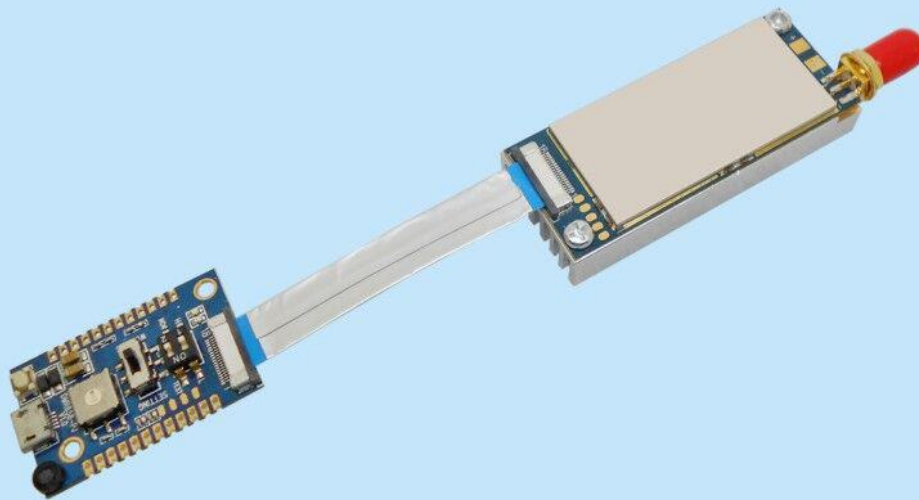


5W all-in-one DMR walkie talkie module

## Product Specification



## Catalogue

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### Note: Revision History

| Revision | Date    | Comment       |
|----------|---------|---------------|
| V1.0     | 2017-11 | First release |
|          |         |               |
|          |         |               |
|          |         |               |

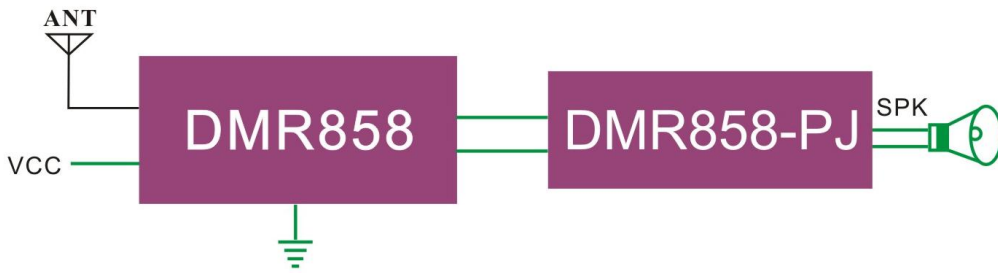
## 1. Brief Description

DMR858 is an ALL-IN-ONE DMR 5W professional walkie talkie. It combined analog and DMR walkie talkie function, and compatible with the walkie talkie in the market. DSP processor, DMR encoder/decoder, RF / Audio Amplifier, PTT, Microphone, 16 Channel switch, Volume adjustment all on board. Connected with power supply and speaker, it build a 5W professional DMR walkie talkie. This product has very good voice quality and very good range. Also special heat sinks are designed specially to guarantee long time talking without any problems.

