




HumDT™ Series Evaluation Module 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.

Table of Contents

- 1 [Description](#)
- 2 [Ordering Information](#)
- 2 [Absolute Maximum Ratings](#)
- 3 [Electrical Specifications](#)
- 4 [Pin Assignments](#)
- 4 [Pin Descriptions](#)
- 6 [Schematic](#)
- 7 [Pad Layout](#)
- 7 [Power Supply Requirements](#)

HumDT™ Series Evaluation Module

Data Guide

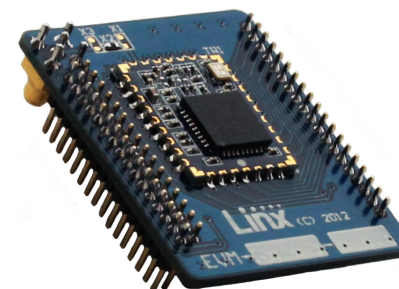


Figure 1: HumDT™ Series Evaluation Module

Description

The HumDT™ Series transceiver is designed for the reliable wireless transfer of serial digital data. It consists of a highly optimized RF transceiver and integrated data and networking protocol. A frequency agile over-the-air protocol provides better link reliability than narrowband solutions while providing faster synchronization and data output than Frequency Hopping Spread Spectrum (FHSS) algorithms.

The frequency agile protocol in the 900MHz version sends the same data on up to 4 channels, providing the noise immunity benefits of FHSS without the overhead of a hopping protocol. A serial command selects the number of channels as well as which specific channels are used. The 868MHz version sends data on a single channel, which is selected with a serial command on the UART.

The module's UART interface is used for module configuration and data transfer. 8 GPIOs can be used for analog and digital functions and are controlled through the UART. The module is available in the 863 to 870MHz and 902 to 928MHz frequency bands.

The evaluation module contains the surface mount HumDT™ Series transceiver module and an MMCX connector on a single board with through-hole headers. This small board simplifies prototyping with the HumDT™ Series module.

Ordering Information

| Ordering Information | |
|------------------------------|---|
| Part Number | Description |
| EVM-***-DT | HumDT™ Series Carrier Board |
| HUM-***-DT | HumDT™ Series Transceiver |
| MDEV-***-DT | HumDT™ Series Master Development System |
| MDEV-PGDCK | Development System Programming Dock |
| MDEV-PROTO | Development System Prototype Board |
| CON-SOC-EVM | EVM Module Socket Kit |
| *** = Frequency; 868, 900MHz | |

Figure 2: Ordering Information

Absolute Maximum Ratings

| Absolute Maximum Ratings | | | | |
|--|------|----|----------------|-----|
| Supply Voltage V_{CC} | -0.3 | to | +3.9 | VDC |
| Any Input or Output Pin | -0.3 | to | $V_{CC} + 0.3$ | VDC |
| RF Input | | 0 | | dBm |
| Operating Temperature | -40 | to | +85 | °C |
| Storage Temperature | -40 | to | +85 | °C |
| Exceeding any of the limits of this section may lead to permanent damage to the device. Furthermore, extended operation at these maximum ratings may reduce the life of this device. | | | | |

Figure 3: Absolute Maximum Ratings



Warning: This product incorporates numerous static-sensitive components. Always wear an ESD wrist strap and observe proper ESD handling procedures when working with this device. Failure to observe this precaution may result in module damage or failure.

Please see the HumDT™ Series Transceiver module data guide for full electrical specifications.

