arkalumen | orb

APT Programmer
Programming Guide - Engineering
ORB5-VWC

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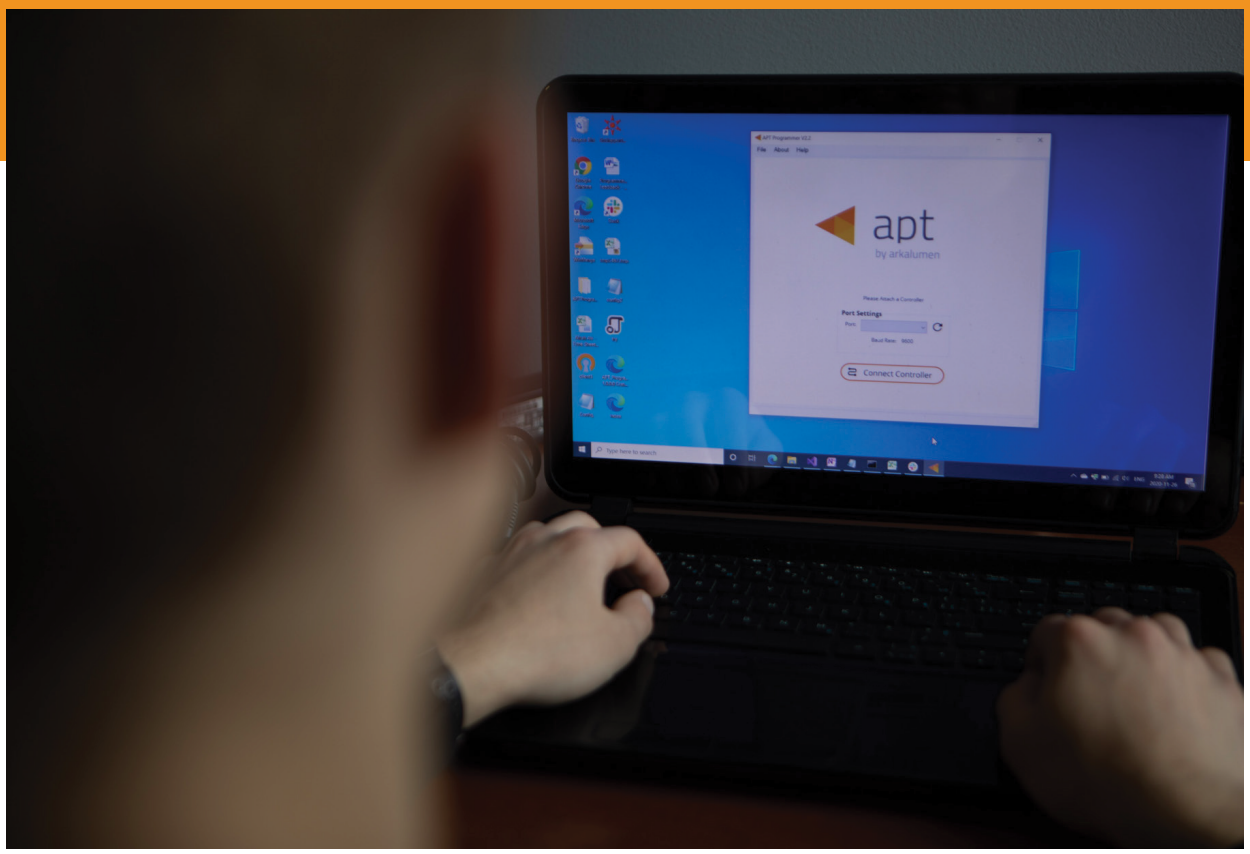

Connecting the APT Programmer

1. Connect the APT Programmer to the PC and controller as shown in Figure 1.

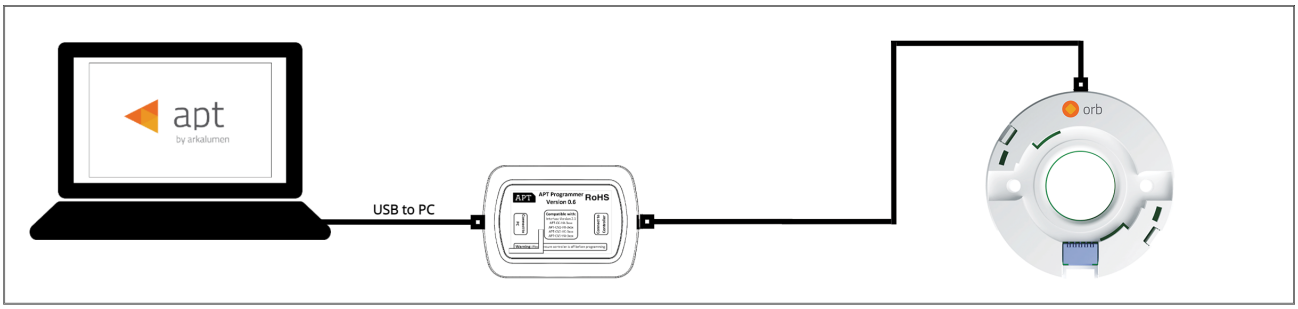

Figure 1: Wiring Diagram

Using the APT Programmer

Installing the APT Programmer Interface

1. To get the latest APT Programmer visit https://www.arkalumen.com/apt-programmer/ and enter your information in the **Request APT Programmer Download** fields, please ensure APT Programmer - Engineering Version is selected. Upon completion, a download link will be sent to the email address provided, if not received shortly after please check your spam folder.

   Note: This Programming Guide is for the APT Programmer - Engineering Version.

2. Open the folder **APT Programmer Interface** on a Windows-based PC,and select the file **setup.exe**

3. Launch **setup.exe** to install the APT Programmer Interface. The APT Programmer Interface shortcut will be added to the Start Menu.

Running the APT Programmer Interface

1. Launch the APT Programmer Interface software by selecting the application, **APT Programmer Interface** , from the Start Menu. The Programmer Connect window (shown in Figure 2) will open.

