ACCLAIM LIGHTING Aria X2 Cortex M4 Based Radio Module Installation Guide

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ACCLAIM LIGHTING Aria X2 Cortex M4 Based Radio Module

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- Module Dimensions: 27.22 x 18.79 x 2.8 mm
- Carrier Board Dimensions: 33.86 x 33.86 x 10.25 mm
- Antenna Types:
  - Stubby Antenna:
    - Frequency Range: 2400-2500MHz
    - Gain: 0dBi

- Impedance: 50ohm
- Stubby Antenna:
  - Frequency Range: 863-928MHz
  - Gain: 0dBi
  - Impedance: 50ohm

Pin Signals and Assignment

Pin #	Name	Description
1	GND	Ground input
2	GND	Ground input
3	GPIO	Unused
4	COMM_RX	Incoming serial communication from external MCU
5	COMM_TX	Outgoing serial communication to external MCU
6	GND	Ground input
7	GPIO	Unused
8	GPIO	Unused
9	DMX_RX	Incoming DMX signal
10	DMX_TX	Outgoing DMX signal
11	DMX_CTS	Clear-to-Send, asserted when ready to receive DMX data
12	GND	Ground input
13	GND	Ground input
14	VCC	Power input
15	GPIO	Unused
16	GPIO	Unused
17	GPIO	Unused
18	GPIO	Unused
19	GPIO	Unused
20	GPIO	Unused
21	GPIO	Unused
22	GPIO	Unused
23	RESET_N	Reset (active low)
24	GND	Ground input

Product Usage Instructions

Mechanical Integration

The Aria X2 module should be integrated into a carrier board (XW-CB1) that fits a Synapse RF220UF1 socket.

Antenna Installation
This product comes with one external antenna. Use the provided stubby antennas based on the desired frequency range:

- For 2.4-2.5GHz frequency range, use the stubby antenna with a gain of 0dBi and an impedance of 50ohm.
- For 863-928MHz frequency range, use the stubby antenna with a gain of 0dBi and an impedance of 50ohm.

Programming

The Aria X2 module can be programmed using either a JTAG interface or over the air via BLE.

Programming via JTAG:

- Connect the Silabs development board to the wireless module's carrier board (XW-CB1) using the necessary debug wires (3.3V, GND, SWDIO, SWCLK).
- For easy access to the pins and a reset button, use a breakout board from Synapse (500202.01A).
- Use Simplicity Commander from Silicon Labs to flash the firmware onto the module.

Frequently Asked Questions (FAQ)

Q: Can I use an antenna not listed in the manual?
A: No, antennas not listed in the manual are strictly prohibited for use with this device.

Q: Can I program the Aria X2 module over the air?
A: Yes, you can program the Aria X2 module over the air via BLE.

OVERVIEW

The Aria X2 is a Cortex-M4 based radio module using the EFR32MG12 microcontroller from Silicon Labs. The Aria X2 is capable of sending and receiving DMX data over proprietary wireless 802.15.4, as well as sending and receiving configuration commands and firmware updates over BLE.

FEATURES

Low energy consumption

- 70 µA/MHz in Active Mode (EM0)
- 1.5 µA EM2 DeepSleep current
- Supply voltage: 1.8V to 3.8V

High Performance 32-bit 40 MHz ARM Cortex®-M4 with DSP instruction and floating-point unit for efficient signal processing

