



EVM-915-025
Data Guide

Wireless made simple[®]



Warning: Linx radio frequency ("RF") products may be used 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. No Linx Technologies product is intended for use in any application without redundancies where the safety of life or property is at risk.

The customers and users of devices and machinery controlled with RF products must understand and must use all appropriate safety procedures in connection with the devices, including without limitation, using appropriate safety procedures to prevent inadvertent triggering by the user of the device and using appropriate security codes to prevent triggering of the remote controlled machine or device by users of other remote controllers.

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 have a frequency hopping protocol built in, but the developer should still be aware of the risk of interference.

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.



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.

Ordering Information

Ordering Information		
Link Part No.	Description	Radiotronix Part No.
EVM-915-025-FCR	TRM-915-R25 Evaluation Module, 915MHz, Right Angle RP-SMA Connector, FCC Approved	Wi.232FHSS-25-FCC-RA-R
EVM-915-025-FCS	TRM-915-R25 Evaluation Module, 915MHz, Straight RP-SMA Connector, FCC Approved	Wi.232FHSS-25-FCC-ST-R

Figure 2: Ordering Information

Electrical Specifications

Electrical Specifications						
Parameter	Designation	Min.	Typ.	Max.	Units	Notes
Power Supply						
Operating Voltage	V_{CC}	4		12	VDC	
Supply Current	I_{CC}					
Receive				25	mA	
Transmit, $P_o = -2dBm$				35	mA	
Transmit, $P_o = 13dBm$				70	mA	
Digital Interface						
Output						
Logic Low	V_{OL}	0		0.4	VDC	
Logic High	V_{OH}	2.5		V_{CC}	VDC	
Input						
Logic Low	V_{IL}	0		$0.3 \cdot V_{CC}$	VDC	
Logic High	V_{IH}	$0.7 \cdot V_{CC}$		V_{CC}	VDC	
Environmental						
Operating Temperature Range		-40		85	°C	

Figure 3: Electrical Specifications

Note: Please see the TRM-915-R25 data guide for complete information about the module, detailed specifications and configuration commands.

Pin Assignments

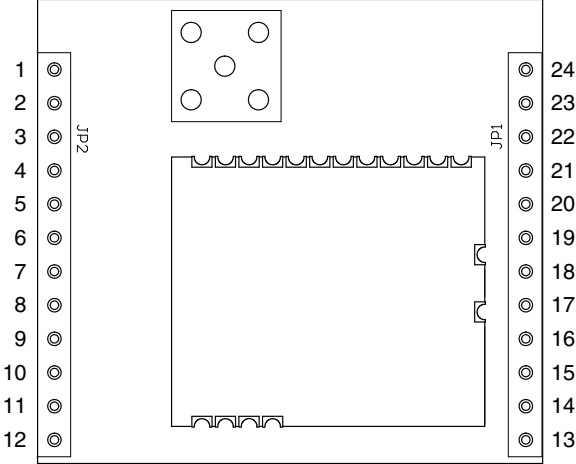


Figure 5: 25 Series EVM Module Pin Assignments (Top View)

PCB Footprint

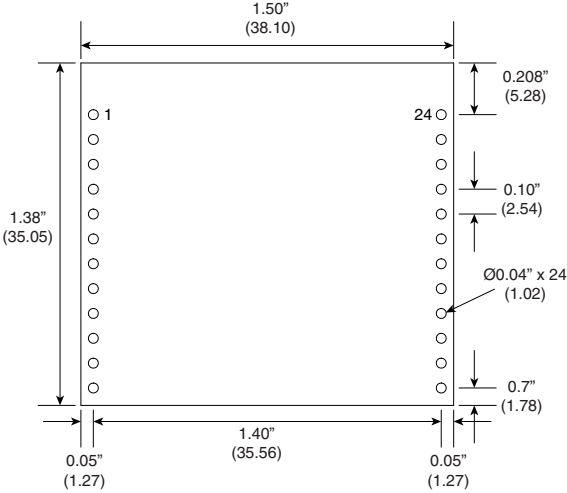


Figure 7: 25 Series EVM Module PCB Footprint

Board Layout Guidelines

The module's design makes integration straightforward; however, it is still critical to exercise care in PCB layout. Failure to observe good layout techniques can result in a significant degradation of the module's performance. Grounding, filtering, decoupling, routing and PCB stack-up are all important considerations for any RF design. Some basic design guidelines are provided here.

The module should, as much as reasonably possible, be isolated from other components on your PCB, especially high-frequency circuitry such as crystal oscillators, switching power supplies, and high-speed bus lines.

When possible, separate RF and digital circuits into different PCB regions.

Make sure internal wiring is routed away from the module and antenna and is secured to prevent displacement.

Bypass caps should be low ESR ceramic types and located directly adjacent to the pin they are serving.

In some instances, a designer may wish to encapsulate or "pot" the product. Since such compounds can considerably impact RF performance and the ability to rework or service the product, it is the responsibility of the designer to evaluate and qualify the impact and suitability of such materials.

Interference Considerations

The RF spectrum is crowded and the potential for conflict with unwanted sources of RF is very real. While all RF products are at risk from interference, its effects can be minimized by better understanding its characteristics.