## 2. Product feature

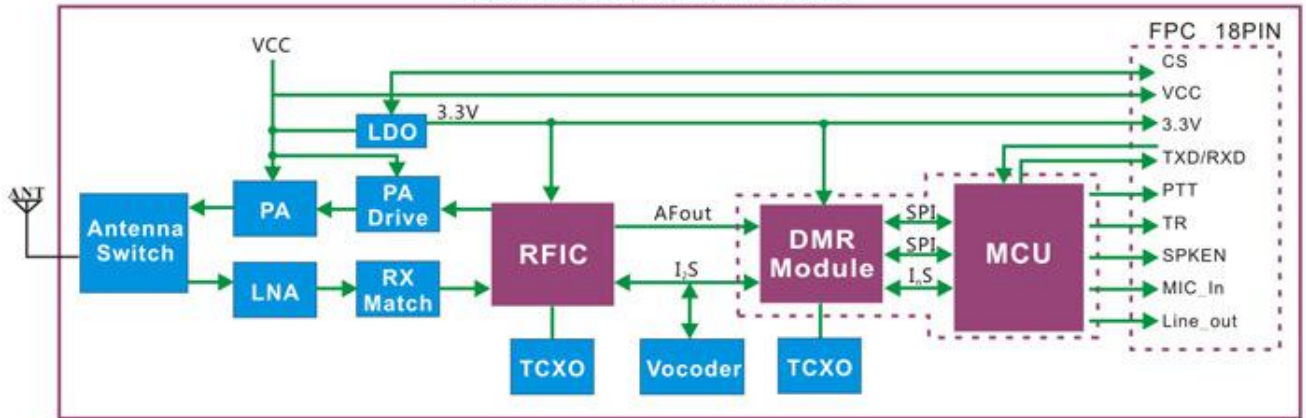
- UHF band frequency: 400~470 MHz
- VHF band frequency: 134~174MHz
- 350 band frequency: 320-390MHz  
(3 frequency bands are optional)
- Voice encoder: NVOC  
AMBE++(MOTO compatible)  
(2 voice encoders are optional)
- 7 Km in open area
- Output power up to 5W
- Sensitivity up to: -124dBm
- Less than 1% BER @ -121dBm
- TX/RX frequency set separately
- Bandwidth for analogy:12.5 / 25 KHz
- Bandwidth for DMR:6.25KHz
- Combined DMR / Analog walkie talkie
- Support IP confirmed/unconfirmed SMS. Provide pre-save SMS
- 1ppm TCXO Crystal
- CTCSS: 51 levels
- CDCSS: 166 levels
- Digital volume :9 class
- Analog volume : continuous (stepless)
- Encryption for SMS and voice
- Support various voice calling types:  
Broadcast, group call and private call
- Reminder for input calling, calling status checking
- Support enhanced function such as  
emergency alarm and radio monitor
- Support Frequency scan
- Support Radio kill and activate
- RSSI value read out
- Provide PC software to configure
- EEPROM inside, parameters stored even powered off