- 1024kB Flash memory

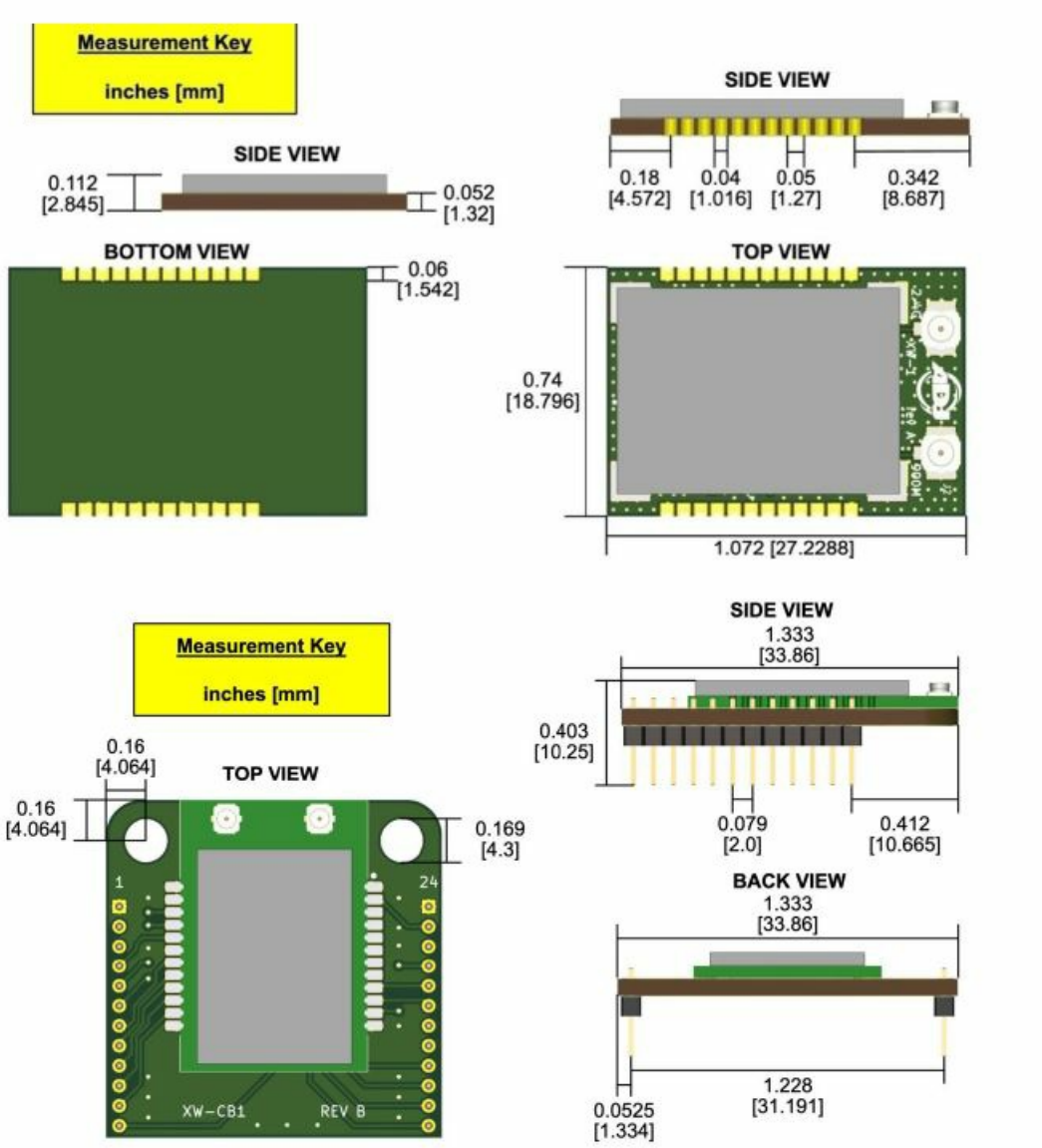
- 256kB RAM
- 2.4 GHz and Sub-GHz radio operation
- Transmit power:
    - 2.4 GHz radio: Up to 19 dBm
    - Sub-GHz radio: Up to 20 dBm

Up to 28 GPIO Easy integration

- Carrier board fits a Synapse RF220UF1 socket
- Capable of Over-The-Air (OTA) firmware updates using BLE

MECHANICAL SPECIFICATIONS

Module Dimensions	27.22 x 18.79 x 2.8 mm
Carrier Board	33.86 x 33.86 x 10.25 mm



ANTENNA

This product has one external antenna. The antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

No.	Antenna Type	Frequency Range	Gain	Impedance
1	Stubby Antenna	2400-2500MHz	0dBi	50ohm
2	Stubby Antenna	863-928MHz	0dBi	50ohm

2.4-2.5GHZ

Main technical specifications	
Frequency Range (MHZ)	2400-2500
Impedance(Ω)	50
Gain(dBi)	>0
VSWR	≤2.5
Admitted Power	50W
Polarization	Linear,Vertical
Connector Type	SMAJ-J
Physical Properties	
Antenna Base	ABS

Antenna Dimension	Φ9.8*28mm
Operating Temp	-30℃~+75℃
Storage Temp	-30℃~+75℃

863-928MHZ

Main technical specifications	
Frequency Range (MHZ)	863-928
Impedance(Ω)	50
Gain(dBi)	>0
VSWR	≤2.5
Admitted Power	50W
Polarization	Linear,Vertical
Connector Type	SMAJ-J
Physical Properties	

