HumPRO™ Series Frequency Hopping Digital Data 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 HumPRO™ is built on this platform and is designed for robust data transfer. It includes a frequency hopping protocol and supports versions at 2.4GHz and 900MHz with a common footprint and pin out.

Low Cost: Linx designed the Hummingbird platform 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. The module 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.

Robust: Built-in error detection and retransmission options create extremely robust point-to-point links for bi-directional data transmissions.

Frequency Hopping: The module has a FHSS protocol that typically locks in under 50ms. This allows it to quickly wake up, send data and go back to sleep, saving power consumption in battery-powered applications that have strict power budgets. It handles all protocol functions automatically.

Ease of Implementation: The user can configure a wide variety of settings through a standard UART interface. For point-point applications, the modules can be configured once, then send and receive data without need for further commands. For larger networks, commands support selective addressing and group broadcasting. The simple interface significantly reduces firmware development.

Addressing: All HumPRO™ modules have a unique 32-bit serial number that can be used as an address. Multiple addressing modes gives the options for 16 or 32 bit source and destination addressing, enabling point-to-point and broadcast messages. Address masking by the receiving module allows for creating subnets. Advanced networks can be implemented with an external microcontroller.

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

Low Power: Linx designed the Hummingbird platform for battery powered applications. It operates as low as 2.0 volts and has low transmit current of 28 to 36mA, receive current of 25mA and standby current of under 1µA.

Ample Range: The HumPRO™ 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.

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

0.55"
(13.97)

0.45"
(11.43)

0.07"
(1.78)
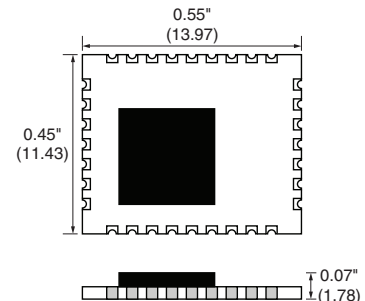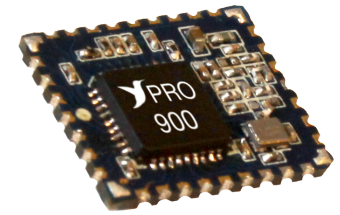
Specifications	
Operating Voltage	2.0 to 3.6VDC
TX Supply Current	
@ 1dBm, 2.4GHz	TBDmA
@ 10dBm, 900MHz	36mA
RX Supply Current	25.5mA
Standby Current	0.5µA
RX Sensitivity	
2.4GHz max rate 2.4GHz min rate	TBDdBm TBDdBm
900MHz max rate 900MHz min rate	–95dBm TBDdBm
Lock Time	<50ms typ
Operating Temperature Range	–40 to +85°C

Custom Modules: In high volume applications, Linx can provide custom firmware to meet the needs of a specific application, removing the firmware design burden.

Applications

- Remote data transfer
- Internet of Things (IoT)
- Machine to Machine (M2M)
- Consumer wireless
- Wireless sensor networks
- Home automation
- Remote status monitoring
- Industrial automation
- Robotics
- Data acquisition

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The HumPRO™ Series wireless UART module is a completely integrated RF transceiver and processor designed to transmit digital data across a wireless link. It has a built-in frequency hopping over-the-air protocol that manages all of the transmission and reception functions. It takes data in on its UART and supplies the data out of a UART on the remote module.

Networking

The HumPRO™ Series modules have three addressing modes that support point-to-point and broadcast messages with 16 or 32-bit addresses. With no internal address or routing tables, the module does not limit the number of directly addressed or broadcast receivers within the operating range of the transmitter. Routing can be performed by an external microcontroller that is sized for memory and speed appropriate for the desired network size. Linx can provide guidance for establishing networks using the HumPRO™ Series modules. Contact us for details.

Typical Application Circuit

The figure below shows a typical circuit that connects the HumPRO™ Series module to a microcontroller. Only three lines are required; CMD_DATA_IN, CMD_DATA_OUT and CMD. The rest offer additional feedback or control, but can also be accessed through the serial interface.
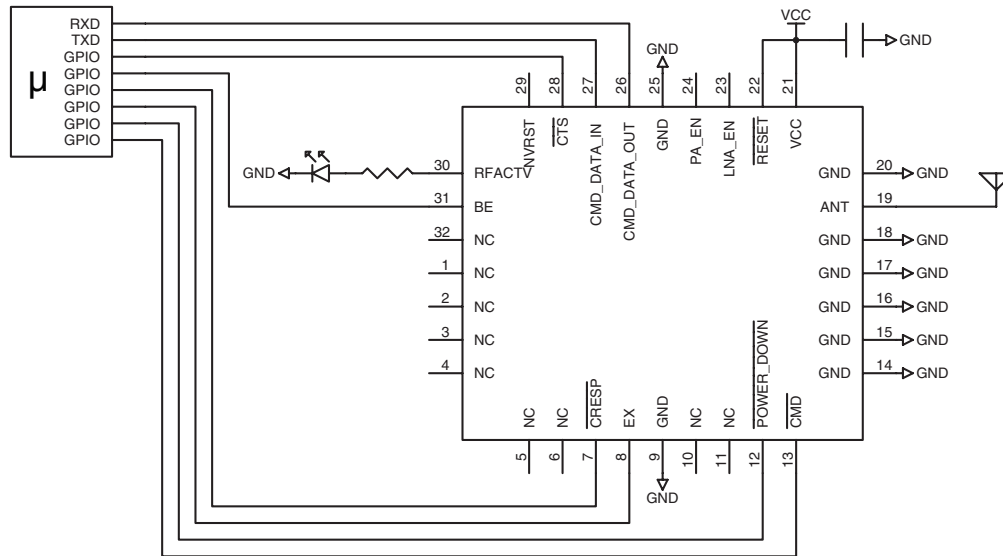
Ordering Information	
Part Number	**Description**
HUM-***-PRO	HumPRO™ Series Data Transceiver
HUM-2.4-PRO-MWA	HumPRO™ Series Data Transceiver with Antenna
HUM-***-PRO-MWC	HumPRO™ Series Data Transceiver with Connector
EVM-***-PRO	HumPRO™ Series Carrier Board
MDEV-***-PRO	HumPRO™ Series Master Development System
EVAL-***-PRO	HumPRO™ Series Basic Evaluation Kit
*** = Frequency; 915MHz, 2.4GHz	