# APT-CV4-Vx-LN-CVO Modules

## Features

- APT-CV4 controllers add advanced control features to standard constant voltage (CV) drivers
- CVO versions of the APT controllers are operable to control multiple outputs for constant voltage LED channels simultaneously
- Integrated between the CV driver and LED modules, the DC modules are powered directly from the CV driver
- Operable for independent control over up to 4 output channels and/or control over overall intensity and CCT
- APT Programmer enables in-factory and in-field changes to control settings including CCT range, CCT mapping and Intensity mapping
- Wired version available with DMX512/RDM (VA)
- Wireless version available with Casambi BLE Mesh (VWC)
- Wireless controller versions available with either embedded antenna (EA) or whip antenna (WA)

## Ordering Information

| Product Code | Description |
|---|---|
| **APT-CV4-V*x*-LN-CVO-*wwww*** | **V*x*** – Hardware version<br>**LN** – Linear form factor<br>**CVO** – Constant voltage output<br>***wwww*** – Internal code provided by Arkalumen as a simplified configuration code for repeat orders |

| Hardware Version | Functionality |
|---|---|
| VA | DMX512/RDM |
| VWC | Wireless – Casambi BLE Mesh |

## System Architecture

| Design Requirements |
|---|
| 1. APT controllers are designed to work with a wide range of drivers, but a fixture manufacturer must test the APT controller for driver compatibility and ensure proper system operation before installation. |
| 2. The DC voltage output from the constant voltage driver should be matched to the desired voltage across each of the constant voltage LED channels. |

Contact Arkalumen for technical support at **support@arkalumen.com**

## Warnings

1. Do not connect/disconnect input or output wiring while powered
2. Do not connect APT Programmer while APT controller is powered by DC power source
3. Follow ESD protection procedures while handling input or output wiring, and programming port
4. Do not attach an AC input to the APT controller; DC input only
5. Use only with a driver providing an isolated DC output (ie. the output has no earth or protective ground reference).
6. Read and respect all voltage, current and power limits outlined in the electrical specifications section of the hardware version being used
7. Carefully follow and check all wiring diagrams in this document for the correct hardware version being used

## Operating Conditions

| Environmental | |
|---|---|
| Ambient Temperature, Range | -40 to +50°C |
| Material | Plastic |

## Mechanical Specifications

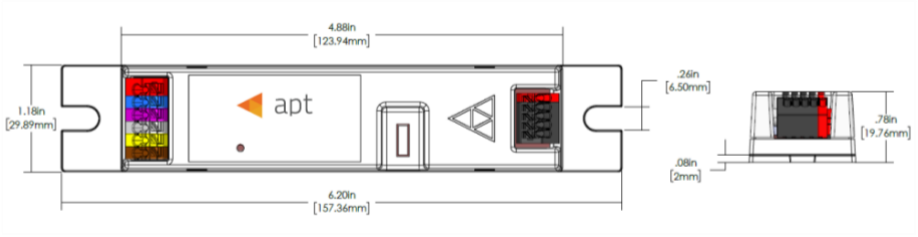



*Figure 1 - APT-CV4-Vx-LN-CVO Mechanical Drawing*

| Dimensions | Inches |
|---|---|
| Length | 6.20 |
| Width | 1.18 |
| Height | 0.78 |

