CRMX Luna/Aurora

User Manual

LumenRadio AB

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Safety information

WARNING / WARNUNG / ATTENTION / ADVERTENCIA /
VARNING / ADVARSEL / VAROITUS / ADVARSEL

This product must be earthed.

Das Gerät muss an eine geerdete Steckdose angeschlossen werden.

Cet appareil doit être branché à une prise de terre.

Este aparato se debe conectar a una toma de tierra.

Apparaten skall anslutas till jordat uttag.

Apparatet må tilkoples jordet stikkontakt.

Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.

Apparatets stikprop skal tilsluttes en stikkontakt med jord.

Product caution

This product may never be powered on without having the antenna properly mounted. Doing so may result in permanent damage to the device.

English

1. Please read these instructions and safety instructions carefully before using this product.
2. Keep these instructions for future reference.
3. Never plug the product into the mains supply while it is still in its packaging. Never cover during use.
4. Only use indoors and in dry spaces, except where otherwise explicitly stated.
5. Verify that the product has not been damaged in transport before you make use of it.
6. Keep the product out of the reach of animals, children and persons who require supervision.
7. This product is intended for professional use only.
8. Always place the product on a stable, solid and flat base or safely secure it.
9. Do not use the product near hot surfaces or objects.
10. The mains cable must be regularly and carefully checked for damage to the cable, the plug and other parts. In the event of damage, the product must not be used until the mains cable has been replaced. If the product needs to be cleaned, the adapter or mains cable must be disconnected from the mains supply.
11. Repairs must only be carried out by a qualified person.
12. Note that the connected voltage and current corresponding to the sticker on the product.
13. Never submerge the product or the mains cable in water or any other liquid, in order to prevent electric shocks, fire, injury and other hazards.
14. Never carry the product by the cables and do not put the cord around sharp edges.

Deutsch

1. Bitte lesen Sie diese Hinweise und Sicherheitshinweise sorgfältig durch, bevor Sie dieses Produkt verwenden.
2. Bewahren Sie diese Anleitung zum späteren Nachschlagen auf.
3. Das Produkt nie anschließen, wenn es sich in der Verpackung befindet- Außerdem darf das Produkt beim betrieb nicht abgedeckt werden.
4. Nur in trockenen Innenräumen verwenden sofern nicht ausdrücklich anders angegeben!
5. Versichern Sie sich vor der Verwendung, das dieses Produkt beim Transport nicht beschädigt wurde.
6. Produkt außerhalb der Reichweite von Kindern, Tieren und zu beaufsichtigenden Personen aufbewahren.
7. Dieses Produkt ist nur für den professionellen Gebrauch bestimmt.
8. Stellen Sie das Produkt immer auf eine stabile, feste und flache Fläche auf.
9. Verwenden Sie das Produkt nicht in der Nähe von warmen Oberflächen oder Objekten.
10. Das Netzkabel muss regelmäßig und sorgfältig auf Schäden am Kabel, Stecker und anderen Teilen kontrolliert werden. Bei einem Schaden darf das Produkt erst wiederverwendet werden, wenn das Netzkabel repariert/ersetzt ist. Wenn das Produkt gereinigt werden soll, muss das Netzkabel vom Stromnetz getrennt werden.
11. Eventuell anfallende Reparaturen müssen von einer qualifizierten Person ausgeführt werden.
12. Beachten Sie, dass die angeschlossene Spannung und Strom dem entsprechen, was auf dem Typenschild angegeben ist.
13. Tauchen Sie das Produkt oder das Anschlusskabel niemals in Wasser oder in andere Flüssigkeiten ein, um einen Stromschlag, Brand, Verletzungen oder andere Gefahren zu vermeiden.
14. Das Produkt nicht am Netzkabel tragen und das Netzkabel nicht um scharfe Kanten legen.

Introduction

This user manual refers to version 1.1.1.0 or later.

Welcome to the large family of users of LumenRadio's world-leading wireless DMX system. We hope that you will enjoy your brand new devices. We, at LumenRadio, have tailored this wireless DMX system to deliver reliability at its best. No matter if you're using them at a night-club, a community theatre or on the set of a feature film, you should be able to trust its cable-like reliability, but without the hassle of cables.

Wireless DMX in a nutshell

Wireless DMX can be used in many different setups, may it be one single universe being transmitted from one point over a distance to one receiver. This is what is called point-to-point, and is a common scenario when shooting wireless DMX over a distance where cable is not possible. The cable is simply replaced with a wireless cable with a fixed latency of 5 ms.

