |
| 3 | SP_CTS_1 | 4 | SP_DSR_1 |
| 5 | SP_DTR_1 | 6 | SP_RXD_1 |
| 7 | SP_RI_1 | 8 | SP_RTS_1 |
| 9 | SP_TXD_1 | 10 | SP_DCD_1 |

USB OTG Wafer

Connector size: 1 x 5 = 5-pin header

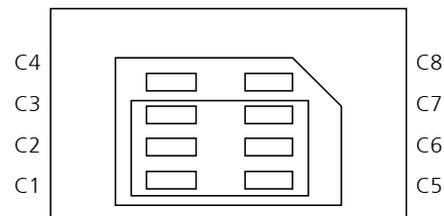
Connector location: J2



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | VCC5 | 2 | OTG_DN |
| 3 | OTG_DP | 4 | USB_OTG_ID |
| 5 | GND | | |

Micro SIM Slot

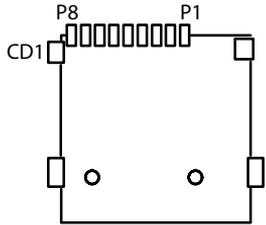
Connector location: CN12



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| C1 | UIM_PWR_A | C2 | UIM_RST_A |
| C3 | UIM_CLK_A | C4 | N.C |
| C5 | GND | C6 | N.C |
| C7 | UIM_DAT_A | C8 | N.C |
| CD | SIM-DET1 | | |

SD Card Slot

Connector location: CN1

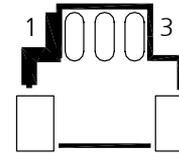


| Pin | Definition | Pin | Definition |
|-----|--------------|-----|--------------|
| P1 | MMC0_DAT2_SD | P2 | MMC0_DAT3_SD |
| P3 | MMC0_CMD_SD | P4 | SD_CON_3V3 |
| P5 | MMC0_CLK_SD | P6 | GND |
| P7 | MMC0_DAT0_SD | P8 | MMC0_DAT1_SD |
| CD1 | MMC0_CD_SD | | |

SOC Debug Port

Connector size: 1 x 3 = 3-pin header

Connector location: J3

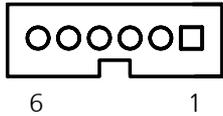


| Pin | Definition |
|-----|------------|
| 1 | DE TX |
| 2 | GND |
| 3 | DE RX |

GPS Signal Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J4

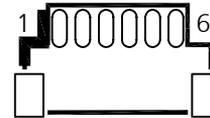


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | GPS_BAT | 2 | NC |
| 3 | GPS_TXD | 4 | GPS_RXD |
| 5 | GND | 6 | VCC3_GPS |

WLAN Module

Connector size: 1 x 6 = 6-pin header

Connector location: J1

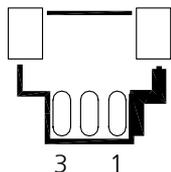


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | USB_VCC5 | 2 | USB_DN |
| 3 | USB_DP | 4 | GND |
| 5 | WLAN_LED# | 6 | WLAN_DIS# |

MCU DEBUG Port

Connector size: 1 x 3 = 3-pin header

Connector location: JP1

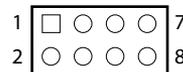


| Pin | Definition |
|-----|------------|
| 1 | MCU-TX2 |
| 2 | GND |
| 3 | MCU-RX2 |

MCU Download Port

Connector size: 2 x 4 = 8-pin header

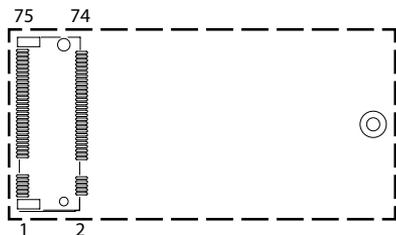
Connector location: JP2



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | +V3.3ALW | 2 | MCU_Nrst |
| 3 | GND | 4 | NC |
| 5 | MCU_SWCLK | 6 | MCU_SWDIO |
| 7 | NC | 8 | GND |

