



**HumPRC 900MHz Long-Range
Handheld Transmitter
Data Guide**

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Warning: Some customers may want Linx radio frequency (“RF”) products to control machinery or devices remotely, including machinery or devices that can cause death, bodily injuries, and/or property damage if improperly or inadvertently triggered, particularly in industrial settings or other applications implicating life-safety concerns (“Life and Property Safety Situations”).

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Do not use this or any Linx product to trigger an action directly from the data line or RSSI lines without a protocol or encoder/decoder to validate the data. Without validation, any signal from another unrelated transmitter in the environment received by the module could inadvertently trigger the action.

All RF products are susceptible to RF interference that can prevent communication. RF products without frequency agility or hopping implemented are more subject to interference. This module does not have a frequency hopping protocol built in.

Do not use any Linx product over the limits in this data guide. Excessive voltage or extended operation at the maximum voltage could cause product failure. Exceeding the reflow temperature profile could cause product failure which is not immediately evident.

Do not make any physical or electrical modifications to any Linx product. This will void the warranty and regulatory and UL certifications and may cause product failure which is not immediately evident.

Ordering Information

Ordering Information	
Part Number	Description
OTX-900-HH-LR8-PRC	900MHz HumPRC™ Long-Range Handheld Transmitter
HUM-900-PRC	900MHz HumPRC™ Series Remote Control Transceiver, Castellatation Interface, External Antenna Connection
HUM-900-PRC-CAS	900MHz HumPRC™ Series Remote Control Transceiver, Certified, Castellatation Interface, External Antenna Connection
HUM-900-PRC-UFL	900MHz HumPRC™ Series Remote Control Transceiver, Certified, Castellatation Interface, u.FL Connector
HUM-900-PRO	900MHz HumPRO™ Series Data Transceiver, Castellatation Interface, External Antenna Connection
HUM-900-PRO-CAS	900MHz HumPRO™ Series Data Transceiver, Certified, Castellatation Interface, External Antenna Connection
HUM-900-PRO-UFL	900MHz HumPRO™ Series Data Transceiver, Certified, Castellatation Interface, u.FL Connector
MDEV-900-PRC	900MHz HumPRC™ Series Master Development System

Figure 3: Ordering Information

Electrical Specifications

Electrical Specifications						
Parameter	Designation	Min.	Typ.	Max.	Units	Notes
Power Supply						
Operating Voltage	V_{CC}	2.1	3.0	3.6	VDC	
Supply Current	I_{CC}		38		mA	1
Power-Down Current	I_{PDN}			1.0	μ A	
Transmitter Section						
Transmit Frequency Range	F_C	902		928		MHz
Environmental						
Operating Temperature Range		-40		+85	$^{\circ}$ C	2,3
<ol style="list-style-type: none"> For a 1-second button press Characterized, but not tested The coin cell battery may limit the operating temperature range; check the manufacturer's reccomendations 						

Figure 4: Electrical Specifications

Button Assignments

Figure 5 illustrates the relationship between the button locations and encoder data lines.

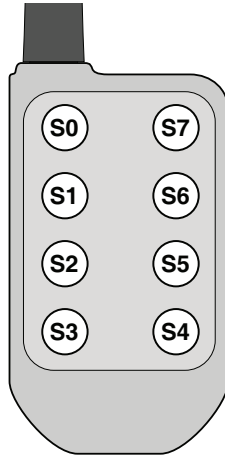


Figure 5: Button Assignments

Assembly Diagram

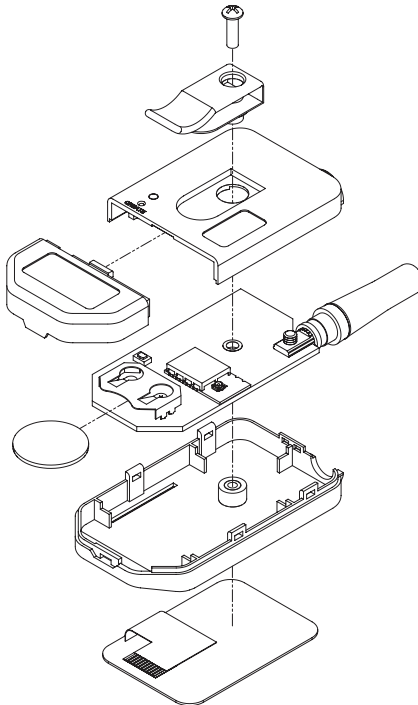


Figure 6: Assembly Diagram

Joining a Transmitter

The handheld transmitter is associated with a receiver using the built-in Join Process. This process configures a star network with the central unit as the system Administrator. Other units are added to the network as nodes one at a time. Typically, the handheld transmitter is added as a node to a module that has been configured as an administrator.