### 3. Typ. Circuit

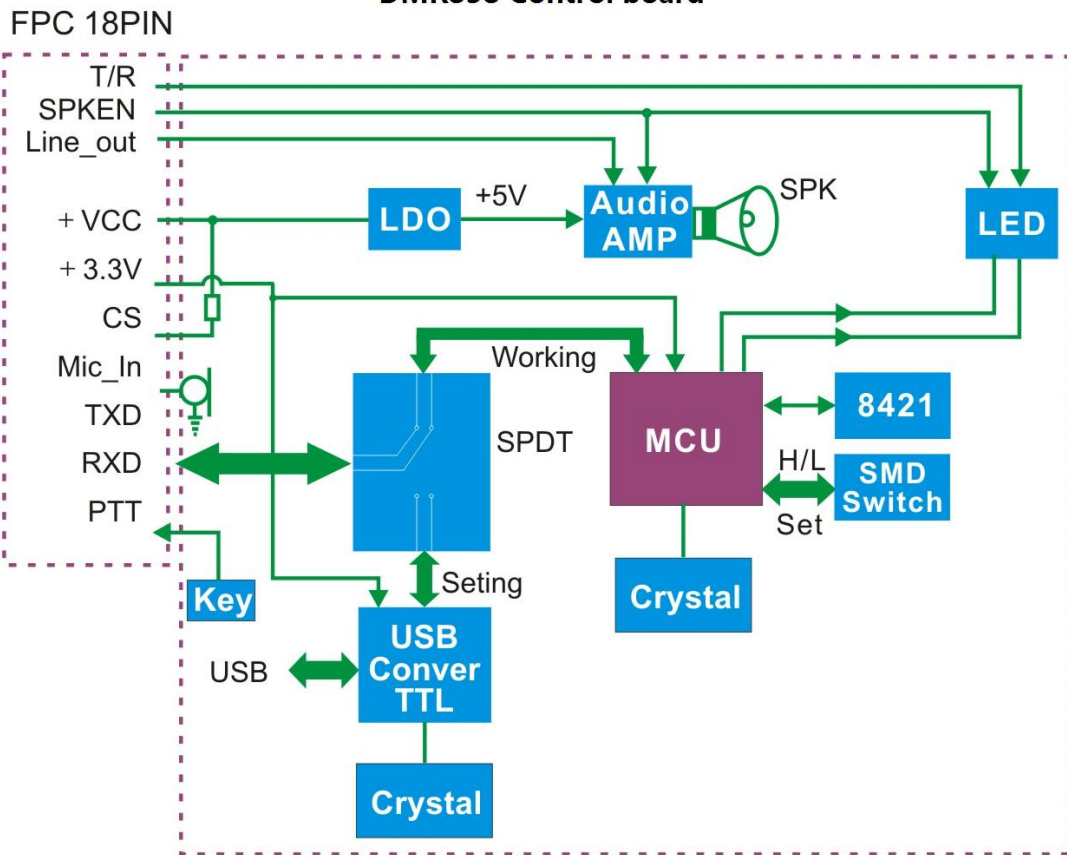


### 4. Block Diagram

DMR858 Functional Board



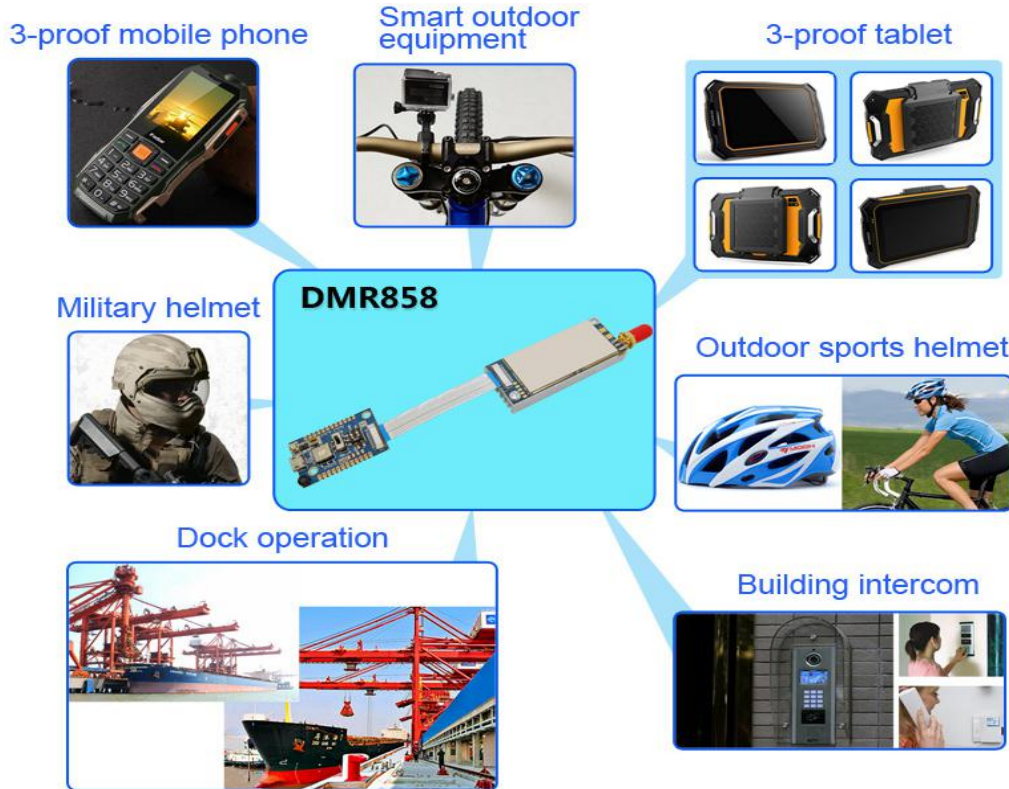
DMR858 Control board



## 5. Electrical Characters

| Parameters                 | condition       | Min        | Typ    | Max | Unit |
|----------------------------|-----------------|------------|--------|-----|------|
| Power Supply               |                 | 3.3        | 8      | 9.0 | V    |
| Working temperature        |                 | -30        | 25     | 70  | °C   |
| Frequency Range            | @UHF            | 400        |        | 480 | MHz  |
|                            | @VHF            | 134        |        | 174 | MHz  |
|                            | @350            | 320        |        | 390 | MHz  |
| Serial baud rate           |                 |            | 57600  |     | bps  |
| <b>Current Consumption</b> |                 |            |        |     |      |
| Sleep current              |                 |            | <50    |     | uA   |
| RX Current                 | @VCC=8.0V       |            | < 100  |     | mA   |
| TX current                 | @VCC=8.0V,5W    |            | < 1.6  |     | A    |
|                            | @VCC=8.0V,3W    |            | <1.1   |     | A    |