M.2 3042 Key B Socket

Connector location: CN2



| Pin | Definition | Pin | Definition |
|-----|------------|-----|-------------|
| 1 | CONFIG_3 | 2 | VCC3 |
| 3 | GND | 4 | VCC3 |
| 5 | GND | 6 | POWER_OFF# |
| 7 | USB_OP | 8 | W_DISABLE1# |
| 9 | USB_ON | 10 | LTE_LED#_A |
| 11 | GND | 20 | PCIE_DIS |
| 21 | CONFIG_0 | 22 | VBUS_SENSE |
| 23 | LTE_WAKE# | 24 | NC |
| 25 | NC | 26 | W_DISABLE2# |
| 27 | GND | 28 | NC |
| 29 | USB3_RX1N | 30 | UIM_RST_A |
| 31 | USB3_RX1P | 32 | UIM_CLK_A |
| 33 | GND | 34 | UIM_DAT_A |
| 35 | USB3_TX1N | 36 | UIM_PWR_A |
| 37 | USB3_TX1P | 38 | NC |
| 39 | GND | 40 | NC |
| 41 | NC | 42 | NC |

| Pin | Definition | Pin | Definition |
|-----|--------------|-----|------------|
| 43 | NC | 44 | NC |
| 45 | GND | 46 | NC |
| 47 | NC | 48 | NC |
| 49 | NC | 50 | NC |
| 51 | GND | 52 | NC |
| 53 | NC | 54 | NC |
| 55 | NC | 56 | NC |
| 57 | GND | 58 | NC |
| 59 | NC | 60 | NC |
| 61 | NC | 62 | NC |
| 63 | NC | 64 | NC |
| 65 | NC | 66 | SIM-DET |
| 67 | M2_RSET#_R_A | 68 | NC |
| 69 | CONFIG_1 | 70 | VCC3 |
| 71 | GND | 72 | VCC3 |
| 73 | GND | 74 | VCC3 |
| 75 | CONFIG_2 | | |

CHAPTER 3: SYSTEM SETUP

Removing the Chassis Cover

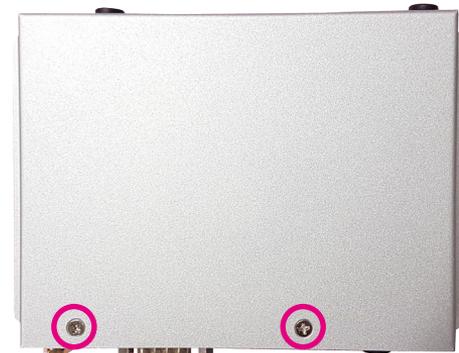


Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

1. The screws circled on the bottom are used to secure the chassis. Remove these screws and put them in a safe place for later



