Wireless
without worries.

lumenradio

WHY LUMENRADIO?

LumenRadio was founded with a clear vision of how wireless technology will change the world. We have been leading the wireless transformation within the lighting industry by consistently being the first to introduce new groundbreaking technology.

RELIABILITY

LumenRadio's reliability comes from developing products with feature sets that assure successful operation even in worst-case environments. Our products are designed to withstand daily wear and tear in harsh environments and our manufacturing and testing processes makes sure that the products we ship always fulfill the most rigourous requirements. We ship all our products with pride and all units proudly carry the "Made in Sweden" mark.

SUPPORT

We are dedicated to building a world-class support team who assist our customers when needed. Customers all around the world use our products for challenging concerts and live projects, permanent architainment installations and projects in extreme outdoor environments. When in need of assistance or recommendations, we are always glad to help.

TECHNOLOGY

We believe in pleasantly surprising our customers with new innovations and groundbreaking technology. Our technology has between 2009 and 2016 won more awards for technical achievements and excellence than any competitor in our market segment.

If you are a newcomer to our wireless technology or an old devotee, you are equally welcome to enjoy the technology our team has developed with passion, love and fanatical attention to perfection.

SALES
sales@lumenradio.com

MARKETING
marketing@lumenradio.com

SUPPORT
support@lumenradio.com

lumenradio

Our offer can be summed up in three words: *Wireless without worries.* With our turnkey solutions, comprehensive experience and radio expertise, we enable you to focus on creating amazing solutions without having to worry about how connectivity actually works. Let us show you how.

Contents

4 time winner...

1. PLASA GOLD AWARD FOR INNOVATION 2014 **|** *For the CRMXchip*

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4. PLASA AWARD FOR INNOVATION 2009 **|** *For the CRMX Nova Product range*

How to be wireless?

Whether your installation demands wireless for cosmetic, cost saving or technical reasons, there are a few factors you should be aware of to ensure optimum performance of a wireless system. LumenRadio has a team of dedicated wireless experts available to guide you through your installation, but here are a few pointers to get you started:

WHAT RANGE CAN I EXPECT FROM MY WIRELESS SYSTEM?

The quick answer is "up to 1000 meters with line of sight". The longer answer is that wireless signals can be transmitted over vast distances, into tens of kilometers - it's simply a question of correct selection of antennas and repeaters. Likewise, materials placed 'in the way' of the wireless link, such as walls, windows, trees and people, all cause a reduction in signal strength of the wireless link. With the correct selection of antennas, use of repeaters and some forethought, a reliable wireless link can be delivered in even the most challenging scenarios.
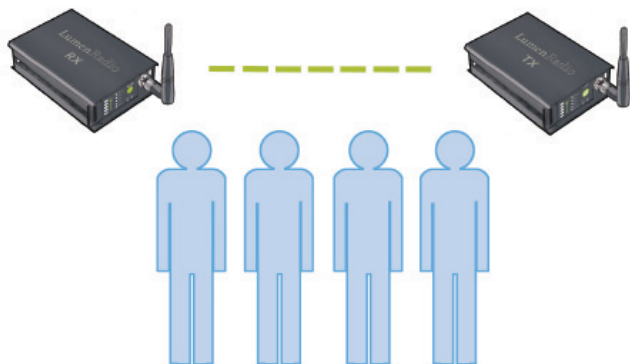
WHERE SHOULD I PLACE MY WIRELESS UNITS?

The key to avoiding most common obstacles is to place transmitters and receivers as high as possible. One example is an audience, which consists of 75% water (which absorbs radio waves). By placing your transmitters and receivers above an audience's head, you can dramatically improve signal strength and reliability.

WHICH ANTENNA SHOULD I USE?

All CRMX products ship with a 2dBi antenna as standard. Although this is suitable for over 95% of applications, a range of higher gain and directional antennas is available for those applications which are particularly challenging. It is preferable to fit the higher gain antenna to the receiver, as this provides optimum signal strength without increasing signal transmission power, which is often controlled by regulations to a maximum level.
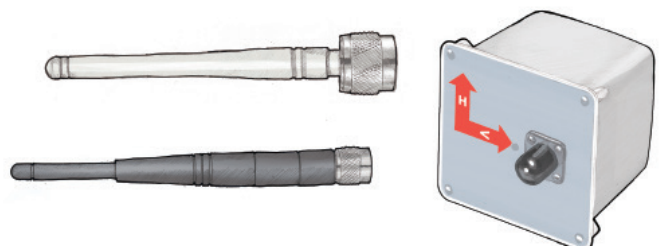
HOW DO I CHOOSE WHICH PRODUCT TO USE?

LumenRadio offer a range of products to suit your installation – indoor Nova units are suitable for use on temporary events, as rental stock or for other indoor applications. The durable Slim units are perfect for permanent installation both in- and outdoors, whilst the Outdoor units offer industry leading IP67 classification for vandal and weather protection. Whatever the environment, LumenRadio have a product to meet your requirements.
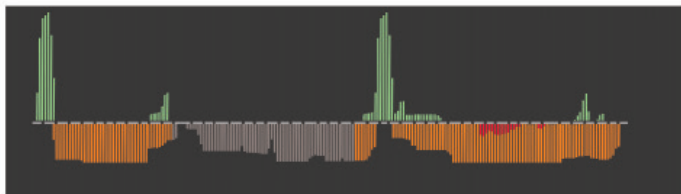
WHAT IS COEXISTENCE?

LumenRadio's patented Cognitive Coexistence technology allows our radio to ensure optimum performance even when other wireless systems are operating in the same area.

As the world becomes more and more wireless; systems such as Wi-Fi, ZigBee, Bluetooth, wireless microphones, wireless cameras, smart phones and even microwave ovens all occupy the same wireless frequency range. This frequency range is often congested and this can affect the performance of all these systems, with radio systems transmitting on top of one another or cancelling each other out.

CRMX enabled products continuously scan the wireless frequencies, detecting activity from other networks and where gaps are available. The radio modules then 'hop' into these available frequencies, making best use of the available space whilst reducing the effects on other networks to almost zero.

WIRELESS IS AS EASY AS 1, 2, 3 ...

1. Unlink all receivers by pushing and holding the link button until the LEDs turn off.

2. Push the link button on the transmitter... The transmitter will automatically link to all receivers within range and immediately start sending DMX data to them.

3. **Job done!** Relax, knowing your wireless link is being managed by CRMX technology.

INDOOR ENTERTAINMENT

CRMX Nova

The CRMX Nova range is designed to meet the requirements of entertainment lighting; to withstand the wear and tear of touring, rental and stage use.

CRMX Nova has received PLASA's Award for Innovation twice. Both for the superior engineering in developing the CRMX Nova product line and for CRMX Nova Flex's ability to act as a complete cross-protocol wireless lighting control system.

CRMX Nova is available as a DMX product, or with optional RDM functionality. All units operate on the 2.4 GHz band, and can be used around the globe without a license. All products feature the fundamental CRMX features such as Automated Cognitive Coexistence, DMX synchronization, lowest latency in the industry at 5 ms, strong 128 bit encryption, up to 1000 meter link range, error correction and fidelity. CRMX Nova receivers are also compatible with W-DMX™ transmitters.

The CRMX Nova RDM products can be used with SuperNova software. RDM transmitters and Flex products can also be used as RDM proxy devices, alongside any RDM controller. In addition to this; all CRMX Nova RDM products have support for wired and wireless in the same installation.

CRMX Nova | www.lumenradio.com/nova

CRMX NOVA FX RDM
RDM/ETHERNET FLEX PRODUCT

CRMX Nova FX RDM can be configured either as a transmitter or a receiver for one full DMX/RDM universe of up to 512 channels, making it ideal for rental applications. In transmitter mode, all supported Ethernet protocols can be used in any direction, both as input and output. In receiver mode, it can output any supported Ethernet protocol alongside standard DMX and RDM. CRMX Nova FX RDM supports both wired and wireless RDM.

KEY FEATURES
• Single Universe Flex unit
  – Transmitter or Receiver
• DMX512-A and RDM support
• Ethernet or wired DMX input/output
• Compatible with W-DMX™
  transmitters
• Up to 1000 meter link range
• Connects to SuperNova
• 5 ms latency
• 128 bit encryption of wireless link
• Automated Cognitive Coexistence
• Forward Error Correction
• RP-TNC antenna connector

CRMX NOVA TX2 RDM
RDM/ETHERNET TRANSMITTER

CRMX Nova TX2 RDM is a dual universe RDM enabled transmitter. Input can be provided by XLR or Ethernet inputs. CRMX Nova TX2 RDM supports both wired and wireless RDM.

KEY FEATURES
• Dual Universe Transmitter
• DMX512-A and RDM support
• Ethernet or wired DMX input
• Up to 1000 meter link range
• Connects to SuperNova
• 5 ms latency
• 128 bit encryption of wireless link
• Automated Cognitive Coexistence
• Forward Error Correction
• RP-TNC antenna connector

CRMX NOVA RX RDM
RDM RECEIVER

CRMX Nova RX RDM is a single universe RDM enabled receiver. It has support for one full DMX/RDM universe of up to 512 channels being transmitted by a CRMX transmitter. Connect a CRMX Nova RX RDM to any RDM enabled fixture to get wireless feedback from the fixture.

