

CCC4

73927

Installation Guide



High precision, auto-addressable Constant Current RGBW LED dimmer supporting PLINK or DMX/RDM.

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Safety



Ensure you are familiarized with all key information within this guide and other relevant ENTTEC documentation before specifying, installing, or operating an ENTTEC device. If you are in any doubt about system safety, or you plan to install ENTTEC device in a configuration that is not covered within this guide, contact ENTTEC or your ENTTEC supplier for assistance.

ENTTEC's return to base warranty for this product does not cover damage caused by inappropriate use, application, or modification to the product.

Electrical safety



- This product must be installed in accordance with applicable national and local electrical and construction codes by a person familiar with the construction and operation of the product and the hazards involved. Failure to comply with the following installation instructions may result in death or serious injury.
- Do not exceed the ratings and limitations defined in the product datasheet or this document. Exceeding can cause damage to the device, risk of fire and electrical faults.
- Ensure that no part of the installation is or can be connected to power until all connections and work is complete.
- Before applying power to your installation, ensure your installation follows the guidance within this document. Including checking that all power distribution equipment and cables are in perfect condition and rated for the current requirements of all connected devices and factor in overhead and verify that it is appropriately fused and voltage is compatible.
- Remove power from your installation immediately if accessories power cables or connectors is in any way damaged, defective, shows signs of overheating or are wet.
- Provide a means of locking out power to your installation for system servicing, cleaning and maintenance. Remove power from this product when it is not in use.
- Ensure your installation is protected from short circuits and overcurrent. Loose wires around this device whilst in operation, this could result in short circuiting.
- Do not over stretch cabling to the device's connectors and ensure that cabling does not exert force on the PCB.
- Do not 'hot swap' or 'hot plug' power to the device or its accessories.
- Do not connect any of this device's V- (GND) connectors to earth.
- Do not connect this device to a dimmer pack or mains electricity.
- Install this product on either insulated or electrically earthed surface.

System Planning and Specification



- To contribute to an optimal operating temperature, where possible keep this device out of direct sunlight.
- Any twisted pair, 120ohm, shielded EIA-485 cable is suitable to transmit DMX512 data to or from the DIN ETHERGATE. The DMX cable should be suitable for EIA-485 (RS-485) with one or more low capacitance twisted pairs, with overall braid and foil shielding. Conductors should be 24 AWG (7/0.2) or larger for mechanical strength and to minimize volt drop on long lines.
- A maximum of 32 devices should be used on a DMX line before re-generating the signal using a DMX buffer/ repeater / splitter.
- Always terminate DMX chains using a 120Ohm resistor to stop signal degradation or data bounce-back.
- The maximum recommended DMX cable run is 300m (984ft). ENTTEC advises against running data cabling close to sources of electromagnetic interference (EMF) i.e., mains power cabling / air

conditioning units.

- This device has an IP20 rating and is not designed to be exposed to moisture or condensing humidity.
- Ensure this device is operated within the specified ranges within its product datasheet.