Interference may come from internal or external sources. The first step is to eliminate interference from noise sources on the board. This means paying careful attention to layout, grounding, filtering and bypassing in order to eliminate all radiated and conducted interference paths. For many products, this is straightforward; however, products containing components such as switching power supplies, motors, crystals and other potential sources of noise must be approached with care. Comparing your own design with a Linx evaluation board can help to determine if and at what level design-specific interference is present.

External interference can manifest itself in a variety of ways. Low-level interference produces noise and hashing on the output and reduces the link's overall range.

High-level interference is caused by nearby products sharing the same frequency or from near-band high-power devices. It can even come from your own products if more than one transmitter is active in the same area. It is important to remember that only one transmitter at a time can occupy a frequency, regardless of the coding of the transmitted signal. This type of interference is less common than those mentioned previously, but in severe cases it can prevent all useful function of the affected device.

Although technically not interference, multipath is also a factor to be understood. Multipath is a term used to refer to the signal cancellation effects that occur when RF waves arrive at the receiver in different phase relationships. This effect is a particularly significant factor in interior environments where objects provide many different signal reflection paths. Multipath cancellation results in lowered signal levels at the receiver and shorter useful distances for the link.

Module Modification

The module must not be physically altered in any way. If any connections are made to the modules that bypass the module pins, socket or antenna connector, neither the FCC nor Anatel modular certification can be inherited.

Information to the User

The following information must be included in the product's user manual.

FCC / IC NOTICES

This product contains FCC ID: Q7V-3F090008X

This device complies with Part 15 of the FCC rules. Operation of this device is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any modifications could void the user's authority to operate the equipment.



Linx Technologies
159 Ort Lane
Merlin, OR, US 97532

3090 Sterling Circle, Suite 200
Boulder, CO 80301

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 Customer's responsibility to verify the suitability of the part for the intended application. At Customer's request, Linx Technologies may provide advice and assistance in designing systems and remote control devices that employ Linx Technologies RF products, but responsibility for the ultimate design and use of any such systems and devices remains entirely with Customer and/or user of the RF products.

LINX TECHNOLOGIES DISCLAIMS ANY AND ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL LINX TECHNOLOGIES BE LIABLE FOR ANY CUSTOMER'S OR USER'S INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR RELATED TO THE DESIGN OR USE OF A REMOTE CONTROL SYSTEM OR DEVICE EMPLOYING LINX TECHNOLOGIES RF PRODUCTS OR FOR ANY OTHER BREACH OF CONTRACT BY LINX TECHNOLOGIES. CUSTOMER AND/OR USER ASSUME ALL RISKS OF DEATH, BODILY INJURIES, OR PROPERTY DAMAGE ARISING OUT OF OR RELATED TO THE USE OF LINX TECHNOLOGIES RF PRODUCTS, INCLUDING WITH RESPECT TO ANY SERVICES PROVIDED BY LINX RELATED TO THE USE OF LINX TECHNOLOGIES RF PRODUCTS. LINX TECHNOLOGIES SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR A CUSTOMER'S, USER'S, OR OTHER PERSON'S DEATH, BODILY INJURY, OR PROPERTY DAMAGE ARISING OUT OF OR RELATED TO THE DESIGN OR USE OF A REMOTE CONTROL SYSTEM OR DEVICE EMPLOYING LINX TECHNOLOGIES RF PRODUCTS.

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. 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.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Sub-GHz Development Tools](#) category:

Click to view products by [Linx Technologies](#) manufacturer:

Other Similar products are found below :

[EVAL-ADF7021DBJZ](#) [EVAL-ADF7021-NDBZ2](#) [MICRF219A-433 EV](#) [MICRF220-433 EV](#) [AD6679-500EBZ](#) [130436-HMC1010LP4E](#)
[EVAL-ADF7901EBZ](#) [EVAL-ADF790XEBZ](#) [110976-HMC453QS16G](#) [STEVAL-IKR002V7D](#) [STEVAL-IKR002V3D](#) [SKY66188-11-EK1](#)
[SKY66013-11-EVB](#) [DRF1200/CLASS-E](#) [1096](#) [1098](#) [MDEV-900-PRO](#) [DVK-SFUS-1-GEVK](#) [DVK-SFUS-API-1-GEVK](#) [US-SIGFOX-](#)
[GEVB](#) [STEVAL-IKR002V2D](#) [107755-HMC454ST89](#) [DM182017-2](#) [110961-HMC453ST89](#) [SX1272MB2DAS](#) [3179](#) [DC689A](#) [DC1513B-](#)
[AB](#) [3229](#) [3230](#) [3231](#) [3232](#) [DC963B](#) [DC1250A-AA](#) [DC1513B-AC](#) [DC1513B-AD](#) [DC1513B-AA](#) [TEL0075](#) [131903-HMC921LP4E](#) [EU-](#)
[SIGFOX-GEVB](#) [856512-EVB](#) [856512-EVB-1](#) [856704-EVB](#) [856882-EVB](#) [856908-EVB](#) [3071](#) [3073](#) [4072](#) [4073](#) [4074](#)