KEY FEATURES
• Single Universe Receiver
• DMX512-A and RDM support
• Compatible with W-DMX™
  transmitters
• Up to 1000 meter link range
• Connects to SuperNova
• 5 ms latency
• 128 bit encryption of wireless link
• Automated Cognitive Coexistence
• Forward Error Correction
• RP-TNC antenna connector

CRMX Nova | www.lumenradio.com/nova

CRMX NOVA TX
DMX TRANSMITTER

Our entry level indoor transmitter. The CRMX Nova TX has support for one full DMX universe of up to 512 channels.

KEY FEATURES
- Single Universe Transmitter
- Support for DMX512-A
- Up to 1000 meter link range
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- RP-TNC antenna connector

CRMX NOVA RX
DMX RECEIVER

Our entry level indoor receiver. The CRMX Nova RX has support for one full DMX/RDM universe of up to 512 channels being transmitted by a CRMX transmitter.

KEY FEATURES
- Single Universe Receiver
- Support for DMX512-A
- Compatible with W-DMX™ transmitters
- Up to 1000 meter link range
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- RP-TNC antenna connector

CRMX NOVA TX USB
DMX TRANSMITTER

The CRMX Nova TX USB delivers never before seen accessibility to the powerful CRMX technology. With its small size and easy to use USB interface it is suitable for small to medium sized temporary shows and works in perfect combination with battery powered fixtures with built-in CRMX technology. This unique product offers all of the advanced features of the larger CRMX Nova products but in a smaller enclosure; Automated Cognitive Coexistence, DMX fidelity and error correction, lowest latency in the industry at 5ms and 128 bit encryption - it's all there.

KEY FEATURES
- Single Universe Transmitter
- USB type A connector
- Supports ENTTEC DMX USB protocol
- Up to 200 meter link range
- Internal antenna
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction

Wireless reliability in Hollywood

Photo: Pawel Pogorzelski & MINI Switch

LumenRadio's technology enables complete wirelessness in the Film & Broadcasting industry – unparalleled flexibility, combined with uncompromised reliability, is the new normal.

The last couple of years LumenRadio has announced partnerships with several of the biggest players within lighting systems for the motion picture, television and photography industries such as Cineo, Kino Flo, LiteGear, DMG Lumière and Innovative Dimmers – with several other major brands in the pipeline.

Products equipped with wireless DMX control using LumenRadio's industry-leading CRMX technology give gaffers and lighting artists rigging solutions they have never even dreamed of before – they choose wireless today because of the ease-of-use, reliability and increased flexibility. Combined with much improved battery technology, these professionals now have the possibility of complete wirelessness – simplifying their work on set and simultaneously cutting production times and costs.

"The choice of wireless provider was obvious to us. Our two companies have a common philosophy in always being innovative and on the forefront of what is possible. We are very proud over this partnership and extremely excited of what it will bring to our users," says Rich Pierceall, CEO of Cineo Lighting.

Peter Lindkvist, Sales Director at LumenRadio, adds: "The Film & Broadcasting industries present a unique challenge and opportunity for us – a requirement for ultra-reliable wireless communication in a challenging radio environment and a very clear incentive for going wireless. They will push us to deliver fully on our promise of Wireless Without Worries, while we will help them to develop the next generation of set lighting – fully embracing the concept of complete wirelessness."

PERMANENT INSTALLATIONS

CRMX Slim

CRMX Slim is a compact and cost efficient wireless unit rated for permanent indoor and outdoor installations. CRMX Slim products can easily be mounted inside lighting poles or anywhere else where space is limited. The integrated DMX to DALI converter makes it a perfect solution where DMX and DALI fixtures are mixed in the same installation.

All CRMX Slim products are IP65 rated and have a discreet and secure housing, which ensures reliable long-term operation in outdoor or other humid environments. All connections are made via two cable glands. The glands offer full environmental protection up to IP65. CRMX Slim products have been used in hundreds of permanent indoor and outdoor installations all over the world.

CRMX SLIM RX RDM
IP65 RDM RECEIVER WITH DALI

CRMX Slim RX RDM supports not only a full 512 channel universe of DMX and RDM, but also DALI and DSI.
The integrated DMX to DALI/DSI converter supports up to 64 DALI addresses or 16 DALI groups as well as DALI or DSI broadcast. It is easily configured over RDM or from SuperNova.

KEY FEATURES
- Single Universe Receiver
- DMX512-A and RDM support
- Compatible with W-DMX™ transmitters
- Up to 1000 meter link range
- Connects to SuperNova
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- IP65 classification
- N-type antenna connector
- Integrated DMX to DALI/DSI bridge

CRMX SLIM TX
IP65 DMX TRANSMITTER

Our entry level outdoor transmitter. The CRMX Slim TX supports one full DMX universe of up to 512 channels.

KEY FEATURES
- Single Universe Transmitter
- Support for DMX512-A
- Up to 1000 meter link range
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- IP65 classification
- N-type antenna connector

"Having used LumenRadio's Slim units in sub-freezing temperatures many times before, we knew we would be able to deliver both the functionality and reliability necessary."

Lux Helsinki

Photo: Hannu Iso-Oja

At the annual Lux Helsinki festival, we once again proved that arctic conditions is not a problem for LumenRadios sturdy products. A number of CRMX Slim units were used to realise the vision of Light Artist Kari Kola with his piece Color Park.

In Color Park the audience can switch the color of the illuminated details of the artwork through several interactive movement and distance sensors. Kola urges the viewers to play with his art: "You can step under a coloured light and your presence will tone the vault next to the Old Church. Ask your friend to come along and you can mix the colours together" explains Kola on his piece. "Or try painting with your hand! Colors react to the sound frequency of the theremin, an instrument invented nearly a hundred years ago. The changes in the sound frequency changes the frequency of light, in other words, the color of light", hints Kola on his new experiment.

Kola's signature shows in strong colours that play the main role in the artwork. This results in tranquil, nearly a meditative vibe in the park in which the viewers can focus on experiencing and exploring light. The visuality of the artwork is supported by multi-channel soundscape. Color Park will be one of Kola's largest pieces of light art in Finland.

LumenRadio's Finnish distributor Sun Effects were tasked with providing the wireless infrastructure necessary for the installation. In total 6 x CRMX Slim TX and 20 x CRMX Slim RX RDM were used to reliably distribute data to remote locations.

Otso Vartiainen, Lighting & System Designer at Sun Effects explains: "An installation of this size and type would be very difficult to pull of using DMX cables. Having used LumenRadio's Slim units in sub-freezing temperatures many times before, we knew we would be able to deliver both the functionality and reliability necessary."

LumenRadio's CRMX Slim series is the most compact and cost efficient wireless unit for permanent indoor and outdoor installations. CRMX Slim products can easily be mounted inside lighting poles or anywhere else where space is limited. The integrated DMX to DALI converter makes it a perfect solution where DMX and DALI fixtures are mixed in the same installation. All CRMX Slim products are IP65 rated and have a discreet and secure housing which ensures reliable long-term operation in outdoor or other humid environments.

EXTREME OUTDOOR

CRMX Outdoor

CRMX Outdoor is an adaptation of the CRMX Nova product line for outdoor use with the same advanced CRMX technology and features for wireless DMX and RDM distribution.

With its discreet and secure metal housing and integrated shock absorption, CRMX Outdoor is built to withstand any outdoor environment for many years. Since all CRMX Outdoor products are IP67 rated, they are not only safe to install in humid environments, but will even withstand temporary submersion. Power and DMX inputs are made via cable glands at the bottom of the main enclosure. The Flex unit also supports Power over Ethernet as an alternative to a mains power input. With support for the most common Ethernet protocols, only one cable is needed for power and control.

CRMX OUTDOOR FLEX
IP67 RDM/ETHERNET FLEX PRODUCT

CRMX Outdoor Flex can be configured either as a transmitter, receiver or repeater for one full DMX/RDM universe of up to 512 channels. In transmitter mode, all supported Ethernet protocols can be used as both input and output. In receiver mode, it can output any supported Ethernet protocol alongside standard DMX and RDM. As a repeater, the Outdoor Flex can be used to build advanced network infrastructures over long distances while also acting as a receiver. The Outdoor Flex supports both wired and wireless RDM.

KEY FEATURES
- Single Universe Flex unit – Transmitter, Receiver or Repeater
- DMX512-A and RDM support
- Power over Ethernet support
- Ethernet or wired DMX input/output
- Compatible with W-DMX™ transmitters
- Up to 1000 meter link range
- Connects to SuperNova
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- IP67 classification
- N-type antenna connector
- Vandal proof casing

CRMX OUTDOOR RX
IP67 RDM RECEIVER

CRMX Outdoor RX is an outdoor receiver for one full DMX/RDM universe of up to 512 channels being transmitted by a CRMX transmitter.

KEY FEATURES
- Single Universe Receiver
- DMX512-A and RDM support
- Compatible with W-DMX™ transmitters
- Up to 1000 meter link range
- Connects to SuperNova
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- IP67 classification
- N-type antenna connector
- Vandal proof casing

Stunning
Eventim Apollo

"GDS recognizes that the combination of reliable wireless, RDM feedback and top quality support offered by LumenRadio is of the highest order and consequently they were the obvious choice for this project"

– Matt Lloyd, GDS

There is perhaps one venue whose name is carved deeper than any other in the hearts of every self-respecting British music fan. Opened in 1932 and designed by Robert Cromie in Art Deco style as The Gaumont Palace cinema, it was renamed the Hammersmith Odeon in 1962, later the Hammersmith Apollo and now after an extensive refurbishment that has restored it to its former Art Deco glory, it will be known as the Eventim Apollo.

GDS was invited to join the design team tasked with the restoration. The vision was to work within the fabric of the original 1932 Robert Cromie masterpiece and wherever possible restore the historical fixtures.