# APT-CV4-VA-LN-CVO MODULE (DMX512/RDM)

## Electrical Specifications

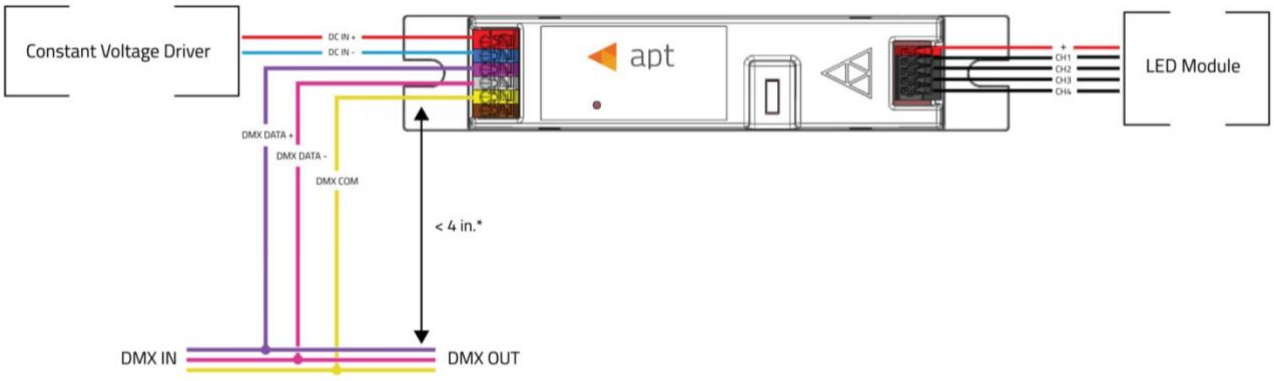
### Input

| Port | Voltage | | | Current | | | Power | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | | Min | Max | | Min | Max | |
| DC IN +/- | 12 | 60 | V | 65 | 4,100 | mA | - | 100 | W |
| DMX Data+ | -10 | 15 | V | -0.8 | 1 | mA | - | - | |
| DMX Data- | -10 | 15 | V | -0.8 | 1 | mA | - | - | |

### Output

| Port | Voltage | | | Current | | | Power | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | | Min | Max | | Min | Max | |
| + | - | 60 | V | 0 | 4,035 | mA | - | 100 | W |
| CH1 | - | 60 | V | 0 | 3,200 | mA | - | - | |
| CH2 | - | 60 | V | 0 | 3,200 | mA | - | - | |
| CH3 | - | 60 | V | 0 | 3,200 | mA | - | - | |
| CH4 | - | 60 | V | 0 | 3,200 | mA | - | - | |

## Wiring Diagram

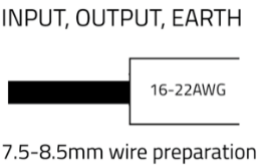



*If no DMX splitter or amplifier is used, splitting between DMX IN/OUT should be done within 4 inches of the APT controller input connector to prevent line reflectance.

*Figure 2 - APT-CV4-VA-LN-CVO DMX512/RDM Configuration*

1. Please follow all best practices for DMX wiring to ensure correct operation of the system such as using shielded wires and proper termination resistance for DMX daisy chain.
2. APT controller acts as a floating device as per ANSI E1.11 – 2008. Use only with a driver with an output not referenced to earth or protective ground (ie. isolated output).
3. It is recommended that each fixture should have DMX IN and DMX OUT wires to allow for installation in a DMX daisy chain*.
   **Exception for installations where a splitter or amplifier will be used for each DMX branch*
4. If no DMX splitter or amplifier is used, splitting between DMX IN/OUT should be done within 4 inches of the APT controller input connector to prevent line reflectance.

| Wiring | AWG |
|---|---|
| **Input, Output** | **16-22** |




## DMX Address Assignment

| Enabled Features | Required DMX Channels |
|---|---|
| Independent Channel Control | One DMX address is required per available output channel |
| Calibrated CCT Control | Two additional DMX addresses are required if calibrated CCT mapping is enabled, one for controlling the CCT and one for controlling the overall light intensity |

## Schemes

| Schemes for DMX [y] | # of DMX Channels | DMX Address Assignment | | | | | |
|---|---|---|---|---|---|---|---|
| | | Base | +1 | +2 | +3 | +4 | +5 |
| 1 | 2 | CCT | INT | - | - | - | - |
| 2 | 3 | R | G | B | - | - | - |
| 3 | 4 | R | G | B | W | - | - |
| 4 | 6 | R | G | B | W | CCT | INT |

| LEGEND | | | | | |
|---|---|---|---|---|---|
| Red | R | White | W | CCT Control | CCT |
| Green | G | | | Intensity Control | INT |
| Blue | B | | | | |

1. The assigned DMX addresses are customizable. The above table is a list of the default schemes available.
2. Changing the DMX Address Assignment does not change the physical wiring of the controller to the LED module. Please refer to Figure 3 for warm white/cool white wiring application.