|                            | @VCC=4.0V, 1.8W |            | < 1000 |     | mA   |
|                            | @VCC=4.0V,1W    |            | < 750  |     | mA   |
| TX Power                   | @high power, 4v |            | 1.6    |     | W    |
|                            | @low power,4v   |            | 1.0    |     | W    |
|                            | @high power, 8v | 4          | 5      | 5.5 | W    |
|                            | @Low power, 8v  | 2          | 3      | 3.5 | W    |
| Mic input voltage          |                 |            | 0.1    | 1.6 | Vpp  |
| <b>Current Consumption</b> |                 |            |        |     |      |
| RX Sensitivity             |                 |            | -124   |     | dBm  |
| BER @DMR mode              | @ -121dBm       |            | 1      |     | %    |
| Speaker                    |                 | 2W & 8 ohm |        |     |      |

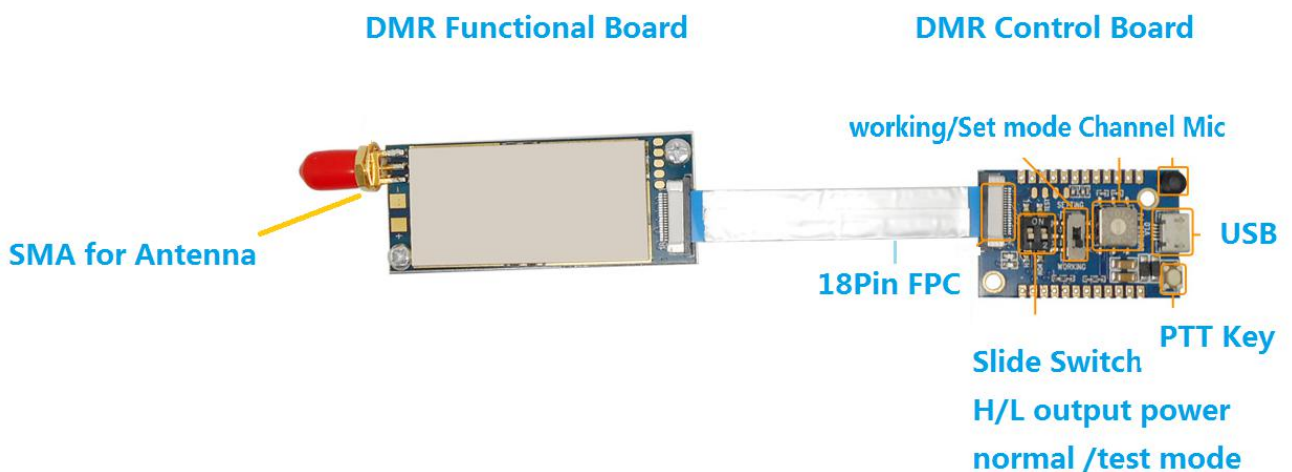
## 6. Typical Application



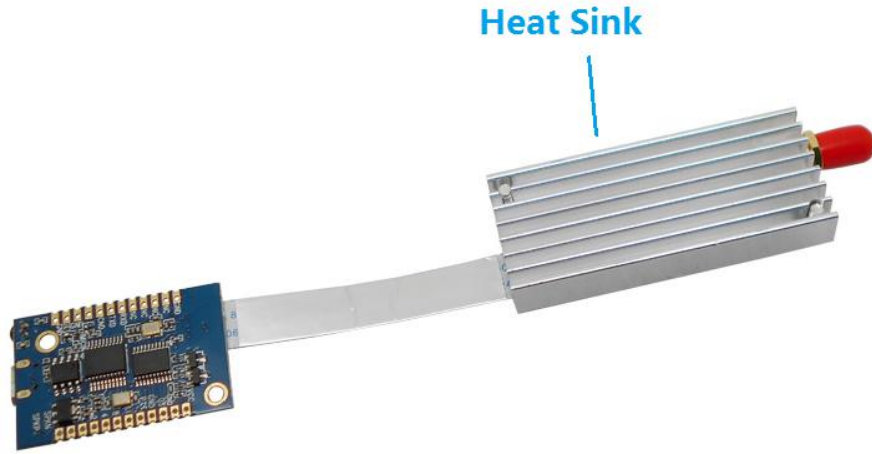
## 7. Pin Description

- DMR858 include 3 parts:
  - DMR858 Functional board
  - DMR858PJ control board
  - DMR858 heat sinks.
- Connected with power supply and speaker, it can be a professional long range DMR walkie talkie.

