orb
by arkalumen

Application Note: Tc Specification

Thermal Specification

LoDA	USB Tc Temperature	LED Array Surface Temperature
L502A-RGB2040	85°C	145°C
L513A-RGB1840	90°C	145°C
L512A-RGB1840	75°C	145°C
L511A-RGB1840	85°C	145°C

Figure 1 - USB Tc temperature is measured on the metal sleeve of the micro-USB programming port. To measure USB Tc, insert a K-type thermal probe between micro-USB and top encasement of the ORB controller as shown. Solder the tip of the thermal probe to the center of the USB connector.

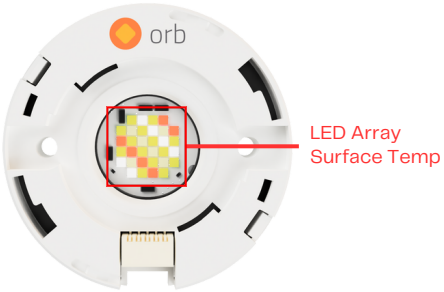

Figure 2 - To measure LED array surface temperature, use thermal camera with diffuser removed after system reached thermal equilibrium

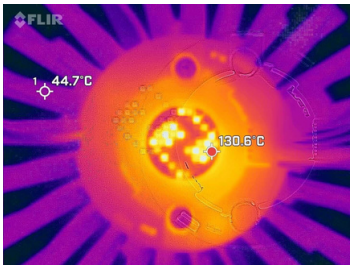

Figure 3 - Example thermal capture of LED array surface temperature

Test Setup and Procedure

1.DMX Configurations:

LoDA	To maximize the USB Tc temperature:	To maximize the LED array surface temperature:
L502A-RGB2040	• Set DMX personality to IKSH • Configure DMX addresses as follows: Address 1: 255 (100%) Address 2: 174 (68%) Address 3: 0 (0%) Address 4: 0 (0%)	• Set DMX personality to RGBWW • Configure DMX addresses as follows: Address 1: 255 (100%) Address 2: 0 (0%) Address 3: 0 (0%) Address 4: 255 (100%) Address 5: 0 (0%)
L513A-RGB1840	• Set DMX personality to IKSH • Configure DMX addresses as follows: Address 1: 255 (100%) Address 2: 255 (100%) Address 3: 0 (0%) Address 4: 0 (0%)	• Set DMX personality to IKSH • Configure DMX addresses as follows: Address 1: 255 (0%) Address 2: 0 (0%) Address 3: 0 (0%) Address 4: 0 (0%) Address 5: 0 (0%)
L512A-RGB1840	• Set DMX personality to IKSH • Configure DMX addresses as follows: Address 1: 255 (100%) Address 2: 212 (83%) Address 3: 0 (0%) Address 4: 0 (0%)	• Set DMX personality to IKSH • Configure DMX addresses as follows: Address 1: 255 (100%) Address 2: 0 (0%) Address 3: 0 (0%) Address 4: 0 (0%) Address 5: 0 (0%)
L511A-RGB1840	• Set DMX personality to IKSH • Configure DMX addresses as follows: Address 1: 255 (100%) Address 2: 255 (100%) Address 3: 0 (0%) Address 4: 0 (0%)	• Set DMX personality to RGBWW • Configure DMX addresses as follows: Address 1: 255 (100%) Address 2: 0 (0%) Address 3: 0 (0%) Address 4: 255 (100%) Address 5: 0 (0%)

2. Controller Operation:

- Run the controller for at least one hour or until thermal equilibrium is reached.
- Operate the system in the intended application environment, including the proper diffuser and reflector.
- Both scenarios, (maximizing USB Tc temperature and maximizing LED array surface temperature) must be run to ensure that both the contoller and the LED module remain within thermal limits at all possible channel commands.

3. Data Recording:

- Record the USB Tc temperature during operation.
- After the test, remove the diffuser and immediately capture a thermal image of the LED module, as it will begin cooling.
- **Caution:** The LED module will be very hot at thermal equilibrium. Neither test point should exceed the ratings provides in the Thermal Specification table. If the thermal measurement exceeds the ratings provided in the Thermal Specification table, consider improving the thermal transfer material or heat sink, or derating the max intensity of the controller.

Measurement Methods

USB Tc Temperature Measurement:

- Use a K-type thermocouple.
- Solder the thermocouple to the top of the USB shield (outer encasement).

LED Array Surface Temperature Measurement:

- Use a thermal camera.
- Record the temperature at the hottest point on the LED array (typically an LED near the center of the module).
- Ensure the thermal camera's readings are not influenced by visible light.

Temperature Rating Compliance

For Higher Ambient Temperatures:

- Test the system at the desired ambient temperature and verify that the LED array surface temperature does not exceed the rated limit.
- If the temperature exceeds the rated limit, reduce the maximum intensity using the APT Programmer and repeat the test.
- If testing at higher ambient temperatures is not possible, apply a derating by reducing the LED array surface temperature by the number of degrees the ambient temperature exceeds **25°C.**

This procedure ensures that the LED controller operates within safe temperature limits under various conditions while maintaining performance in its intended application environment.