

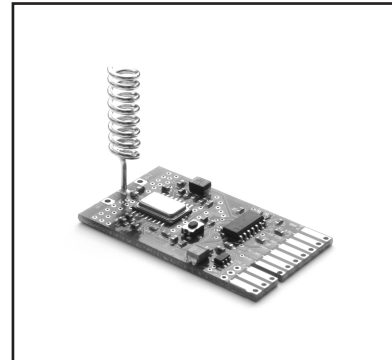


- **Base Station with Host Serial Interface**
- **Compatible with RFM miniMESH™ Network Protocol**
- **3 V, Very Low Current Operation**
- **Ready-to-Use OEM Module**

The DM1800-916MB is the 916.50 MHz base station module in the DM1800 family of RF transceivers. The DM1800 family is designed for adding wireless mesh network connectivity to a wide range of monitoring and control systems. The DM1800-916MB is equipped with a serial I/O port to interface a host microcontroller. Radio communications range in an “open field” environment is typically 200 meters/hop. The DM1800-916MB combines RFM’s very low current ASH radio technology with low power microcontroller technology to achieve long battery life. This module is compatible with RFM’s miniMESH™ network protocol, which provides “plug-and-play” multicast mesh network routing. The DM1800-916MB is certified for operation under FCC 15.249 regulations.

DM1800-916MB

916.50 MHz Transceiver Module



Absolute Maximum Ratings

| Rating | Value | Units |
|---|--------------|-------|
| All Input/Output Pins Except VIN | -0.3 to +3.3 | V |
| Non-Operating Ambient Temperature Range | -40 to +85 | °C |

Electrical Characteristics

| Characteristic | Sym | Notes | Minimum | Typical | Maximum | Units |
|---|-----------------|-------|---------|---------|---------|-------------------|
| Operating Frequency | f _o | | 916.30 | | 916.70 | MHz |
| Modulation Type | | | | OOK | | |
| RF Encoded Data Transmission Rate | | | | 4.8 | | kb/s |
| Average Receiver Input Current, No External Power Supply Load | I _R | | | 4 | | mA |
| Receiver Input Signal for 10 ⁻³ BER, 25 °C | | | | -98 | | dBm |
| Peak Transmitter Input Current, No External Power Supply Load | I _{TP} | | | | 13.5 | mA |
| Peak Transmitter Output Power | P _O | | | 1 | | mW |
| Bind Input Logic High | | | 2.4 | | | V |
| Bind Input Logic Low | | | | | .45 | V |
| Serial Port Data Rate | | | | 9.6 | | kb/s |
| Average Sleep Input Current, No External Power Supply Load | I _{SA} | | | 90 | | µA |
| Power Supply Input Voltage Range | VIN | | 2.6 | | 10 | V |
| Regulated Power Supply Output Voltage, VIN 3.1 to 10 V | VOUT | | | 3.0 | | Vdc |
| Regulated Power Supply Voltage Ripple | | | | | 10 | mV _{P-P} |
| Operating Temperature Range | | | 0 | | 85 | °C |