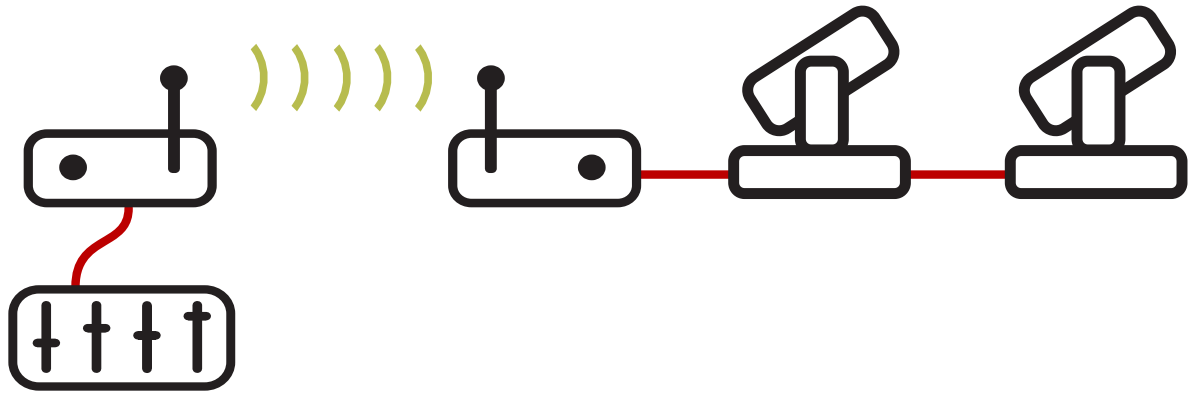

Figure 1: One DMX universe in a point-to-point setup

It is simple to just add more receivers to a universe of wireless DMX to create a wireless splitter, where the same DMX data is outputted with a synchronisation of less than 0.1 ms. This is what is called a point-to-multipoint setup.

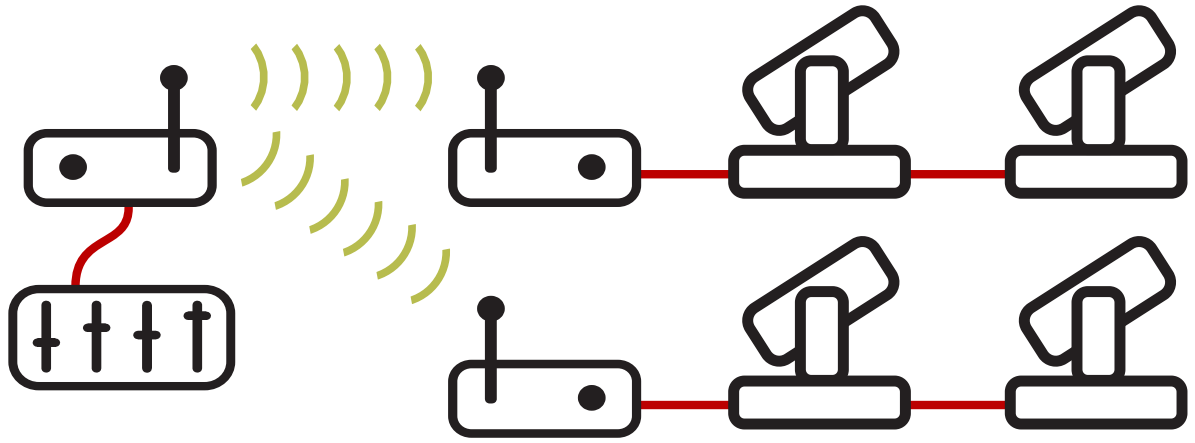

Figure 2: One universe in a point-to-multipoint setup

It is possible to have multiple universes being transmitted simultaneously in what's called a multipoint-to-multipoint setup. Simply link each receiver to the transmitted universe you want it to output. The system will automatically exchange encryption keys and other security parameters. The system will coordinate the frequency usage to avoid collisions so that multiple universes can be transmitted simultaneously.