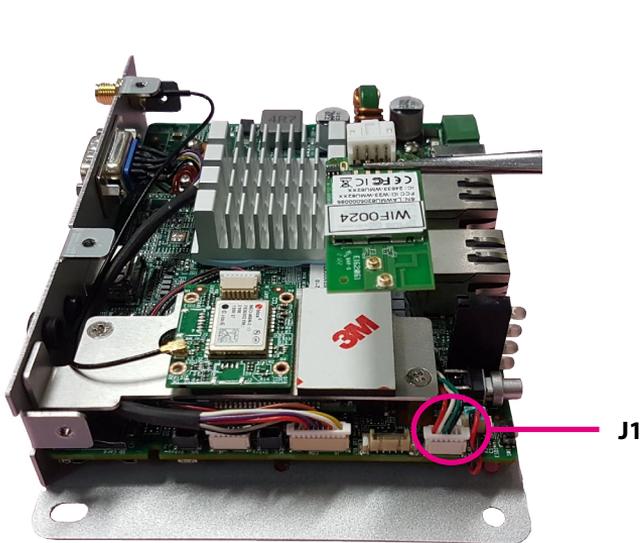
Bottom View



Top View

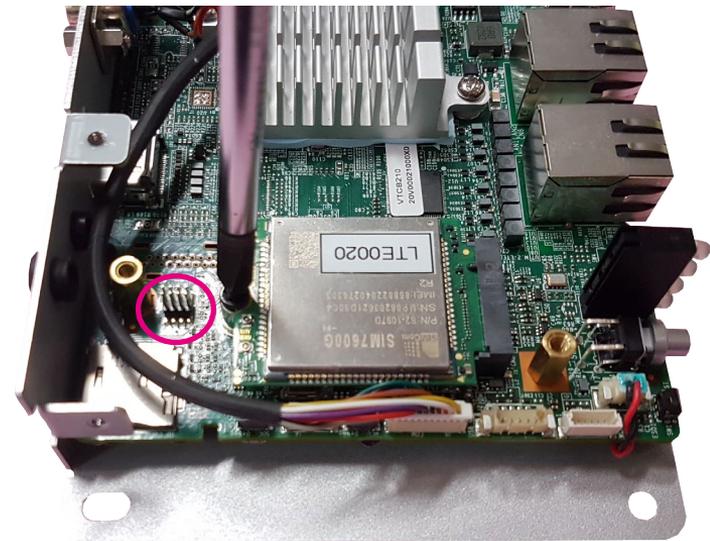
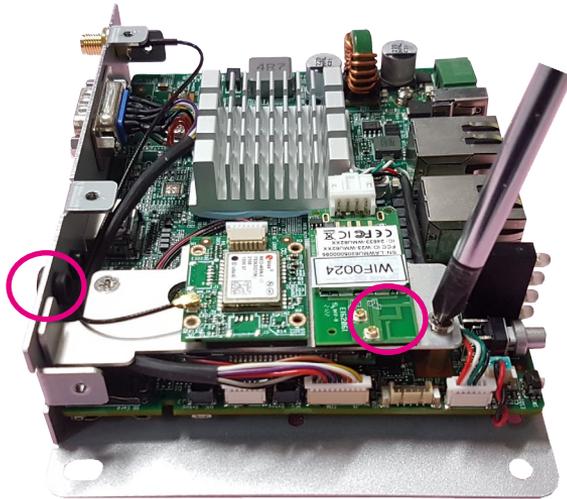
Installing a WLAN Module

1. Plug one end of the USB cable into the onboard connector J1, then plug another end of the cable into USB WLAN module.
2. Tear off the 3M tape protective film and fix the WLAN module with 3M tape.



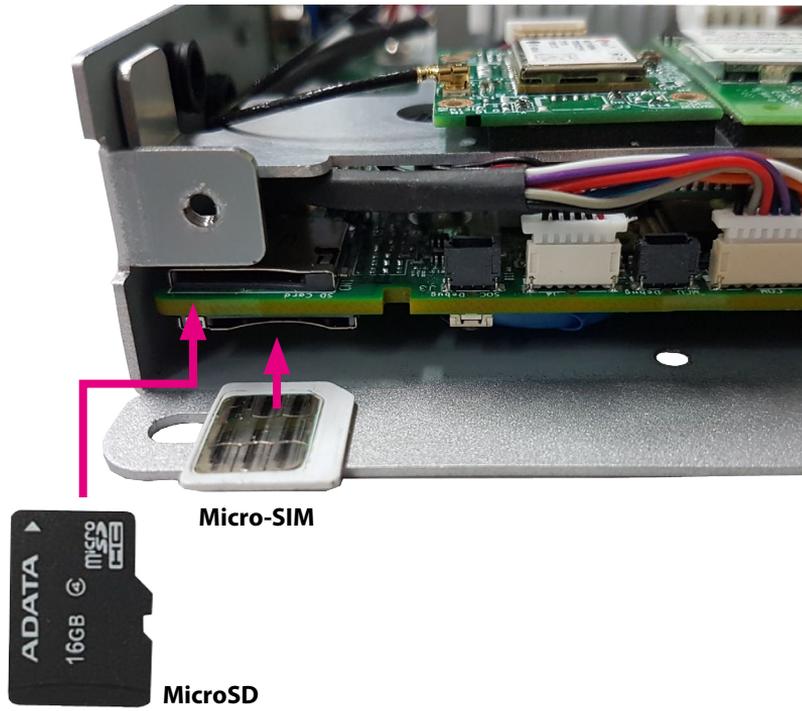
Installing a WWAN Module (Mini-PCle)

1. Unscrew and remove the GPS bracket.
2. Locate the WWAN Mini PCI Express slot (CN2). Insert the module into the Mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. Then fasten a screw into the mounting hole to secure the module.



Installing a SIM Card and MicroSD Card

1. Insert the MicroSD card (CN1) and the SIM card (CN12). Please take note of the MicroSD card and SIM card installation direction as shown in the following picture.



