RMCU MANUAL

(Remote Machine Control Unit)

2017. 05

I. Overview

Remote Machine Control Unit (RMCU) consists of 3G communication module, GPS, Controller Area Network (CAN), Powersupply device, and Microcontroller. The 3G module provides wcdma, gsm communication and carries the information of the vehicle to the external server. The CAN obtain information of the vehicle while communicating with each Electronic Control Unit (ECU). The Microcontrolle controls the entire RMCU.

[RMCU]

II. General Specifications

1.1 Rated Voltage and Operating Temperature
  1) Operating voltage: 12/24 [VDC]
  2) Operating temperature: -30 ~ + 85 ℃

1.2 Detail Specification

1) Main power supply

	Name	Function	I/O	Spec.	Remarks
power supply	External constant power	1) Main power supply 2) System Back-up	Input	12/24VDC	Leakage current: 10mA or less
	External input power	1) System function start	Input	ON:9~28V OFF:0~11V	ON:function start OFF:function end
	12V or 24V Power	1) Internal rectified power 2) Regulator power supply 3) Communication terminal power supply	Output	12V Input:9~15V 24V Input:20~32V	
	5V Power	1) Vcc power 2) Internal IC drive power 3) Antenna supply Power	Output	5V ± 3%	5V regulator Output voltage
	3.3V Power	1) GPS board driving power	Output	3.3V ± 3%	3.3V regulator Output voltage

2) CPU AND MEMORY

	Name	Function	I/O	Spec.
CPU AND MEMORY	CPU	Microcontroller	32bits, ARM Cortex-3 class	According to manufacturer's specifications
	Serial Flash	Data memory	4 Mbytes	
	ROM(Flash)	Program memory	128Kbytes	
	EEPROM	Non volatile memory	8M Flash EEPROM	Maintain recorded data even after power off

3) Wired communication

	Name	Function	I/O	Spec.
Wired communication	Serial(1)	MCU comm.	RS232 standard	Data communication with equipment controller and firmware update
	Serial(2)	monitoring		
	CAN	Data communication	J1939 standard	

4) Mobile communication

	Name	Description	Remark
Mobile	Coverage	WCDMA	
	Frequency	UMTS-FDD (Uplink / Downlink) 　Band I　(1920~1980 / 2110~2170 MHz) 　Band II (1850~1910 / 1930~1990 MHz) 　Band V　(824~849 / 869~894 MHz) 　Band VI (830~840 / 875~885 MHz) 　Band VIII (880~915 / 925~960 MHz) GSM/EDGE (Uplink / Downlink) 　GSM850　(824.2~849.2 / 869.2~894.2 MHz) 　GSM900　(880~915 / 925~960 MHz) 　DCS1800 (1710.2~1784.8 / 1805.2~1879.8 MHz) 　PCS1900 (1850.2~1909.8 / 1930.2~1989.8 MHz)	Uplink ≦5.76Mbps Downlink≦21Mbps
	SIM	Chip type　SIM(SMD Type)	
	Add. function	SMS / TCP / UDP / FTP	
GPS		GPS L1 Receiver(GPS + GNASS)	
Connector	Mobile	TNC (Silver)	
	GPS	SMA (Gold)	
	Main	14 Pin	

III. Pin Map Description

No.	Name	Description
1	CAR_BATT1	Battery1
2	KEY_IGN	Equipment IG
3	MONITOR_TX	[RMCU->PC] Monitoring (TX)
4	MONITOR_RX	[PC->RMCU] Monitoring (RX)
5	GND	GND
6	GND	GND
7	CAN_S	CAN communication(Shield)
8	FW_EN	F/W updated
9	MTS_TX	[RMCU->MCU] Monitoring (TX)
10	MTS_RX	[MCU->RMCU] Monitoring (RX)
11	CAN_H	CAN communication (High)
12	CAN_L	CAN communication (Low)
13	GND	GND
14	CAR_BATT2	Battery 2

IV. Description of Circuit

1. Power supply

A. When power is applied, 5.3V DC DC Converter operates and + 5.3V_DCDC_SYS is output.

B. + 5.3V_DCDC_SYS is input to 0.5A 3.3V LDO and outputs + 3.3V_LIVE which corresponds to the power supply in the system. The previous circle is fed into a circuit that must always be operated. MCU, SPI FLASH and RESET IC.