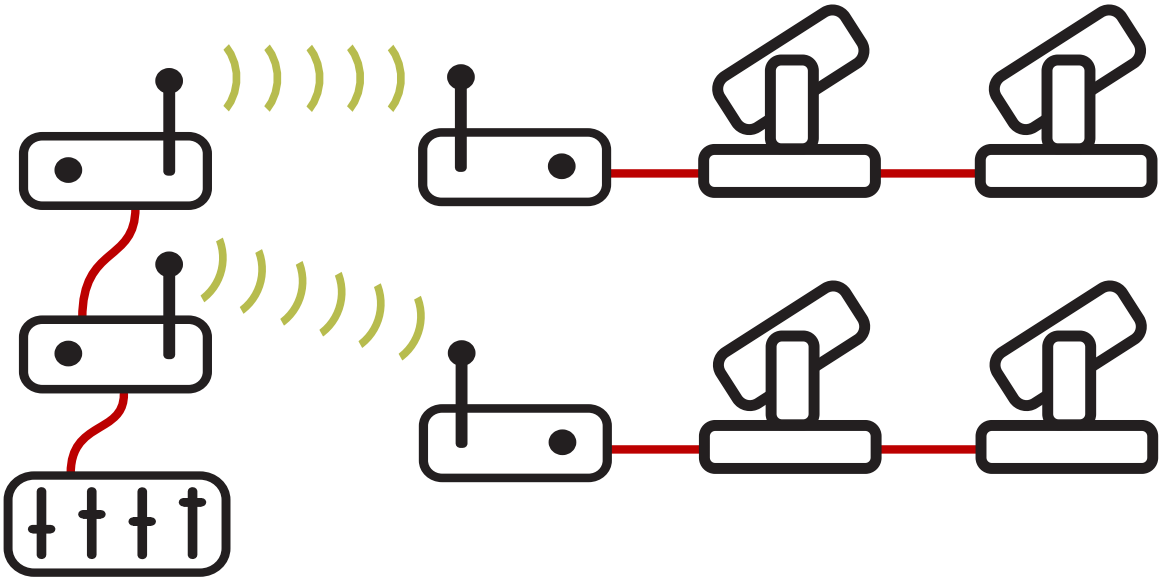

Figure 3: Multipoint-to-mutlipoint setup

Cognitive coexistence

Cognitive Coexistence is LumenRadio's patented technology for real-time adaptive frequency hopping. It's the foundation of our CRMX® technology and the main reason why we are perceived as the most reliable and resilient wireless DMX system on the market.

CRMX systems automatically scan and adapt to the RF environment 1500 times per second. If disturbances are detected, the system will move to frequencies that are currently not disturbed. This is how the cable-like reliability can be achieved, trusted by users in the most demanding sets.

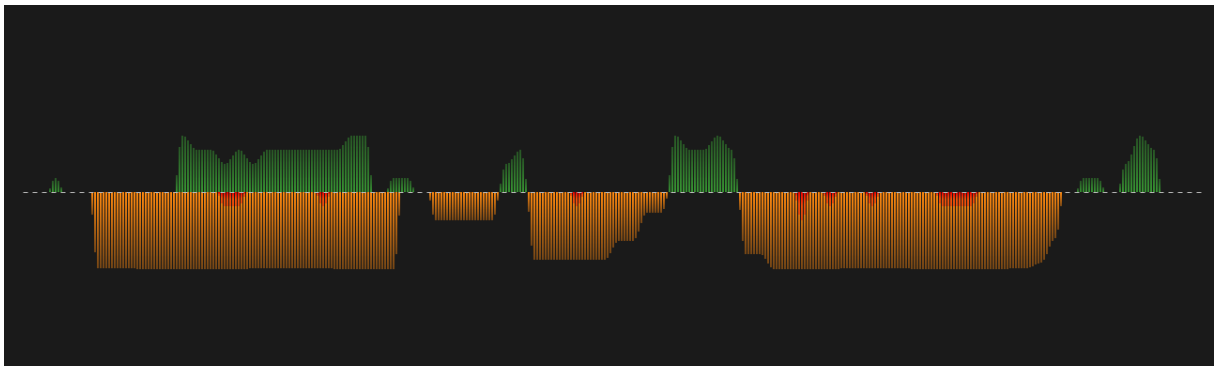

Figure 4: Cognitive coexistence

Compatibility

There has been two major wireless DMX systems on the market for a while - CRMX® and W-DMX™. They have historically not been fully compatible due to different technologies being used. But CRMX receivers have been able to receive the W-DMX G3 protocol. However, your new CRMX Aurora or CRMX Luna can be operated in different modes when in transmitter mode;

1. **CRMX** - transmit CRMX data to compatible receivers.
2. **W-DMX G3** - transmit W-DMX G3 protocol.
3. **W-DMX G4S** - transmit W-DMX G4S protocol.

