APT

APT-CV5-VX MODULES

$_c$**RU**$_{US}$

Features

> APT-CV5 controllers add advanced control features to constant voltage (CV) drivers

> Integrated between the CV driver and LED light engines, the DC modules are powered directly from the CV driver

> APT-CV5 controllers provide up to 5 constant current outputs for powering LED channels of varying forward voltages

> Operable for independent control over each output channel and/or control over overall intensity and CCT

> Optional calibrated CCT feature can enable control to precise points on the black body curve with specified LED light engines

> APT Programmer enables in-factory and in-field changes to control settings and addresses

> DMX or DALI options for controlling independent channel control, overall intensity and CCT

> Wireless add-on modules implemented with Casambi Bluetooth Mesh (CBM), Qualified Bluetooth Mesh (QBM), Wiz Wi-Fi (WIZ), and LumenRadio Wireless DMX (LRX) (Available Sept 2019)

Product Code

The product code indicates the hardware and firmware versions of the controller.

APT-CV5-*Vx*-wwww	**CV5**– Indicates up to 5 output channels **Vx** - Hardware version (ie. VA, VB) **wwww** - Arkalumen internal code; not needed for ordering

Hardware Version		Functionality
	VA	DMX COM port
	VB	DALI COM port

Specifications

Power Characteristics

DC Input		
Power, Max.	100	W
Voltage, Range	12-60	V
Current, Max.	4,100	mA
Ripple Current, Max.	150	mA
COM 1/2 A/B Current, Max.	25	mA
COM 1/2 A/B Voltage, Max.	10	V

DC Output		
Power, Max.	100	W
Voltage, Range	12-60	V
Current, Max.	4,100	mA
Voltage Per Channel, Max.	DC IN Voltage	
Current Per Channel, Max.	3,200	mA
Voltage Drop ($\Delta V = V_{IN} – V_{OUT}$), Max.	15	V

System Architecture

Design Requirements
1. Ensure DC V_{IN} is greater than V_{OUT} of each channel (dictated by LED forward voltage of channel)
2. Minimize ΔV of each channel for optimal efficiency. ΔV Max determined based on channel current (I_{CH}). For I_{CH} < 1.0A, ΔV Max = 15V, For 1.0A < I_{CH} < 2.0A, ΔV Max = 10V, For 2.0A < I_{CH} < 3.2A, ΔV Max = 5.5V Contact Arkalumen for technical support at support@arkalumen.com , if required.

Operating Conditions

Environmental	
Ambient Temperature, Range	-20 – 50 °C
Encasement Material	Plastic

Arkalumen Products may be covered by patents in the US and elsewhere.
www.arkalumen.com/patents

arkalumen

Ordering Information

Please specify the desired product code and configuration code when ordering.

Product Code: **APT-CV5-Vx-**wwww	Ensure to specify the hardware version (ie. VA, VB). The internal code (wwww) will be provided by Arkalumen and does not need to be specified.
Configuration Code: *nnnn-Ammm-tttt-1Cxxx-* *[2Cxxx-3Cxxx-4Cxxx-5Cxxx]*	Ensure to specify the selected configuration options. See Configuration Code Table on Page 3 for a summary and the nomenclature of the configuration options.

Nomenclature

Input Control Options

Abbreviation		Description
DMX	DMX512A Control Input	DMX512 wired communication via COM ports with up to 512 addresses. Refer to Figure 3 for wiring instructions.
DALI	DALI Control Input	DALI wired communication via COM1 port. Refer to Figure 4 for wiring instructions.
A	DMX Base Address	Base address of the controller when using DMX.

Output Control Options

Abbreviation		Description
CALC	Calibrated CCT Mapping	Calibrated mixing of LED light spectra by adjusting the ratio of currents between output channels to achieve predetermined light metrics
C	Channel Specified Maximum Current	Used to denote the maximum current in the controller firmware for a specific channel

Figure 1 - APT-CV5 Ports

Configuration Code

The configuration code indicates value of key parameters within the controller as configured in factory.

Hardware Version	Configuration Code	Component Description
CV5 VA/VB	Configuration Code: *nnnn-Ammm-tttt-1Cxxx-[2Cxxx- 3Cxxx-4Cxxx-5Cxxx-]*	**nnnn** – COM port functionality **Ammm** – Base DMX address (when applicable) **tttt** – Calibrated CCT option **[1-5]Cxxx** – Channels-specific maximum current[1]