C. The + 3.3V_LIVE is then distributed to + 3.3V_FETOUT and + 3.3V_FETOUT_GPS by the FET Switch, which is fed to the peripheral peripheral circuits, ie the circuits that do not need to operate in Sleep mode, such as Analog Switch, UART Transceiver , CAN Transceiver & Controller, etc. + 3.3V_FETOUT_GPS is designed to supply power to and disconnect the GPS circuit.

D. + 1.8V LDO is used for comparator input power for Ignition verification and RTC of Cellular MODEM circuit.

E. + 5.0V_LDO is used for CAN transceiver IC.

F. 2A 3.8V DC The DC CVT is used as a power source for Cellular modem.

2. Ignition

A. When the vehicle is turned on, 9V or more is input to the IGN signal line.

B. Check this and check the start on. If the start is on, the IGN_DET pin goes low.

C. The basic operation principle of the circuit is determined by applying 1.8V to the comparator + with a comparative power supply and inputting the voltage divided by the resistor to the comparator.

3. CAN Communication

A. CAN communication is operated by CAN Transceiver and CAN Controller.

B. CAN Controller is implemented by SPI communication method.

4. UART communication

  A. Two UART communications are available: one for monitoring operation of the product and one for firmware update.

  B. These UARTs do not work in sleep mode.

5. Cellular Communication

 A. MODEM Module is used as peripheral circuit, and there is Level Shift to interface 1.8V I / O voltage of Micro SIM Socket and MODEM and 3.3V I / O voltage of MCU as peripheral circuits.

 B. The power source is + 3.8V_DCDC and the RTC power source is used by applying + 1.8V_LDO.

 C. The connector for connecting the external antenna is used with the TNC connector
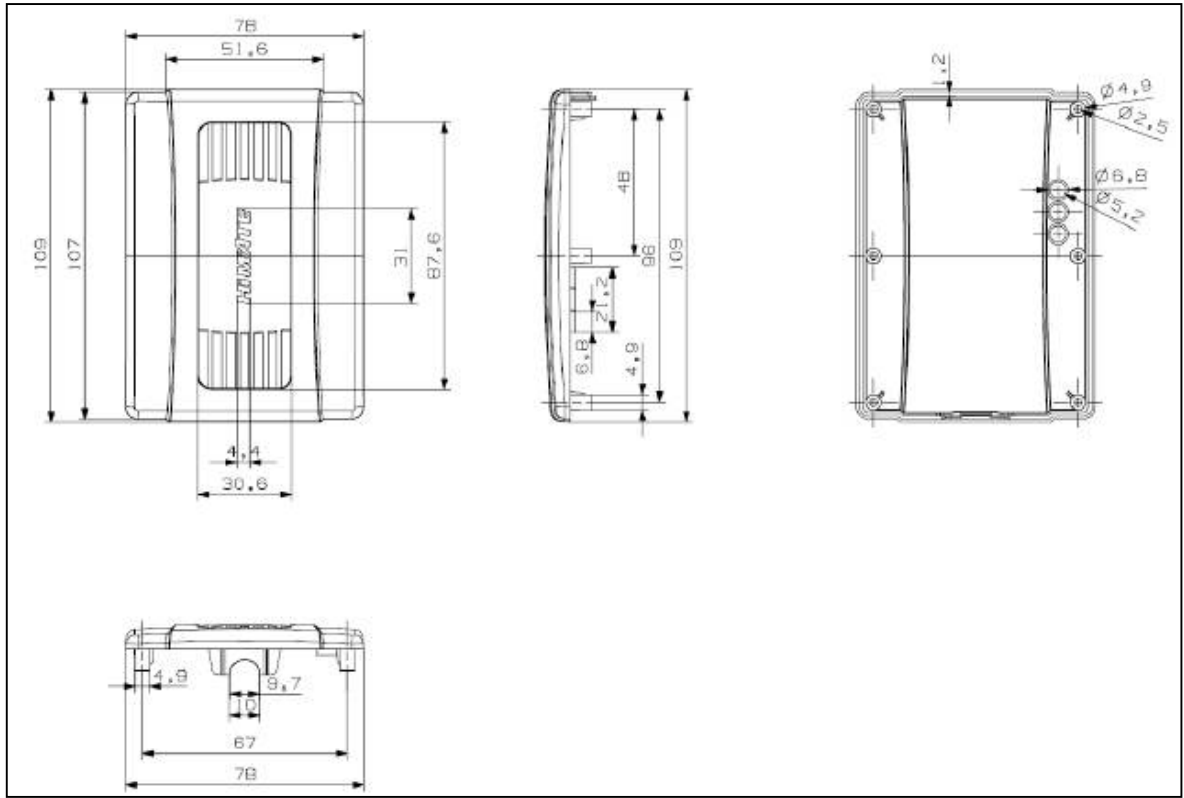