For W-DMX receivers, please use the W-DMX G3 mode for maximum compatibility. *Note:* This mode can also be used with CRMX receivers, but security and DMX fidelity is not as good as when running CRMX mode.

Mode	CRMX receivers	Older CRMX receivers	W-DMX receivers
CRMX	Yes	Yes	No

Mode	CRMX receivers	Older CRMX receivers	W-DMX receivers
W-DMX G3	Yes	Yes	Yes
W-DMX G4S	Yes	No	Yes

When operated as receivers, CRMX Aurora and CRMX Luna will automatically detect and link using the protocol used by the transmitter at the time of linking.

Linking key

What is Linking Key

The Linking Key is a user-defined 8 digit key code. It can be used as a password to to the link credentials of a CRMX link. It can be used to tell two (or more) different transmitters to set up identical links. This is what we call *cloned transmitters*.

It can also be used to link a receiver to a transmitter that has an active link using the same linking key. This allows for easy addition of a receiver to a network where the transmitter might be inaccessible for instance, without the need to initiate a linking process from the transmitter.

Cloning transmitters

By cloning transmitters, by entering the same Linking Key into both transmitters, you can place them at separate physical locations and move receives between the locations without the need to relink.

Note: It is important that the transmitters are separated, otherwise receivers may end up creating a link with any of the transmitters, which may lead to undefined behaviour.

Linking an RX by Linking Key

In receivers that supports it, it is possible to enter the linking key of the transmitter to join that network without the need for performing a linking procedure from the transmitter.

Enter the same Linking Key into the receiver as you have entered into the transmitter and the receiver will automatically link to the transmitter when it is within range.

Your device

Aurora Overview

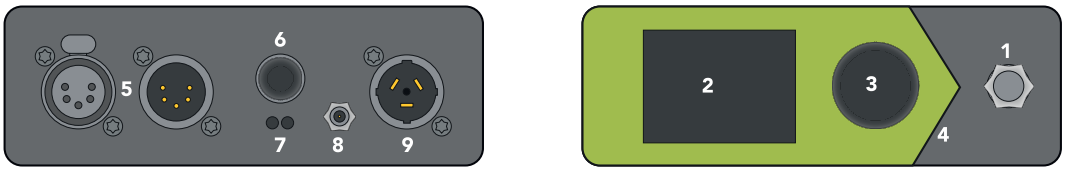

Figure 5: Aurora back and front

1. Antenna
2. IPS TFT display for menu system
3. Control knob
4. Decorative lights
5. DMX in/out with auto terminate
6. WiFi antenna
7. WiFi Link/Data LEDs
8. DC inlet (10-20V DC)
9. AC inlet (90-240 VAC) (PowerCON TRUE1)

Luna Overview

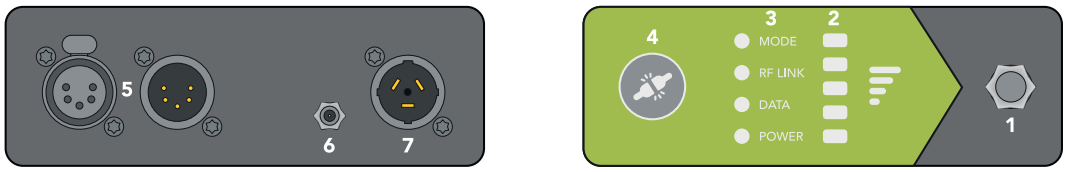

Figure 6: Luna back and front

1. Antenna
2. Signal level indication
3. Status LEDs
4. Link button
5. DMX in/out with auto terminate
6. DC inlet (10-18V DC)

7. AC inlet (90-240 VAC) (PowerCON TRUE1)

Mounting

Your Aurora/Luna is designed to be able to be mounted in a number of different ways;

1. Truss mounted - using a clamp with either M10 or 3/8” thread.
2. Rack mounted - using the rack mounting kit accessory.
3. Tripod mounted - using a M10 or 3/8” spigot or the yoke accessory.
4. Wall mounted - using the wall mount kit accessory.