Protection from Injury During Installation



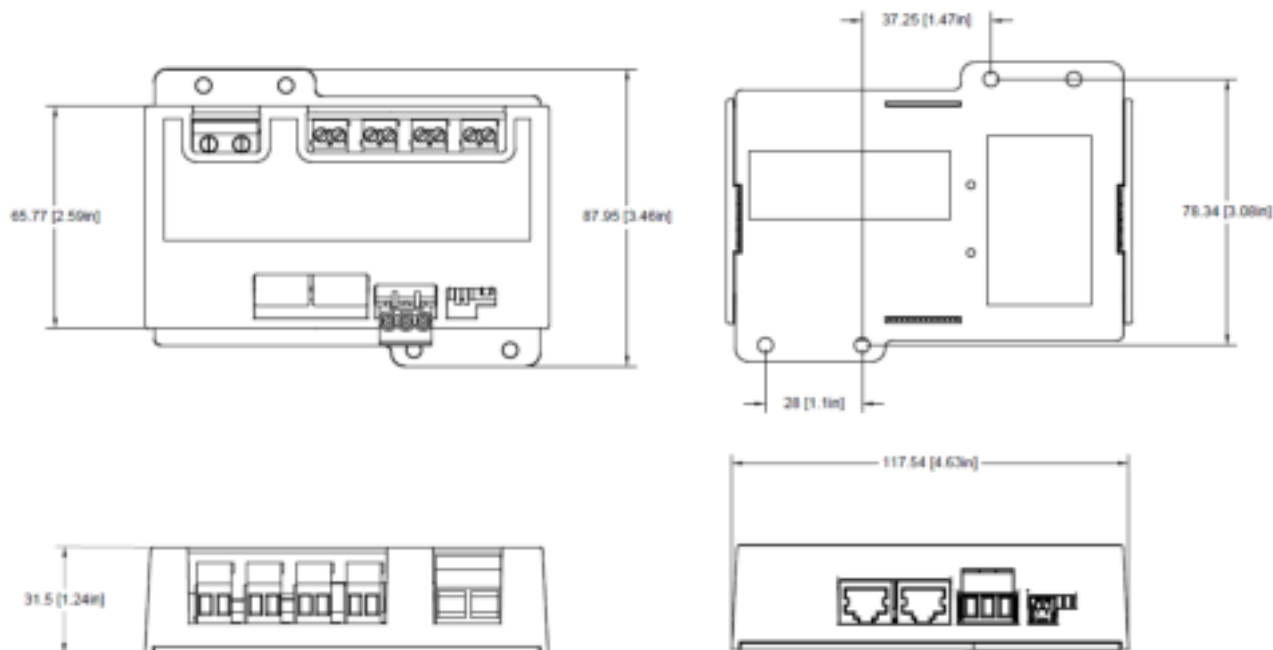
- Installation of this product must be performed by qualified personnel. If ever unsure always consult a professional.
- Always work with a plan of the installation that respects all system limitations as defined within this guide and product datasheet.
- All network cabling should be terminated with an RJ45 connector in accordance with the T-568B standard.
- Always use suitable personal protective equipment when installing ENTTEC products.
- Once installation is completed, check that all hardware and components are securely in place and fastened to supporting structures if applicable.

Installation Safety Guidelines



- The device is convection cooled, ensure it receives sufficient airflow so heat can be dissipated. If the CCC4 overheats its output brightness will be temporarily halved to protect itself and the indicator LED will flash red.
- The device is not designed for inductive loads.
- Do not cover the device with insulating material of any kind.
- Do not operate the device if the ambient temperature exceeds that stated in the device specifications.
- Do not cover or enclose the device without a suitable and proven method of dissipating heat.
- Do not install the device in damp or wet environments.
- Do not modify the device hardware in any way.
- Do not use the device if you see any signs of damage.
- Do not handle the device in an energized state.
- Protect product from swarf and dust during setup and installation.
- When planning for vertical/overhead installation, consider both weight of product and cabling for mounting solution.
- To avoid damage to product housing, DO NOT use countersunk screws or bolts for surface mounting.
- Do not sign off a system without ensuring all cabling to the device and accessories has been appropriately restrained, secured and is not under tension.

Physical Dimensions



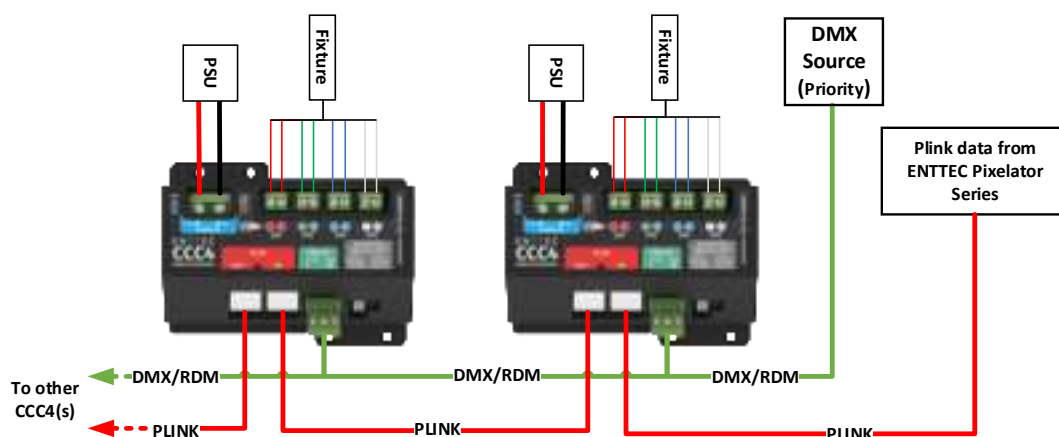
Installation

Surface Mounting

- CCC4 features 4 * M4 surface mounting holes for either screws or bolts.

