Exhibit 8: User's Manual

RF Module Manual

Hardware Reference Design
for RF Device

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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, in 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 use 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.**
- **Consult the dealer or an experience radio/TV technician for help.**

Any changes made by the user not approved by emWare can void the user's authority to operate the equipment.

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Table of Contents

General Information

The RF Module acts as a passthrough device: accepting data in and passing the same data out. The Module has as onboard voltage regulator and microcontroller. The radio uses FM modulation and operates at 9600 Bps. The data rate can be increased or decreased by changing the firmware. Please note however, that while not affecting RF emissions whatsoever, changing the data rate will directly affect range. For example: if the data rate were increased to 38.4 Kbps, the range would decrease to 600-500 feet line of sight or half the current range. On the other hand, if you were to decrease the data rate to 2400 Kbps, the range would improve. This is solely a function of the receiving code's ability to decode pulse widths as the radio approaches sensitivity. While the RF emissions remains constant, the wider pulses will expand the capacity of the receiving firmware to decode incoming data.

The radio itself is used as a virtual wire allowing for remote capabilities of devices. The radio is powered from a 9 V battery or a power supply that delivers anywhere from 6 – 15 Volts. The radio has it's own linear voltage regulator (please U8 on see schematic 3 of 3). Data is accepted into the USART of the microcontroller that buffers the data and Manchester encodes it. The onboard microcontroller in turn modulates the carrier.

Features

- FM (Frequency Shift Keying)
- Frequency Range of 902.5 – 909 MHz
- Line of sight range of 1200 ft.
- Data Rate of 9600 Bps (data rate can be increased at the compromise of range)
- Size Dimensions: 1.67 in. by 2.52 in.
- Output Power of 1 mW (maximum allowed by FCC)
- Sensitivity –112 dBm for a 95% percent packet success rate at 9600 Bps
- Input voltage of 5.5 volts to 15 volts, consumes 30 mA in RX and 40 mA in TX