The installation used a whole DMX universe that exceeded the normal ARC system 64 channel capability. LumenRadio were glad to help by providing an integrated CRMX OEM solution that connected perfectly with the ARC system electronics. Of critical importance to any refurbishment solution is the need for work to progress quickly

and the Apollo was no exception. The work was completed in a nine week turnaround and delivered a complete transformation of the whole space. GDS chose LumenRadio's CRMX technology on this prestigious project because it was essential to deliver a large number of DMX channels to certain fixtures which could not be cabled. Frame integrity as well as flawless data transfer was an absolute requirement for Eventim Apollo and this is one of the many performance areas where CRMX really excels.

GDS Managing Director Matt Lloyd underlined the value of GDS' existing relationship with LumenRadio:

"We have worked closely for a number of years with LumenRadio on some of our wireless product ranges. GDS recognizes that the combination of reliable wireless, RDM feedback and top quality support offered by LumenRadio is of the highest order and consequently they were the obvious choice for this project."

OEM SOLUTIONS

CRMX OEM solutions

LumenRadio's CRMX OEM range allow manufactures to easily integrate all the advantages of the CRMX technology into their products. Fixtures, controllers and other devices with CRMX OEM technology integrated will be fully compatible with other CRMX products.

Products equipped with the RDM enabled CRMX OEM classic or CRMX TiMo are also compatible with SuperNova and third party RDM controllers which allows for easy visualization, configuration and monitoring. The CRMX technology is the fastest growing wireless lighting system in the industry and some of the largest and most respected lighting companies in the world are going wireless with CRMX. LumenRadio provide full integration support to prospective OEM clients, and are able to advise on all aspects of going wireless - from antenna placement to software interfaces.

The LumenRadio OEM range contains of a wide variety of OEM options:

CRMX OEM classic – our standard plug-in modules where we offer a choice of DMX only versions or options that feature RDM.

CRMXchip – the world's smallest wireless DMX receiver. Measuring only 6 x 6mm, CRMXchip has quickly become a standard feature in many manufacturer's product lines.

CRMX TiMo – the newest addition to the CRMX OEM family, is a smaller, cheaper and updated version of our CRMX OEM classic. CRMX TiMo is the smallest fully integrated wireless RDM receiver on the planet and represents the next generation CRMX technology.

CRMX OEM classic

CRMX OEM DMX

CRMX OEM DMX is the OEM version of the CRMX Nova DMX products. It supports one full DMX universe of up to 512 channels at maximum refresh rate. It is available as a DMX receiver, DMX transmitter or DMX transceiver with Flex functionality that can act either as a receiver or as a transmitter, allowing the user to switch between modes on demand.

The CRMX OEM DMX is based on LumenRadio's advanced CRMX technology, hence you get all the advanced features such as Automated Cognitive Coexistence, DMX fidelity, low latency, strong encryption, etc, all packed together on one small module. To fit in to legacy wireless systems, the CRMX OEM DMX is compatible with W-DMX™ transmitters.

Available as
DMX Receiver
DMX Transmitter
DMX Flex

KEY FEATURES
- Support for DMX512-A
- Compatible with W-DMX™ transmitters
- Up to 1000 meter link range
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- MCX antenna connector

CRMX OEM RDM

CRMX OEM RDM is the OEM version of the CRMX Nova RDM products. It supports one full DMX universe of up to 512 channels at maximum refresh rate. It is available as a standard DMX/RDM receiver or as a DMX/RDM transmitter on special request.

The CRMX OEM RDM is based on LumenRadio's advanced CRMX technology; hence you get all the advanced features such as automated cognitive coexistence, DMX fidelity, low latency, strong encryption etc. CRMX OEM RDM allows for feedback in RDM enabled fixtures as well as feedback from the module itself, when used together with RDM compatible CRMX Nova and CRMX Outdoor equipment. To fit in to legacy wireless systems, the CRMX OEM RDM receiver is compatible with W-DMX™ transmitters.

Available as
*RDM Receiver*
RDM Transmitter

KEY FEATURES
- DMX512-A and RDM support
- Compatible with W-DMX™ transmitters
- Up to 1000 meter link range
- Connects to SuperNova
- 5 ms latency
- 128 bit encryption of wireless link
- Automated Cognitive Coexistence
- Forward Error Correction
- MCX antenna connector

CRMXchip
The world's smallest wireless DMX receiver

Available exclusively from LumenRadio, the patent pending CRMXchip 24DMX512 is the worlds smallest wireless lighting control solution. Built on the latest chip technologies, CRMXchip includes everything needed for manufacturers to add a multi functional wireless DMX receiver into high volume products.

2004
W-DMX™

2009
CRMX

2014
CRMXCHIP
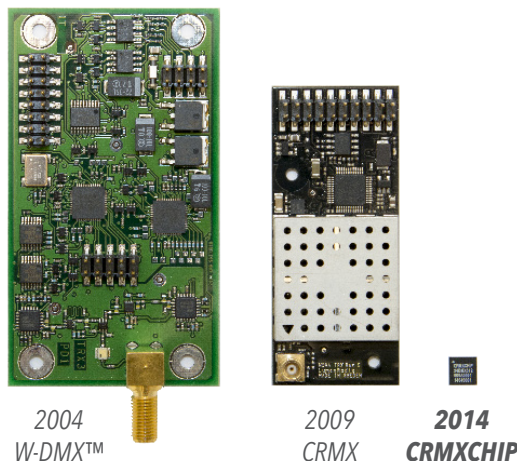
Building on years of experience in manufacturing industry leading wireless integration modules, LumenRadio's patent pending CRMXchip is an industry first – a compact, developer friendly chip which can be integrated into products with ease. Interfaces are provided for SPI, TTL and (via external drivers) RS485 signals, including an industry first "DMX Window" functionality, which removes the need to process a full 512 slot to locate start addresses within a product. This innovation enables extremely low cost wireless-only products to be manufactured with almost no DMX processing requirements.

CRMXchip can receive signals from all CRMX compatible transmitters, as well as W-DMX transmitters G2, G3, G4 and G4S. A full development kit is available together with advanced development support from LumenRadio engineers; including mechanical, electrical and software development support where required.

With wireless integration available as an on-chip solution, the question is:
what are you waiting for?

KEY FEATURES
- QFN48 6mm x 6mm package
- SPI DMX window functionality
- Over the air upgrades of radio drivers
- <40mA current consumption
- Supports receiving CRMX, W-DMX G2, W-DMX G3, W-DMX G4 and W-DMX G4S

DMX WINDOW
This unique, patent pending, feature allows fixture manufacturers to specify a range of the DMX universe they are interested in. CRMXchip then sends an interrupt when there is a change within this range and makes available only the specified channels via an SPI register. A fixture manufacturer can implement full DMX control by simply reading the relevant data only when the interrupt is received.
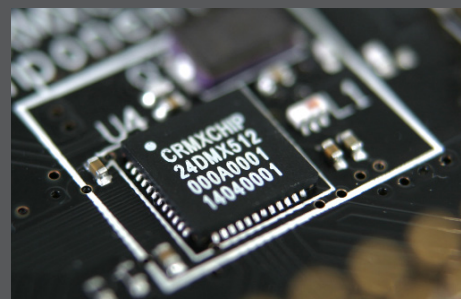
CRMX TiMo
The world's smallest wireless RDM transceiver

By using the award-winning CRMXchip technology, LumenRadio can offer the only fully integrated DMX/RDM compatible SMT module for high-volume product integration. TiMo is small on form factor but huge on functionality – featuring all of the same capabilities as our full sized CRMX OEM classic modules in a package just 33.5mm x 18.5mm, but with added benefits from CRMXchip such as over-the-air firmware upgrades, SMT mounting and an integrated on-chip antenna as well as a UF.L connector for external antenna.

TiMo is fully compliant with the ETSI EN 300328 (v1.8.1) '2015' revision, as well as fully FCC certified with a modular approval to 300mW – the highest allowed output power of any manufacturer within the industry due to LumenRadio's unique CRMX technology.

As with all LumenRadio receivers, TiMo is fully compatible with all existing CRMX transmitters, as well as transmitters from Wireless Solution running in G2, G3, G4 or G4S 2.4GHz mode, enabling a single wireless component to maximize compatibility within fixtures. Manufacturers can add TiMo to their products easily with full OrCAD, Allegro and DXF symbol libraries available to simply drop onto existing layouts.

Available in two different versions offering receiver or transceiver capabilities, TiMo can be used in many different applications to create new and amazing products.

CRMX TiMo is available in two different configurations:

TIMO RX RDM

TiMo RX RDM is a DMX/RDM receiver for one full DMX universe of up to 512 channels at maximum refresh rate. TiMo RX RDM is fully RDM compatible to allow for remote configuration and monitoring of supported fixtures when used together with RDM compatible CRMX equipment.

TIMO FX RDM

TiMo FX RDM is a DMX/RDM receiver and a DMX transmitter for one full DMX universe on the same PCB. Mode of operation can be easily changed at any time. In transmitter mode, TiMo FX RDM is a fully operational CRMX transmitter, utilizing our award-winning Cognitive Coexistence technology to minimize interference. In receiver mode, TiMo FX RDM offers the same functionality as TiMo RX RDM.

DEVELOPMENT KIT

A full development kit is available together with advanced development support from LumenRadio engineers; including mechanical, electrical and software development support where required.

