

HumRC™ Series Remote Control and Sensor Transceiver Module



At below \$9 in volume, the Hummingbird platform is the lowest cost complete wideband transceiver with microcontroller module on the market today. The HumRC™ is built on this platform and is designed for reliable bi-directional remote control and sensor applications. It uses Frequency Hopping Spread Spectrum (FHSS) technology for interference immunity and supports versions at 900MHz and 2.4GHz with a common footprint and pin out.

Low Cost: The Hummingbird platform was designed with cost in mind from the start to appeal to OEMs who have a limited budget to incorporate RF. It uses advanced system on chip (SoC) technology to minimize the footprint and the number of components. It is designed for high volume production, leading to a price that is nearly half that of similar modules, and making it cost competitive with discrete designs.

Ease of Implementation: The transceiver has 8 status lines that can be individually configured as inputs to register button presses or as outputs to drive application circuitry. When an input line on one module goes high, it sends a transmission to take a corresponding output line on a paired module high. This makes implementation of basic remote control extremely simple.

Configuration: Primary settings are hardware-selectable, eliminating the need for an external microcontroller or other logic. Advanced configuration and operation are supported by a UART interface; however, no programming is required for basic operation.

Acknowledgements: A receiving module can send an acknowledgement to the transmitting unit after receiving a command or when a line is raised with external circuitry to indicate successful control. The acknowledgements can be configured to include up to two bytes of custom data.

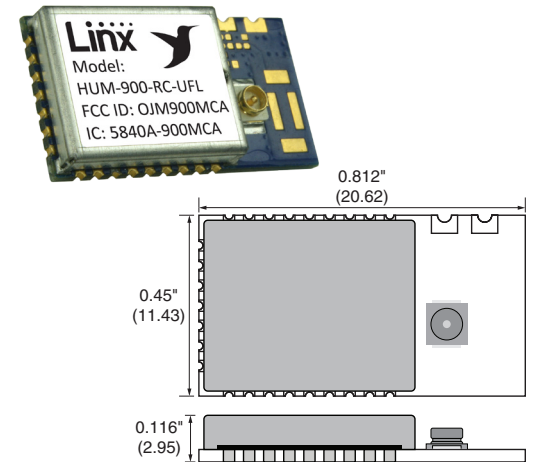
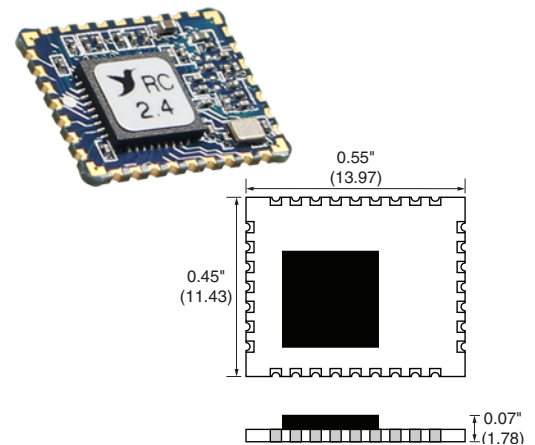
Analog Inputs: The transceiver has 2 analog inputs for sensors or circuits that output an analog voltage. The module can automatically respond to a command with these values, so a sensor node does not need an additional microprocessor. Just the module, sensor, battery, antenna and enclosure.

Small Size: Like its namesake, the Hummingbird modules are tiny. At 11.5mm by 14.0mm, they are less than one quarter the size of similar modules.

Low Power: Linx designed the Hummingbird platform for battery powered applications. It operates down to 2.0 volts and has a low transmit current of 28 to 37mA, receive current of 25mA and standby current under 1µA.

Ample Range: The HumRC™ 900MHz version outputs up to 10dBm, resulting in a line-of-sight range of up to 1,600m (1.0 miles), depending on the antenna implementation. The 2.4GHz version outputs up to 1dBm, resulting in a line-of-sight range of 100m (300 feet).

External Amplifiers: The module has control lines that allow it to work with an external PA and LNA for applications that need more system range.



Specifications	
Operating Voltage	2.0 to 3.6VDC
TX Supply Current	
@ 1dBm, 2.4GHz	28mA
@ 10dBm, 900MHz	37mA
RX Supply Current	25.5mA
Standby Current	0.5µA
RX Sensitivity	
2.4GHz	-99dBm
900MHz	-98dBm
Response Time	50ms max
Operating Temperature Range	-40 to +85°C

Certification: The HumRC™ Series is available in a non-certified version and in pre-certified versions with an RF connector or castellation connection.

The HumRC™ Series Transceiver can be completely configured in hardware, so no programming or serial interface is required for basic remote control applications. However, a UART interface provides more control and advanced features.

