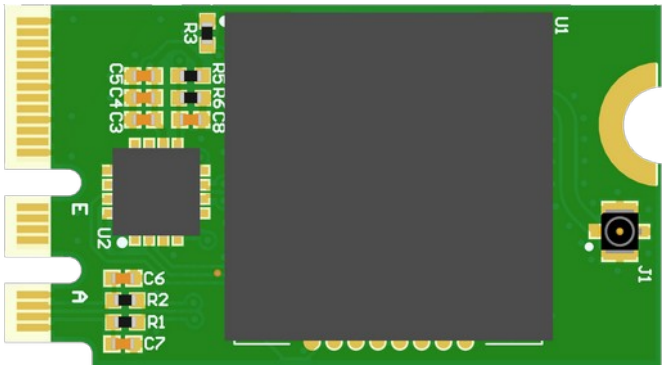
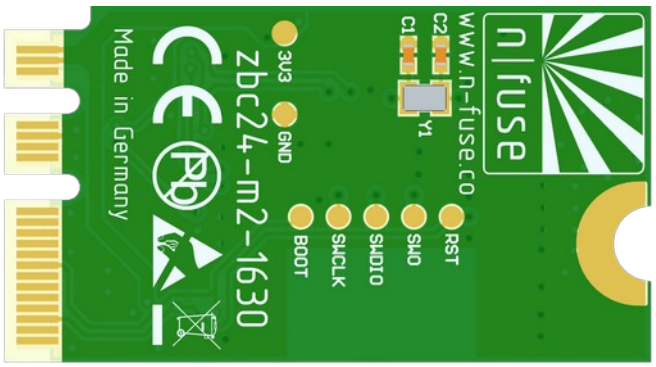
Data Sheet

ZBC-M2-1630 card M.2 1630 E-Key

ZBC24-M2-1630





ZigBee®/ Thread/ Bluetooth® Card based on the Silabs EFR32MG24 Multi-protocol SoC in M.2 1630 A-E-Key Form Factor

The ZBC card is based on a Silabs MGM240P module adopting the M.2 1630 A-E-Key form factor. Based on the EFR32MG24 SoC, it enables ZigBee®, Thread, Bluetooth® and multi-protocol connectivity while delivering best-in-class RF range and performance, enhanced security, low active current consumption, and a temperature rating suited for operating in demanding environmental conditions.

Key Features

- 32-bit ARM Cortex®-M33 with DSP instruction and floating point unit for efficient signal processing
- Hardware Cryptographic Acceleration with DPA countermeasures1 for AES128/256, SHA-1, SHA-2 (up to 256-bit), ECC (up to 256-bit), ECDSA, and ECDH
- Ultra-low power consumption
- Super slim profile and compact size
- Robust mounting and interfaces
- Broad usage spectrum through standard M.2 1630 A-E-Key
- USB virtual com power interface
- TX power up to +20 dBm

Available Firmware

- Multi-protocol OpenThread+Zigbee RCP design
- Thread version 1.3 OpenThread border router RCP design
- Firmware upgrade via Gecko Bootloader (XMODEM)

Application Areas

- Internet of Things (IoT) and Industrial Internet of Things (IIoT) applications
- Connected lighting

- Building automation and security
- Machine to machine (M2M)
- Smart home and smart city
- Home-, building-, industrial monitoring and control