KEY FEATURES
- Over the air firmware upgrades
- RDM UID binding for transparent RDM capabilities with SuperNova
- Integrated chip antenna for tiny form factor wireless integration
- External RF connectivity via U.FL/IPEX connector

BINDING UID
Manufacturers are able to set TiMo up with a binding UID which links TiMo to their fixtures RDM UID. This means that controller software, such as SuperNova, can display the fixture as a single entity with the wireless features tightly integrated into the RDM controls of the fixture itself. No other wireless module offers such tight integration into fixture designs.

FCC MODULAR APPROVAL
TiMo features FCC modular approval under FCC part 15, meaning that manufacturers integrating TiMo into their fixture design are not required to perform additional FCC certification upon adding the component. This saves both time and money in the product development cycle.

Götaplatsen Gothenburg

INSTALLATION COST CALCULATION WIRED VS WIRELESS

Installation cost wired:	**€40,711**
Work:	€38,166
Equipment:	€2,545
Installation cost wireless:	**€4,940**
Work:	€635
Equipment:	€4,305
Cost saving with wireless:	**87.8%**

Götaplatsen is a major plaza and focal point for cultural activities in the city of Gothenburg as well as home to a large LumenRadio CRMX system. Götaplatsen is lined by 3 major institutions; the Gothenburg City Theater, the City Art Museum, and the Gothenburg Concert Hall.

It also features an impressive fountain with a gigantic statue of Poseidon and attracts large crowds for many big annual events. The area was renovated recently with particular emphasis on improved and coordinated illumination as a part of a citywide plan to enhance the visual environment in major public spaces.

LumenRadio's wireless CRMX technology was deployed to extend the reach of DMX and RDM distribution to all parts of the comprehensive lighting system on and around the plaza without any disruptive and costly construction work. The roof of the City Art Museum does duty as the central transmitter site and IP65 rated CRMX Slim receivers are strategically placed around the plaza to avoid any cabling between

buildings, lighting poles, and fixtures. This allowed the team of designers; Lars Fredén, Iben Winther Orton, Vladan Paunovic, Linda Fagerström, and Eric Eliasson at Ramböll Sverige AB, to maintain an uncluttered appearance and to keep the technical infrastructure invisible to the largest extent possible.

The extensive lighting system is monitored using LumenRadio's SuperNova software; which allows continuous monitoring of all connected devices and fixtures and keeps maintenance personel

informed about such vital information as signal strength & condition, critical temperatures, errors, and other operational issues.

Götaplatsen was awarded the prestigious 2012 Swedish Lighting Award, which aims to highlight projects where lighting has been used in an exemplary and innovative manner.

OEM partners

LumenRadio collaborates and have ongoing joint development projects with many industry leading manufacturers. The CRMX technology integrates easily into new and existing products and provides OEM's with wireless connectivity featuring unparalleled DMX and RDM performance. Below are some representative manufacturers and products featuring CRMX technology. It's simply: *Wireless integration without worries.*

SGM G-Spot

SGM have a long history of delivering high quality innovative LED fixtures for the entertainment industry, with their latest being the G-Spot, the first IP65 moving head. As part of their continuous strive for improvement, SGM evaluated the available wireless products in early 2013 before settling on LumenRadio's CRMX technology for all wireless enabled SGM products going forward.

The G-Spot fixture is also based on SGM's revolutionary P-5 technology.

Robe Spiider®

Spiider is a superbright next generation of LED WashBeam luminaries, using 18x 30 Watt and 1x 60 Watt LEDs and combining it with a very efficient 12,5:1 zoom optical system ranging from tight 4° Beam to wide 50° Wash. Beautiful convergence of hard edge in-air effects, punchy beams and smooth homogenized wash is all encapsulated in the unique Spiider.
Rich colors of 19 powerfull RGBW LEDs can create charming wash light with velvety smooth transitions thanks to internal 18bit LED dimming system. Spiider is available with the most reliable wireless technology om the market, CRMX!

JOSEF VALCHAR
FOUNDER AND GENERAL MANAGER AT ROBE LIGHTING

"Robe chose to partner with LumenRadio because we wanted a wireless partner we could trust. LumenRadio's advanced RDM implementations together with comprehensive support and great people meant they were the obvious choice, and our customers love the integration of the wireless modules into our fixtures".

Astera AX5

AX5 is by far the most advanced wireless multi-tasker in the event industry: it is powered by Lumenradio`s CRMX chip and can be used as a wireless PAR light, a compact uplighter or as a wired PAR (all-in-one fixture) while still offering all of the top-end features of Astera products. AX5 features 45W RGBAW chips; 20h runtime; IR, App and Wireless DMX control. Its foldable bracket slides out in seconds to transform the light into a powerful battery uplighter with an adjustable kickstand for the best angle on the wall. All that is enclosed in a rugged and waterproof housing insures usability through any weather condition.

Kino Flo DMX Select 30 and Select 20

Kino Flo Lighting Systems's new DMX Select 30 and Select 20 LED's feature tunable Kelvin, from 2700K to 6500K, with full green to magenta correction, and wireless DMX. From software to hardware, the Select LED lighting systems are re-shaping the future of cinema and television production with lustrous white light that doesn't flicker or shift color temperature when dimmed.

The Select 30 and Select 20 systems can be operated wirelessly, with the use of a LumenRadio transmitter, as an alternative to DMX cables. Kino Flo has further refined the Selects with variable green-magenta settings. Hues can be balanced to other lights on the set and tuned to match the spectral curves of professional digital cameras.

Ayrton MagicPanel™FX

MAGICPANEL™FX is the exciting new multi-function, multi-use luminaire descended from the renowned MAGICPANEL™R (patent pending). With a revolutionary new optical zoom system that has no visible moving parts and a stationary transmitting lens, this proprietary system has a 15:1 zoom ratio with a range of 3.6° to 53°. The front face of MAGICPANEL™FX is comprised of a 5 x 5 array of squared lenses with perfectly isolated emitters – which offer exciting new possibilities for creating 2D graphical effects.

One additional large advantage of the fixture is that MAGICPANEL™FX is equipped with LumenRadio's wireless OEM RDM module as a standard feature.

YVAN PÉARD

MANAGING DIRECTOR AT AYRTON

"We have introduced RDM in all our new products and quickly learned that RDM requires a level of technology, reliability, and performance that only LumenRadio's CRMX can provide. Their high-performance products with all the necessary RDM features, as well as engineering and on-site support, made the decision to make LumenRadio Ayrton's exclusive wireless DMX & RDM partner quite obvious".

Cineo HSX

Cineo builds soft sources for the film, TV and photo markets in a full range of sizes and power levels: from 10 to 1200 watts. HSX is a color-tunable soft source for image capture with the same powerful, accurate light output as the HS2 Remote Phosphor fixture. Cineo has created a compact, 25,000 lumen fixture with no color shift or need for calibration. HSX includes a built-in LumenRadio receiver for wireless DMX and RDM in addition to wired DMX ports.

Chroma-Q® Space Force™

The Space Force from Chroma-Q® is a cutting-edge variable white LED Space Light that is a modern replacement for conventional space lights or soft light sources commonly used in lm and TV studios around the world. The Space Force benefits from cool running, energy efficiency, lightweight design and minimum maintenance. CCT tuneable between 2,800K and 6,500K, and natively single source, the diffuse nature of its output negates the need for silks or skirts.

Space Force is available with the LumenRadios CRMX wireless technology!

Innovative Dimmers RATPAC

Innovative Dimmers is the result of a rigging gaffer and an electrical engineer designing a dimmer that would be quiet enough to use on the set; it's called the RATPAC line. The idea caught on because all of their customers had the same need - to do the job faster and more efficiently. Unlike traditional dimmers, RATPACs are designed to be portable, versatile, and virtually silent. The combination of LumenRadio's powerful CRMX technology and the unique Whisper Fan Technology enables placement of the dimmers right on set, eliminating costly set up time and long cable runs.

IMPLEMENTATION GUIDE
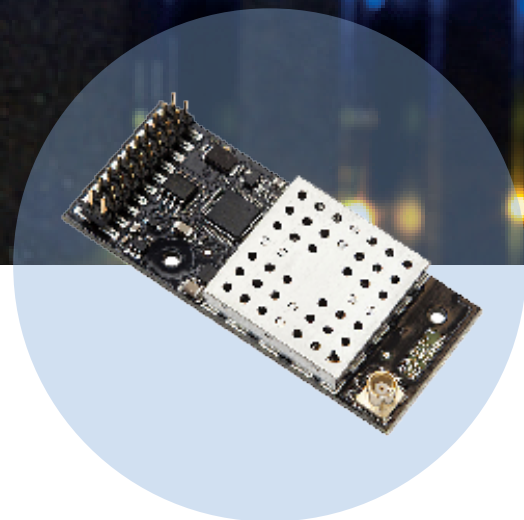
LumenRadio's award winning CRMX technology can with minimal effort be added to any fixture or device that might benefit from wireless DMX/RDM control. An extensive range of CRMX OEM products and accessories is available to accommodate a wide variety of indoor or outdoor products and applications. LumenRadio's OEM products are the smallest in the industry, including the CRMX-chip at just 6mm x 6mm, which greatly aids in many manufacturers' effort to make their equipment smaller and more compact.

Keep in mind that integration of wireless control technology is best done at an early stage of your product design process. Our extensive CRMX OEM Implementers Guide offers all the necessary information about dimensions, mounting, electrical interfaces, etc. that is required for the process. LumenRadio's engineering staff is also always available to assist you to achieve the optimal result with the least effort.

