Linx TECHNOLOGIES

KH3 Series
Basic Evaluation Kit
User´s 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**
EVAL-***-KH3	KH3 Series Basic Evaluation Kit

*** = 315, 418 (Standard), 433MHz

Figure 2: Ordering Information

KH3 Series Transmitter / Encoder Evaluation Board

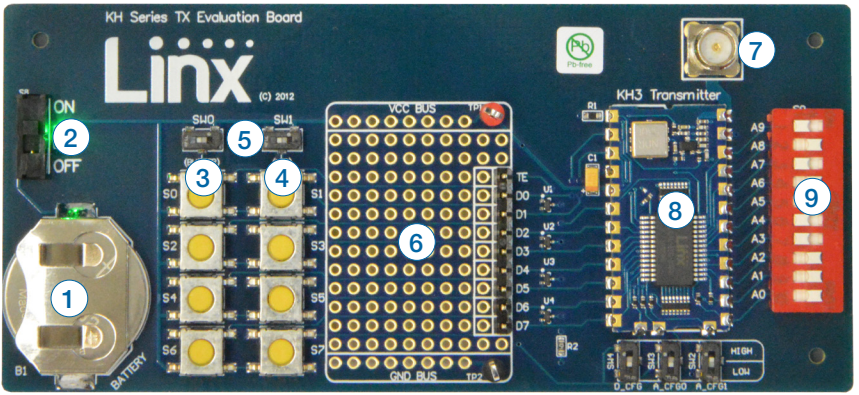

Figure 3: KH3 Transmitter / Encoder Evaluation Board

1. Battery – 3VDC (use a CR2032-style battery only)
2. Power Switch
3. Momentary Pushbutton – S0 (D0)
4. Momentary Pushbutton – S1 (D1)
5. Continuous Transmit Switches
6. Prototyping Area
7. Reverse-Polarity SMA Antenna Connector
8. KH3 Series Transmitter Module
9. 10-Position Address DIP Switch

Theory of Operation

Transmitter Evaluation Board

The transmitter board is powered by a 3V CR2032 lithium battery. It has eight SPST pushbutton switches, the states of which are encoded into a data stream by the module. When a switch is closed, the module captures the settings of the 10 address lines (connected to a DIP switch) and the eight pushbutton lines for encoding and transmission. The transmitter continuously transmits when any switch is closed or when the Transmit Enable (TE) line is pulled high. The board has a prototyping area with all of the transmitter lines wired to a header for easy access by external circuitry.

Decoder Evaluation Board

The receiver board is powered by two AAA batteries. The data recovered by the KH3 Series receiver is internally decoded. If the settings of the 10-position DIP switch on the receiver board match the address setting of the transmitter board, the data lines are updated to match the state of the data lines (or pushbuttons) on the transmitter board. To demonstrate this, one data line is used activate a buzzer while the others are used to activate LEDs. This board has a prototyping area with all of the receiver lines brought out to a header for easy access by external circuitry.

Development Using the Prototyping Area

In addition to their evaluation functions, the boards may also be used for product development. They feature a prototyping area for the addition of application-specific circuitry. This area has connections to V_{CC} at the top and to ground at the bottom that can be used to power any circuitry that is added.

> Note: The CR2032-style battery on the transmitter board has very low current capacity with, only about 3mA available for external circuitry. If added circuitry requires a higher current, the battery must be removed and the board powered from an external source.

The holes are plated and set at 0.1" on center with a 0.04" diameter, making it easy to add most industry-standard SIP and DIP packages to the board.

On the transmitter board, the data lines and the TE line from the encoder have been wired out to a header on the right side of the prototyping area. On the receiver board, the data, PDN and DATA lines from the receiver have been wired out. This allows for easy access to connect external circuitry to the modules, the encoder, and the decoder. Data line D0 is connected to the buzzer and the rest are connected to LEDs.

RSSI voltage with the transmitter turned off to determine if ambient interference is present. If this fails to resolve the issue, please contact Linx technical support.

Using the Boards as a Design Reference

The basic evaluation boards included in this kit are very simple, yet they illustrate some important techniques that should be incorporated into the board layout. The module's mounting pads extend slightly past the edge of the part. This eases hand assembly and allows for better heat conduction under the part if rework is necessary. A full ground plane fill is placed on the bottom of the board. This ground plane serves three important purposes:

First, since a quarter-wave antenna is employed, the ground plane is critical to serve as a counterpoise (please see Application Note AN-00500 "Antennas: Design, Application, and Performance" for details on how a ground plane affects antenna function).