2. Select the COM port to which the APT Programmer is connected from the **Port** drop-down menu. If a COM port is not visible, click the ↻ button until the correct port is visible.

3. Click **Connect Controller** to establish a connection. Once connected, the APT Programmer Interface window (shown in Figure 3) will open.

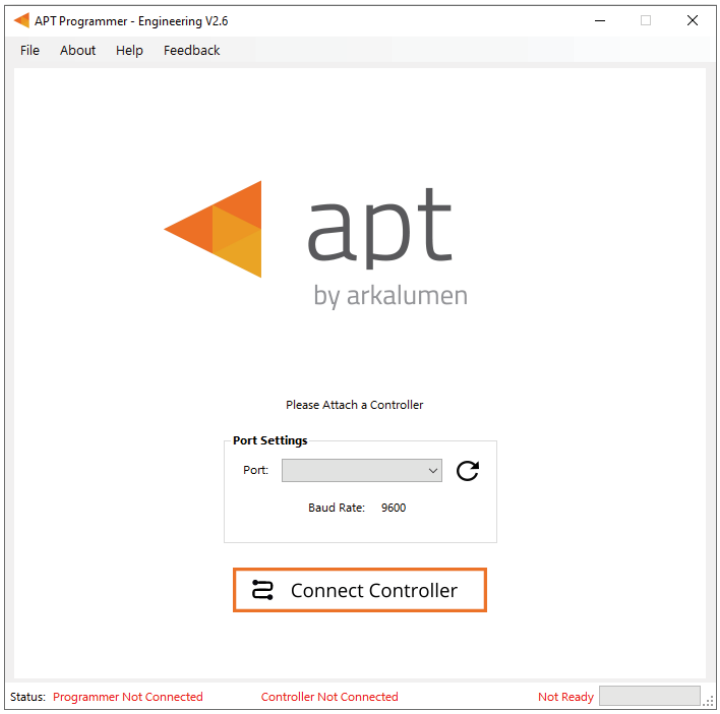

Figure 2: Programmer Connect window

Note: Once connected, if the APT Programmer is not displayed in the port list, please run the CDM212364_Setup file sent with the APT Programmer software to install the drivers.

Using the Programmer Interface Window

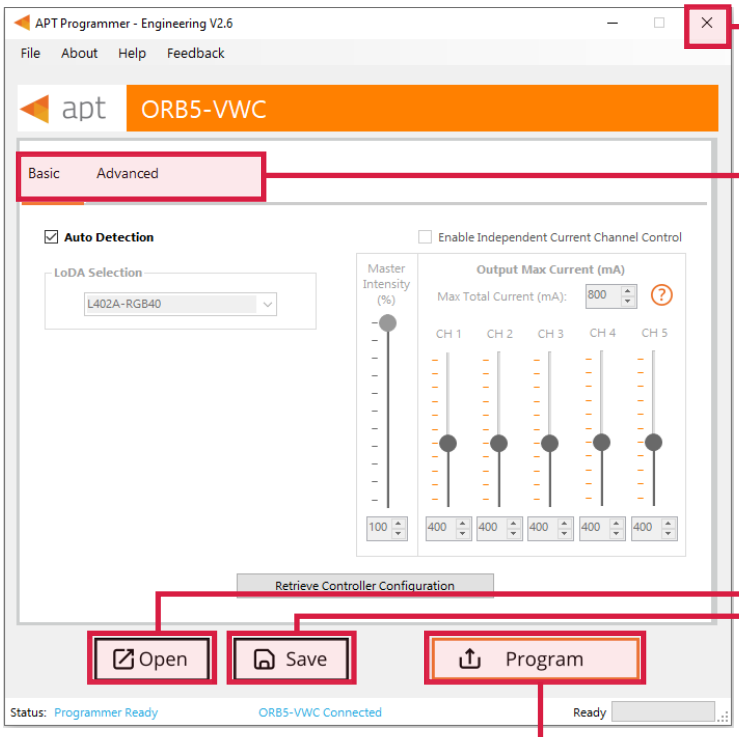

Figure 3: Programmer Interface Window

Exit the APT Programmer Interface by either clicking ×, pressing **Ctrl+Q** or selecting **File** > **Exit**. This will open a window with the option to save the current configuration.

*Note: Clicking **No** will discard all unsaved configurations.*

Navigate through settings quickly by clicking on the tabs.

Open a previously saved configuration file (.ARKENC) by either clicking **Open**, pressing **Ctrl+O** or selecting **File > Open** from the menu.

Save the current configuration by either clicking **Save**, pressing **Ctrl+S** or selecting **File > Save** as from the menu. A .txt file is created with a readable summary of the saved configurations and a .ARKENC file which is used to upload the saved configurations to the APT Programmer User Interface or to the APT Production Programmer.

When satisfied with the configuration, click **Program** to program the controller.

The progress bar displays the status of the current task.

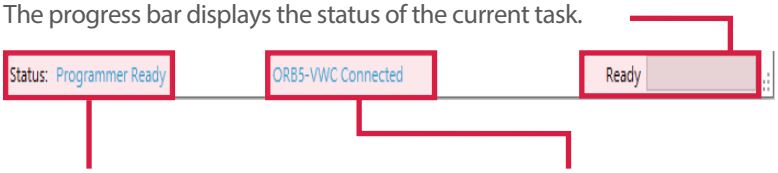

Figure 4: Programmer Interface Window - Status Bar at bottom of Window of Fig 3

Displays **Programmer Ready** if the APT Programmer Interface has successfully connected to the APT Programmer. If no connection has been established, it will read **Programmer Not Connected.**

Displays the currently connected ORB controller and its hardware version. If no connected ORB controller is found, it will read **Controller Not Connected**.