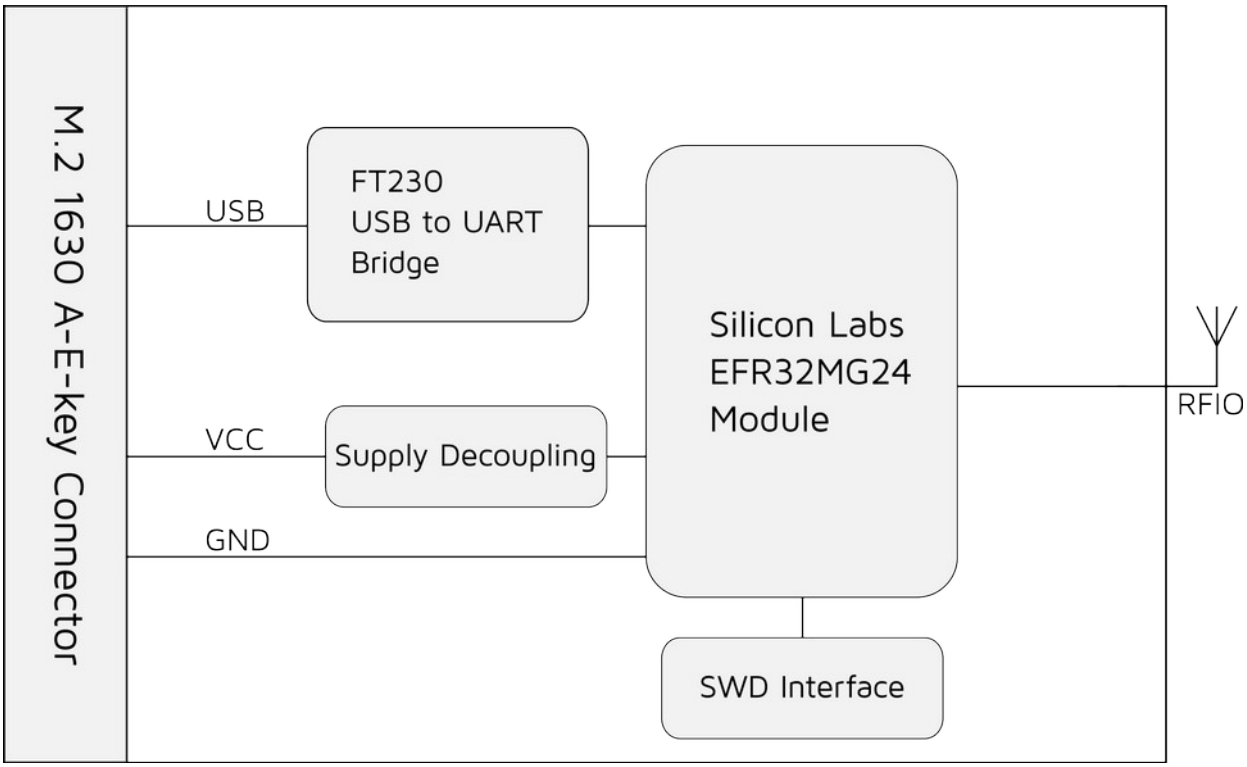
Specifications

Category	Feature	Description
General Radio	Multi-protocol `	EFR32MG24 SoC, 2.4 GHz radio Supporting various combinations of - Zigbee - Thread - Bluetooth (5.3)
	Wireless System-on-Chip	32-bit ARM Cortex®-M33 with DSP instruction and floating point unit for efficient signal processing 1536 kB flash program memory 256 kB RAM data memory Embedded Trace Macrocell (ETM) for advanced debugging
	Security	Secure Boot with Root of Trust and Secure Loader (RTSL) Hardware Cryptographic Acceleration with DPA countermeasures1 for AES128/256, SHA-1, SHA-2 (up to 256-bit), ECC (up to 256-bit), ECDSA, and ECDH True Random Number Generator (TRNG) compliant with NIST SP800-90 and AIS-31 ARM® TrustZone® Secure Debug Interface lock/unlock
Connectors	Connector Type	M.2 1630 A-E-Key
	External Antenna	MHF4 connector with 50 Ω impedance
Host Interface	USB	Virtual com port with baud rate of 460800
Power	Input Voltage	1.71 to 3.8 V
	Consumption	5.2 mA RX current @ 250 kbps O-QPSK DSSS 4.5 mA RX current @ 1 Mbps GFSK 4.8 mA TX current @ 0 dBm (MGM240Px22) 18.8 mA TX current @ 10 dBm (MGM240Px22) 158 mA TX current @ 20 dBm (MGM240Px32) 33.4 µA/MHz in Active Mode (EM0) @ 39.0 MHz 1.3 µA EM2 DeepSleep current (16 kB RAM retention and RTC running from LFRCO)
RF	Frequency Range	2.4 GHz
	Max RF Output Power	+20 dBm
	Sensitivity	- 106.0 dBm 802.15.4 RX sensitivity - 98.5 dBm BLE 1M RX sensitivity