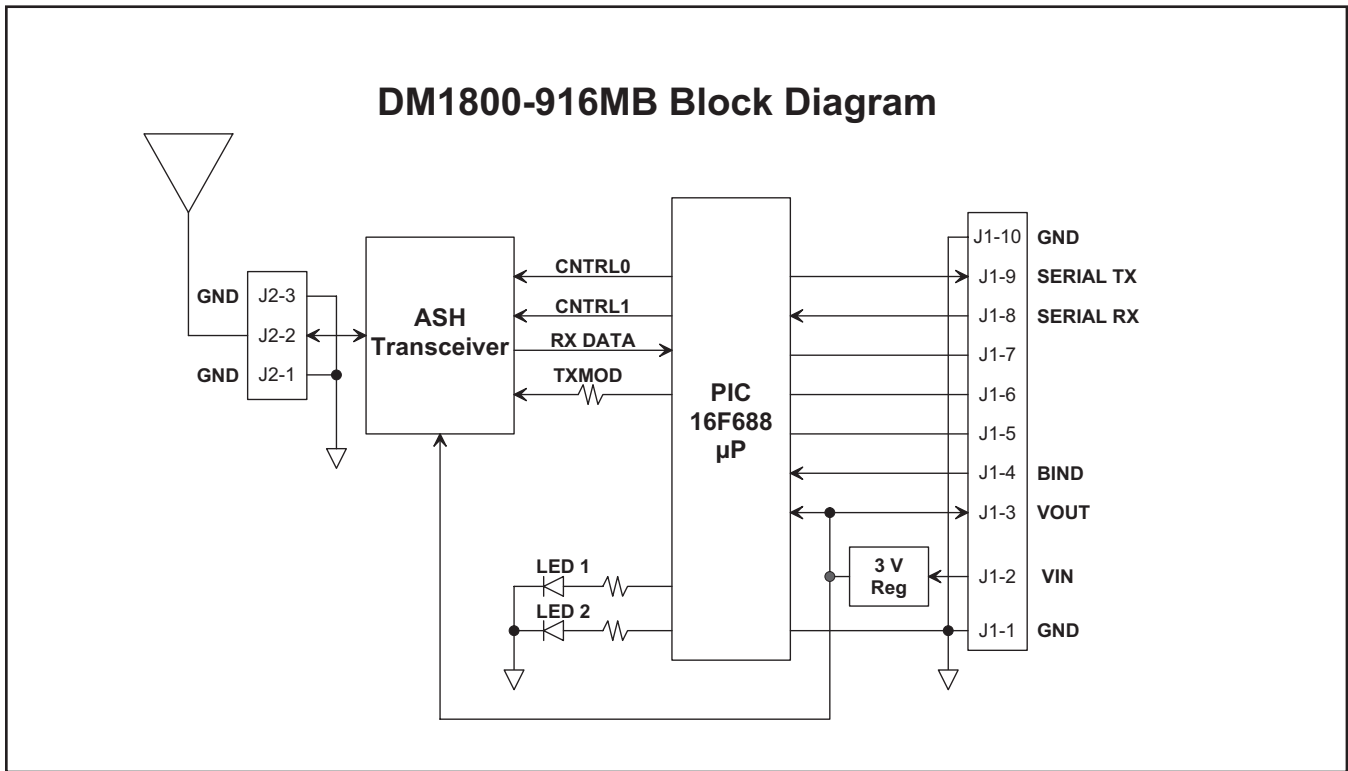


Figure 1

Theory of Operation

The major components of the DM1800-916MB include an RFM TR1000 ASH transceiver and a Microchip PIC16F688 microcontroller. The TR1000 operates on a frequency of 916.50 MHz, at a nominal output power of 1 mW.

The 16F688 provides a 9.6 kb/s serial interface for communication with a host microcontroller. A companion interface board, the IM1800, is available with USB bridge circuitry to interface the DM1800-916MB to a host PC. The DM1800 includes two LEDs that indicate the module's operating mode.

The DM1800-916MB firmware is based on RFM's miniMESH network protocol, which utilizes time-synchronized redundant routing to provide robust, deterministic packet delivery through a network with up to 7 routers. Network configuration and maintenance features are built into the miniMESH protocol, simplifying commissioning and operating logistics. The firmware also includes several sleep cycling methods for extended battery life operation.

Please refer to the *DM1800 User's Guide* and the *AN1800 series Application Notes* for installation and application programming information. See the RFM web site at www.RFM.com.

DM1800-916MB FCC Certification

The DM1800-916MB hardware has been certified for operation under FCC Part 15 Rules, Section 15.249. This certification applies only when a DM1800-916MB is equipped with one of the following antennas:

- helical antenna, part number 500-1195-003
- helical antenna, part number 500-1195-103

WARNING: *the DM1800-916MB must be re-certified if used with any antennas other than the two listed above.*

FCC Notices and Labels

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.

A clearly visible label is required on the outside of the user's (OEM) enclosure stating that this product contains a DM1800-916MB transceiver assembly, FCC ID: TE6-DM1800. **WARNING:** This device operates under Part 15 of the FCC rules. Any modification to this device, not expressly authorized by RFM, Inc., may void the user's authority to operate this device.