The Ready field in the Status Bar displays:

- Ready
- Not Ready
- Successfully Programmed
- Retrieve Successful
- Wrong Controller Connected
- No Controller Identified

Basic Tab

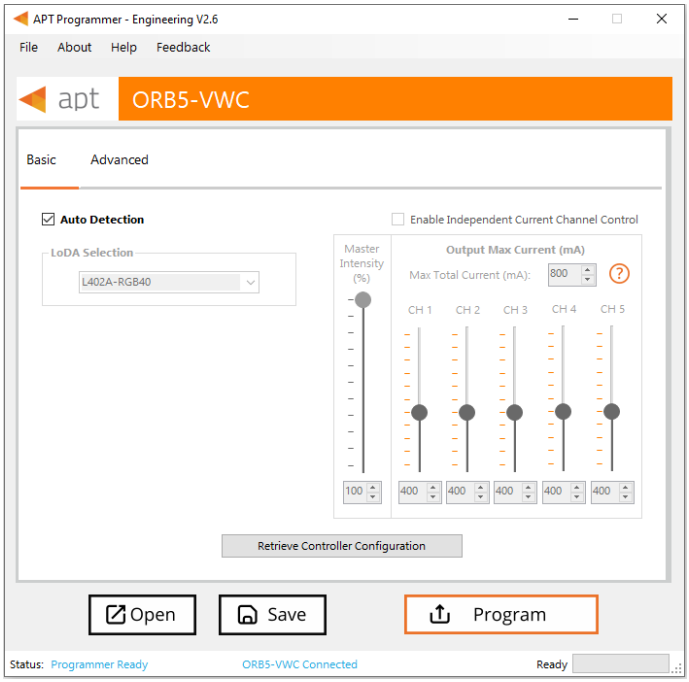

Figure 5: Programmer Interface window - Basic Tab

Auto Detection Feature:

By default, upon insertion of a LoDA into the ORB controller, the **Auto-Detection** feature becomes activated. In this operational state, the **Output Max Current** values are automatically set to the appropriate levels of the inserted LoDA, hence making the **Output Max Current** box inactive. Only the **Advanced** settings are accessible.

It is imperative to note that when opting to disable the Auto-Detection feature, a thorough understanding of the specific LoDA inserted into the ORB controller is strongly advised, ensuring compliance with all LoDA specifications.

Note: If Auto-Detection is disabled, the LoDA selection drop-down list will be available containing the full portfolio of Arkalumen LoDAs available for the connected APT or ORB controller.

Selecting LoDA:

This functionality is intended for scenarios in which an ORB controller has been preconfigured for a specific Arkalumen LoDA, and the user would like to switch to a different Arkalumen LoDA.

1. To activate the **LoDA Selection** feature, ensure that **Auto-Detection** is deactivated.
2. From the dropdown menu offering the available LoDA options, select the appropriate LoDA. Upon selection, the **Total Max Current** and **Output Max Current** settings for each channel will automatically adjust to the default values corresponding to the chosen LoDA. Additionally, the corresponding CCT and Intensity mapping tables will be adjusted accordingly.

Basic Tab

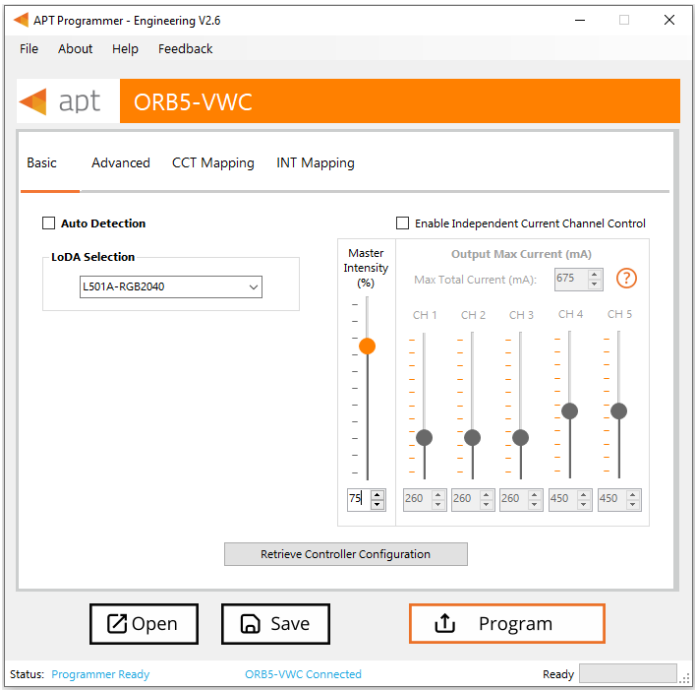

Figure 6: Master Intensity Enabled - Basic tab

Configuring Output Channels

The APT Programmer provides two ways to set the max total current and max output current for each channel for the ORB5-VWC controller: **Master Intensity** and **Independent Current Channel Control.**

Master Intensity: The slider allows easy adjustment of the max total current and the maximum current for all 5 output channels simultaneously. When moving the **Master Intensity** slider, it sets the **max total** current and **max current of each output channel** to a specific percentage of their respective maximum values. This is useful for quickly configuring all channels with a unified setting.

Steps:

1. Uncheck **Auto-Detection** box to enable **Master Intensity Slider**
2. Adjust the **Master Intensity Slider**: Move the slider up or down to increase or decrease the intensity percentage. The percentage displayed indicates the proportion of the max total current and the max current of each output channel that will be applied to the connected ORB5-VWC controller.

Basic Tab

Independent Current Channel Control:

If needing to set the max total current and the max current for each channel individually, check the **Enable Independent Current Channel Control** box. This option allows precise control over each channel's intensity.

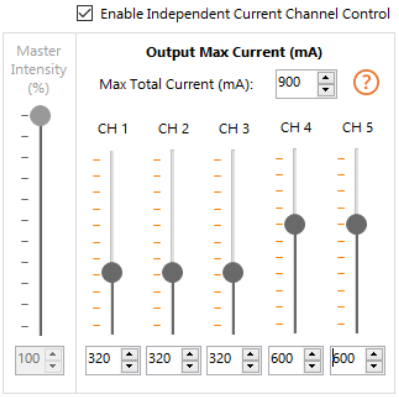

Figure 7: 5- CH Independent Channel Current Control example

Setting Output Max Currents to Custom Configure LoDAs:

This feature is intended for scenarios where a LoDA with known specific parameters, programmable by the user, will be used.

