

1. Summary

1.1 Purpose

The MAAS UNIT terminal is a terminal for collecting vehicle information and consists of a MAIN Control unit and an RF modem unit.

It is a terminal that can control the door of the vehicle through BLE.

1.2 Product Overview

- Product Size: 107mm x 102mm x 29.8mm
- Maximum Input Voltage Range: DC +35V
- Operating Input Voltage Range: DC+12V
- Terminal consumption current: 200mA (@DC+12V)(With GPS Module,MODEM),
Maas UNIT MAIN Current(Without GPS Module,MODEM) 120mA
- Operating Temperature Range : -20°C to + 80°C

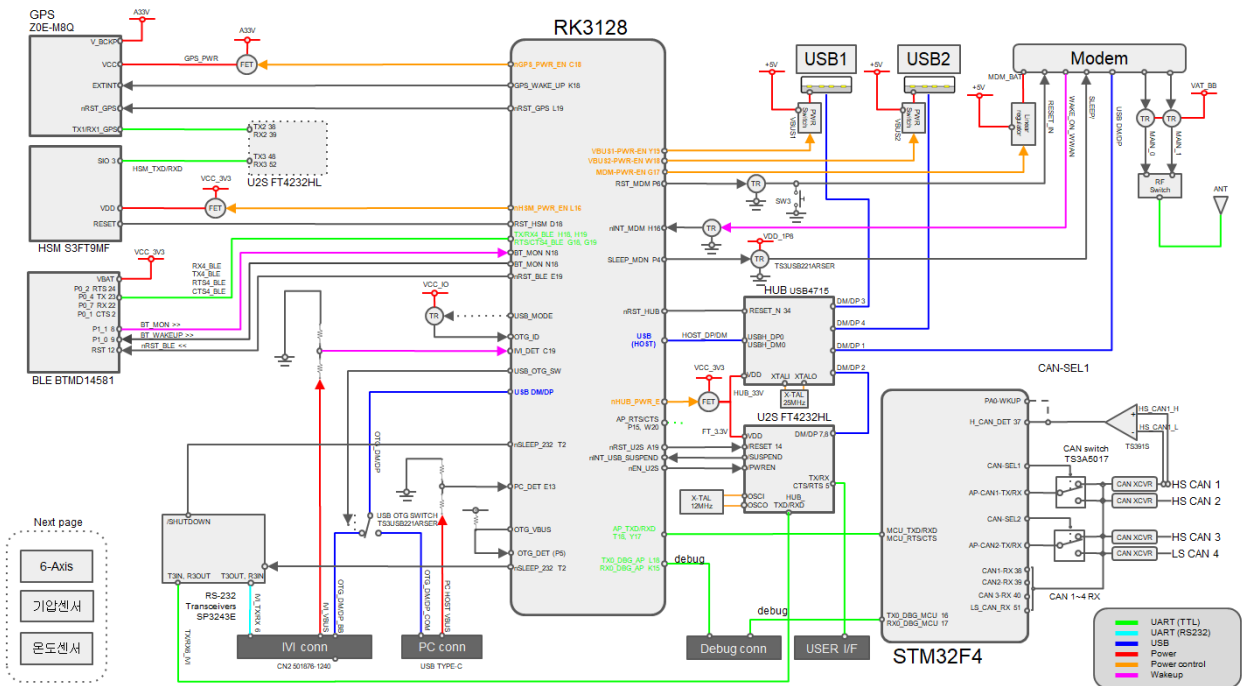
1.3 Mounting method

MaaS Unit terminal is installed in the rear of the fuse box inside the driver's seat,,

The distance from the human body is more than 40cm

2. Development Details

2.1 Product Block Diagram and Configuration



2.2 Specification

division 1	division 2	Explanation
system	O/S	Linux 3.10.49
	Processor	RK3128 ARM® Cortex™-A7 Quad core 1.3GHz
	RAM	1GB DDR3
	ROM	16GB eMMC
Wireless communication	BLE	Bluetooth 4.1 BLE
	MODEM	WP7610, Sierra Wireless LTE Cat4 Module
SENSOR	GPS	Ublox ZOE-M8Q GPS/QZSS/GLONASS/GALILEO/BEIDOU A-GPS supported
	Gyro	BMI160(6축, Gyroscope and Accelerometer)
	pressure	BMP280
	Temperature	Thermistor
I/O	IVI	USB 2.0 High-speed DEVICE (NOT USED)
	CAN	2 basic, 4 support through switching, HS x 3, LS x 1
	FOB control	PWR, 4point control
	USER UART	UART (TTL/232 transform)
	PC	USB 2.0 High-speed DEVICE (Administrator port)
	AUX	UART TTL (Administrator port)
	USB A TYPE	USB 2.0 HOST x2 (OPTION)
Etc	HSM	Security chip
Input Voltage Range	DC	7 ~ 35VDC
Operating temperature	temperature	-20 ~ 80℃
Instrument	size	107mm x 102mm x 29.8mm
	weight (g)	198