All the 3 parts will be connected together before shipping.





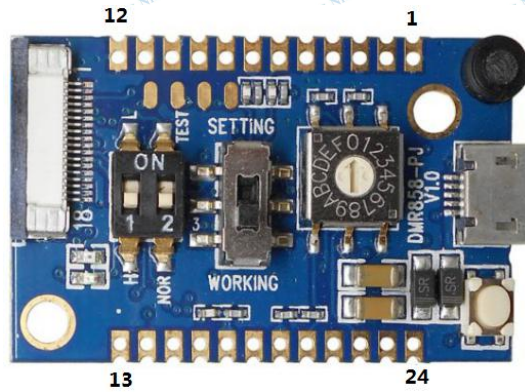


➤ DMR858 Functional Board Pin Assignment



| Pin No      | Definition | Description                                     |
|-------------|------------|---|
| 1, 2, 4     | GND        | Ground  |
| 3           | MIC_IN     | Microphone input                                |
| 5           | UART-RX    | Connected with UART-TX of external device       |
| 6           | UART-TX    | Connected with UART-RX of external device       |
| 7, 13       | GND        | Ground  |
| 8           | CS         | Sleep: 0 ; working: 1 (default when leave open) |
| 9           | PTT        | TX: 0, RX: 1 ( Default)                         |
| 10          | LINE_OUT   | Line out for voice                              |
| 11          | T/R        | TX/RX indicator, 1: TX , 0: RX                  |
| 12          | SPKEN      | External Voice amplifier on/off, 1: on, 0:off   |
| 14, 15      | +3.3 V     | 3.3V output, maximum 50mA loading               |
| 16,17,18,19 | VCC        | VCC (3.3V-9V)                                   |
| 20          | GND        | Ground  |

➤ DMR858-PJ (Control Board ) Pin Assignment



| Pin No.     | Definition | Description   |
|-------------|------------|---|
| 1           | VCC        | VDD (connected to Pin 19 of function board)   |
| 2,4         | GND        | Ground  |
| 3           | CS         | Connect to CS of the function board   |
| 5           | PTT        | Connect to PTT of the function board  |
| 6           | LINE_OUT   | Connect to Line Out of the function board   |
| 7           | 8          | Frequency channel indicator,( 16 channel selected )<br>8 :the maximum bit,<br>4: the 3rd bit,<br>2: the 2nd bit,<br>1: the least bit for example :<br>8421 encoding:<br>0000: channel 0,<br>0001: channel 1<br>0010: channel 2<br>0011 :channel 3<br>...<br>1111 : channel 15 |
| 8           | 4          |   |
| 9           | 2          |   |
| 10          | 1          |   |
| 11          | SPKN       |   |
| 12          | SPKP       | Connected with Speaker: 8 Ohm 2W  |
| 13,15,17    | GND        | Ground  |
| 14          | SET        | Setting mode (0: setting mode , 1: normal mode )  |
| 16          | MIC_IN     | Connect to Mic_IN of the function board   |
| 18          | TXD        | Connect to TXD/RXD of the function board  |
| 19          | RXD        |   |
| 20,21,22,23 | NC         | NC  |
| 24          | GND        | Ground  |



## 8. Function Description

16 default channels are set before shipping. Channel 0 -7 for DMR channel, channel 8-15 are analog Walkie Talkie. A rotary switch is used to change the channels. And Pin7 - 10 output the channel status.

### 1) Parameters setting

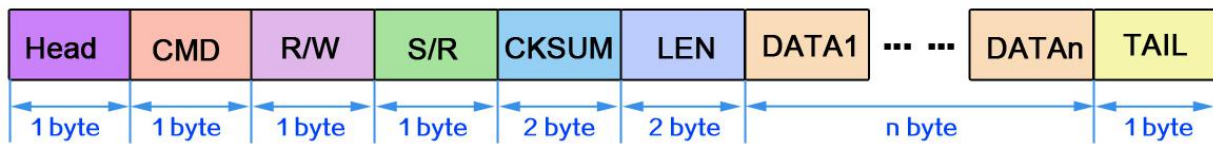
Both Standard mini-USB interface and serial UART interface are used to configure the parameter. Either of them can be used. And we provide PC software which is easy to use to configure all the necessary parameters. Below is the typical connection diagram.