1:Maximum current specified in increments of 10mA

Code	Description	Option	Configuration Trait
nnnn	***nnnn*** denotes the control interfacing system	**DMX[y]**	DMX wired communication via COM ports. **y** denotes the DMX Address Assignment scheme. See Table 1.
		DALI	DALI wired communication via COM1 port
Ammm	***mmm*** denotes the base address of the controller on a DMX bus (when enabled)	**A000**	No DMX address
		A001	Lowest base address option
		A###	Base DMX address specified
		A512	Highest base address option for DMX
tttt	***tttt*** denotes whether a calibrated CCT mapping is enabled	**0000**	No calibrated CCT mapping is enabled within the controller
		CALC	Calibrated CCT mapping is enabled within the controller. The calibrated CCT can be a custom setting to output specific desired light metrics.
#Cxxx[1]	***xxx*** denotes the maximum current for channel *#* as configured in the controller firmware	**[1-5]C###**	Specified current for a given channel in increments of 10mA. Maximum current per channel is 3,200mA. (eg. 1C100-2C100-3C100-4C100-5C100 would specify 1000mA maximum current for channels 1 through 5)

1:Maximum current specified in increments of 10mA

DMX Channel Footprint Options

Enabled Feature	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

DMX Address Assignment

Schemes for DMX[y]	# of Output Channels	# of DMX Channels	DMX Address Assignment						
			1	2	3	4	5	6	7
1	3	3	R	G	B	-	-	-	-
2	4	4	R	G	B	W	-	-	-
3	4	4	W	R	G	B	-	-	-
4	5	5	R	G	B	WW	CW	-	-
5	5	5	WW	CW	R	G	B	-	-
6	5	7	R	G	B	WW	CW	CCT	INT
7	5	7	WW	CW	R	G	B	CCT	INT
8	5	7	CCT	INT	R	G	B	WW	CW
9	5	7	CCT	INT	WW	CW	R	G	B

Legend							
Warm White	WW	Red	R	Blue	B	CCT Control	CCT
Cool White	CW	Green	G	White	W	Intensity Control	INT

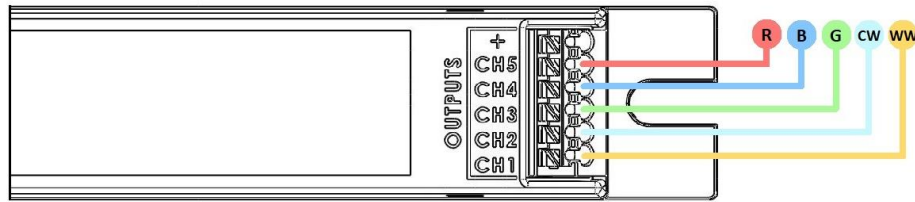**Table 2 - APT-CV5 DMX Address Assignment Configurations (VA)**

Figure 2 – Wiring for APT-CV5 to RGBWW light engine

APT-CV5 controllers allow for the assignment of DMX addresses to be customizable. DMX address assignment is independent of physical output channels, and wiring of the output channels will not change with changes in DMX Address Assignment.

Please note that these are typical addressing assignments only; Custom addressing assignments are available upon request

Mechanical Drawings

APT-CV5
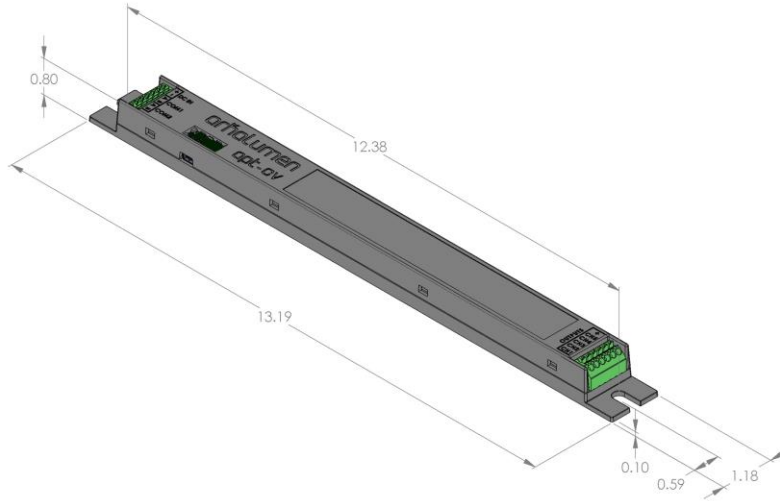
Dimensions

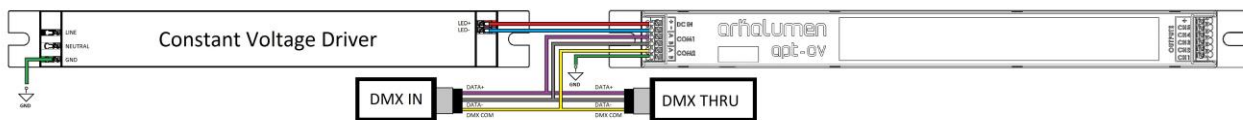| Dimensions (inches)	
Length	13.19
Width	1.18
Height	0.78

Wiring Diagrams

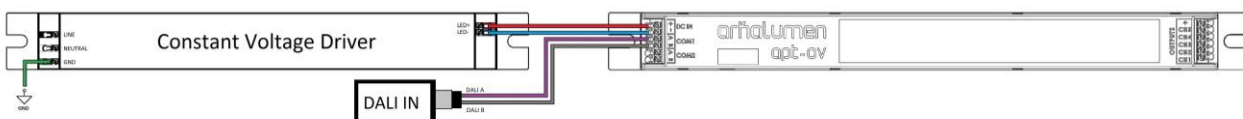**Figure 3 - APT-CV5 DMX Configuration (VA)**

Figure 4 - APT-CV5 DALI Configuration (VB)

APT Ecosystem Components

Add-ons are available for APT-CV controllers for enhanced functionality.