2.3 BLE

- Product name: Bluetooth Module
- MODEL: BTMD14581
- VENDOR: Partron
- Interface : UART
- compliant with Bluetooth 4.1 ,ETSI EN 300 328 and EN 300 440 Class 2
- Main Power: DC+3.3V
- Operating Temperature: -20°C ~ +85°C

For BLE operation, BLE is connected by CMD operation as designed, and when power is off, BLE is connected by CMD operation again

2.4 GPS

- Product name: Ultra-small u-blox M8 GNSS SiP module
- MODEL: ZOE-M8Q
- VENDOR: UBLOX M8
- Main Pwr: DC+3.3V
- MAX. Supply Current: 67mA @ 3.0V DC typical
- Operating Temperature: -40°C ~ +85°C

2.5 DDR3 SDRAM

- Part name: K4B4G1646D-HCK0,256MB*16
- VENDOR: Samsung
- Main Pwr: DC+1.5V
- DDR CLOCK Frequency: up to 420MHz
- Operating Temperature: -40°C ~ +95°C

2.6 CPU

- Part name: RK3128 Quad-Core processor
- VENDOR: ROCK CHIP
- Operation Voltage Range :IO supply +3.3V(±10%)
- Package Type: BGA316
- Operating Temperature: -40°C ~ +85°C

2.7 eMMC

- Part name: KLMAG1JENB-B041(대치품 NCEMAD6B-16G)
- VENDOR: Samsung
- Main Pwr: DC+3.0V
- Package Type: FBGA153
- MMC I/F CLOCK Frequency: 0~200MHz
- Operating Temperature: -25°C ~ +85°C

2.8 MCU

- Part name: STM32F412RET6 (ARM Microcontrollers)
- VENDOR: ST
- Main Pwr: DC+3.3V
- Package Type: LQFP64
- CLOCK Frequency: 96MHz
- Operating Temperature: -40°C ~ +85°C

2.9 U2S

- Part name: FT4232HL (QUAD HIGH SPEED USB TO MULTIPURPOSE UART)
- VENDOR: FTDI
- Main Pwr: DC+3.3V
- Package Type: LQFP64
- Communication interface specifications and speed:
USB 2.0/Hi-Speed(480 Mbps),UART DATA Rate : up to 12Mbaud
- Operating Temperature: -40°C ~ +85°C

2.10 HUB

- Part name: USB4715x1Y9X (USB 2.0 Hi-Speed Hub Controller)
- VENDOR: MICROCHIP
- Main Pwr: DC+3.3V
- USB 2.0/Hi-Speed: 480 Mbps.
- Package Type: 48PIN VQFN(7x7mm)
- Operating Temperature: -40°C ~ +85°C

2.11 SENSOR

- Part name: BMI160 (6 축 , accelerometer and gyroscope)
- VENDOR: BOSCH
- Main Pwr : DC+3.3V
- Package Type: LGA (2.5mm x 3.0mm x 0.83mm)
- Operating Temperature: -40°C ~ +85°C

2.12 SENSOR

- Part name: BMP280 (DIGITAL PRESSURE SENSOR)
- VENDOR: BOSCH
- Main Pwr : DC+3.3V
- Pressure rang : 300...1100 hPa
- Package Type: 8PIN LGA
- Operating Temperature: -40°C ~ +85°C

2.13 MODEM

- Product name: Sierra Wireless LTE Cat4 Module
- MODEL: **WP7610**
- VENDOR: Sierra
- Supply voltage - DC+ 3.9V
- Baseband Chipset : Qualcomm(MDM9207)
- DATA Speed (Maximum)
 - D/L : LTE 150Mbps(Cat.4)
 - U/L : LTE 50Mbps(Cat.4)
- Power consumption (typical values/BW 10M) : 800mA
- Maximum RF Output power -Class 3 LTE 23dBm
- Operating Temperature : -40 to +85°C

2.15 FCC/IC

FCC ID: TMGMAASUS01

Contains FCC ID: N7NWP7610

IC: 24731-MAASUS01

Contains IC : N7NHL7748

FCC Part 15.19

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.

FCC Part 15.21

Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF Radiation exposure limits set forth for an uncontrolled environment.

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

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Note : 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 or more 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.

Modifications not expressly approved by the manufacturer could void your authority to operate the equipment under FCC rules.

ISED Warning Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED RF Radiation Exposure Statement: This equipment complies with ISED RF Radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

RF du ISED d'exposition aux radiations: Cet équipement est conforme à l'exposition de ISED rayonnements RF limites établies pour un environnement non contrôlé. L'antenne pour ce transmetteur ne doit pas être même endroit avec d'autres émetteur sauf conformément à ISED procédures de produits Multi-émetteur.

Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.