Antenna Base	ABS
Antenna Dimension	Φ9.8*28mm
Operating Temp	-30℃~+75℃
Storage Temp	-30℃~+75℃

PIN SIGNALS AND ASSIGNMENT

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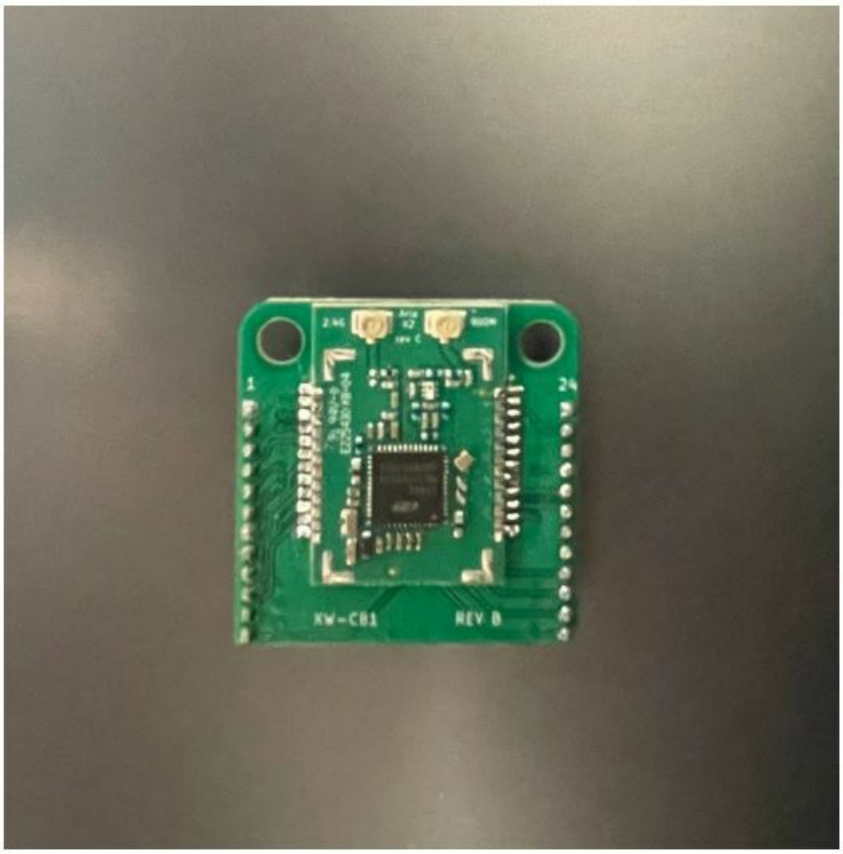
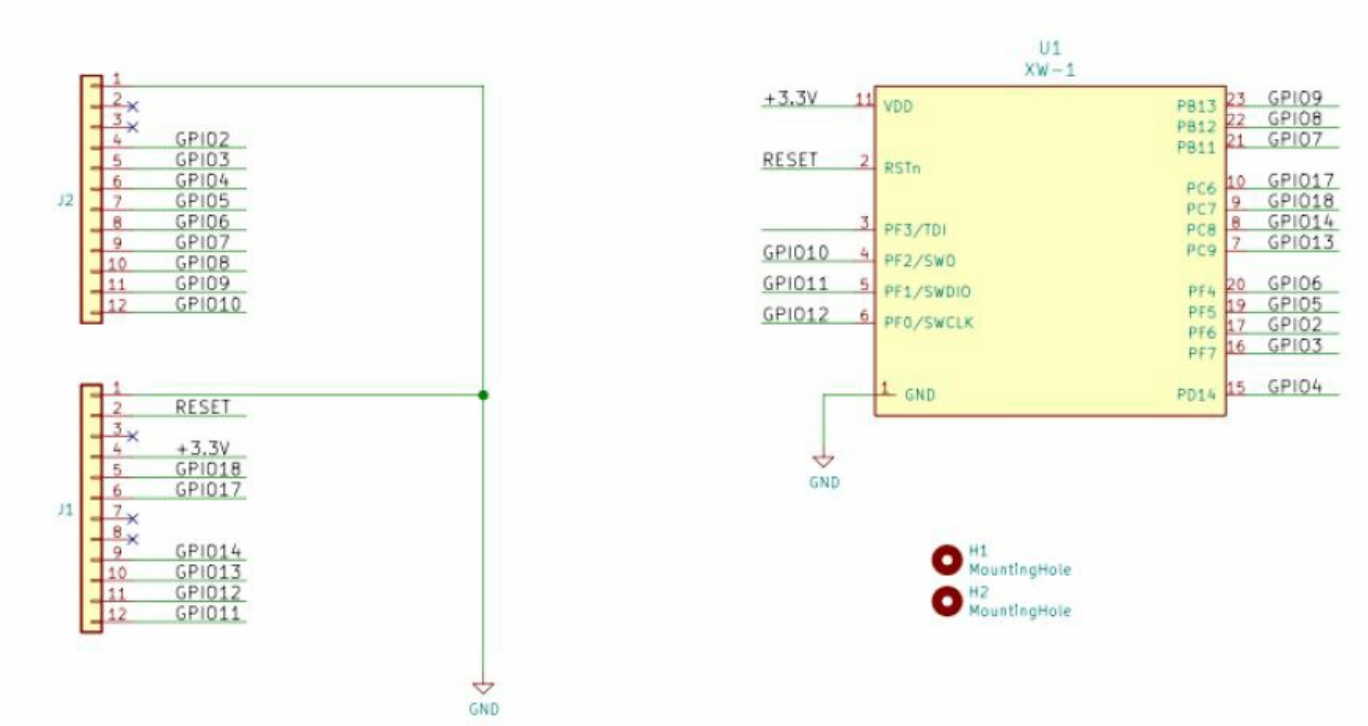
16	GPIO	Unused
17	GPIO	Unused
18	GPIO	Unused
19	GPIO	Unused
20	GPIO	Unused
21	GPIO	Unused
22	GPIO	Unused
23	RESET_N	Reset (active low)
24	GND	Ground input