Wiring

- Multiple CCC4's can be powered from one PSU rated to handle the maximum current requirement of all connected LED strip. Ensure the cable between your power supply to each CCC4 is capable of handling the full power capability of your CCC4.
- Locate the power supply as close as possible to the CCC4 to reduce the impact of voltage drop.
- ENTTEC recommend the use of stranded copper cabling rated to handle the maximum current deliverable from your selected power supply.
- ENTTEC recommends the use of cable ferrules for all stranded cables connected to the CCC4's screw terminal to ensure a reliable connection.
- Maximum recommended data extensions between devices when using PLINK are 300 metres over Cat6 cable.



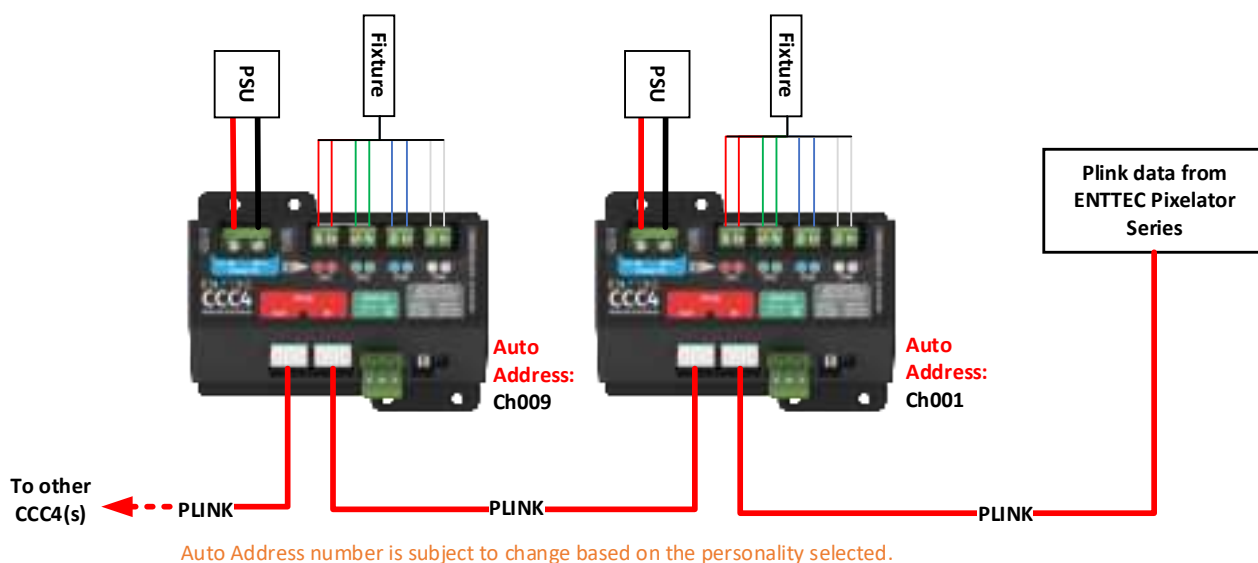
Application Diagrams

Controlling CCC4s Using ENTTEC's PLINK System

PLINK is ENTTEC's proprietary auto-addressing protocol, designed for cost-effective data transmission over long distances. PLINK signals can be generated from Art-Net, sACN, or ESP universes using ENTTEC PLINK Controllers.

To integrate with CCC4 units, connect the PLINK output from the controller to the CCC4's input port. The DMX start address for the PLINK feed can be configured within the controller's web interface. Using CAT6 cable, a maximum cable length of 300 metres can be achieved between each CCC4 unit.

The diagram below demonstrates a setup with all CCC4 units configured in a 16-bit RGBW operating mode, utilising 8 channels per CCC4:



Note:

- **Using CCC4s with ENTTEC PLINK Controllers:** When connecting CCC4s to ENTTEC PLINK controllers, configure the PLINK port to output WS2812b with the RGB colour order. This setup ensures a 1:1 conversion of your DMX input signal into PLINK, enabling the flexibility to mix and match CCC4 operating modes within the same chain and manage them in your lighting control software.
- **Fail-Safe Data Handling:** In all applications, if the data source to your CCC4—whether PLINK or DMX—fails while the CCC4 remains powered (e.g., a control system power loss while the installation remains active), the CCC4 will continue to output the last received frame of data. For example, if channel 1 was set to 50% intensity before the signal dropped, the CCC4 will maintain that level until the data source is restored.