6. GPS reception

 A. The GPS receiver IC uses UBLOX's 7Series.

 B. Supply + 3.3V to the outside to use Active Antenna.

 C. An analog switch is used to block unnecessary UART interrupts.

 D. The power supply uses + 3.3V_FETOUT_GPS.

 E. The connector for connecting to an external active antenna is SMA.

7. Serial NOR Flash

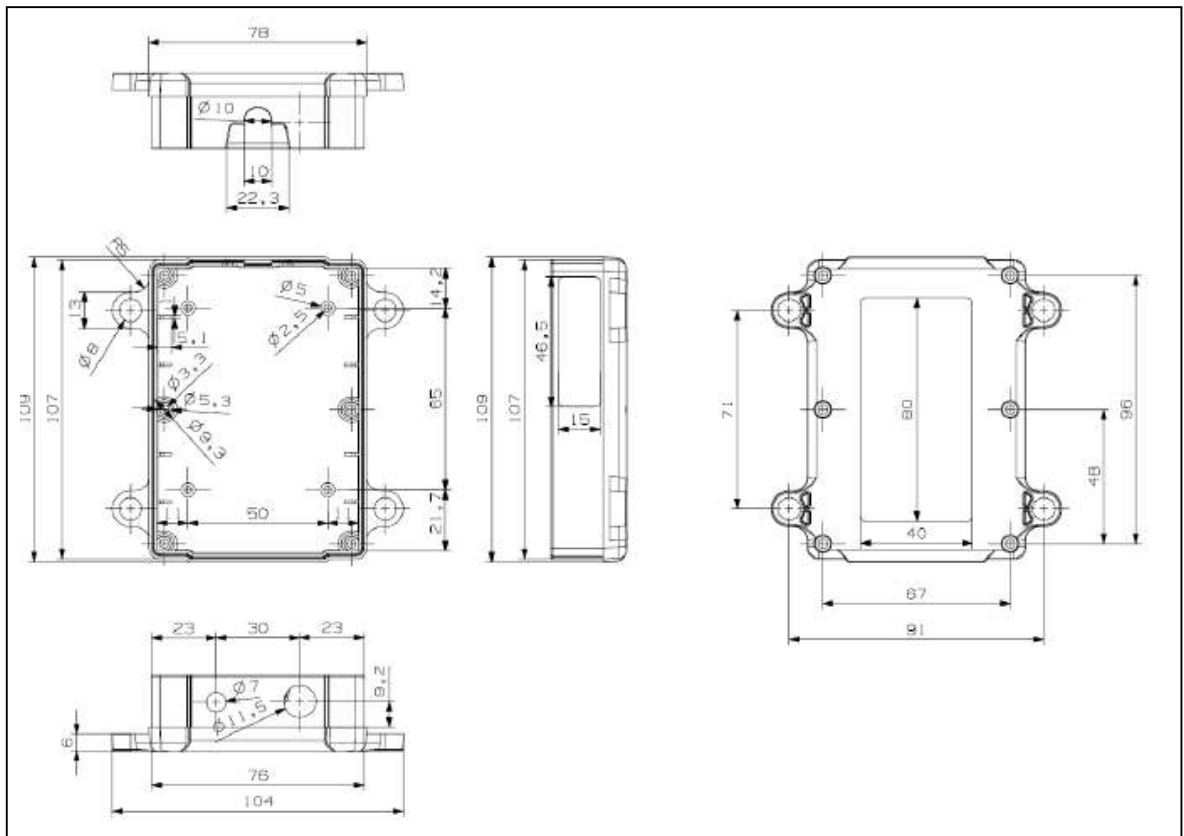 A. It is memory for various NV data and FOTA.

  This Flash is connected to the constant power + 3.3V_LIVE

V. Mechanical Drawings

[Upper]

[Lower]