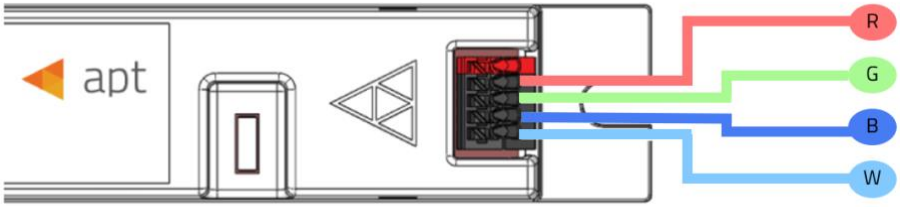



*Figure 3 - Wiring APT-CV4-VA-CVO to RGBW LED module*

## Ordering Information

| Product Code | Description |
|---|---|
| **APT-CV4-VA-LN-CVO-*wwww*** | **VA** – DMX512/RDM hardware version<br>**LN** – Linear form factor<br>**CVO** – Constant voltage output<br>***wwww*** – Internal code provided by Arkalumen as a simplified configuration code for repeat orders |

| Configuration Code | Description |
|---|---|
| **DMX*n*-A*mmm*-*tttt*** | **DMX*n*** – DMX Address Assignment Scheme<br>**A*mmm*** – Base DMX address<br>***tttt*** – Output control feature |

| Code | Description | Option | Configuration Trait |
|---|---|---|---|
| **DMX*n*** | **DMX*n*** denotes DMX wired communication using DMX Address Assignment Scheme ***n***. | **DMX*n*** | DMX Address Assignment Scheme ***n***. See Schemes under DMX Address Assignment on page 4. |
| **A*mmm*** | ***mmm*** denotes the base address of the controller on a DMX bus. | **A001** | Lowest base address option |
| | | **A###** | Base address specified between 1 and 512 |
| | | **A512** | Highest base address option |
| ***tttt*** | ***tttt*** denotes the output control features enabled on the controller. | **0000** | Calibrated CCT mapping disabled |
| | | **CALC** | Calibrated CCT enabled. Calibrated CCT can be customized to output specific desired light metrics. |

# APT-CV4-VWC-LN-CVO Module (Wireless)

## Electrical Specifications

### Input

| Port | Voltage | | | Current | | | Power | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | | Min | Max | | Min | Max | |
| DC IN +/- | 12 | 60 | V | 42 | 4,100 | mA | - | 100 | W |

### Output

| Port | Voltage | | | Current | | | Power | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | | Min | Max | | Min | Max | |
| + | - | 60 | V | 0 | 4,058 | mA | - | 100 | W |
| CH1 | - | 60 | V | 0 | 3,200 | mA | - | - | |
| CH2 | - | 60 | V | 0 | 3,200 | mA | - | - | |
| CH3 | - | 60 | V | 0 | 3,200 | mA | - | - | |
| CH4 | - | 60 | V | 0 | 3,200 | mA | - | - | |

| Wireless Operating Conditions[1] | |
|---|---|
| Maximum Transmitter Power | +4dBm |
| Operating Frequencies | 2.4GHz |
| Maximum Open-Air Range | 270m |

Contains modular transmitter with FCC ID: X8WBM832, IC (Industrial Canada) ID: 4100A-BM832
Wireless signal range of the controller will decrease if placed in a metal enclosure or placed near other wireless devices operating at similar frequencies, keep the VWx controller at least 20cm away from other VWx controllers or wireless devices. The end product with this module may subject to perform FCC part 15 unintentional emission test requirement and be properly authorized.
This device is intended for OEM integrator only.
If used with ANT020 antenna or integrated PCB trace antenna, device does not require routine evaluation or SAR testing.