Controlling CCC4s Using DMX512

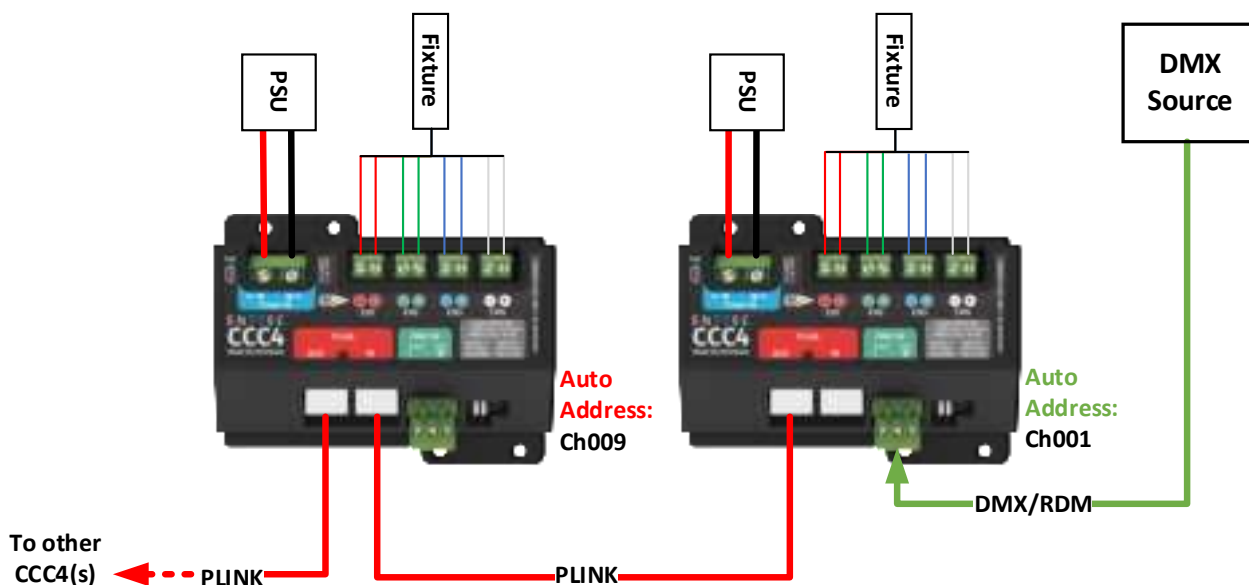
When controlling a chain of CCC4 units via DMX512, the DMX input should be connected to the 3-pole Phoenix connector on the first CCC4 in the chain. By default, the CCC4 is set to channel 001, which can be modified using any RDM (E1.20)-compliant controller.

After the first unit, the PLINK Output of the CCC4 is used to connect subsequent units in the chain, utilising the auto-addressing PLINK protocol. This setup supports a maximum cable length of 300 metres between each CCC4 when using CAT6 cable.

If both DMX and PLINK input sources are connected to the same CCC4, the DMX input takes priority.

The diagram below illustrates all CCC4 units configured in a 16-bit RGBW operating mode, utilising 8 channels per CCC4.

Note: The CCC4 allows for operation mode to be set by DIP Switches only – Not via RDM.



Auto Address number is subject to change based on the personality selected.

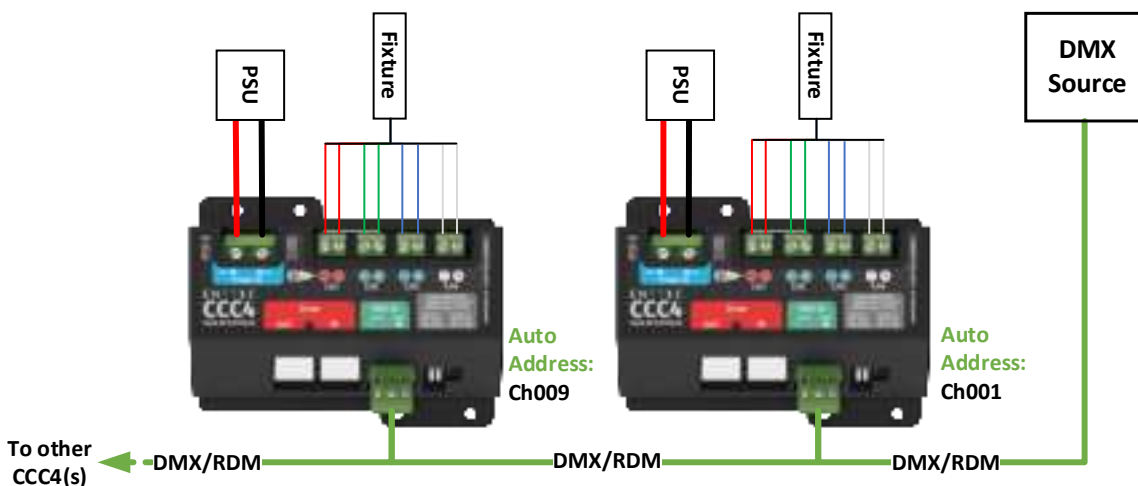
Controlling CCC4s using DMX512 & RDM

RDM functionality allows you to address, identify, and update the firmware of CCC4 units with ease. When utilising RDM, a DMX feed can be daisy-chained across multiple CCC4s, with the DMX start address for each unit conveniently configured via RDM.