We can also provide design and development services for products and technologies related to lighting control systems. Our engineering staff has for a long time been active in the development and maintenance of new communication standards such as RDM E1.20 and RDMnet E1.33 and is exceptionally well versed in RDM controller development. It also has extensive expertise in the other protocols commonly used in entertainment and architectural lighting control, including the many Ethernet based protocols.

One example of such a product co-developed with an OEM is ROBE's RUNIT WTX™. This USB connected interface provides an RDM controller and wired and wireless DMX, RDM, and firmware upload capabilities to ROBE's entire line of products. Most of ROBE's fixtures are equipped with LumenRadio's CRMX technology as standard or as an optional feature.

The integration design process typically comprise the following steps:

- Select a CRMX OEM product; depending on your requirements this is a choice between DMX or DMX/RDM, a plug-in CRMX OEM classic module or a surface mounted CRMXchip/CRMX TiMo module

- Find a suitable location inside your product to mount the OEM module or redesign your PCB to carry the surface mounted component

- Provide mounting facilities if you are using a module; most commonly easy to use and inexpensive snap-in plastic stand-offs

- Provide the necessary electrical connections to the OEM product – either via the via the 20-pin connector for a CRMX OEM module, or directly to the chip for CRMXchip/CRMX TiMo

- Select an antenna; indoor or outdoor; straight or right angle, etc.

- Find a suitable location on your product where the antenna can be mounted

- Install the antenna cable between the module and antenna locations

ROBE RUNIT WTX™

MANAGEMENT SOFTWARE

SuperNova offers a complete system management tool for monitoring and configuring your lighting network. With support for both CRMX enabled transmitters and Art-Net nodes, SuperNova provides a clear and detailed view of the status of your entire network – both wired and wireless devices. RDM enabled fixtures can be displayed, monitored and configured from the software, with configuration of common tasks just a click away. SuperNova 3 was awarded the PLASA award for Innovation 2013 and this year we proudly release SuperNova 4.

HOW DO I MANAGE MY SYSTEM?

A computer running SuperNova can be connected into the show network and run as a monitor for the whole system. Each sensor and signal can be monitored – if a sensor goes outside of a range, it can

trigger an alert. Alerts can be configured as e-mails, push notifications or system logs – depending on preferences. By setting a relevant monitoring system, it is possible to reduce maintenance routines and proactively resolve problems in the rig before they become issues with the production.

WHAT ABOUT NON-WIRELESS FIXTURES?

By default, SuperNova can communicate with all CRMX products with Ethernet connectivity. This enables monitoring of the wireless link and any RDM enabled devices connected to RDM compatible CRMX receivers. However, LumenRadio recognize that not all fixtures are connected wirelessly in typical systems and SuperNova also allows communication with Art-Net compliant devices from other manufacturers.
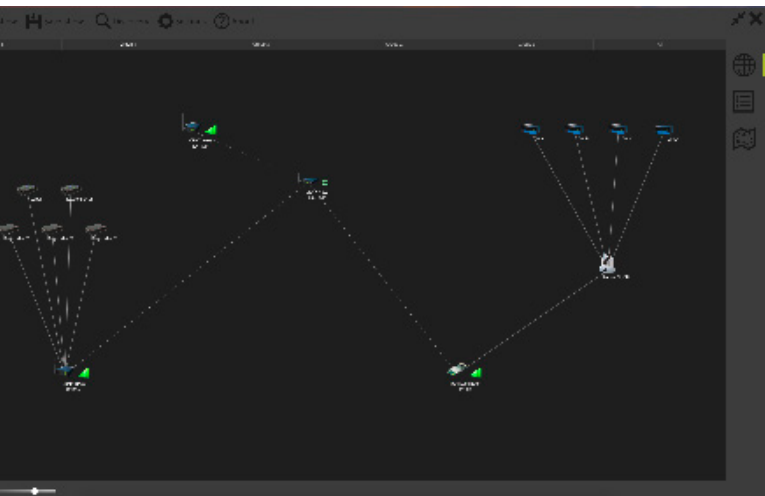
SYSTEM MANAGEMENT

• Visualise and manage all your CRMX, RDM, and Art-Net compliant devices
• Color coded lines and icons indicate the health of the whole system.
• Solid lines indicate a wired connection while dotted lines indicate a wireless connection.
• Monitor wireless signal strength, DMX information and device sensors.
• Alarms and warnings can be sent out through e-mail, push notifications to smart phones or saved in an SQL database.

REMOTE PATCHING

- Patching devices; simply drag and drop a device to where you want it and SuperNova will automatically patch the device.
- Display the DMX data for each channel to see what data is being sent out to a specific device.
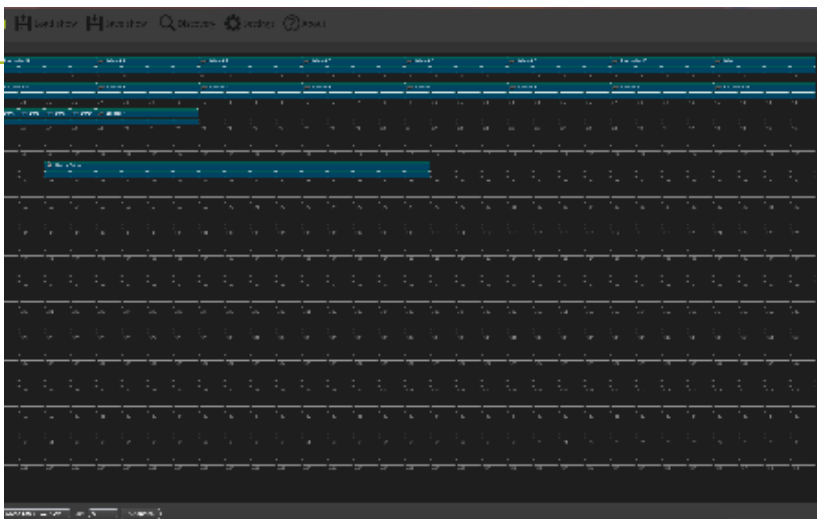
FREQUENCY MANAGEMENT

- See what frequencies the CRMX system is using.
- Witness the automated frequency adaptation in real-time.
- View both your own traffic and the traffic of other surrounding wireless systems.
- Management of each individual transmitter's frequency usage.
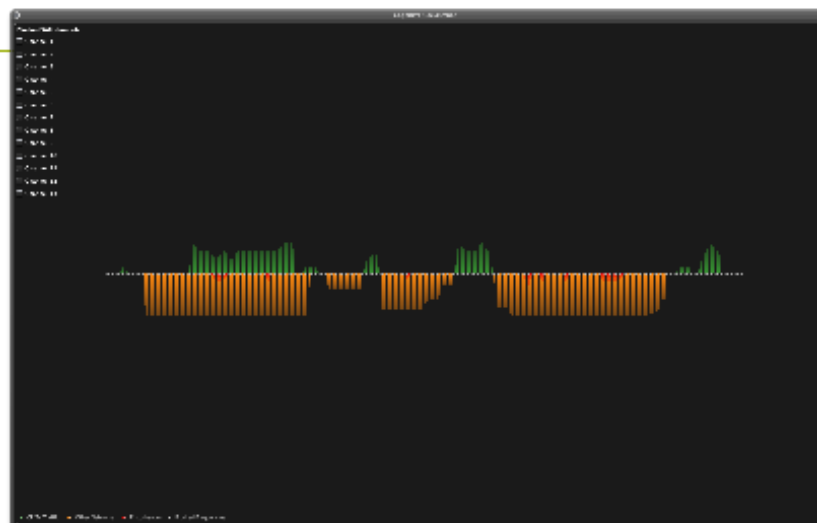
VIRTUAL CONSOLE

- Local control of a single fixture's DMX channels.
- Automatic download of channel allocations from compatible RDM fixtures.
- Inject DMX data directly into fixtures for setup and testing.

25
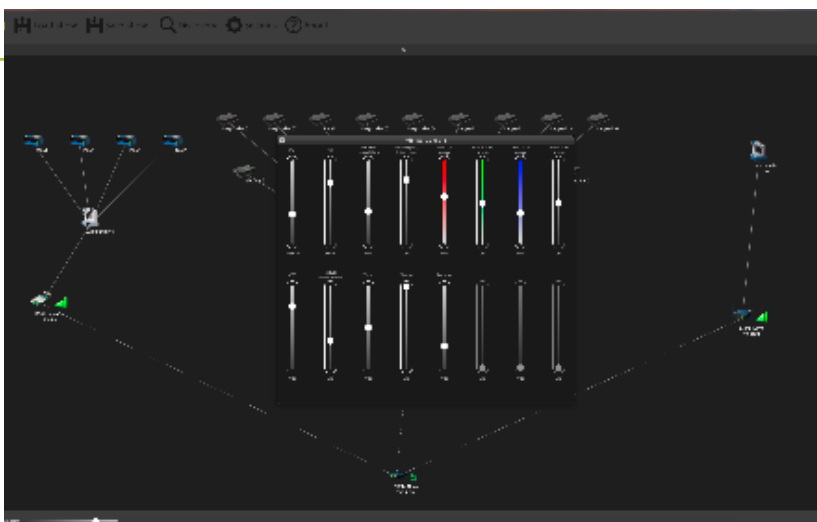
ACCESSORIES

LumenRadio have a wide variety of different accessories. All CRMX Nova, Slim and Outdoor products ship with a standard 2 dBi antenna, but when you need more than that our range of high gain indoor and outdoor antennas makes sure any installation will be a success. A complete range of cables and adapters also ensure you can connect everything together.