The schematic for a HumPRC™ Series transceiver configured as a receiver is shown in the Typical Applications section. The transceiver is set as an Administrator by pressing and holding the PAIR button for 30 seconds. While the button is held, the MODE_IND line is on. After 30 seconds, the MODE_IND line repeats a double blink, indicating that the operation has begun. When the button is released the key and address generation are complete and the module is an Administrator. A full explanation of this operation is in the HumPRC™ Series data guide.

The handheld transmitter is joined to an Administrator by pressing and releasing the PAIR buttons on both units. The modules automatically search for each other using a special protocol. When they find each other, the administrator sends the node the encryption key, UMASK and its network address. The UDESTID is set to the address of the administrator. The values are encrypted using a special factory-defined key. Once the JOIN process is complete, the MODE_IND blinks on both units and they now operate together.

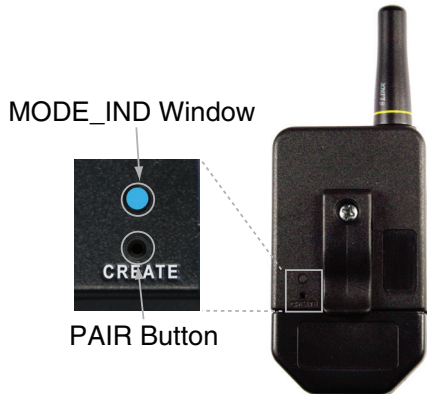


Figure 8: PAIR Button Access

Typical Applications

The signal sent by the PRC Long-Range Handheld Transmitter can be received by a HumPRC™ Series transceiver. When a button is pressed on the transmitter, a corresponding line on the transceiver goes high. This is then connected to external circuitry to perform whatever function is required by the application.



Figure 9: Standard (top) and Pre-certified (bottom) HumPRC™ Modules

The transmitter and transceiver must first learn each other's addresses. This is done by taking the PAIR line high on the transceiver, typically with a pushbutton switch. At the same time, the PAIR button is pressed on the back of the transmitter, typically with a paper clip or similar probe. The MODE_IND line on the transceiver and the LED on the back of the transmitter begin flashing, indicating that the Pair Process has been started. The devices automatically find each other and swap addresses. The MODE_IND line and LED flash to indicate that the process was successful and the devices are ready to use.

Figure 10 shows a typical schematic for the HumPRC™ Series transceiver being used as a receiver only. The C0 and C1 lines are pulled to ground, setting all of the status lines as outputs.

The MODE_IND line is connected to an LED to provide visual feedback to the user that an action is taking place.

The PAIR line is connected to a pushbutton switch for activating the Join Process.

The ACK_EN line is pulled to supply so that the module will send an acknowledgement as soon as it receives a signal. Alternatively, this line can be connected to external circuitry to take the line high when an action has taken place. For example, a circuit can take the line high when a motor has actually stopped or a door has actually locked. This way the LED on the handheld lights up only when the desired action has occurred.

Additional features can be enabled through the module's Command Data Interface. The data guide and additional documentation for the HumPRC™ Series transceiver can be found on the Linx Technologies website at www.linxtechnologies.com.

Operation with the HumPRO™ Series

The commands from the handheld transmitter can be received by a HumPRO™ Series transceiver. The transmitter should be joined to the HumPRO™ Series module in the same manner as it would be joined to a HumPRC™ Series module. The transmitter sends a Remote Activation command and accepts a Remote Confirm command.

Remote Activation

The transmission output consists of six bytes:

0x03 0x00 0x00 0x00 0x10 <STATUS>

The first byte is 0x03 with the next three bytes 0x00. Byte five is 0x10 which indicates a Remote Activation. Byte six is the STATUS byte, which is a bit map of the button states. Bit 0 corresponds to button S0 and so forth. Each bit is 1 if the corresponding line is high. The external microcontroller connected to the HumPRO™ module can read out the header from the transmission and know which transmitter sent the command. It can then take whatever action is required by the STATUS bits. Additional information about reading out the header is available in the HumPRO™ Series Transceiver data guide.

Remote Confirm

The handheld transmitter accepts a Remote Confirm command over the air to control the LED in the membrane switch. This command has the following format:

0x00 0x11 <DURATION> <ALIVE>

The first two bytes are 0x00 0x11 and indicate that the packet is a remote confirm packet.

The DURATION byte indicates the amount of time that the LED should be held high. This value is multiplied by 10ms. If the value is 0, the LED output is immediately taken low.

The ALIVE byte indicates how long after the transmission the module should stay awake in receive mode. This value is multiplied by 0.1s. Once this duration expires, the module returns to sleep mode.

This message is transmitted to the handheld transmitter's address. It must be received by the handheld transmitter within one second of initial



LinX Technologies
159 Ort Lane
Merlin, OR, US 97532

Phone: +1 541 471 6256
Fax: +1 541 471 6251

www.linxtechnologies.com

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