If both DMX and PLINK input sources are connected to the same CCC4, DMX will always take priority, ensuring consistent control.

Please note: While RDM enables configuration for many settings, the CCC4's operating mode must be set using DIP switches and cannot be adjusted via RDM.

The diagram below illustrates all CCC4s configured in a 16-bit RGBW operating mode, with each CCC4 utilising 8 channels.



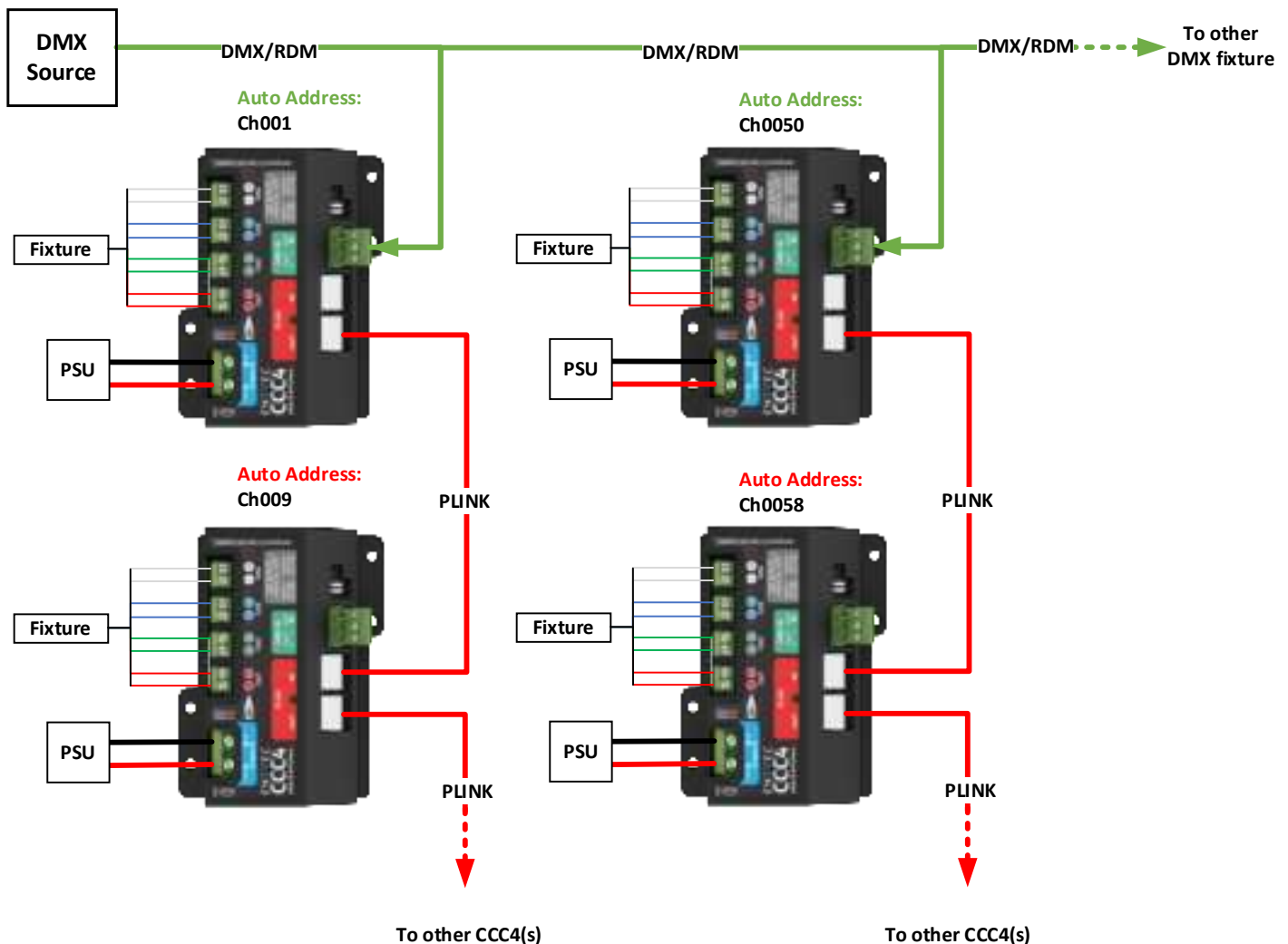
Auto Address number is subject to change based on the personality selected.