Adapters

COAXIAL CABLE ADAPTER
N-female to RP-TNC male
Order code: 800-9201

COAXIAL CABLE ADAPTER
N-female to N-female
Order code: 800-9202

COAXIAL CABLE ADAPTER
N-female to RP-TNC female
Order code: 800-9203

COAXIAL CABLE ADAPTER
N-male to N-male
Order code: 800-9204

XLR ADAPTER
5 pin male to 5 pin male
Order code: 102-1010

Indoor antennas

2 dBi OMNI ANTENNA
RP-TNC male connector
Order code: 104-1001

2 dBi OMNI ANTENNA
RP-SMA male connector
Order code: 104-1006

5 dBi OMNI ANTENNA
RP-TNC male connector
Order code: 104-1003

2 dBi OMNI OEM ANTENNA
R/A MCX connector, 25 cm
Order code: 104-1008

POWER DIVIDER 2.4 GHZ
Order code: 104-2001

Outdoor antennas

2 dBi OMNI ANTENNA
N-male connector
Order code: 104-1002

6 dBi OMNI ANTENNA
N-female connector
Order code: 104-1004

2 dBi BLACK 90° ANGLED ANTENNA
N-male connector
Order code: 104-1010

12 dBi DIRECTIONAL ANTENNA
N-female connector
Order code: 104-1012

Cables

FLEXIBLE LOW LOSS CABLE
N-male to N-male
1 meter
Order code: 800-9001
3 meters
Order code: 800-9002
5 meters
Order code: 800-9003

OEM COAX CABLE
Indoor
R/A MCX to RP-TNC female
15 cm
Order code: 102-2001
25 cm
Order code: 102-2003

OEM COAX CABLE
CRMX TiMo
IPEX to RP-TNC female
15 cm
Order code: 102-2006
25 cm
Order code: 102-2007

SUPER LOW LOSS CABLE
N-male to N-male
1 meter
Order code: 800-9101
3 meters
Order code: 800-9102
5 meters
Order code: 800-9103
10 meters
Order code: 800-9104

OEM COAX CABLE
Outdoor
R/A MCX to N female
15 cm
Order code: 102-2002
25 cm
Order code: 102-2005

CRMX UPGRADE CABLE
Order code: 102-4001

OUR DISTRIBUTORS

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Leafun Light & Sound Technology Co., Ltd.
Phone: +86 20 855 29280
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Email: sales@leifull.com
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Web: www.steatar.rs

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Fax: +48 228450069
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Web: www.ltt.com.pl

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Fax: +351 256 579 659
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Web: www.nan.pt

ROMANIA

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Web: www.symphelectronics.ro

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Email: info@sofitlight.ru
Web: www.sofitlight.ru

SLOVAKIA

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Fax: +420 571 751515
Email: jj.valchar@robe.cz
Web: www.robe.cz

SLOVENIA

MK Light Sound d.o.o.
Phone: +386 1 89 63 112
Fax: +386 1 89 63 110
Email: info@mklight-sound.si
Web: www.mklight-sound.si

SPAIN

Stonex Show Lighting s.l.
Phone: +34 91 428 1050
Email: stonex@stonexsl.com
Web: www.stonexsl.com

SWEDEN

BigBlack by BellaLite
Phone: +46 10-47 00 220
Fax: +46 10-47 00 265
Email: kundtjanst@bigblack.se
Web: www.bigblack.se

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Web: www.iqunlimited.biz

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Fax: +90 (212) 267 34 48
Email: info@atempo.com.tr
Web: www.atempo.com.tr

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A.C. Entertainment Technologies Ltd.
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Fax: +44 (0) 1494 461024
Email: sales@ac-et.com
Web: www.ac-et.com

For countries and territories not listed, contact LumenRadio sales directly at sales@lumenradio.com or +46 31 301 03 70.

CRMX Nova specifications | www.lumenradio.com/nova

	CRMX Nova FX RDM (Flex reconfigurable)	CRMX Nova TX2 RDM (RDM transmitter)	CRMX Nova RX RDM (RDM receiver)	CRMX Nova TX (DMX transmitter)	CRMX Nova RX (DMX receiver)
Model code (Order code)	IN-RFX1 (800-3001)	IN-RTX2 (800-2101)	IN-RRX1 (800-2001)	IN-DTX1 (800-1101)	IN-DRX1 (800-1001)
Supported protocols					
USITT DMX-512 (1986 & 1990) and DMX512-A	Yes	Yes	Yes	Yes	Yes
Art-Net I, II & 3, ETCNet 2 & 3, Strand ShowNet, Streaming ACN, Pathport, KiNet V1 & V2	Yes, input any protocol and output any protocol	Yes, input any protocol	No	No	No
RDM ANSI E1.20	Yes	Yes	Yes	No	No
Works with CRMX SuperNova RDM Controller	Yes	Yes	Yes	No	No
Firmware upgrade	Ethernet	Ethernet	XLR	XLR	XLR
DMX interface					
Number of universes supported	1	2	1	1	1
Full DMX fidelity and frame integrity	Yes	Yes	Yes	Yes	Yes
Error correction and packet recovery	Yes	Yes	Yes	Yes	Yes
Frame synchronization	Less than 0.01 ms	Less than 0.01 ms	Less than 0.01 ms	Less than 0.01 ms	Less than 0.01 ms
End-to-end DMX latency	Less than 5 ms	Less than 5 ms	Less than 5 ms	Less than 5 ms	Less than 5 ms
Auto sensing of DMX frame rate and size	Yes	Yes	Yes	Yes	Yes
Supported DMX frame rates	0.8 – 7352 Hz Transmitter mode / 1 – 830 Hz[1] Receiver mode	0.8 – 7352 Hz	1 – 830 Hz[1]	0.8 – 7352 Hz	1 – 830 Hz[1]
Number of DMX channels supported	0 – 512	0 – 1024	0 – 512	0 – 512	0 – 512
Loss of DMX input behavior	DMX output will go into high impedance state	Timeout after 1.25 s	DMX driver will go into high impedance state	Timeout after 1.25 s	DMX driver will go into high impedance state
ESD protected interfaces	Yes	Yes	Yes	Yes	Yes
W-DMX™ G2/G3/G4/G4S Compatibility[2]	Yes, in receive mode	No	Yes	No	Yes
Power					
High voltage input	100-240VAC / 47-70Hz / 0.12A / 10W	100-240VAC / 47-70Hz / 0.25A / 22W	100-240VAC / 47-70Hz / 0.12A / 10W	100-240VAC / 47-70Hz / 0.12A / 10W	100-240VAC / 47-70Hz / 0.12A / 10W
Low voltage input	12VDC ±20% / 0.6A / 7.5W	12VDC ±20% / 1A / 12W	12VDC ±20% / 0.2A / 2.5W	12VDC ±20% / 0.3A / 4W	12VDC ±20% / 0.2A / 2.5W
Power over Ethernet	Yes	Yes	No	No	No
Transient protected power inputs	Yes	Yes	Yes	Yes	Yes
RF characteristics					
Modes of operation	Transmitter, Receiver	Transmitter	Receiver	Transmitter	Receiver
Automated Cognitive Coexistence	Yes	Yes	Yes	Yes	Yes
Dynamic adaptive frequency hopping	Yes	Yes	Yes	Yes	Yes
Recoverable Radio Packet Error Rate	30%	30%	30%	30%	30%
Operational frequency range	2402-2480 MHz	2402-2480 MHz	2402-2480 MHz	2402-2480 MHz	2402-2480 MHz
RF output in high power mode	300 mW (25 dBm)[3]	300 mW (25 dBm)[3]	300 mW (25 dBm)[3]	300 mW (25 dBm)[3]	N/A
RF output in normal power mode	100 mW (20 dBm)	100 mW (20 dBm)	100 mW (20 dBm)	100 mW (20 dBm)	N/A
RF output in low power mode	35 mW (15 dBm) or 10 mW (10 dBm)	35 mW (15dBm) or 10 mW (10 dBm)	35 mW (15 dBm) or 10 mW (10 dBm)	35 mW (15 dBm) or 10 mW (10 dBm)	N/A
RF modulation	GFSK	GFSK	GFSK	GFSK	GFSK
Sensitivity at 0.1% Packet Error Rate	-96 dBm	-96 dBm	-96 dBm	-96 dBm	-96 dBm
Tested link range (High power mode using standard antennas in free line-of-sight)	Up to 1000 m	Up to 1000 m	Up to 1000 m	Up to 1000 m	Up to 1000 m
Recovery time upon loss of radio link	Less than 1 s	N/A	Less than 1 s	N/A	Less than 1 s
Approvals					
FCC: 15.247&68 Class B; Canada ICES 003 CE; EN 301 489-1; EN 301 489-3; EN 300 328; SS-EN 61547:2009; EN 60 950; SRRC - China; ARIB STD-T66 - Japan	Yes	Yes	Yes	Yes	Yes
Environment					
Operating temperature range (ambient)	-20° C to +50° C -4° F to 122° F	-20° C to +50° C -4° F to 122° F	-20° C to +50° C -4° F to 122° F	-20° C to +50° C -4° F to 122° F	-20° C to +50° C -4° F to 122° F
Humidity	0-90% non-condensing	0-90% non-condensing	0-90% non-condensing	0-90% non-condensing	0-90% non-condensing
Physical					
Enclosure	Anodized extruded aluminum	Anodized extruded aluminum	Anodized extruded aluminum	Anodized extruded aluminum	Anodized extruded aluminum
Dimensions (W x H x D) excluding antenna	110 x 44 x 160 mm 4.3" x 1.7" x 6.3"	220 x 44 x 125 mm 8.6" x 1.7" x 4.9"	110 x 44 x 160 mm 4.3" x 1.7" x 6.3"	110 x 44 x 160 mm 4.3" x 1.7" x 6.3"	110 x 44 x 160 mm 4.3" x 1.7" x 6.3"
Weight	0.8 kg, 1.8 lbs	0.9 kg, 2.0 lbs	0.7 kg, 1.5 lbs	0.7 kg, 1.5 lbs	0.7 kg, 1.5 lbs
Connectors					
Antenna connector	RP-TNC female	RP-TNC female	RP-TNC female	RP-TNC female	RP-TNC female
DMX connectors	1 XLR 5-pin female	2 XLR 5-pin male	1 XLR 5-pin female	1 XLR 5-pin male	1 XLR 5-pin female
Ethernet connectors	1 RJ45	1 Neutrik® Ethercon™ RJ45			
DC input	Pluggable terminal strip, Phoenix® MSTB 2.5	Pluggable terminal strip, Phoenix® MSTB 2.5	Pluggable terminal strip, Phoenix® MSTB 2.5	Pluggable terminal strip, Phoenix® MSTB 2.5	Pluggable terminal strip, Phoenix® MSTB 2.5
AC input	IEC 320-C14 Male	IEC 320-C14 Male	IEC 320-C14 Male	IEC 320-C14 Male	IEC 320-C14 Male
Supplied accessories	AC power cord, DC power connector, 2 dBi RP-TNC antenna	AC power cord, DC power connector, 2 dBi RP-TNC antennas	AC power cord, DC power connector, 2 dBi RP-TNC antenna	AC power cord, DC power connector, 2 dBi RP-TNC antenna	AC power cord, DC power connector, 2 dBi RP-TNC antenna

