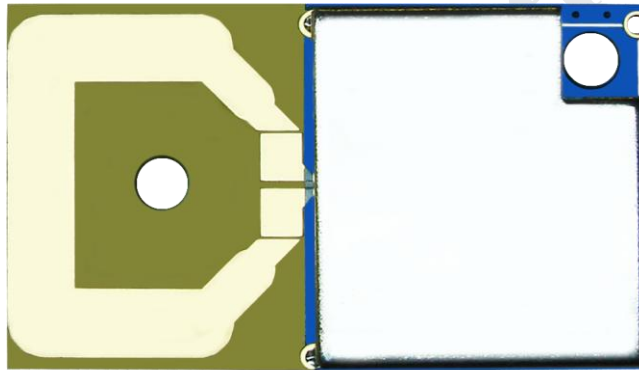

2.4G Direct Sequence Spread Spectrum RF Module



Version History

| Version | Date | Changes |
|---------|---------------|---------------------------|
| V1.00 | May 23, 2009 | 1 st . Edition |
| V1.01 | Jan 7, 2010 | 2 nd . Edition |
| V1.02 | July 15, 2010 | 3 rd . Edition |

Product Profile

本模組應用於無線資料雙向傳送，工作頻率為 2.4GHz，採用展頻技術，抗干擾性強，尤其不易受無線網卡、藍芽接收器、無線網路、Wifi、微波爐等影響...。

TRW-24DSMCU 雙向模組採用直接序列展頻技術(Direct Sequence Spread Spectrum；DSSS)，通過使用可變相位調變如 PSK、QPSK(Quadrature Phase Shift Keying)、DQPSK(Differential Quadrature Phase Shift Keying)等，可以得到最高的可靠性以及表現高數據速率性能。其優點為處於現有 2.4GHz 無線網路高干擾環境下，仍可保持優越通訊。

最大資料傳輸速率為 250Kbps，最大發射功率+4dBm，工作電壓範圍 3.5V~6V，內建 UART Micro-controller interface，適合應用在各種資料傳輸及短距離手持裝置類的應用，如無線滑鼠、無線鍵盤、無線遙控器、家庭自動化控制及無線玩具等。

Application

- Wireless Keyboard and Mouse
- Remote Control
- VOIP Phone
- AMR – Automatic Meter Reading
- Wireless Game Pad
- Wireless Toys
- Home Automation
- RKE – Two-way Remote Keyless Entry