Combined System

The CCC4's auto-addressing PLINK functionality and RDM addressing capabilities can be combined to create efficient chains of CCC4 units. Starting with the RDM-addressed CCC4 at the beginning of the chain, subsequent CCC4 units will automatically update their addresses in sequence.

This seamless integration makes the CCC4 an ideal solution for custom set pieces with multiple LED strips. By modifying the DMX address of the first CCC4 in the PLINK chain via RDM, all subsequent CCC4 units will auto-increment their addresses accordingly.

The diagram below illustrates a configuration where all CCC4 units are set to a 16-bit RGBW operating mode, with each CCC4 utilising 8 channels:



Auto Address number is subject to change based on the personality selected.

How to Specify CCC4

The CCC4 is a versatile constant current dimmer designed for professional lighting solutions, regulating the required current without the need for manual settings. It provides regulated current output based on the voltage provided that is required by the connected LEDs.

Each CCC4 can dim up to a 4A load spread over each of its four 1A output channels. It is critical that all cabling and constant current power supplies are rated to handle the maximum power required by the system.

When running a board at 900mA with a typical forward voltage of 34.8V for instance, a 36V off-the-shelf driver can be used to power the CCC4.



Warning:

- ENTTEC recommends using stranded copper cable.
- A larger mismatch between the input voltage and the LED's forward voltage results in increased heat generation and inefficiency. It is recommended to match the input voltage as close as possible or no greater than 5%.

Step 1: Gather Necessary Information

To begin, gather the following information for your LED strips and power supply unit (PSU) to ensure the power supply unit is compatible with the requirements of the load connected to the CCC4's outputs and provides sufficient current.

- **Voltage (V)** required by your LED tape.
- **The current (A)** required for each channel.
- **The Power Draw (W/m)** of each of your LED tape channels.

Step 2: Calculate PSU Requirements

1. Determine the Total Current Required:

Calculate the total current required for the installation, including the CCC4 device itself.

$$\text{Total Current} = (\text{Number of Channels} \times \text{Current per Channel}) + \text{CCC4 Operating Current}$$

For example, if using 24V constant current LED tapes with each channel drawing 1A:

$$\text{PSU Current} \geq 4 \times 1A + 0.3A = 4.3A$$

2. Determine the Total Power Required:

Calculate the power required by multiplying the PSU voltage by the total current.

$$\text{PSU Wattage} \geq \text{PSU Voltage} \times \text{Total Current}$$

Continuing the example:

$$\text{PSU Wattage} \geq 24V \times 4.3A = 103.2W$$

Step 3: Determine Maximum Tape Length

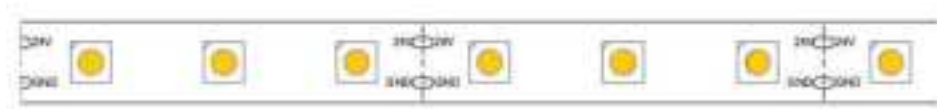
To find out the maximum length of LED tape that can be controlled by each channel and the entire CCC4 device:

1. Calculate Current per Metre of LED Tape:

Determine the current draw per metre of your constant current LED tape.

$$\text{Current per Meter} = \frac{\text{Power Draw per Metre}}{\text{Voltage}}$$

For instance, for a 24V single channel LED tape consuming 8W/m:



$$\text{Current per Meter} = \frac{8W}{24V} = 0.33A$$

2. Calculate Maximum Tape Length per Channel:

Divide the maximum current per channel by the current per metre.

$$\text{Max Tape Length per Channel} = \frac{1A}{\text{Current per Metre}}$$

Using the example:

$$\text{Max Tape Length per Channel} = \frac{1A}{0.33A} \approx 3m$$

3. Calculate Maximum Tape Length per Device:

Multiply the maximum tape length per channel by the number of channels.

$$\text{Max Tape Length per Device} = \text{Max Tape Length per Channel} \times 4$$

Using the example:

$$\text{Max Tape Length per Device} = 3m \times 4 = 12m$$

Note:



- The calculations are representative of the maximum capacity of LED strip that a CCC4 driver can control based on current draw. Always check the datasheet of your LED strip to determine the maximum continuous run length or if any additional considerations are required by its manufacturer.
- Always, check manufacturer guidance for your selected LED Strip to determine its maximum continuous run length, this is often lower than the maximum amount of strip the CCC4 can control.