SRRC ARIB STD-T66

[1] Limited by the DMX512-A standard   [2] Compatible with W-DMX™ transmitters on the 2.4 GHz band   [3] Allowed in North America only

All CRMX products are covered by the United States Patent No. 7,432,803. CRMX technology is patent pending.

> *"I was most impressed by its ease of use. The SuperNova software provides an ideal interface to set up the devices and monitor them during use"*

Light Fantastic

Photo: Mark Rainford

A.C. Entertainment Technologies Ltd.'s Lighting division has supplied a range of LumenRadio products to Lighting, Sound, Staging and AV specialists Black Light, based in Edinburgh, to create a wireless DMX connection for lighting up the city's Melville Monument as part of the recent International Science Festival.

The event, called 'Light Fantastic', took place 'from sunset to sunrise' between 12th March to 28th April 2015. It invited visitors to 'Change the face of the Edinburgh skyline with a Tweet!' Organisers encouraged the public to Tweet their favourite colours using the hashtag #lightfantastic, which would then change the lighting state at the Melville Monument automatically. Black Light invested in a LumenRadio CRMX Nova TX2 RDM transmitter, four CRMX Nova transmitters and four outdoor-rated receivers, plus ancillary antennae and cables which were utilized on this event.

"Phil Haldane from Black Light created custom script allowing the software to poll the amount of Tweets every 3 minutes. The most popular colour Tweeted would then automatically change the lighting onto the monument", explains Andrew Green, who was responsible for the Wireless DMX and ArtNet systems. "The LumenRadio products were used to create a wireless DMX link between the control room in the centre of the monument, and the fixtures on the outside perimeter of St. Andrew Square."

"When choosing which wireless system to invest in we did a lot of research as our main concerns were reliability, range and functionality. As we were using the system in a heavy Wi-Fi traffic area in Edinburgh's city centre, it was imperative that the system was reliable, not prone to interference, and did not disturb other networks. LumenRadio's coexistence function was ideal for this, as well as its high range and durability."

Operating licence-free on the 2.4GHz frequency, LumenRadio's patented Cognitive Coexistence technology ensures optimum performance even when other wireless systems are operating in the same area. LumenRadio's innovative CRMX technology continuously scans the wireless frequencies, detecting activity from other networks and where gaps are available. The radio modules 'hop' into these available frequencies, making best use of the available space whilst reducing the effects on other networks.

"I was most impressed by its ease of use. The SuperNova software provides an ideal interface to set up the devices and monitor them during use, whilst the capability to monitor RDM devices and Wi-Fi traffic in the area is also extremely useful", Andrew continues. "I configured the system at Black Light's offices, and once onsite it worked first time, and for a further six weeks without fail, whilst enduring some typical Scottish weather – including high winds, rain, snow, and even sun!"

CRMX Slim specifications

	CRMX Slim TX	CRMX Slim RX RDM
Model code (Order code)	OS-DTX1 (800-5101)	OS-RRX1 (800-5001)
Supported protocols		
USITT DMX-512 (1986 & 1990) and DMX512-A	Yes	Yes
RDM ANSI E1.20	No	Yes
Firmware upgrade	TIA/EIA-485	TIA/EIA-485
DALI (converted from DMX)	No	Yes, broadcast/16 groups/ 64 short addresses
Works with CRMX SuperNova RDM controller	No	Yes
DMX interface		
Number of universes supported	1	1
Full DMX fidelity and frame integrity	Yes	Yes
Error correction and packet recovery	Yes	Yes
Frame synchronization	Less than 0.01 ms	Less than 0.01 ms
End-to-end DMX latency	Less than 5 ms	Less than 5 ms
Auto sensing of DMX frame rate and frame size	Yes	Yes
Supported DMX frame rates	0,8 – 7352 Hz	1 – 830 Hz[1]
Number of DMX channels supported	0 – 512	0 – 512
Loss of DMX input behavior	Timeout after 1.25 s	DMX driver output will go into high impedance state
W-DMX™ G2/G3/G4/G4S Compatibility[2]	No	Yes
Power		
High voltage input	100-240VAC / 47-70Hz / 0.12A / 10W	100-240VAC / 47-70Hz / 0.12A / 10W
Transient protected power input	Yes	Yes
RF characteristics		
Modes of operation	Transmitter	Receiver
Automated Cognitive Coexistence	Yes	Yes
Dynamic adaptive frequency hopping	Yes	Yes
Recoverable Radio Packet Error Rate	30%	30%
Operational frequency range	2402-2480 MHz	2402-2480 MHz
RF output in high power mode	300 mW (25 dBm)[3]	300 mW (25 dBm)[3]
RF output in normal power mode	100 mW (20 dBm)	100 mW (20 dBm)
RF output in low power mode	35 mW (15dBm) or 10 mW (10 dBm)	35 mW (15 dBm) or 10 mW (10 dBm)
RF modulation	GFSK	GFSK
Sensitivity at 0.1% Packet Error Rate	-96 dBm	-96 dBm
Tested link range (High power mode using standard antennas in free line-of-sight)	Up to 1000 m	Up to 1000 m
Recovery time upon loss of radio link	N/A	Less than 1 s
Approvals		
FCC: 15.247&68 Class B; Canada ICES 003 CE; EN 301 489-1; EN 301 489-3; EN 300 328; SS-EN 61547:2009; EN 60 950; SRRC - China; ARIB STD-T66 - Japan	Yes	Yes
Environment		
Operating temperature range (ambient)	-20° C to +50° C -4° F to 122° F	-20° C to +50° C -4° F to 122° F
Humidity	Water jets protected	Water jets protected
Physical		
Enclosure	IP65 PC Plastic	IP65 PC Plastic
Dimensions (W x H x D) excluding antenna	90 x 174 x 40 mm 3.5" x 6.8" x 1.6"	90 x 174 x 40 mm 3.5" x 6.8" x 1.6"
Weight	0.25 kg, 0.5 lbs	0.25 kg, 0.5 lbs
Connectors		
Antenna connector	N female	N female
DMX connector	Screwless terminal 0.08-0.5 mm² / 20-28AWG	Screwless terminal 0.08-0.5 mm² / 20-28AWG
DALI connector	Screwless pluggable terminal 0.5-1.3 mm² / 16-28AWG	Screwless pluggable terminal 0.5-1.3 mm² / 16-28AWG
AC input	Screwless pluggable terminal 0.5-1.3 mm² / 16-28AWG	Screwless pluggable terminal 0.5-1.3mm² / 16-28AWG
Supplied accessories	2 dBi N antenna	2 dBi N antenna

[1] Limited by the DMX512-A standard
[2] Compatible with W-DMX™ transmitters on the 2.4 GHz band
[3] Allowed in North America only