1. To activate **LoDA Selection**, ensure that **Auto-detection** is disabled.
2. From the dropdown menu of available LoDA selection, opt for **Custom.** Upon selecting Custom, the **Master Intensity** slider becomes adjustable as required.
3. Check **Enable Independent Current Channel Control.** This will disable the Master Intensity slider and activate the individual sliders for each channel.
4. Adjust Individual **Output Max Current** Sliders. Move each slider to the desired position to adjust the current for that specific channel.

*Note: Please select the desired LoDA from the dropdown menu of **LoDA Selection** or choose Custom. Upon selecting the LoDA, the **Master Intensity** slider will default to 100% and the **Output Max Current** for each channel will be set according to the LoDA selection.*

Example: Suppose a LoDA has designated Output Max Currents (mA) of 320mA for channels 1, 2, and 3, and 600mA for channels 4 and 5. In such a scenario, this feature can be utilized to configure each channel's current according to the specified parameters, mitigating the risk of damaging the LoDA.

Using an ORB5-VWC controller with RGBW (4 Channel) LoDAs

When utilizing an ORB5-VWC controller with RGBW (4 Channel) LoDAs, users can select the desired LoDA from the drop-down list. This list includes options for both RGBW and RGBWW LoDAs. When choosing an RGBW LoDA, the Output Max Current for Channels 4 and 5 will adjust simultaneously to the same value.

Basic Tab

Setting Max Total Current for LoDAs:

This feature would prorate the channel currents if their sum exceeds the selected max total current value.

1. To activate **LoDA Selection**, ensure that **Auto-detection** is disabled.
2. From the dropdown menu of available LoDA selection, opt for **Custom**. Upon selecting Custom, the **Master Intensity** slider becomes adjustable as required.
3. Check **Enable Independent Current Channel Control**. This will disable the Master Intensity slider and activate the Max Total Current field.
4. Input the desired Max Total Current for the LoDA.

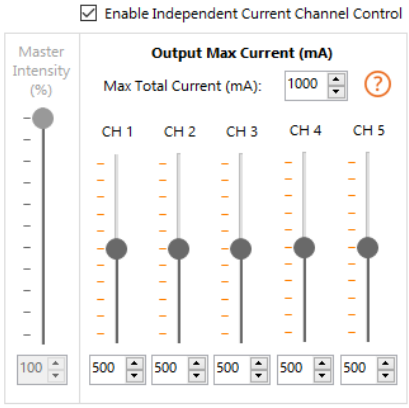

Figure 8: Setting Max Total Current example

Example: Suppose you have a LoDA where each channel is set to draw 500mA, and the Max Total Current is set to 1000mA. In this case, the ORB Controller ensures that the total current output does not exceed 1000mA. If the combined current demand from all channels surpasses this limit, the ORB Controller will proportionally reduce each channel's current according to the requested ratios at that time.

Tips:

- ***Master Intensity Disabled:*** *When* ***Enable Independent Current Channel Control*** *is checked, the* ***Master Intensity*** *slider becomes inactive, ensuring that the channels are controlled independently.*
- ***Unified Control:*** *To control all channels simultaneously, uncheck the* ***Enable Independent Current Channel Control*** *box. This action will reactivate the* ***Master Intensity*** *slider and disable the individual channel sliders. The Master Intensity will reset to 100%, and both the Max Total Current and the currents of each channel will return to their default settings.*

Basic Tab

Retrieving Current Controller Configurations:

This feature is designed to display the configuration programmed onto the connected controller. Its primary purpose is to validate whether the controller is programmed to the desired configurations or to inspect the configuration of the connected controller to program additional controllers.

Steps:

1. Click **Retrieve Controller Configuration**
2. The **Configuration From Controller** window will be displayed, presenting the details of the connected controller configuration
3. **Scenario 1:** If this information is being used to validate the configurations of the controller:
   If the information is correct, click **Cancel** to exit the window
   If the information is incorrect, click **Cancel** to exit the window, then proceed to set the desired configurations. Finally, click **Program** to initiate programming of the controller
4. **Scenario 2:** If this information is being used to retrieve configurations for programming additional controllers: Click on **Use This Configuration** to import the current configuration of the connected controller into the APT Programmer interface

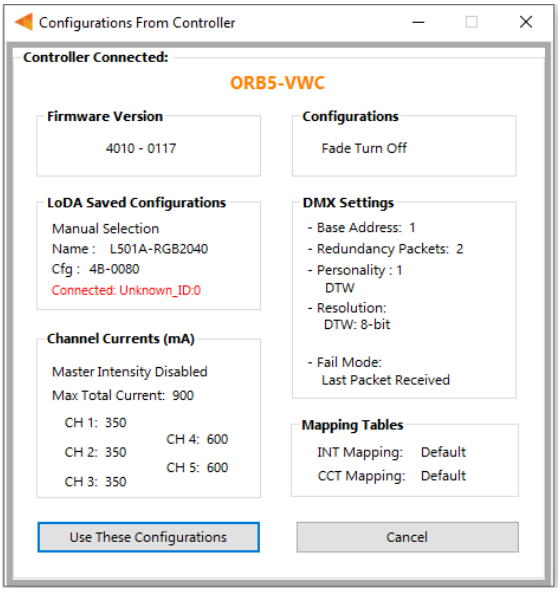

Figure 9: Retrieved Configurations from Connected Controller

Note: : Importing the current controller configuration will result in all programmer interface settings being adjusted to match the configuration of the connected controller. Please note that the CCT and Intensity mapping tables will not be retrieved.