Second, a ground plane suppresses the transfer of noise between stages of a product as well as unintentional radiation of noise into free space.

Third, a ground plane allows for the implementation of a microstrip feed between the module and the antenna. The term microstrip refers to a PCB trace running over a ground plane that is designed to serve as a 50-ohm transmission line. See the module's data guide or the calculator available on our website for details on microstrip calculations.

KH3 Series Transmitter Evaluation Board Schematic

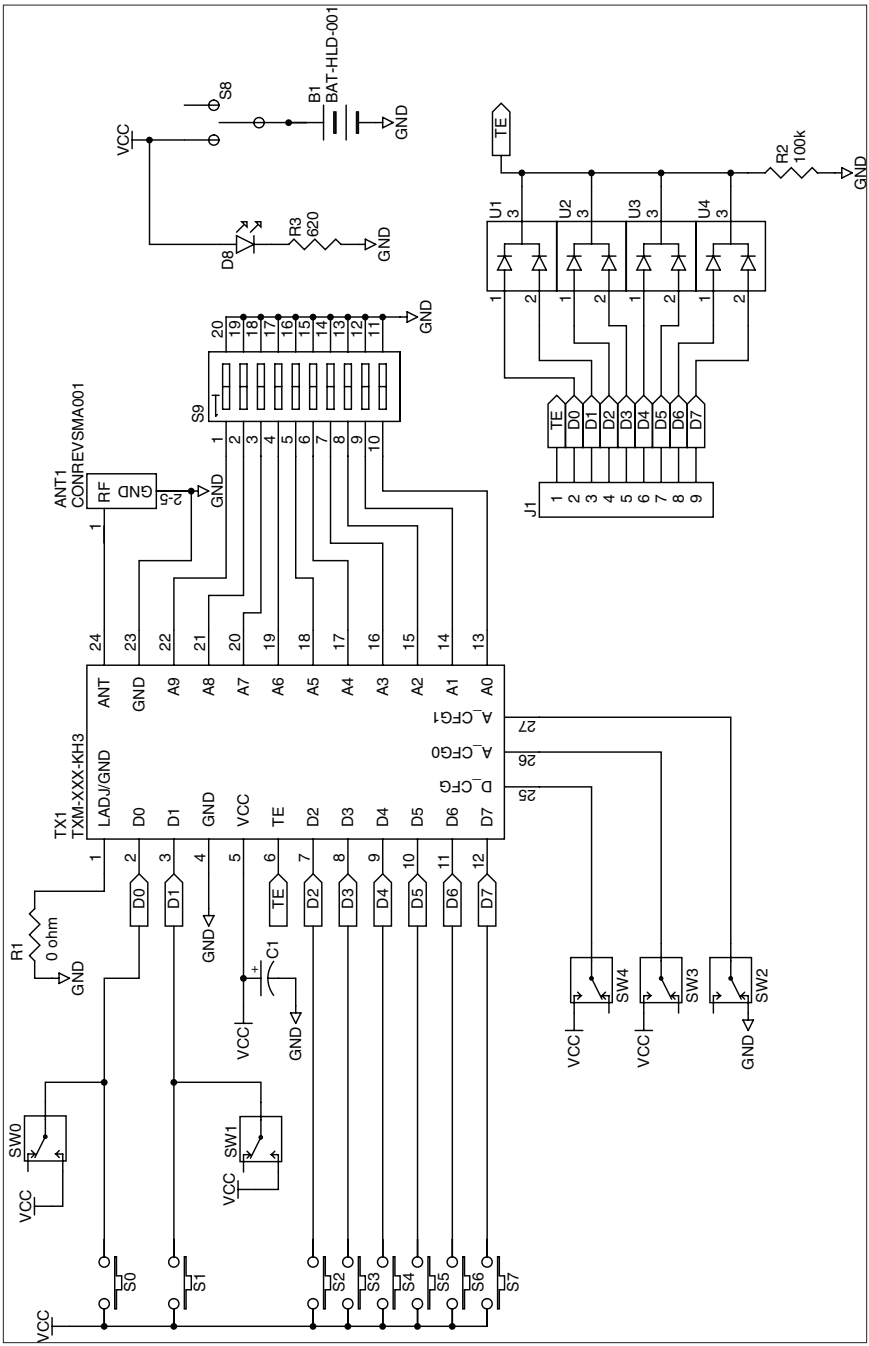

Figure 5: KH3 Series Transmitter / Encoder Evaluation Board Schematic

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