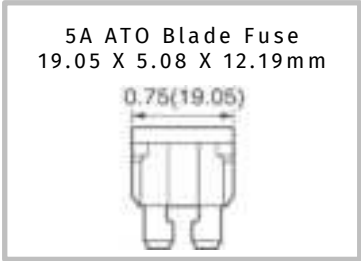
Replacing the User Serviceable Fuse

If the CCC4's outputs get short circuited or the total dimmable load is higher than 5A, the CCC4's internal fuse will blow.

Users may wish to replace this fuse for one of a lower rated value and shorter blow time if the total power draw of their system is lower than 5A. – ENTTEC cannot be held accountable for replacement fuses selected by end users or damage caused to the product when replacing the fuse.

To replace this fuse:

- 1. Ensure your system is powered down and power supplies have discharged.
- 2. Disconnect all cabling from your CCC4.
- 3. Gently push and lift both the snap fit joint located along the side of CCC4. Pull the top lid to dislodge and remove.
- 4. Remove the old fuse by holding the CCC4 in place with one hand and pinching and pulling up on the top plastic part of the fuse with the other.
- 5. Insert the replacement fuse into the fuse holder ensuring a secure fit.
- 6. Lower the top lid and slide the lid along the side of bottom base. Push firmly until the lid snap into position.



Ensure you are electrically grounded before opening this product to stop the device being damaged by Electro-Static Discharge (ESD). Do not touch this products PCB at any time. If ever unsure contact ENTTEC.

Setting Fixture Operating Mode

The CCC4 features two DIP switches and a LED Indicator, enabling users to quickly and easily configure the DMX operating mode. Each of the CCC4’s four modes is associated with a unique LED colour, providing clear visual feedback.

Note: The CCC4 allows for operation mode to be set by DIP Switches only – Not via RDM



Fixture Operating Modes	DMX Channel Footprint	Indicator LED Colour	Fixture Footprint							
			1	2	3	4	5	6	7	8
8-Bit RGB	3ch	Green	Red	Green	Blue					
8-Bit RGBW	4ch	Blue	Red	Green	Blue	White				
16-Bit RGB	6ch	Yellow	Red	Red Fine	Green	Green Fine	Blue	Blue Fine		
16-Bit RGBW	8ch	Magenta	Red	Red Fine	Green	Green Fine	Blue	Blue Fine	White	White Fine

In addition to being useful for setup, the mode LED indicator acts as a quick troubleshooting tool for users to identify any incorrectly configured CVC’s units in one glance.

If one CCC4’s fixture operating mode is changed, the following CCC4’s in the chain will update their address to ensure no gaps or overlaps between each CCC4’s address.

When patching DMX addresses into your lighting console factor in the mode of each CCC4 if mixing Operating Modes within the same chain.

The following table shows a selection of CCC4’s in different operating modes and the impact this has on

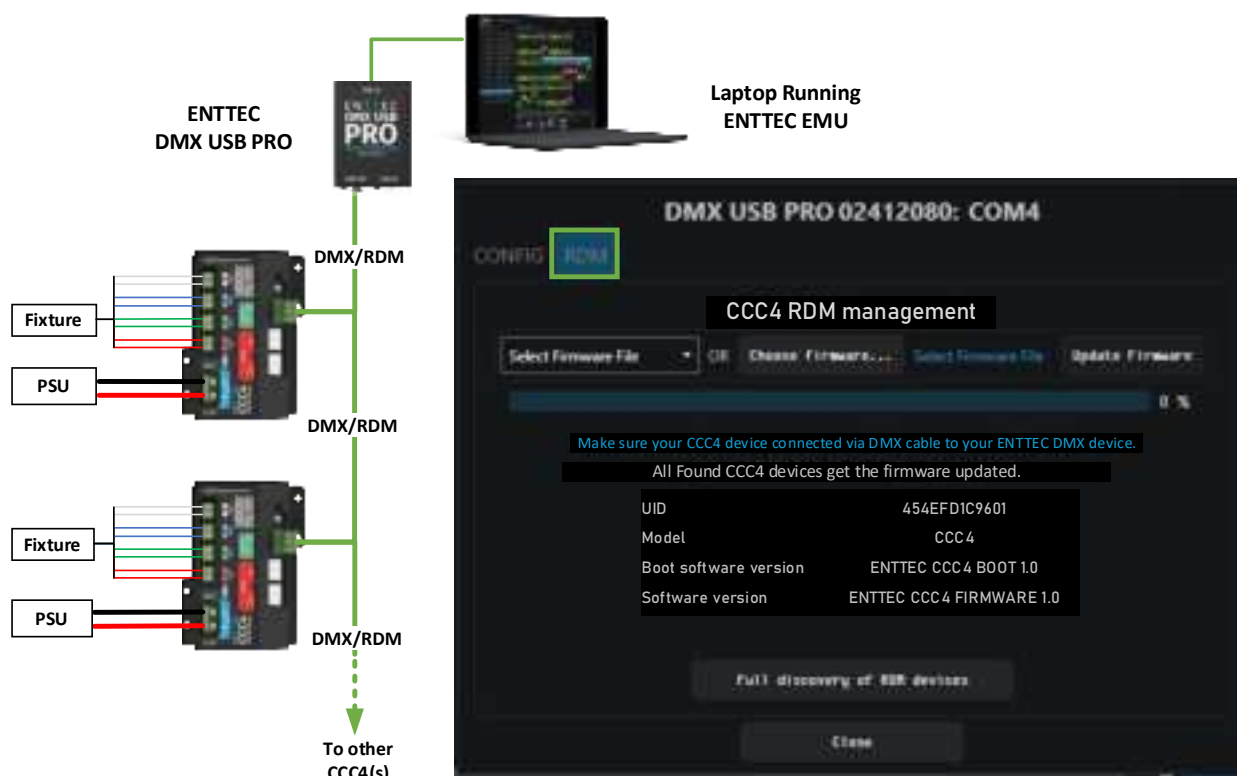
the fixture patch:

Position in PLINK Chain	Operating Mode	Resolution	Channel Footprint	DMX Footprint
1	RGB	8-Bit	3ch	001 -> 003
2	RGB	16-Bit	6ch	004 -> 009
3	RGBW	8-Bit	4ch	010 -> 013
4	RGBW	16-Bit	8ch	014 -> 021
5	RGB	8-Bit	3ch	022 -> 024

Updating Firmware

To update the firmware of your CCC4, follow these steps:

1. Connect your CCC4 to your computer using ENTTEC RDM Controller. i.e. a DMX USB Pro or Pro MK2.
2. Download the latest firmware from ENTTEC website.
3. Download and launch ENTTEC EMU Software to the latest version.
4. Click "Rescan for devices" to identify the CCC4.
5. From the list on 'Conf' column, select the device you wish to update.
6. Select firmware from the drop-down menu or upload the firmware file.
7. Click Update firmware.



Servicing, Inspection & Maintenance



- The device has no user serviceable parts. If your installation has become damaged, parts should be replaced.



- Power down the device and ensure a method is in place to stop the system from becoming energized during servicing, inspection & maintenance.

Key areas to examine during inspection:

- Ensure all connectors are mated securely and show no sign of damage or corrosion.
- Ensure all cabling has not obtained physical damage or been crushed.
- Check for dust or dirt build up on the device and schedule cleaning if necessary.
- Dirt or dust buildup can limit the ability for a device to dissipate heat and can lead to damage.

The replacement device should be installed in accordance with all steps within the installation guide.

To order replacement devices or accessories contact your reseller or message ENTTEC directly.

Cleaning

Dust and dirt build up can limit the ability for the device to dissipate heat resulting in damage. It's important that the device is cleaned in a schedule fit for the environment it is installed within to ensure maximum product longevity.

Cleaning schedules will vary greatly depending on the operating environment. Generally, the more extreme the environment, the shorter the interval between cleanings.



- Before cleaning, power down your system and ensure a method is in place to stop the system from becoming energized until cleaning is complete.



- Do not use abrasive, corrosive, or solvent-based cleaning products on an device.
- Do not spray device or accessories. The device is an IP20 product.

To clean an ENTTEC device, use low-pressure compressed air to remove dust, dirt and loose particles. If deemed necessary, wipe the device with a damp microfiber cloth.

A selection of environmental factors that may increase the need for frequent cleaning include:

- Use of stage fog, smoke or atmospheric devices.
- High airflow rates (i.e., in close proximity to air conditioning vents).
- High pollution levels or cigarette smoke.
- Airborne dust (from building work, the natural environment or pyrotechnic effects).

If any of these factors are present, inspect all elements of the system soon after installation to see whether cleaning is necessary, then check again at frequent intervals. This procedure will allow you to determine a reliable cleaning schedule for your installation.

Ordering Information

For further support and to browse ENTTEC's range of products visit the [ENTTEC website](https://www.enttec.com).

Item	SKU
CCC4	73927

enttec.com

Due to constant innovation, information within this document is subject to change.