Advanced Tab

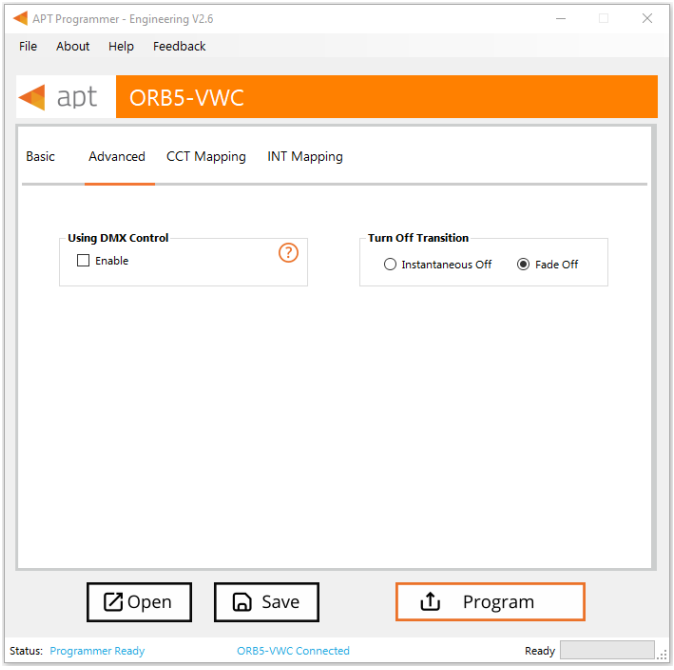

Figure 10: Advanced Tab Window

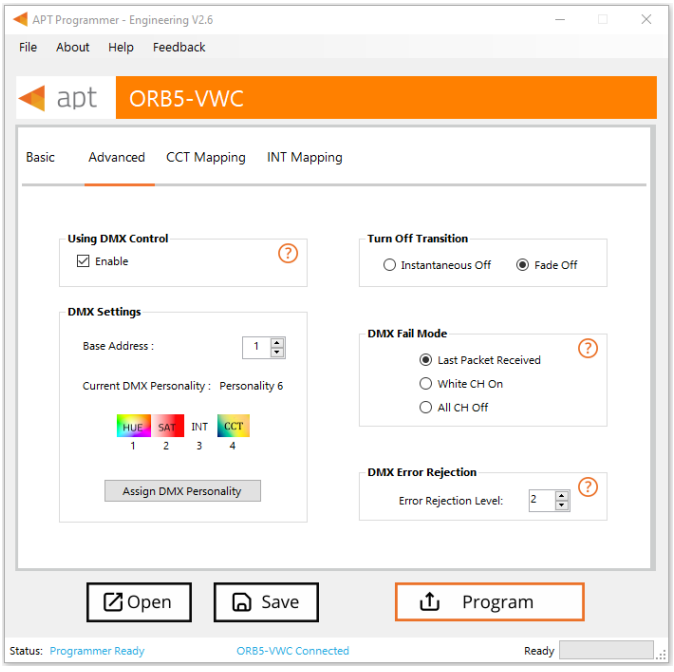

Figure 11: Advanced Tab Window with DMX Control enabled

Using the Turn-off Transition Feature:

When switching off the LEDs, users have the option to select between two modes:

Instantaneous Off: LEDs will promptly switch off completely when an off state is triggered.
Fade Off: LEDs gradually transition to an off state when triggered, ensuring a smooth and gentle fade-out effect.

Using the DMX Control

The ORB5-VWC can be programmed to use different protocols for operation. One of the advanced features available is the **Using DMX Control** option. This allows the user to control the ORB5-VWC controller using the DMX protocol, which is widely used for lighting control in entertainment and architectural lighting industries.

Note: DMX (Digital Multiplex) is a standard protocol used to control stage lighting and effects. It allows multiple devices to be controlled through a single data cable, providing precise and synchronized control over various lighting fixtures. By using DMX, you can achieve complex lighting patterns and effects.

Enabling DMX Control

1. Go to the **Advanced Tab**
2. In the **Using DMX Control** box check the **Enable**
3. Once enabled, additional DMX settings will be displayed (Figure 11). This step is needed to configure these settings to ensure proper communication between the DMX controller and the ORB5-VWC controller

Advanced Tab

Choosing DMX Personality and Base Address:

This functionality serves to designate the desired DMX Personality and establish the initial (base) address for the connected controller.

Example: Suppose there is a need to independently control multiple fixtures, all set to DMX Personality #6. Referring to the illustration below, DMX Personality 6 comprises four DMX addresses : address 1 for Hue, address 2 for Saturation, address 3 for Intensity, and address 4 for CCT. Therefore, the base address for the first fixture should be programmed as 1, the second fixture as 5, the third fixture as 9, and so forth.

*Note: Within the **Change DMX Personality** drop-down menu, **Custom Requested Personality** refers to a custom DMX Personality tailored by Arkalumen according to specific customer needs. If not requested, users should refrain from selecting this option.*

Example Steps:

1. In the **Advanced Tab**, enable **Using DMX Control**
2. Under **DMX Settings** select **Assign DMX Personality**
3. DMX Personality Selection window will appear, under **Change DMX Personality** select DMX Personality 6 -> H-S-INT-CCT
4. Click **Submit**
5. Under **DMX Settings**, input the corresponding base address for the connected controller for the first fixture
6. Click **Program** to set the configurations
7. For the rest of the fixtures, repeat step 5 to input the corresponding base address and step 6 to program the connected fixture

Using an ORB5-VWC controller with RGBW (4 Channel) LoDAs

When pairing an RGBW LoDA with the ORB5-VWC controller, selecting DMX Personalities designed specifically for 4 channels is needed.

Example: when using an RGBW LoDA with the ORB5-VWC controller, it's recommended to avoid Personality 5, which requires 5 addresses. Instead, opt for one of the other personalities, ensuring compatibility and optimal performance.