DESIGNING ARIA X2 INTO END APPLICATION

The Aria X2 was designed to be implemented using a carrier board (XW-CB1) that fits a Synapse RF220UF1 socket.





PROGRAMMING

The Aria X2 can be programmed using a JTAG interface or over the air via BLE.

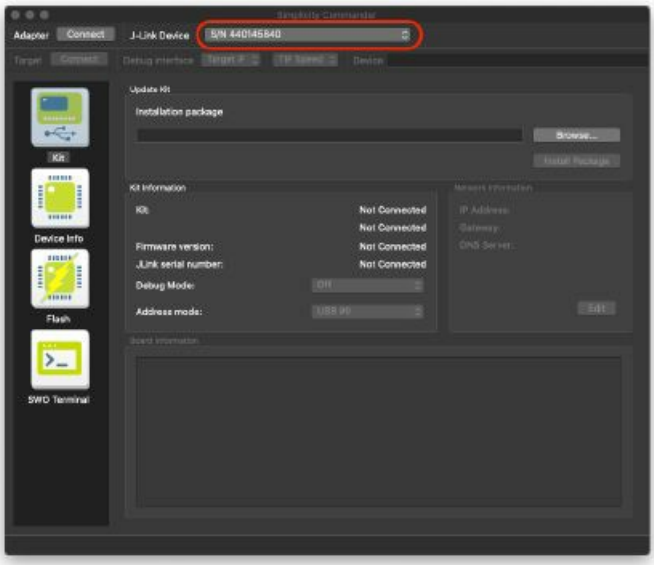
PROGRAMMING VIA JTAG

The process for reprogramming the wireless modules includes a Silabs development board with the necessary debug wires broken out (3.3V, GND, SWDIO, SWCLK). The wireless module's carrier board (XW-CB1) fits the

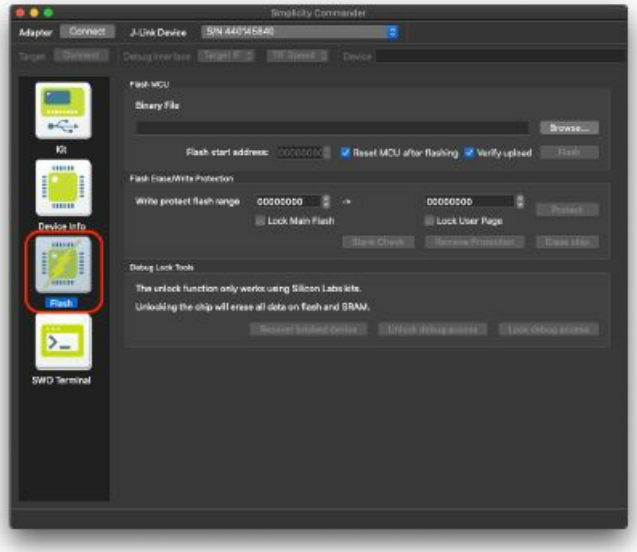
Synapse RF220UF1's socket, so a breakout board from Synapse (500202.01A) is used to easily access the pins, as well as provide a reset button.