SRRCARIB STD-T66
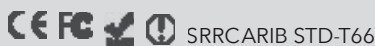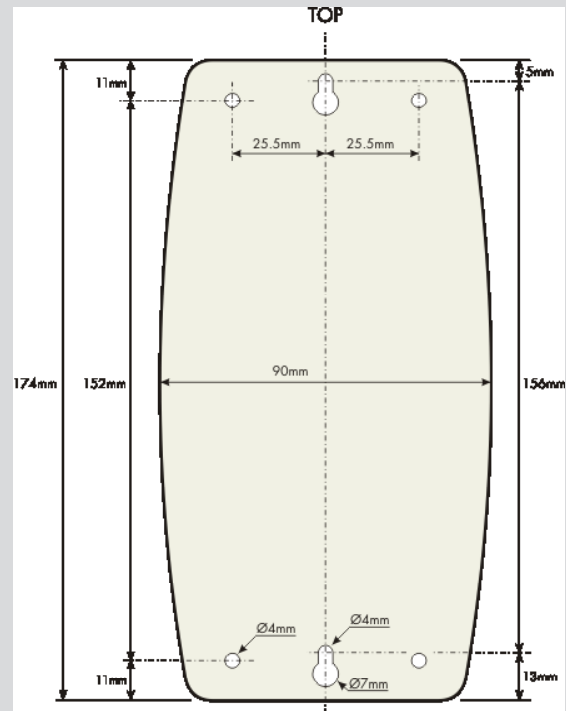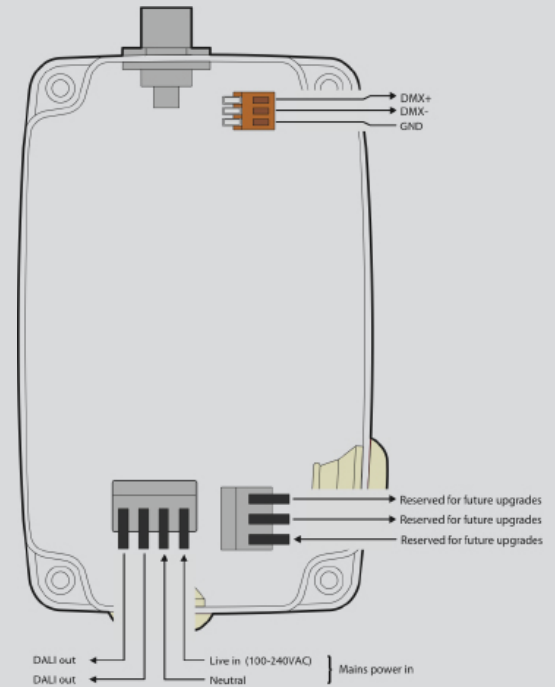
All CRMX products are covered by the United States Patent No. 7,432,803. CRMX technology is patent pending.

Melbourne Airport

"The sheer scale of the site, access issues and the number of control channels needed (over 40,000) meant that we had to use every tool in the box"

Nicolas Moreau, ENTTEC founder and General Manager.

Melbourne Airport welcomes over 30 million travellers each year, with that number set to grow over the next few years. A team of visionaries at APAM (Australia Pacific Airports Melbourne) decided that these travellers, and those who come to greet them, deserved a better experience

LumenRadio's long-term OEM partner, ENTTEC together with Mint Lighting Design, was brought on-board to provide custom lighting solution to realize the vision and design proposed for Melbourne Airport.

Mint Lighting Design and ENTTEC transformed the forecourt and main terminal facade with a dynamic lighting installation. The project

has 12 individual sites programmed as one to create an intricate, synchronized light show with more than 40,000 pixels requiring 57 universes of control. The project involved more than 2,140 individual components.

In order to distribute DMX data to the difficult locations of the site, ENTTEC custom made a wireless DMX system to suit the site-specific requirements. The wireless system contains of one transmitter and nine receivers, all based on LumenRadio's CRMX OEM modules. Due to the extreme flexibility of the LumenRadio OEM solution the team at ENTTEC were able to create these custom solutions very quickly to fit the project time-line.

CRMX Outdoor specifications

www.lumenradio.com/outdoor

	CRMX Outdoor Flex	CRMX Outdoor Receiver
Model code (Order code)	ON-RFX1 (800-4101)	ON-RRX1 (800-4001)
Supported protocols		
USITT DMX-512 (1986 & 1990) and DMX512-A	Yes	Yes
Art-Net I, II & 3, ETCNet 2 & 3, Strand ShowNet, Streaming ACN, Pathport, KiNet V1 & V2	Yes, input any protocol and output any protocol	No
RDM ANSI E1.20	Yes	Yes
Firmware upgrade	Ethernet	TIA/EIA-485
Works with CRMX SuperNova RDM controller	Yes	Yes
DMX interface		
Number of universes supported	1	1
Full DMX fidelity and frame integrity	Yes[1]	Yes
Error correction and packet recovery	Yes	Yes
Frame synchronization	Less than 0.01 ms	Less than 0.01 ms
End-to-end DMX latency	Less than 5 ms[2]	Less than 5 ms
Auto sensing of DMX frame rate and frame size	Yes	Yes
Supported DMX frame rates	1 – 830 Hz[3] / 0.8 – 7352 Hz	1 – 830 Hz[3]
Number of DMX channels supported	0 – 512	0 – 512
Loss of DMX input behavior	DMX driver output will go into high impedance state in receiving and repeating mode. Timeout after 1.25s in transmitting mode	DMX driver output will go into high impedance state
W-DMX™ G2/G3/G4/G4S Compatibility[4]	Yes, in receive mode	Yes
Power		
High voltage input	100-240VAC / 47-70Hz / 0.12A / 10W	100-240VAC / 47-70Hz / 0.12A / 10W
Transient protected power input	Yes	Yes
RF characteristics		
Modes of operation	Transmitter, Receiver and Repeater	Receiver
Automated Cognitive Coexistence	Yes	Yes
Dynamic adaptive frequency hopping	Yes	Yes
Recoverable Radio Packet Error Rate	30%	30%
Operational frequency range	2402-2480 MHz	2402-2480 MHz
RF output in high power mode	300 mW (25 dBm)[5]	300 mW (25 dBm)[5]
RF output in normal power mode	100 mW (20 dBm)	100 mW (20 dBm)
RF output in low power mode	35 mW (15 dBm) or 10 mW (10 dBm)	35 mW (15 dBm) or 10 mW (10 dBm)
RF modulation	GFSK	GFSK
Sensitivity at 0.1% Packet Error Rate	-96 dBm	-96 dBm
Tested link range (High power mode using standard antennas in free line-of-sight)	Up to 1000 m	Up to 1000 m
Recovery time upon loss of radio link	Less than 1 s	Less than 1 s
Approvals		
FCC: 15.247&68 Class B; Canada ICES 003 CE; EN 301 489-1; EN 301 489-3; EN 300 328; SS-EN 61547:2009; EN 60 950; SRRC - China; ARIB STD-T66 - Japan	Yes	Yes
Environment		
Operating temperature range (ambient)	-20° C to +50° C -4° F to 122° F	-20° C to +50° C -4° F to 122° F
Humidity	Ingression protection, submerged down to 1 m	Ingression protection, submerged down to 1 m
Physical		
Enclosure	IP67 Vandal proof housing	IP67 Vandal proof housing
Dimensions (W x H x D) excluding antenna	201 x 244 x 78 mm 7.9" x 9.6" x 3"	201 x 244 x 78 mm 7.9" x 9.6" x 3"
Weight	1.6 kg, 3.5 lbs	1.6 kg, 3.5 lbs
Connectors		
Antenna connector	N female	N female
DMX connector	Pluggable terminal strip, Phoenix® MSTB 2.5	Pluggable terminal strip, Phoenix® MSTB 2.5
DALI connector	Pluggable terminal strip, Phoenix® MSTB 2.5	Pluggable terminal strip, Phoenix® MSTB 2.5
AC input	13AWG Pluggable terminal strip	13AWG Pluggable terminal strip
Supplied accessories	2 dBi N antenna	2 dBi N antenna
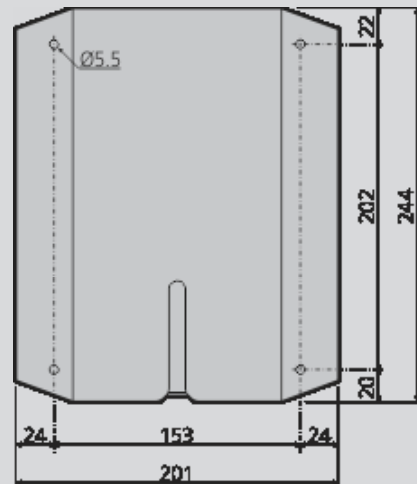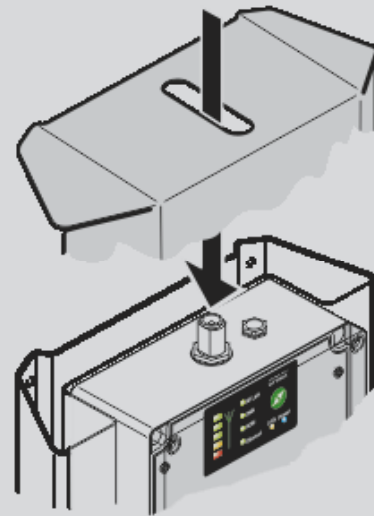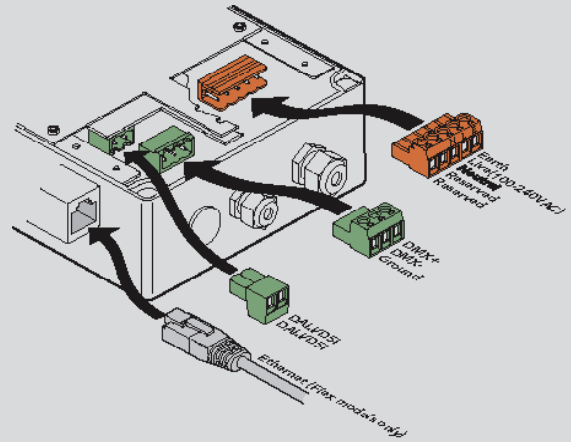
[1] Not in repeater mode
[2] Latency increased with repeater
[3] Limited by the DMX512-A standard
[4] Compatible with W-DMX™ transmitters on the 2.4 GHz band
[5] Allowed in North America only

CE FC SRRC ARIB STD-T66

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