Electrical Specifications

| HumDT™ Series Transceiver Specifications | | | | | | |
|--|------------|------|------|-------|-------|---------------------------------|
| Parameter | Symbol | Min. | Typ. | Max. | Units | Notes |
| Power Supply | | | | | | |
| Operating Voltage | V_{CC} | 2.0 | | 3.6 | VDC | |
| TX Supply Current | I_{CCTX} | | | | | |
| at +10dBm | | | 38 | 40 | mA | 1,2 |
| at 0dBm | | | 20.5 | 24 | mA | 1,2 |
| RX Supply Current | I_{CCRX} | | 22 | 28 | mA | 1,2,3 |
| Sleep Current | I_{SLP} | | 4.5 | 5 | μA | 1,2 |
| Power-Down Current | I_{PDN} | | 0.3 | 2 | μA | 1,2 |
| Idle Current | I_{IDL} | | 4.5 | 5 | μA | 1,2 |
| RF Section | | | | | | |
| Operating Frequency Band | F_C | | | | MHz | |
| HUM-900-DT | | 902 | | 928 | MHz | |
| HUM-868-DT | | 863 | | 870 | MHz | |
| Data Rate | | | | | | |
| RF Data Rate | | 26 | | 250 | kbps | |
| Serial Data Rate | | 1.2 | | 115.2 | kbps | |
| Receiver Sensitivity | | | | | | |
| @min rate | | -98 | -101 | | dBm | 5 |
| @max rate | | -89 | -92 | | dBm | 5 |
| Output Power | P_O | +8.5 | +9.5 | | dBm | 6 |
| Antenna Port | | | | | | |
| RF Impedance | R_{IN} | | 50 | | Ω | 4 |
| Environmental | | | | | | |
| Operating Temp. Range | | -40 | | +85 | °C | 4 |
| 1. Measured at 3.3V V_{CC} | | | | | | 4. Characterized but not tested |
| 2. Measured at 25°C | | | | | | 5. PER = 5% |
| 3. Input power < -60dBm | | | | | | 6. Into a 50-ohm load |

Figure 4: Electrical Specifications

Pin Assignments

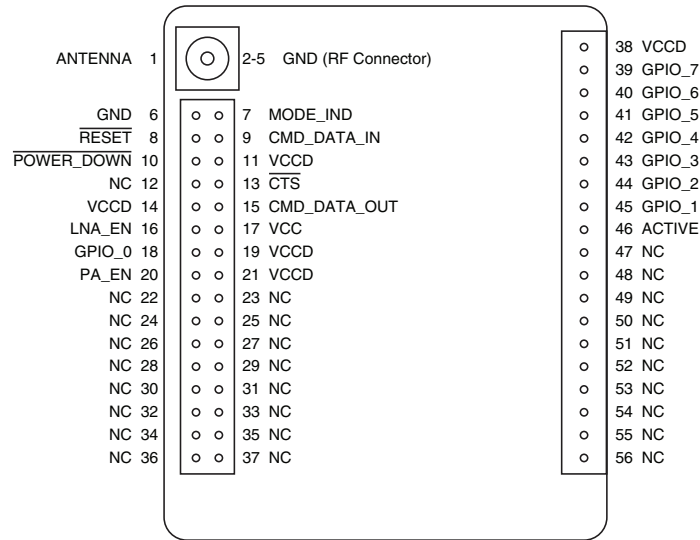


Figure 5: EVM-xxx-DT Pin Assignments

Pin Descriptions

| Pin Descriptions | | | |
|------------------|-------------|-----|--|
| Pin Number | Name | I/O | Description |
| 1 | ANTENNA | — | 50-ohm RF Antenna Port |
| 2, 3, 4, 5, 6 | GND | — | Ground |
| 7 | MODE_IND | O | This output goes high when the module is sending or receiving data over the air. This line can directly drive an LED for visual indication of activity. |
| 8 | RESET | I | This line resets the module when pulled low. It should be pulled high for normal operation. This line has an internal 10k resistor to supply, so leave it unconnected if not used. |
| 9 | CMD_DATA_IN | I | Command Data In. Input line for the serial interface commands. If serial control is not used, this line should be tied to VCC or POWER_DOWN to minimize current consumption. |
| 10 | POWER_DOWN | I | Power Down. Pulling this line low places the module into a low-power state. The module is not functional in this state. Pull high for normal operation. Do not leave floating. |