## Wiring Diagram

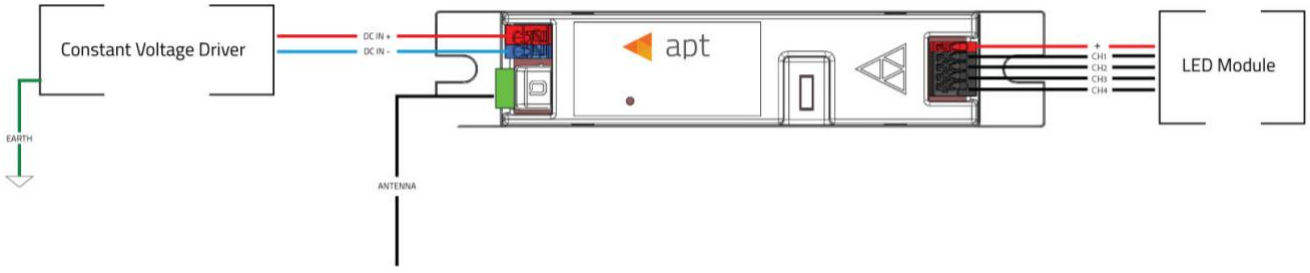



*Figure 4 - APT-CV4-VWC-LN-xA-CVO Wireless Communication Configuration*

| Wiring | AWG |
|---|---|
| **Input** | **20-26** |
| **Output** | **16-22** |
| **Antenna** | **ANT020*** |

***Integrated embedded PCB trace antenna option available on request, ANT020 antenna does not come with device by default, please include request for antenna if necessary**


Schemes

| Scheme *n* | #of Sliders | Slide Number | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| 1 | 3 | R | G | B | - |
| 2 | 4 | R | G | B | W |

| LEGEND | | | | | |
|---|---|---|---|---|---|
| Red | R | Green | G | Blue | B |
| White | W | | | | |

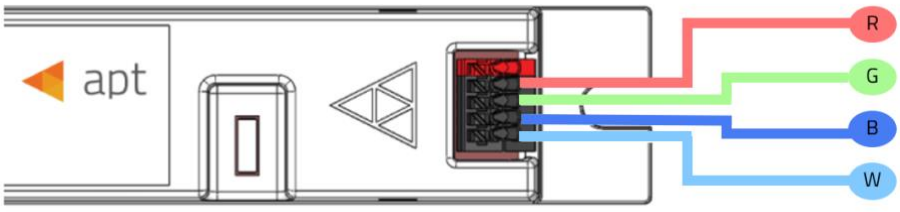



*Figure 5 - Wiring APT-CV4-VWC-LN-xA-CVO to RGBW LED module*

## Ordering Information

| Product Code | Description |
|---|---|
| **APT-CV4-VWC-LN-yA-CVO-*wwww*** | **VWC** – Wireless – Casambi BLE Mesh hardware version<br>**LN** – Linear form factor<br>**yA** – Antenna version (EA – embedded antenna, WA -whip antenna)<br>**CVO** – Constant voltage output<br>***wwww*** – Internal code provided by Arkalumen as a simplified configuration code for repeat orders |

| Configuration Code | Description |
|---|---|
| ***CBMn*-0000-*tttt*** | ***CBMn*** – Casambi BLE Mesh wireless control protocol<br>**0000** – No base address to be specified<br>***tttt*** – Output control feature |

## Configuration Code Details

| Code | Description | Option | Configuration Trait |
|---|---|---|---|
| ***CBMn*** | **CBM*n*** denotes wireless communication using Scheme Address Assignment ***n***. | **CBMn** | Address Assignment Scheme ***n***. See Schemes under Scheme Address Assignment on page 7. |
| ***tttt*** | ***tttt*** denotes the output control features enabled on the controller. | **0000** | Calibrated CCT mapping disabled. |
| | | **CALC** | Calibrated CCT enabled. Calibrated CCT can be customized to output specific desired light metrics. |