Optional Add-ons for APT-CV Controllers

Add-on	Description
Switch Array Module APT Add-on-VSAM-FW1.00.1	External removable add-on connected to the USB port allowing in-field setting of APT controller parameters, such as base DMX Address
Wireless Modules (Available Sept 2019)	Wireless add-on modules implemented with Casambi Bluetooth Mesh (CBM), Qualified Bluetooth Mesh (QBM), Wiz Wi-Fi (WIZ), and LumenRadio Wireless DMX (LRX)

APT Programmer

The APT Programmer system is designed to be used by system integrators to access and adjust key parameters within Arkalumen APT Controllers. The system is comprised of the APT Programmer hardware as well as the APT Programmer Interface PC software. The APT Programmer and the APT Programmer Interface can be used together to modify parameters on APT Controllers.

From the APT Programmer Interface main window, the user can access parameters specific to the relevant APT Controller by choosing from the controller programming windows. Configuration settings can be saved to and opened from PC storage.

The APT Programmer Interface allows the user to change the DMX address assignments, adjust transition speeds of the channels and add a DMX filter setting. The APT Programmer Interface also allows the user to set a virtual CCT range different from the physical range of the light engine. The APT Programmer Interface can generate configuration reports and replacement labels for the APT Controllers.

Contact Arkalumen at support@arkalumen.com for more information on the APT Programmer.

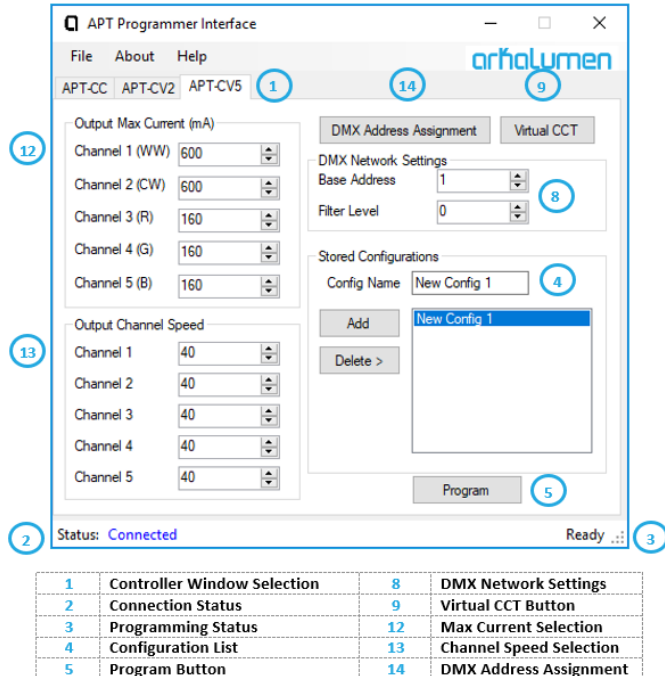| 1	Controller Window Selection	8	DMX Network Settings
2	Connection Status	9	Virtual CCT Button
3	Programming Status	12	Max Current Selection
4	Configuration List	13	Channel Speed Selection
5	Program Button	14	DMX Address Assignment

Figure 5 - APT-CV5 Programmer Window
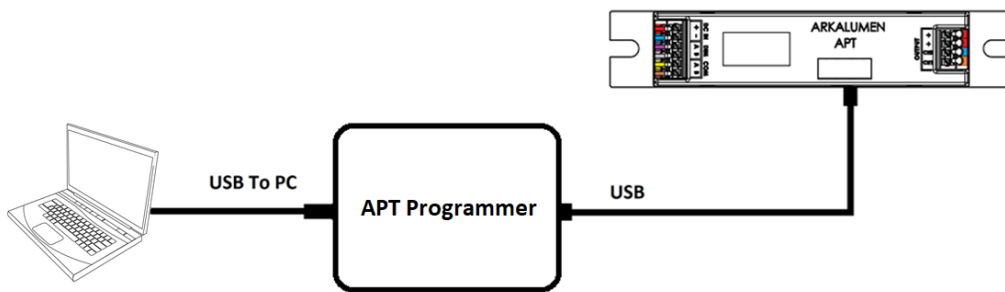
Figure 6 - Connection between PC, Arkalumen APT Programmer and APT Controller