M10 and 3/8” holes

On either side of your Aurora/Luna unit you’ll find holes for M10 (1.5 mm pitch) and 3/8” (UNC). These can be used with any standard truss mounting clamps or spigots, for instance a standard TV spigot. Do not use screws that can go deeper than 27 mm.

Safety wire

There are holes on the device where a safety wire shall be fasted.

Rack mounting

You can use the rack mounting kit (sold separately) to mount a Aurora/Luna in a standard 19 inch rack.

To mount the rack brackets, loosen four (4) of the M4 screws on each side of the unit, place the rack bracket, and fasten it in place using the M4 screws. Tighten firmly.

Wall mounting

Aurora/Luna can be mounted to a wall using the wall mounting kit (sold separately). Loosen the lower two M4 screws on each side of the unit, place the brackets and fasten them using the M4 screws. Tighten firmly.

Settings and operation

Luna front panel

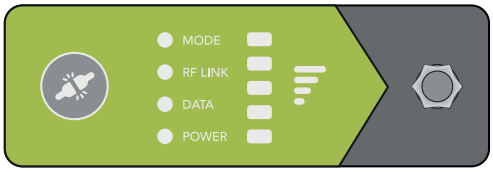

Figure 7: Luna front panel

Signal quality

When operating as RX, the signal quality indicator shown how good the signal reception is.

When operating as TX, these LEDs are always off.

MODE

The MODE LED shows what transmission protocol the device is using. When operating as RX this follows the mode of the TX. This LED is off if Luna is unlinked as RX.

- **White:** CRMX
- **Green:** W-DMX G3
- **Red:** W-DMX G4
- **Violet:** W-DMX G4S
- **Amber:** W-DMX G5

Bluetooth

- Bluetooth is on: this LED blinks once every few seconds.
- Bluetooth is connected: this LED blinks twice every few seconds.
- Bluetooth is off: this LED has no blue blinks.

RF LINK

The RF LINK LED shows the status of the RF LINK:

Figure 8: RX: Unlinked

Figure 9: RX: Linked and active RF link, TX: normal active RF link

Figure 10: RX: Linking or linked but no active RF link, TX: linking

Figure 11: TX: unlinking

Universe color

The RF LINK LED will be lit in the selected universe color.

DATA

- **Off:** No data
- **Green:** DMX data
- **Red:** RDM activity

POWER

Lit when device is on.

Changing between RX/TX

Changing between RX and TX can be done from the app, or by following this procedure:

1. Press the link button 5 times rapidly.
2. Press and hold the link button for more than 3 seconds.
3. Now the RF LINK LED will flash to indicate what mode is selected: RX: fast blink, TX: slow blink.

4. Press the link button momentarily to step between the modes.
5. Press and hold the link button for more than 3 seconds to save the selected setting.

Changing transmission protocol

Changing between the available transmission protocols can be done from the app, or by following this procedure:

1. Press the link button 3 times rapidly.
2. Press and hold the link button for more than 3 seconds.
3. Now the MODE LED will flash and indicate what protocol is selected.
4. Press the link button momentarily to step between the supported protocols.
5. Press and hold the link button for more than 3 seconds to save the selected setting.

As TX, the following protocols can be selected:

- CRMX
- W-DMX G3
- W-DMX G4S

Aurora front panel

Status screen

The status screen collects the most needed status information.

Figure 12: Aurora status screen

- **Signal level:** When in RX, the received signal quality is shown.
- **Mode:** RX or TX (and what protocol - CRMX, W-DMX - when in TX).
- **Status:** Shows the status of the radio link.
- **Universe name:** Shows the wireless universe name.

- **Universe color:** The text is shown in the selected universe color.

Status icons

In status screen there are some status icons to indicate certain functions.

Icon	Description
	Bluetooth enabled
	Bluetooth connected
	WiFi access point enabled
	WiFi client enabled
	RDM proxy activated

Main menu

The operation of Aurora can be performed from the front panel menu system. Linking, WiFi settings, Bluetooth, etc is all done from here.

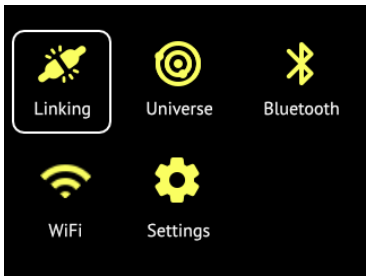

Figure 13: Aurora main menu

Linking

Linking and unlinking receivers is done from the *Linking* menu.

Changing between RX/TX

Changing between RX and TX is done under the *Settings* menu.