Simplicity Commander from Silicon Labs is used to flash the firmware onto the module.

1. Open up Simplicity Commander and connect the Silabs dev board to your PC's USB port. The board should be automatically discovered by the Commander.



2. Switch to the Flash tab.



3. Browse for the .s37 file to load onto the device.
4. Click Flash to program the device.

PROGRAMMING VIA BLUETOOTH OTA DFU

1. The Aria X2 is capable of securely updating firmware via Over-The-Air Device Firmware Upgrade (OTA DFU), using signed and encrypted upgrade files in a custom GBL (Gecko Bootloader) format.
2. Before upgrading via OTA DFU, the encryption key and public key tokens must be flashed onto the device using Simplicity Commander.

CLEANING

The use of “No Clean” paste is recommended as it does not require a wash phase after reflow. Washing a final assembly that uses the Aria X2 is not recommended as water may be captured under the module and/or RF shield causing part degradation.

PACKAGING

The Aria X2 and the accompanying XW-CB1 carrier board each come in sheets of 20pcs

REGULATOR TESTING AND CONFIGURATION

If necessary, the Aria X2 module can be configured for host product evaluation for different operational conditions. In other words, if Aria X2 is implemented into a host system that needs secondary certifications the Aria X2 can be loaded with test firmware to put the radio into different constant transmission or reception states to verify the end device does not emit spurious emissions caused by the Aria X2.

REGULATORY STATEMENTS

FCC Statements
This device complies with part 15 of the FCC Rules. Operation 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.

Note: This product 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 product 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 product 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.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance

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

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

FCC Modular Usage Statement

- **Note 1**: This module certified complies with RF exposure requirements under mobile or fixed condition; this module is to be installed only in mobile or fixed applications.
  A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.
  A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.
- **Note 2**: Host product manufacturers must provide in their user manual the required RF exposure information for mobile & fixed usage of this module. Host product manufacturers must use the following RF exposure statement in their user manual "This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and all persons. This transmitter must not be co-location or operating in conjunction with any other antenna or transmitter."
- **Note 3**: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user shall have no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.
- **Note 4**: Additional testing and certification may be necessary when multiple modules are used.
- **Note 5**: The module may be operated only with the stubby antenna with which it is authorized.
- **Note** 6: To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter-certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, the manufacturer shall provide guidance to the host manufacturer for compliance with the part 15B requirements.
- **Note 7:** The FCC ID label on the final system must be labeled with "Contains FCC ID: 2AVDP-ARI002"
- **Note 8**: The FCC rule/s for this module are CFR 47 Part 15 Subpart C.
- **Note 9:** This modular transmitter is only FCC authorized for the specific rule parts listed on its grant. The host product manufacturer is responsible to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product will require Part 15 Subpart B compliance when the modular transmitter is installed.

ISED Statements

This device complies with Innovation, Science and Economic Development Canada's license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept and interference, including interference that may cause undesired operation of the device.

Under Innovation, Science and Economic Development Canada's regulations, this radio transmitter may only operate using the integral antenna under which it was approved

ISED RF Exposure Statement
This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter

ISED Modular Usage Statement
NOTE1: When the ISED certification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use the wording "Contains transmitter module IC: 28121-ARI002" or "Contains IC: 28121-ARI002".

REVISION HISTORY

REVISION	DATE	DESCRIPTION
1.0.0	May 16, 2023	Initial Release

Documents / Resources

	ACCLAIM LIGHTING Aria X2 Cortex M4 Based Radio Module [pdf] Installation Guide Aria X2 Cortex M4 Based Radio Module, Aria X2, Cortex M4 Based Radio Module, Based Radio Module, Radio Module

References

- User Manual

Manuals+, Privacy Policy