***Note:** The ORB5-VWC controller is compatible with RDM (Remote Device Management). Using RDM enables remote configuration and management of the DMX personality and base address of the ORB5-VWC controller, eliminating the need for direct physical access.*

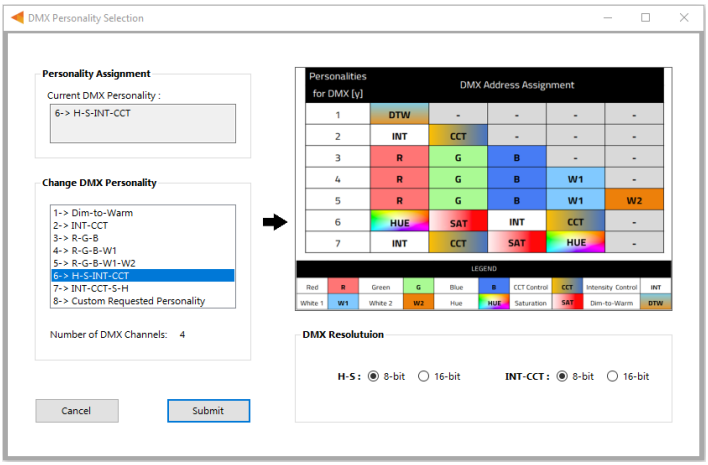

Figure 12: DMX Personality Selection Window

Advanced Tab

Using an ORB5-VWC controller with RGBW (4 Channel) LoDAs

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Using the DMX Fail Mode Feature

The **DMX Fail Mode feature** allows setting the controller's response in the event of a DMX signal loss. This ensures that the lighting system behaves predictably and safely when communication with the DMX controller is interrupted. There are three options available for the DMX Fail Mode:

1. **Last Packet Received**: When this option is selected, the controller will maintain the settings of the last DMX packet received before the signal loss. *Note: This is the default DMX Fail Mode for the ORB5-VWC controller.*
   ***Use Case*:** *This is useful when wanting the lights to stay in their last known state during a signal interruption, providing a seamless visual experience.*
2. **White CH On**: Selecting this option will turn on the White channel to a predefined intensity when a DMX signal loss is detected.
   Use Case: *This mode is ideal for situations where a fallback white light is needed for safety or visibility during a DMX signal failure.*
3. **All CH Off:** This option will turn off all channels when a DMX signal loss occurs.
   Use Case: *Use this setting when wanting to ensure that all lights are turned off during a signal loss, which can be desired for specific operational requirements.*

Using the DMX Error Rejection Feature:

This feature allows users to configure the number of consecutive DMX packets needed to process incoming data and implement changes accordingly.

Note: For standard applications, it is advisable to set the value to 1 or 2. Higher values are recommended in environments with significant interference or when DMX values undergo frequent or rapid changes

CCT Mapping Tab

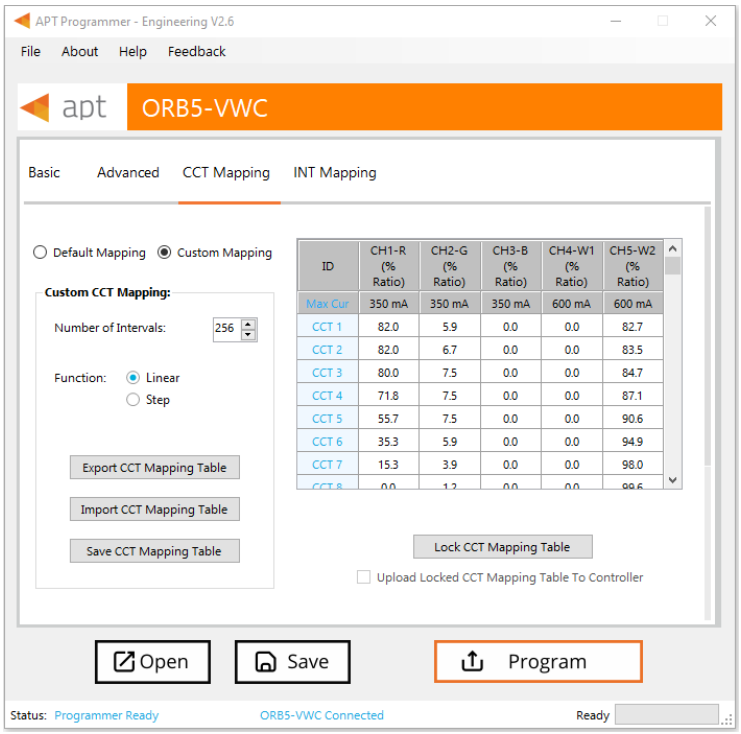

Figure 13. CCT Mapping Tab window

The CCT Mapping feature for ORB5-VWC is available only if the Using DMX Control option is enabled in the Advanced tab and a DMX personality that includes CCT Control is selected.

The CCT Mapping feature allows users to create customized spectral profiles and calibrations for their tunable color controllers. This advanced functionality ensures that users can achieve precise lighting effects tailored to specific needs.

CCT Mapping for tunable color controllers enables:

- Creation of Custom Spectral Profiles: Design specific light spectra by adjusting the intensity and combination of different color channels.
- Develop Custom Calibrations: Fine-tune LED fixtures to ensure accurate color representation and consistency.

Steps:

1. Ensure **Auto Detection** is not selected in the **Basic Tab**
2. Select DMX Personality with CCT Control:
   a. In the **Advanced tab**, enable **Using DMX Control** and select a DMX personality that includes CCT control by clicking **Assign DMX Personality**
3. Navigate to the **CCT Mapping Tab**:
   a. Go to the CCT Mapping tab. The CCT table will be populated with the default values of the selected LoDA
4. Edit CCT Values:
   a. To modify the values in the table, select **Custom Mapping**
5. Create Desired Spectrum or Calibration:
   a. Directly in the APT Programmer Table:
      i. Adjust the CCTs of each channel by entering the CCT value for each color channel
      ii. Adjust the number of CCT intervals
      iii. Select either **Linear** or **Step** Function:
         1. Linear: Creates a CCT mapping with smooth transitions between each interval point
         2. Step: Creates a CCT mapping with step transitions between each interval point
   b. Using Excel:
      i. Export the CCT mapping table from the CCT Mapping tab
      ii. Adjust the values in Excel
      iii. Import the adjusted table back into the APT Programmer

Steps (continued):

6. Lock the CCT Mapping Table:
   a: Click on Lock CCT Mapping Table to prevent further changes
   b. Note: Scroll to the bottom of the CCT Mapping tab window to view the graph of the desired calibration