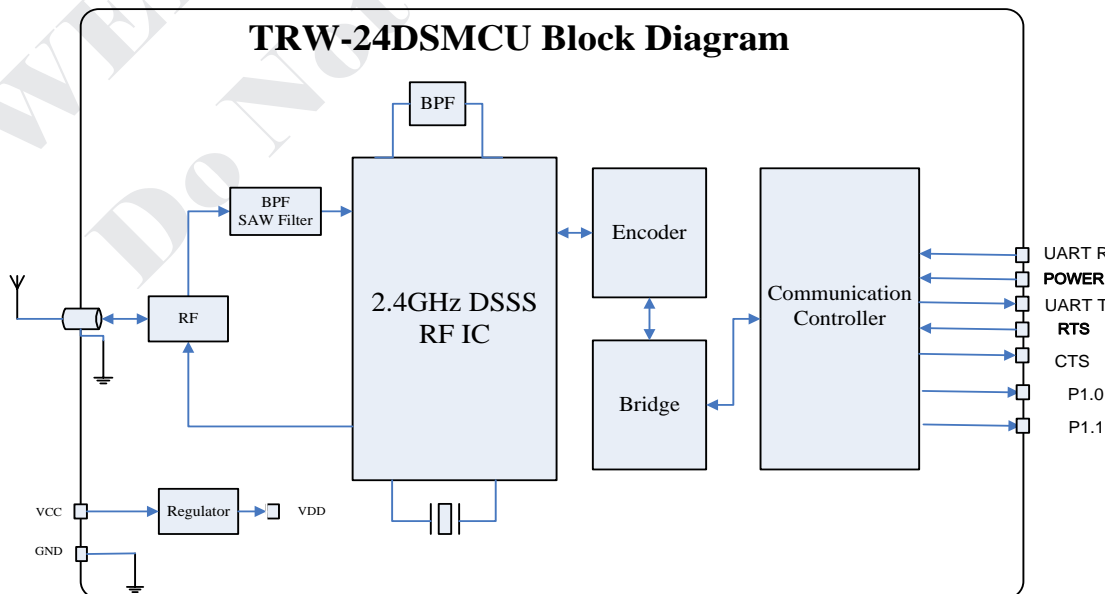
Key Feature

- 2.4GHz Sequence Spread Spectrum
- RF Output Power up to +4dBm
- Receive Sensitivity up to -98dBm
- Voltage Supply from 3.5V~6V
- Distance range up to 180m(Open Space)
- DSSS Data rate up to 250KBps
- Auto transaction sequencer no need MCU
- Dynamic data rate reception
- UART Micro-controller Interface(TTL 3V3)