APPENDIX A: GNSS FEATURE

uBlox-NEO M9N Overview

The NEO-M9N module is built on the robust u-blox M9 GNSS chip, which provides exceptional sensitivity and acquisition times for all L1 GNSS systems. The u-blox M9 standard precision GNSS platform, which delivers meter-level accuracy, succeeds the well-known u-blox M8 product range.

NEO-M9N supports concurrent reception of four GNSS. The high number of visible satellites enables the receiver to select the best signals. This maximizes the position accuracy, in particular under challenging conditions such as in deep urban canyons. NEO-M9N detects jamming and spoofing events and reports them to the host, so that the system can react to such events. Advanced filtering algorithms mitigate the impact of RF interference and jamming, thus enabling the product to operate as intended.

A SAW filter combined with an LNA in the RF path is integrated in the NEO-M9N module. This setup allows normal operation even under strong RF interferences, for example when a cellular modem is co-located with NEO-M9N.

NEO-M9N offers backwards pin-to-pin compatibility with previous u-blox generations, which saves designers time and cost when upgrading their design. Software migration requires little effort thanks to the continuous support of UBX messages across product generations.

Technical Specifications

Product performance

| | | |
|-------------------------------------|--|----------|
| Receiver type | 92-channel u-blox M9 engine GPS L1 C/A, QZSS L1 C/A/S, GLONASS L10F BeiDou B1I, Galileo E1B/C SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN | |
| Nav. update rate | Up to 25 Hz (4 concurrent GNSS) | |
| Horizontal position accuracy | 1.5 m CEP (with SBAS) 2.0 m CEP (without SBAS) | |
| Acquisition¹ | Cold starts: | 24 s |
| | Aided starts: | 2 s |
| | Hot start: | 2 s |
| Sensitivity¹ | Tracking & Nav: | -167 dBm |
| | Reacquisition | -160 dBm |
| | Cold start: | -148 dBm |
| | Hot start: | -159 dBm |

Tracking features

| | |
|-------------------------|---|
| Power save modes | On/off, cyclic |
| Data batching | Autonomous tracking up to 5 minutes |
| Data-logger | Position, velocity, time, and odometer data |

Tracking Features cont.

| | |
|-------------------|--|
| Geofencing | Up to 4 circular areas; Software message or GPIO for waking up the host CPU |
|-------------------|--|

Security features

| | |
|-------------------------|--|
| Signal integrity | RF interference & jamming detection and reporting Active GNSS in-band filtering Spoofing detection and reporting |
| Device integrity | Secure boot of firmware downloaded from host or flash Receiver configuration lock by command |
| Secure interface | Signed UBX messages (SHA-256) JTAG port locked |

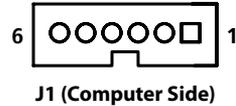
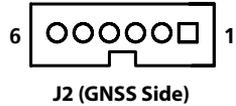
Electrical data

| | |
|--------------------------------------|---|
| Power supply | 2.7 V to 3.6 V |
| Power Consumption¹ | 36 mA at 3.0V (4 GNSS continuous) 32 mA at 3.0V (2 GNSS continuous) 28 mA at 3.0V (1 GNSS continuous) |
| Backup Supply | 1.65V to 3.6V |

Interfaces

| | |
|---------------------------|--|
| Serial interfaces | 1 UART 1 USB (NEO-M9N) 1 SPI (optional) 1 DDC (I2C compliant) |
| Digital I/O | Configurable timepulse 1 EXTINT input for Wakeup |
| Raw Data output | Code phase data |
| Timepulse | Configurable: 0.25 Hz to 10 MHz |
| Supported antennas | Active and passive |
| Protocols | NMEA 4.10, UBX binary, RTCM 3.3 |

VIOB-GPS-06 Module and Computer Connector Pin Definitions



J2 Pin Definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | GPS_3V3 | 2 | GND |
| 3 | GPS_TXD_M | 4 | GPS_RXD_M |
| 5 | NC | 6 | +V3.3ALW |

J1 Pin Definition

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | 3.3V_BAT | 2 | NC |
| 3 | TX | 4 | RX |
| 5 | GND | 6 | 3.3V |

COM Port for GNSS: COM 4

Baud Rate: 9600