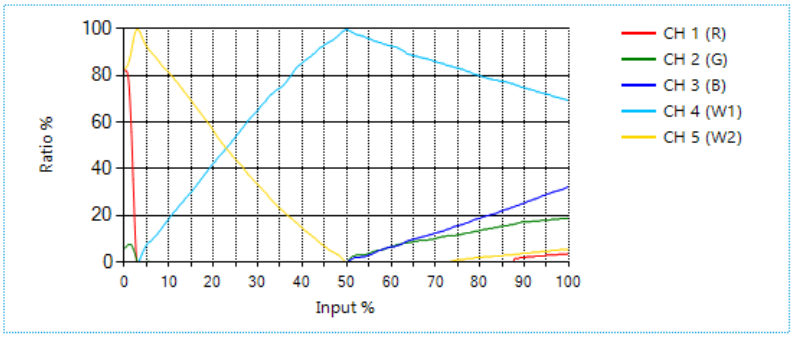

Figure 14: Example of CCT Calibration Graph

7. Upload the Mapping Table to the Controller:
   a. Check the Upload Locked CCT Mapping Table to Controller box to upload the mapping table to the ORB5-VWC controller before final programming
8. Program the Controller:
   a. Click on Program to implement the customized spectral profile or calibration onto the ORB5-VWC controller
9. Save the Customized Spectral Profile:
   a. To save the customized spectral profile calibration table, click Save Mapping Table. An Excel file will be generated with the customized mapping table. Name and save the file to the desired location

Tips:

- Unlocking the CCT Mapping Table: If changes are needed after locking, click on **Unlock CCT Mapping Table** to adjust any values.
- CCT Value Mapping: Each CCT value in the table is mapped to a percentage ratio for the particular channel, ranging from 0% (minimum) to 100% (maximum).

INT Mapping Tab

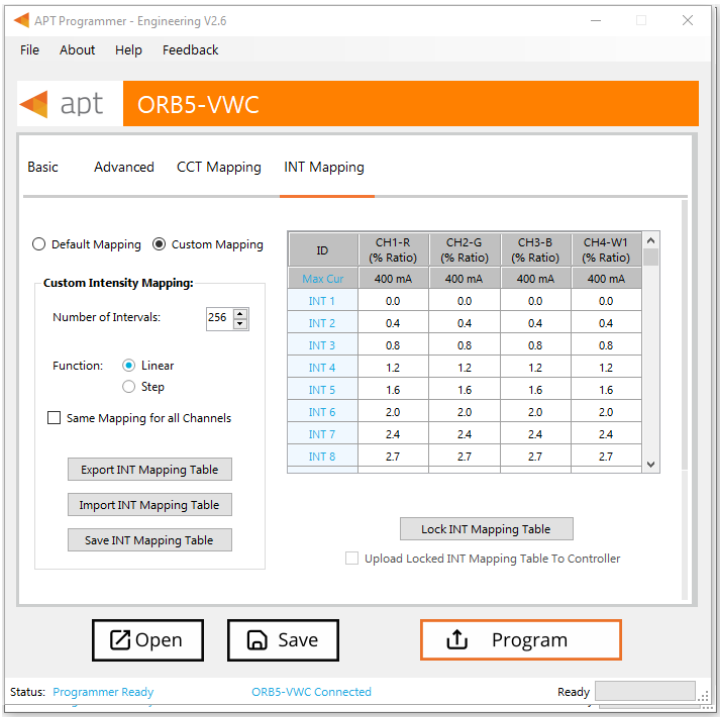

Figure 15: INT Mapping Tab window

This feature allows customization of the intensity curves of the LED fixture. This is particularly useful when needing to match the dimming behavior of other fixtures in the surrounding environment, ensuring a seamless lighting experience.

INT Mapping enables:

- Matching Dim Curves: Align the dimming behavior of the LED fixture with other fixtures in the same space.
- Customizing Intensity Profiles: Create and save custom intensity profiles to suit specific lighting requirements.

Example: This feature can be used to match dim curves of a fixture with an ORB controller to other fixtures in the immediate environment in order to maintain a uniform lighting effect.

Steps:

1. Ensure **Auto Detection** is not selected in the **Basic Tab**
2. Navigate to the INT Mapping Tab:
   a. Go to the **INT Mapping** tab. The INT table will be populated with the default values of the selected LoDA
3. Edit INT Values:
   a. To modify the values in the table, select Custom Mapping
4. Create Desired Intensity Profile:
   a. Directly in the APT Programmer Table:
      i. Adjust the INTs of each channel by entering the INT value for each channel
      ii. Adjust the number of INT intervals
      iii. Select either **Linear** or **Step Function:**
         1. Linear: Creates a INT mapping with smooth transitions between each interval point
         2. Step Function: Creates a INT mapping with step transitions between each interval point
   b. Using Excel:
      i. Export the INT mapping table from the INT Mapping tab
      ii. Adjust the values in Excel
      iii. Import the adjusted table back into the APT Programmer

Steps (continued):

5. Lock the INT Mapping Table:
   a. Click on **Lock INT Mapping Table** to prevent further changes
   b. Note: Scroll to the bottom of the INT Mapping tab window to view the graph of the desired calibration

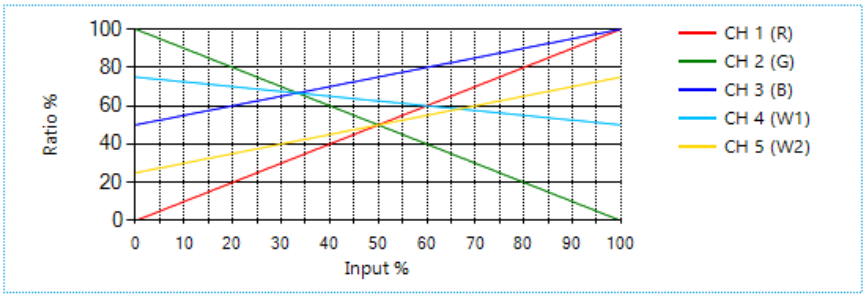

Figure 16. Example of INT Calibration Graph

6. Upload the Mapping Table to the Controller:
   a. Check the **Upload Locked INT Mapping Table** to Controller box to upload the mapping table to the ORB5-VWC contoller before final programming
7. Program the Controller:
   a. Click on **Program** to implement the customized intensity profile onto the ORB5-VWC Controller
8. Save the Intensity Profile:
   a. To save the customized intensity profile calibration table, click **Save Mapping Table.** An Excel file will be generated with the customized mapping table. Name and save the file to the desired location

Tips:

- Unlocking the INT Mapping Table: If changes are needed after locking, click on **Unlock INT Mapping Table** to adjust any values.
- INT Value Mapping: Each INT value in the table is mapped to a percentage ratio for the particular channel, ranging from 0% (minimum) to 100% (maximum). The default mapping evenly spreads out 256 values along a linear curve.