| Pin Descriptions | | | |
|--------------------|---------------|-----|---|
| Pin Number | Name | I/O | Description |
| 11, 14, 19, 21, 38 | VCCD | — | These lines are inputs that are pulled to supply internally. They can be left unconnected, but boards in noisy environments or with noisy components in the same product are recommended to pull these lines to V _{CC} . The potential exists for random noise to affect the line and cause unexpected operation. This risk is reduced in simple, battery powered applications, but should be considered in all designs. |
| 12, 22–37, 47–56 | NC | — | No Electrical Connection. Do not connect any traces to these lines. |
| 13 | CTS | O | UART Clear To Send, active low. This line indicates to the host microcontroller when the module is ready to accept data. When CTS is high, the module is busy. When CTS is low, the module is ready for data. |
| 15 | CMD_DATA_OUT | O | Command Data Out. Output line for the serial interface commands |
| 16 | LNA_EN | O | Low Noise Amplifier Enable. This line is driven high when receiving. It is intended to activate an optional external LNA. |
| 17 | VCC | — | Supply Voltage |
| 18, 39–45 | GPIO_0–GPIO_7 | I/O | General Purpose I/O Lines. Each line can be configured as either an analog input, a digital input or a digital output. The digital inputs can be configured to have either a 20kΩ pull up or pull down resistance or high impedance (no resistors). |
| 20 | PA_EN | O | Power Amplifier Enable. This line is driven high when transmitting. It is intended to activate an optional external power amplifier. |
| 46 | ACTIVE | O | This output goes high when the module is powered on and functional. This line can directly drive an LED for visual indication of activity. |

Figure 6: EVM-xxx-DT Pin Descriptions

Schematic

Figure 7 shows the schematic diagram for the evaluation module.

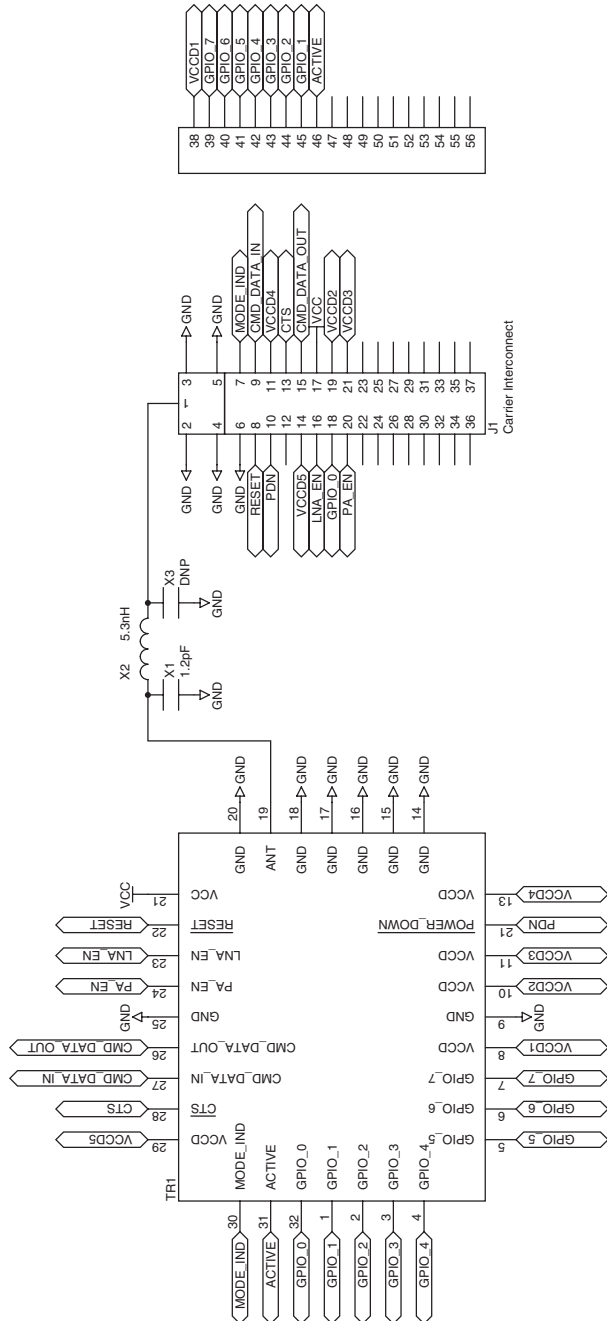


Figure 7: EVM-xxx-DT Schematic

Pad Layout

Figure 8 shows the recommended PCB layout for the evaluation module.