Hardware Controlled Operation

- Send a control message by taking a status line input high
- Pair modules so that they work together
- Set status lines as inputs and outputs in groups of 4 lines
- Enable acknowledgements
- Set the transmitter output power
- Power down the module
- Set all status line outputs to be latched or momentary

Software Configuration Options

- All hardware configuration options
- Enter two bytes of custom data to be sent with control messages or acknowledgements
- Individually configure the address and control permissions of up to 40 paired units
- Configure status line direction individually
- Configure status line output latching individually
- Configure receiver duty cycling for lower power
- Configure one or two input lines for analog voltage sensing
- Configure the transmitter to automatically limit the transmission time or to periodically transmit when an input is high
- Configure interrupts to trigger an external micro on events

Software Operation

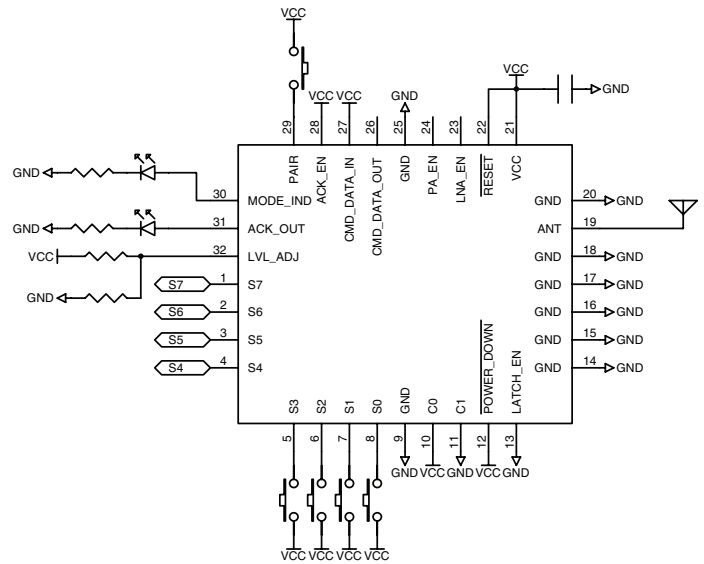
- All hardware-controlled operations
- Initiate a transmission of a specified number of packets
- Send acknowledgements
- Read RSSI
- Read remote status line values by serial interface, rather than 8 separate hardware lines
- Receive serial break on selected events
- Poll a remote unit for state of analog or digital status lines
- Read two bytes of additional data from remote transmitter

Applications

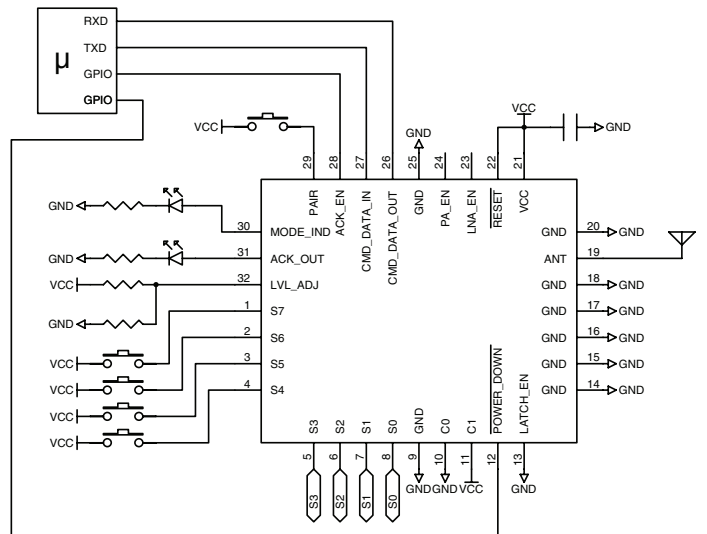
- Remote control with global certifications
- Long-range remote control with confirmation
- Home and industrial automation
- Remote status monitoring
- Keyless entry

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Typical Application Circuits



Hardware configuration with 4 inputs and 4 outputs



Software configuration with 4 inputs and 4 outputs and an external microcontroller

Ordering Information

Part Number	Description
EVM-***-RC	HumRC™ Series Carrier Board
EVM-900-RC-UFL	HumRC™ Series Carrier Board with Certified module, UFL Connector
EVM-900-RC-CAS	HumRC™ Series Carrier Board with Certified module, Castellated Connection
HUM-***-RC	HumRC™ Series Remote Control Transceiver
HUM-900-RC-UFL	HumRC™ Series Remote Control Transceiver, Certified, UFL Connector
HUM-900-RC-CAS	HumRC™ Series Remote Control Transceiver, Certified, Castellated Connection
MDEV-***-RC	HumRC™ Series Master Development System
EVAL-***-RC	HumRC™ Series Basic Evaluation Kit

*** = Frequency; 900MHz, 2.4GHz