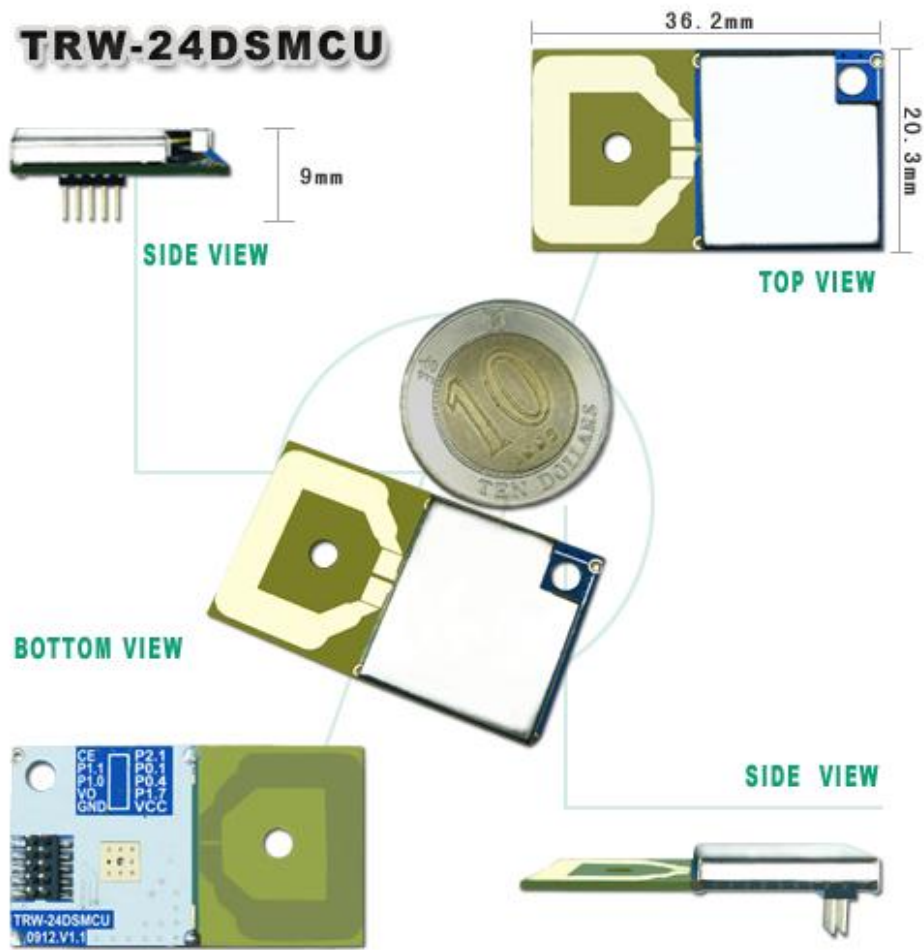
Characteristic

| Parameter | Min | Type | Max | Unit | Condition |
|-----------------------------|------------|------|------|------|---------------|
| Operating Condition | | | | | |
| Operating Temperature Range | -10 | | +70 | °C | |
| Storage Temperature Range | -40 | | +90 | °C | |
| Operating Supply Voltage | 3.5 | | 6 | V | |
| Current Consumption | | | | | |
| Rx mode | | | 30 | mA | |
| Tx mode | | | 48 | mA | |
| Sleep mode | | | 3 | μA | |
| RF Characteristic | | | | | |
| Frequency Range | 2400 | | 2490 | MHz | |
| Frequency Deviation | 270 | | 330 | KHz | |
| Data Rate | 15.6 25 | | 1000 | Kbps | |
| Tx Output Power | -35 | | +4 | dBm | 8 Step select |
| Rx Sensitivity | | | -98 | dBm | |
| Link Turnaround Time | 30 | | 65 | μs | |
| Modulation | DSSS | | | | |

Block Diagram



View



Pin Assignment

| Pin | Function | I/O | Description |
|-----|----------|-----|-------------------------------------|
| 1 | P2.1 | O | CTS |
| 2 | P0.1 | I | RTS |
| 3 | P0.4 | O | UART TX |
| 4 | P1.7 | I | UART RX |
| 5 | VCC | P | Power Cathode |
| 6 | GND | G | Power Negative |
| 7 | VO | O | 3.3V Output |
| 8 | P1.0 | O | UART Data Rate Select |
| 9 | P1.1 | O | UART Data Rate Select |
| 10 | CE | I | Puller-low to turn off Module Power |

時序圖



When the data into the RF no more than 2 BYTE time, RF began to send, and DATA should not exceed 64BYTE

Interface Data Rate Select

| P1.1 | P1.0 | Data Rate |
|------|------|-----------|
| 0 | 0 | 4.8K |
| 0 | 1 | 9.6K |
| 1 | 0 | 19.2K |
| 1 | 1 | 19.2K |

Command Summary

1. 介面速率選擇：當模組與設備的介面速率相同時會透過 UART 持續回覆 0xFE 0xFE 0xFE 0xFE 的數值，直到配置模組完成才會停止回覆。
2. 配置模組：
 - 0xFE+1Byte(頻道)+1Byte(RF 速率)+1Byte(固定為 00)+1Byte(高位 GID)+1Byte(低位 GID)
 - 頻道：0x01(2400MHz)~0x53(2483MHz)，頻道間隔 1MHz。

Interface Data Rate Select

| P1.1 | P1.0 | Data Rate |
|------|------|-----------|
| 0 | 0 | 4.8K |
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Command Summary

3. 介面速率選擇：當模組與設備的介面速率相同時會透過 UART 持續回覆 0xFE 0xFE 0xFE 0xFE 的數值，直到配置模組完成才會停止回覆。

4. 配置模組：

0xFE+1Byte(頻道)+1Byte(RF 速率)+1Byte(固定為 00)+1Byte(高位 GID)+1Byte(低位 GID).

● 頻道：0x01(2400MHz)~0x53(2483MHz)，頻道間隔 1MHz.

● RF 速率：

| Value | RF Data Rate | Modulation Mode |
|-------|--------------|-----------------|
| 00 | 1M | GFSK |
| 01 | 250K | 32 Chip 8DR |
| 02 | 125K | 64 Chip 8DR |
| 03 | 62.5K | 32 Chip DDR |
| 04 | 31.25K | 64 Chip DDR |

◇ In GFSK mode, data is transmitted at 1 Mbps, without any DSSS.

◇ In 8DR mode, 1 byte is encoded in each PN code symbol transmitted.

◇ In DDR mode, 2 bits are encoded in each PN code symbol transmitted.

◇ In SDR mode, a single bit is encoded in each PN code symbol transmitted.

● 群組 ID(GID)：共有 2 個 Bytes 可供使用者自行設定，若設定 0000 則為廣播模式在相同頻道內的所有設備都可收到。

5. 讀取內部設定：Value=0x7E

回傳值=0x7E+1Byte(頻道)+1Byte(RF 速率)+1Byte(RF 功率)+1Byte(高位 GID)+1Byte(低位 GID).

6. 傳輸資料：0xFD+data(需小於 62bytes).