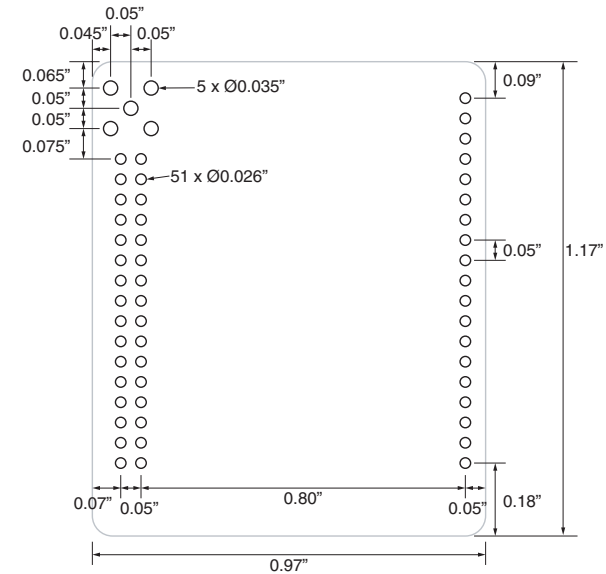


Figure 8: EVM-xxx-DT PCB Layout Dimensions

Power Supply Requirements

The transceiver incorporates a precision low-dropout regulator which allows operation over a wide input voltage range. Despite this regulator, it is still important to provide a supply that is free of noise. Power supply noise can significantly affect the module's performance, so providing a clean power supply for the module should be a high priority during design.

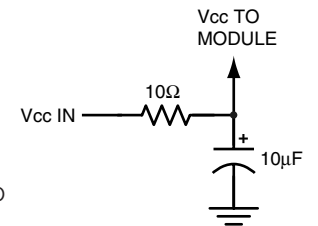


Figure 9: Supply Filter

A 10Ω resistor in series with the supply followed by a 10μF tantalum capacitor from V_{cc} to ground helps in cases where the quality of supply power is poor (Figure 9). This filter should be placed close to the module's supply lines. These values may need to be adjusted depending on the noise present on the supply line.



Linx Technologies
159 Ort Lane
Merlin, OR, US 97532

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

www.linxtechnologies.com

Disclaimer

Linx Technologies is continually striving to improve the quality and function of its products. For this reason, we reserve the right to make changes to our products without notice. The information contained in this Data Guide is believed to be accurate as of the time of publication. Specifications are based on representative lot samples. Values may vary from lot-to-lot and are not guaranteed. "Typical" parameters can and do vary over lots and application. Linx Technologies makes no guarantee, warranty, or representation regarding the suitability of any product for use in any specific application. It is the customer's responsibility to verify the suitability of the part for the intended application. **NO LINX PRODUCT IS INTENDED FOR USE IN ANY APPLICATION WHERE THE SAFETY OF LIFE OR PROPERTY IS AT RISK.**

Linx Technologies **DISCLAIMS ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL LINX TECHNOLOGIES BE LIABLE FOR ANY OF CUSTOMER'S INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING IN ANY WAY FROM ANY DEFECTIVE OR NON-CONFORMING PRODUCTS OR FOR ANY OTHER BREACH OF CONTRACT BY LINX TECHNOLOGIES.** The limitations on Linx Technologies' liability are applicable to any and all claims or theories of recovery asserted by Customer, including, without limitation, breach of contract, breach of warranty, strict liability, or negligence. Customer assumes all liability (including, without limitation, liability for injury to person or property, economic loss, or business interruption) for all claims, including claims from third parties, arising from the use of the Products. The Customer will indemnify, defend, protect, and hold harmless Linx Technologies and its officers, employees, subsidiaries, affiliates, distributors, and representatives from and against all claims, damages, actions, suits, proceedings, demands, assessments, adjustments, costs, and expenses incurred by Linx Technologies as a result of or arising from any Products sold by Linx Technologies to Customer. Under no conditions will Linx Technologies be responsible for losses arising from the use or failure of the device in any application, other than the repair, replacement, or refund limited to the original product purchase price. Devices described in this publication may contain proprietary, patented, or copyrighted techniques, components, or materials. Under no circumstances shall any user be conveyed any license or right to the use or ownership of such items.

©2015 Linx Technologies. All rights reserved.

The stylized Linx logo, Wireless Made Simple, WISE, CipherLinx and the stylized CL logo are trademarks of Linx Technologies.

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9