Changing transmission protocol

It's possible to change what wireless protocol the Aurora shall transmit. In the settings menu it's possible to select between the following protocols:

- CRMX
- W-DMX G3
- W-DMX G4S

When operating as RX the protocol is automatically detected at the time of linking.

RDM

Aurora has a built-in RDM proxy that allows any 3rd party controllers that supports ANSI E1.20 Remote Device Management (RDM) to discover, monitor and administer any RDM compatible device that resides downstream of the wireless link.

Enable the proxy

RDM proxy needs to be enabled for downstream devices to be discovered. This can be done it any of two ways;

1. Via the front panel UI - enable proxy in the Settings menu
2. Via RDM - change DMX personality using your RDM controller

Monitor receiver signal quality

With the use of RDM it is possible to monitor the downstream receivers' signal quality if they support RDM. Each receiver presents a sensor with the current signal quality level.

WiFi

The built-in WiFi on Aurora operates as an ArtNet or sACN to DMX node.

Access Point (AP mode)

In access point mode Aurora will create a WiFi network that your phone, tablet, etc could connect to. This is handy for instance for iPad based lighting control apps, that can send data to Aurora directly over WiFi.

Any controller software that supports ArtNet or Streaming ACN (sACN) can be used.

In AP mode you need to do the following settings:

- **SSID** *(the device's Device Label is used as SSID)*
- **Password**
- **IP settings**
- **DHCP** *(if the DHCP server shall be enabled or not)*

Disabled

When WiFi is disabled, the is turned off and no DMX is generated.

Bluetooth

Both Aurora and Luna have Bluetooth activated by default.

Note: When running in W-DMX mode and transmitting to W-DMX receivers Generation 5 or older, Bluetooth must be turn off for proper operation. If using with CRMX receivers or W-DMX receivers from Generation 6, Bluetooth can be left on.

Configuration

Both Aurora and Luna supports being configured via Bluetooth using the CRMX Toolbox app, available from App Store on iOS and Google Play on Android.

Search for "CRMX Toolbox2" on App Store or Google Play.

DMX data

Aurora and Luna supports receiving DMX data with limited refresh rate over the Bluetooth interface.

This can be used with apps that supports this interface natively.

PIN code

A PIN code can be used to protect against unauthorised access via the Bluetooth interface.

On Aurora PIN code can be set and disabled from the menu system. Setting a PIN code of *000000* disables PIN code.

To disable the PIN code on Luna:

1. Press the link button rapidly 7 times.
2. Press and hold the link button for at least 3 seconds.
3. The device will reboot with the PIN code disabled.

Turning Bluetooth on/off

On Aurora, Bluetooth is turned on or off via the menu system.

On a Luna, the MODE LED will flash with a blue light every few seconds when Bluetooth is enabled. When Bluetooth is disabled no blue flashes will appear on the MODE LED.

To turn Bluetooth on/off on a Luna device:

1. Press the link button rapidly 2 times.
2. Press and hold the link button for at least 3 seconds.
3. The device will now reboot with the Bluetooth mode toggled.

Firmware upgrades

You can expect firmware updates to be released on a regular basis for your new Aurora or Luna unit. Even though we take pride in quality, we probably have overlooked something. Also, there will be new features released on a regular basis.

How to update

1. Start the CRMX Toolbox2 app on your iOS or Android device.
2. Click *Connect* and you will be presented with a list of nearby devices. The list is sorted by an approximated distance.
3. Click a device in the list and choose *Identify Device* if you are unsure which unit to connect to.
4. Click *Connect Device* to connect to the desired device.
5. In the *Home screen* view, you will be able to click the *Update* button and the app will show you if there is a new firmware available.