*Note: If the intensity profile is the same for all the channels, check the **Same Mapping for all Channels** box in the INT Mapping Tab*

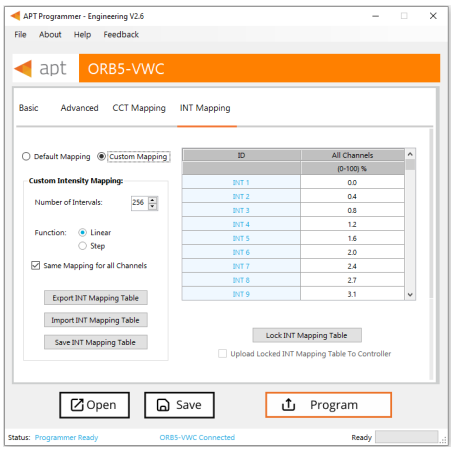

Figure 17. Same Mapping for all channels INT Mapping Tab window

Generating a Report

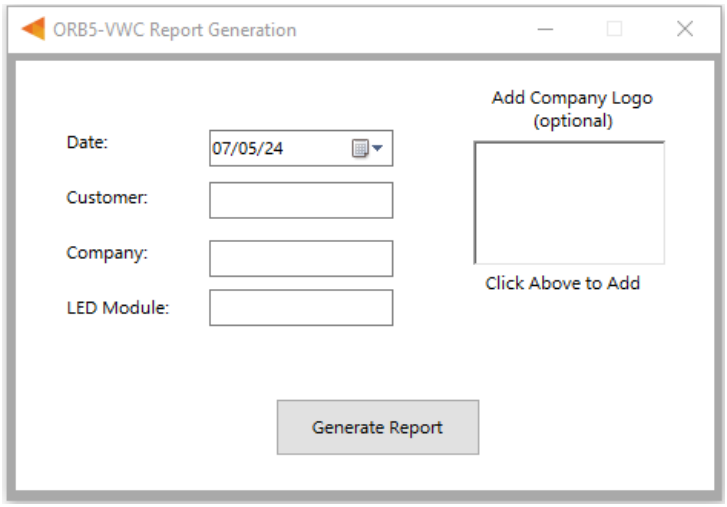

Figure 18: Report Generation window

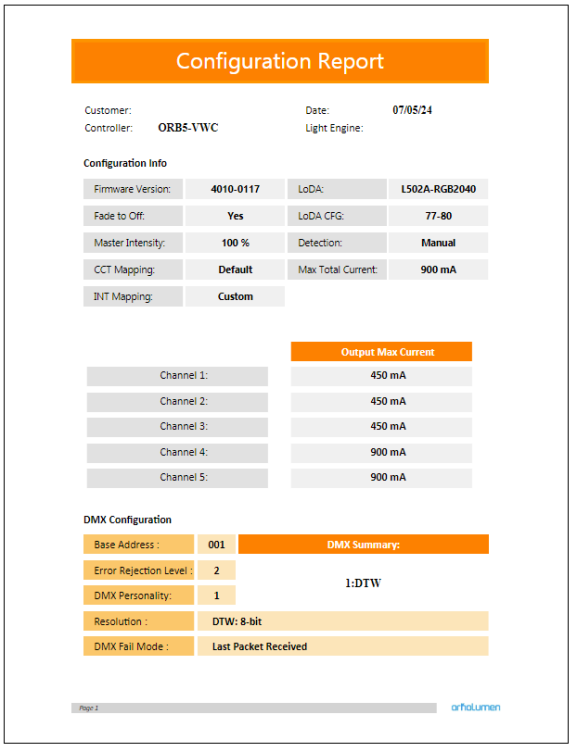

Figure 19 Example of the first page of a generated report

The **Generate Report** feature allows creating a PDF document that summarizes all the configurations specified for the connected controller. This is useful for record-keeping, troubleshooting, and sharing configuration settings with others

Steps:

1. Select **File** > **Generate Report**, or press **Ctrl+R**, to open the Report Generation Window (shown in Figure 18).
2. Enter the **Date**, **Customer**, **Company**, and **Light Engine** part number to customize the report.
3. Click on the white box under **Add Company Logo** to include a logo in the report (optional).
4. Select the desired logo (.jpg) in the file browser and click **Open** (optional).
5. Click **Generate Report**, the default web browser will open and display a preview of the print (shown in Figure 19).

*Note: Arkalumen recommends using Google Chrome and setting margins to **None** in the printing options.*

If at any time you have comments or suggestions regarding the APT Programmer or APT Controller, please click on the Feedback tab in the top menu bar to submit information to our team. We appreciate all feedback and are committed to continuously improving our products. For immediate support, please contact the Arkalumen team at 1-877-856-5533 or email support@arkalumen.com

Arkalumen designs and manufactures intelligent LED controllers and custom LED modules for light fixture manufactures in order to enable energy efficient and feature rich lighting solutions. For over 10 years, **Arkalumen** has focused on simple, flexible, cost effective solutions that allow highly differentiated fixtures to be launched in commercial, industrial, and residential markets. With 30+ patents, we have a history of driving innovation within the lighting industry and are proud to push the limits of what lighting in applications in education, healthcare, film and horticulture can be.

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