DM1800-916MB I/O Pad Descriptions

| Pin | Name | Description |
|-------|------------|---|
| J1-1 | GND | This pad is a signal and power supply ground. |
| J1-2 | VIN | This is the power supply input pad. The allowed input voltage range is 2.6 to 10 V. |
| J1-3 | VOUT | VOUT tracks 50 to 100 mV below VIN when VIN is in the range of 2.6 to 3.1 V. When VIN is in the range of 3.1 to 10 V, VOUT is regulated at 3.0 Vdc. Up to 10 mA can be supplied from this pad for powering external circuits such as thermistor-resistor networks. External circuitry must not impress more than 10 mV _{p-p} ripple on the regulated output voltage. |
| J1-4 | BIND Input | This pad is connected to a logic input on the microcontroller, and is configured with a weak pull-up. When this pin is momentarily grounded (to J1-1 or J1-10, the module is placed into the bind mode, allowing this module to be associated with other modules to form a network. |
| J1-5 | - | This pad is unused in base station operation. Leave this pad electrically unconnected. |
| J1-6 | - | This pad is unused in base station operation. Leave this pad electrically unconnected. |
| J1-7 | - | This pad is unused in base station operation. Leave this pad electrically unconnected. |
| J1-8 | SERIAL RX | This pad is connected to the module's serial data input (USART). Data to this pin is received at 9.6 kb/s, using 8 data bits, no parity, and one stop bit. The input voltage range on this pad is 0 to VOUT. Applying a voltage outside of this range may damage the module. |
| J1-9 | SERIAL TX | This pad is connected to the module's serial data output (USART) through a 1 kilohm resistor, which provides short-circuit protection. Data from this pad is sent at 9.6 kb/s, using 8 data bits, no parity, and one stop bit. |
| J1-10 | GND | This pad is a signal and power supply ground. |
| J2-1 | GND | This pad is a ground for the antenna port. |
| J2-2 | ANT | This pad is the antenna port. |
| J2-3 | GND | This pad is a ground for the antenna port. |



CAUTION: Electrostatic Sensitive Device. Observe precautions when handling.

DM1800-916MB I/O Pad Labels

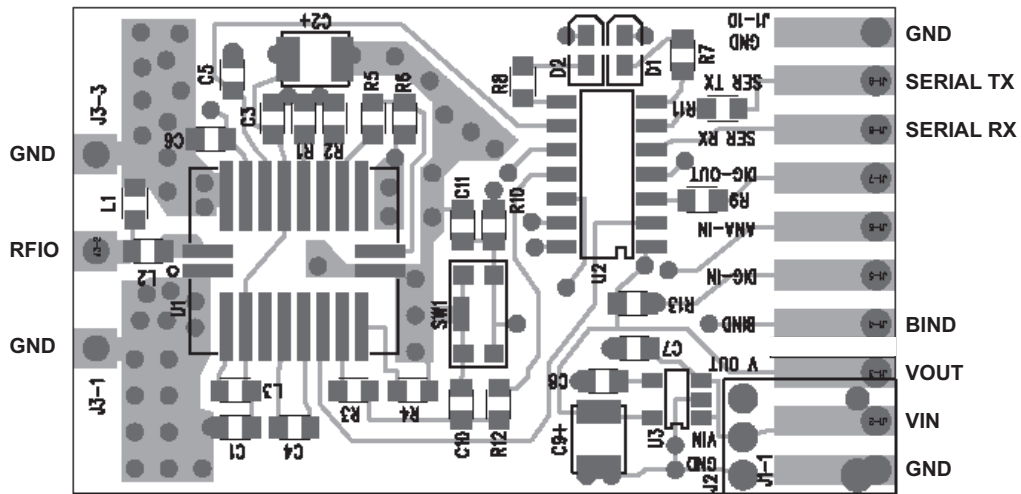


Figure 2

DM1800-916MB SMT Mounting Pattern

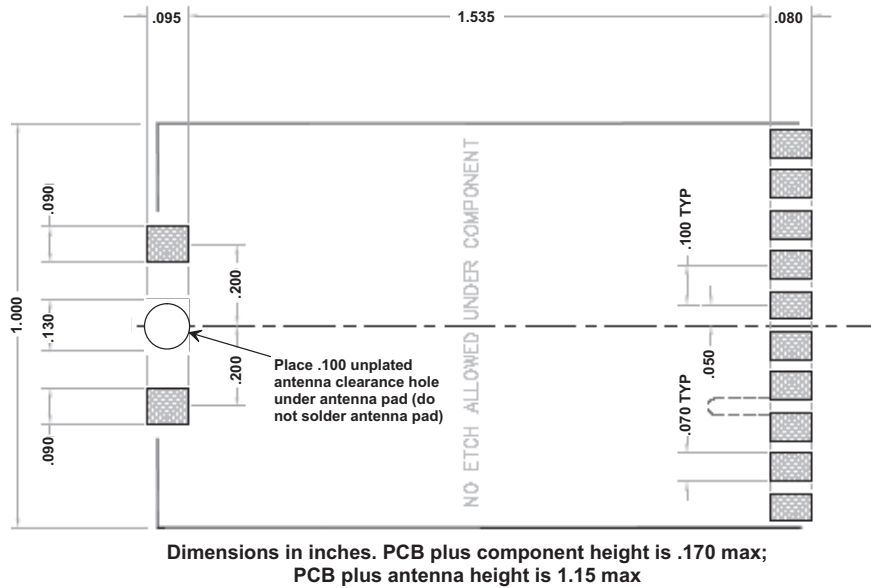


Figure 3

Note: Specifications subject to change without notice.