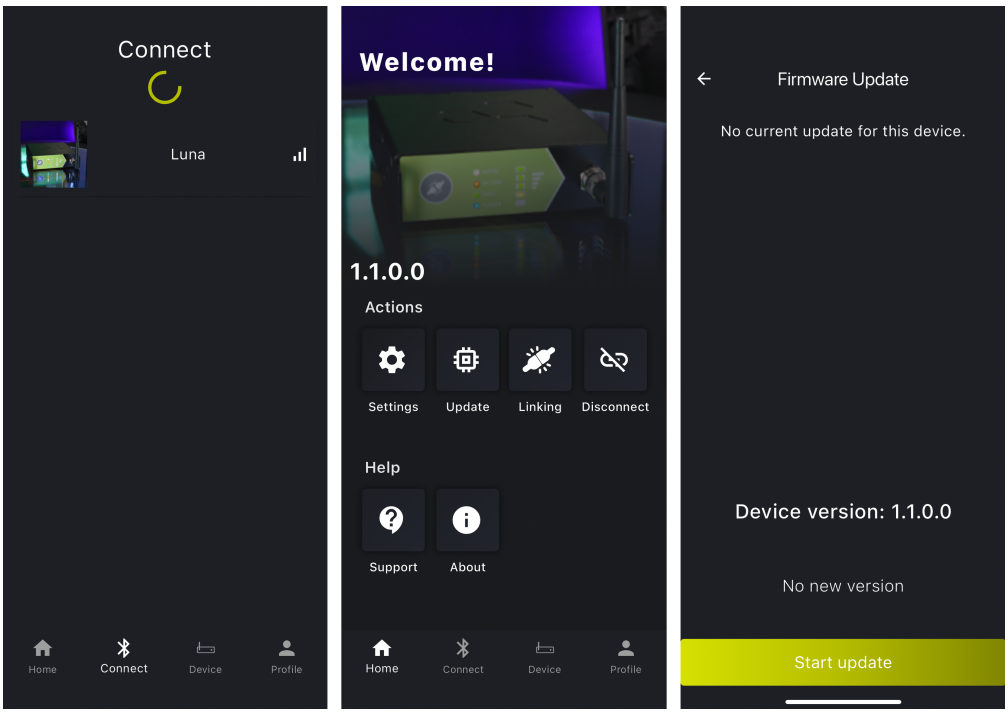

Figure 14: CRMX Toolbox2

Compliance information

CE

This product complies with the Essential Requirements of RED (Radio Equipment Directive) of the European Union (2014/53/EU). This product meets the requirements of relevant conformance standards.

A detailed Declaration of Conformity is available upon request from the manufacturer.

UKCA

This product complies with the relevant statutory requirements in the United Kingdom. This product meets the requirements of relevant conformance standards.

A detailed Declaration of Conformity is available for market surveillance upon request from the manufacturer.

FCC

FCC IDENTIFIERS: XRSTIMOMWAN301, 2ACSVHF-LPD100[1]

FCC Information to User

This product does not contain any user serviceable components and is to be used with approved antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals.

FCC Guidelines for Human Exposure

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

[1] For Aurora only.

FCC Declaration of Conformity

We LumenRadio AB, Svangatan 2B, 416 68 Gothenburg, Sweden, declare under our sole responsibility that this product complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

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

FCC Radio Frequency Interference Warnings & Instructions

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 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 methods:

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

Modifications made to the product, unless expressly approved by LumenRadio AB, could void the user's right to operate the equipment.

Industry Canada

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le resent appareil numerique nemet pas de bruits radiolectriques depassant les limites applicables aux appareils numeriques de la classe B prescrites dans le Reglement sur le broullage radioelectrique edicte par le ministere des Communications du Canada.

Specifications

Aurora

Spec	Details
Power supply AC	100-240 VAC, 50/60 Hz, 1A max
Power supply DC	10-18 VDC, 350mA max
IP rating	IP20
Operating temperatue	-20 to +55 °C
Storage temperature	-30 to +65 °C
Humidity	0-90% non-condensing
Antenna connectors	RP-TNC
Frequency range (CRMX)	2402-2480 MHz
Frequency range (WiFi)	5180-5240 MHz
	5745-5825 MHz
Maximum RF power (CRMX)	100mW (280mW in North America only)
Maximum RF power (WiFi)	40mW (5180-5240 MHz)
	25mW (5745-5825 MHz)

Luna

Spec	Details
Power supply AC	100-240 VAC, 50/60 Hz, 1A max
Power supply DC	10-18 VDC, 200mA max
IP rating	IP20
Operating temperatue	-20 to +55 °C
Storage temperature	-30 to +65 °C
Humidity	0-90% non-condensing
Antenna connectors	RP-TNC
Frequency range	2402-2480 MHz
Maximum RF power	100mW (280mW in North America only)

Accessories

All accessories can be ordered from your local CRMX distributor.

Order code	Description
800-2205	Aurora/Luna Rack Mounting Kit
800-2206	TNG Wall Mounting Kit
800-2208	TNG V-mount Battery mount