Category	Feature	Description
	Max. TX Power	Up to +20 dBm
Operating Conditions	Temperature (operating)	-20 to +55 °C
	Humidity	10% ~ 90% RH Non-condensing
Physical Properties	Dimensions WxHxD	30 x 16.5 x 3.2 mm
	Weight	4 g
Regulatory	Certifications	CE
	Materials	RoHS, REACH
Warranty		12 months for B2B customers 24 months for B2C customers

Block Diagram

The ZigBee card is a highly-integrated, high-performance system with all the hardware components needed to enable 2.4 GHz wireless connectivity and support robust networking capabilities via multiple protocols.



Interfaces

M.2 1630 Connector

The card is compliant with the M.2 1630 A-E-Key specification and can thus be used in any compatible host system. Some reserved pins are used and others re-purposed as shown in the following table.

Pin #	Symbol	Type	Description
1	GND	power	
2	VCC	power	
3	USB_D+	input/ output	USB differential data (+)
4	VCC	power	
5	USB_D-	input/ output	USB differential data (-)
6	NC	-	
7	GND	power	
16	NC	-	
17	NC	-	
18	GND	power	
19	NC	-	
20	NC	-	
21	NC	-	
22	NC	-	
23	NC	-	
32	NC	-	
33	GND	power	
34	NC	-	
35	NC	-	
36	NC	-	
37	NC	-	
38	NC	-	
39	GND	power	
40	NC	-	
41	NC	-	
42	BOOT	input	Boot mode select (active high for bootloader)
43	NC	-	
44	NC	-	
45	GND	power	
46	NC	-	
47	NC	-	

Pin #	Symbol	Type	Description
48	NC	-	
49	NC	-	
50	NC	-	
51	GND	power	
52	RESET	input	Reset the module (active low)
53	NC	-	
54	NC	-	
55	NC	-	
56	NC	-	
57	GND	power	

NC = Not Connected
VCC = 1.71 to 3.8 V=Power Supply
GND = Ground

RF IO Port

The RF IO port is a W.FL type connector for the connection to the antenna. Usually a 'pigtail' cable with a W.FL to SMA or N-Type connector is used for this.
Built around the EFR32MG24 Wireless Gecko SoC, the card includes, both, a built-in antenna and a 50 Ω-matched RF port for an external antenna.

Product Family Portfolio

Part Number	Description	Availability
zbc24-m2-1630	ZBC card an based on the EFR32MG24 SoC, design in M.2 1630 A-E-Key	available

Ordering Information

All n-fuse products can be ordered directly through the n-fuse website.
You can also contact a sales representative via devices-sales@n-fuse.co for volume ordering.

n-fuse RESERVES THE RIGHT TO CHANGE PRODUCTS, INFORMATION AND SPECIFICATIONS WITHOUT NOTICE. Products and specifications discussed herein are for reference purposes only. All information discussed herein is provided on an "AS IS" basis, without warranties of any kind. This document and all information discussed herein remain the sole and exclusive property of n-fuse. No license of any patent, copyright, mask work, trademark or any other intellectual property right is granted by one party to the other party under this document, by implication, estoppel or other-wise. n-fuse products are not intended for use in life support, critical care, medical, safety equipment, or similar applications where product failure could result in loss of life or personal or physical harm, or any military or defence application, or any governmental procurement to which special terms or provisions may apply. For updates or additional information about n-fuse products, contact us. Product names, logos, brands, and other trademarks featured or referred are the property of their respective trademark holders.

Version 12.09.2024

© 2024 n-fuse GmbH, All rights reserved.