



**MS Long-Range
Handheld Transmitter
Data Guide**

Wireless made simple[®]



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”).

NO OEM LINX REMOTE CONTROL OR FUNCTION MODULE SHOULD EVER BE USED IN LIFE AND PROPERTY SAFETY SITUATIONS.

No OEM Linx Remote Control or Function Module should be modified for Life and Property Safety Situations. Such modification cannot provide sufficient safety and will void the product’s regulatory certification and warranty.

Customers may use our (non-Function) Modules, Antenna and Connectors as part of other systems in Life Safety Situations, but only with necessary and industry appropriate redundancies and in compliance with applicable safety standards, including without limitation, ANSI and NFPA standards. It is solely the responsibility of any Linx customer who uses one or more of these products to incorporate appropriate redundancies and safety standards for the Life and Property Safety Situation application.

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-***-HH-LR8-MS-xxx	MS Long-Range Handheld Transmitter
MDEV-***-HH-LR8-MS	MS Long-Range Transmitter Master Development System

*** = 315, 418 (Standard) or 433.92MHz
 xxx = Custom color, leave blank for black

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}		3.4		mA	
Power-Down Current	I_{PDN}		5.0		nA	1
Transmitter Section						
Transmit Frequency Range	F_C					
OTX-315-HH-LR8-MS			315		MHz	
OTX-418-HH-LR8-MS			418		MHz	
OTX-433-HH-LR8-MS			433.92		MHz	
Center Frequency Accuracy		-50		+50	kHz	
Environmental						
Operating Temperature Range		-40		+85	°C	1

1. Characterized, but not tested

Figure 4: Electrical Specifications

Setting the Transmitter Address

The MS Long-Range Handheld Transmitter allows the selection of one of 16,777,216 (2^{24}) unique addresses. All transmitters are supplied set to a unique address to avoid contention with other units; however, the address can be changed. This is accomplished by using a paper clip or probe to press the CREATE button on the board through the hole in the back of the case. Press the button and an LED lights up in the MODE_IND window, indicating that the address is being created. The address is randomized for as long as the button is held down. Release the button and the randomized address is saved and the LED begins flashing to indicate that the Control Permissions may now be set. Press the buttons that the transmitter should have the authority to access. Press the CREATE button with the paper clip again or wait 17 seconds for it to time out. The address and Control Permissions are now set. The decoder needs to learn the address before it will accept any transmissions. Please see the Typical Applications section of this data guide or the MS Series Decoder Data Guide for details.



Figure 5: CREATE Button Access

OTX-***-HH-LR8-MS Button Assignments

Figure 6 illustrates the relationship between the button locations and encoder data lines.

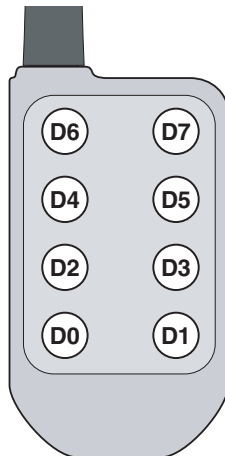


Figure 6: OTX-***-HH-LR8-MS Button Assignments

Labeling / Instruction Requirements

The transmitter has been pre-certified for FCC Part 15 and Industry Canada license-exempt RSS standards for an intentional radiator. The 433.92MHz version has also been tested for CE compliance for use in the European Union. The 315MHz and 418MHz versions are not legal for use in Europe. It has already been labeled in accordance with FCC, Industry Canada and CE regulations. No further labeling of the unit is needed; however, it is necessary to include the following statement in the end product's instruction manual or insert card. EU does not require a statement.

Typical Applications

The signal sent by the MS Long-Range Transmitter can be received by an LR Series receiver module or LT Series transceiver module. The outstanding sensitivity of the LR Series receiver offers the best range when used with a Linx OEM transmitter. The receiver module is then connected directly to an MS Series decoder, which decodes the received signal.

When a button is pressed on the transmitter, a corresponding line on the decoder goes high. This is then connected to external circuitry to perform whatever function is required by the application.



Figure 9: Receiver and Decoder

The decoder must learn the transmitter's address before they can work together. This is done by taking the LEARN line on the decoder high, typically with a pushbutton switch. The MODE_IND line starts switching (if a LED is attached, this causes it to flash) indicating that the decoder is in Learn Mode. Press any of the buttons on the transmitter to initiate a transmission. Take the LEARN line high again to exit Learn Mode and the system is ready for use. "Figure 10: LR Receiver and MS Decoder Schematic" on page Figure 10 shows a schematic for a typical application.

The MS Long-Range Transmitter is set to 9,600bps, so SEL_BAUD0 should be tied high and SEL_BAUD1 tied low. The decoder has several unique features, such as Latch Mode, Receiver Control, and TX_ID.

If the LATCH line is tied to V_{CC} , the outputs go high on the first transmission, then low on the second. Figure 10 shows it tied low, so the outputs are momentary (high for as long as a signal is received that instructs the decoder to make them high).

The RX_CNTL line can be connected to the PDN line of the receiver and the decoder activates the receiver with a 10% duty cycle. This greatly reduces the average current consumption of the system. The adjacent figure shows it tied to ground, but to use this feature, connect the RX_CNTL line of the decoder directly to the receiver's PDN line.

The TX_ID line outputs a number associated with the originating transmitter / encoder. Application Note AN-00156 shows how to use this feature.



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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