### 2) Serial Communication Protocol

All the parameters of DMR818 can be configured using Serial Communication Protocol.

#### MSB for the command.

Format as below:



The definition of protocol as below:

| Offset | Flag  | Length | Comment              | Detail  |
|--------|-------|--------|----------------------|---|
| 0      | Head  | 1      | Packet header        | 0x68  |
| 1      | CMD   | 1      | command              | 0x01~0x28: parameter function refer to table 1  |
| 2      | R/W   | 1      | Read/write operation | 0x00: reading ;<br>0x01: writing ;<br>(external CPU TX is writing,external CPU RX is reading)<br>0x02: initiative sending   |
| 3      | S/R   | 1      | Setting/Respo nding  | setting:<br>0x01: start<br>answering:<br>0x00 Done<br>0x01 busy or fail (note 2)<br>0x02 No channel or channel errors (note 3)<br>0x07 module killed<br>0x09 check error<br>note: message, voice refer to below corresponding specification |
| 4、5    | CKSUM | 2      | Checksum             | Checksum for all the packet   |
| 6、7    | LEN   | 2      | Data length          | DATA length, no information, LEN is 0   |
| 8      | DATA  | len    | Data info            |   |
|        | TAIL  | 1      | Tail of packet       | 0x10  |

**Note 1: CMD as below:**

| CMD  | Function                          | Message available for All channels or current channel | Message save when Power off (yes / no) |
|------|-----------------------------------|---|--|
| 0x01 | Channel change                    |   | yes                                    |
| 0x02 | Receive volume                    | All   | yes                                    |
| 0x03 | scanning                          | current channel                                       | no                                     |
| 0x04 | Transceiver status checking       | current channel                                       | no                                     |
| 0x05 | Signal strength value             | current channel                                       | no                                     |
| 0x06 | Various call modes (Call Type)    | current channel                                       | no                                     |
| 0x07 | Message mode setting and transmit | current channel                                       | no                                     |
| 0x09 | Emergency alarm                   | current channel                                       | no                                     |
| 0x0a | Enhancements                      | current channel                                       | no                                     |
| 0x0b | Mic Gain configuration            | All   | yes                                    |
| 0x0c | Power-saving mode configuration   | All   | yes                                    |
| 0x0d | Transceiver frequency             | current channel                                       | yes                                    |
| 0x0e | Repeater/off-web                  | current channel                                       | no                                     |
| 0x10 | Receive/call type, number output  | current channel                                       | no                                     |
| 0x11 | Read received data                | current channel                                       | no                                     |
| 0x12 | SQ setting                        | current channel                                       | yes                                    |
| 0x13 | Mode of CTCSS/CDCSS               | current channel                                       | yes                                    |
| 0x14 | CTCSS/CDCSS                       | current channel                                       | yes                                    |
| 0x15 | Monitor switch                    | current channel                                       | no                                     |
| 0x16 | Bit Error rates                   |   | no                                     |
| 0x17 | High/low power                    | current channel                                       | yes                                    |
| 0x18 | Contact person                    | current channel                                       | no                                     |
| 0x19 | Encryption switch                 | current channel                                       | no                                     |
| 0x1a | Completed initialization          |   | no                                     |
| 0x22 | Transmit contacts information     | current channel                                       | no                                     |
| 0x23 | Testing message                   | current channel                                       | no                                     |
| 0x24 | ID reading                        | all   | no                                     |
| 0x25 | Firmware Version reading          | all   | no                                     |
| 0x26 | Check contacts list               | all   | no                                     |
| 0x27 | Checking scan status              | current channel                                       | no                                     |
| 0x28 | Checking encryption status        | current channel                                       | no                                     |

**Note 2: When module is transmitting, receiving, and configuring, it will show 0x01 to tell setting fail for busy.**

**Note 3: It show 0x02 for below condition:**

**3.1: When change to non-exist channel;**

**3.2: It all happen when configure DMR settings in analog channel( such as: message, special functions) ,**

**3.3 : Configure analog parameters in DMR channel.**

9. Dimension (Unit: mm)

