

Application Note:

DALI-2 D4i Integrated Bus Supplies and Auxiliary Supplies

Purpose and Scope:

The purpose of this application note is to outline the best practices when utilizing the DALI Bus Supply and Auxiliary Supply features present in Inventronics DALI-2 D4i LED drivers.

Introduction:

D4i is an extension of the DALI-2 certification and outlines a specific set of features to be included in the LED driver. Table 1 below outlines the requirements for DALI-2 drivers and DALI-2 D4i drivers. For more information on DALI-2 and D4i, please reference our [DALI, DALI-2 and D4i Technical Primer](#).

Table 1: DALI-2 and DALI-2 D4i Requirements

DALI-2 and DALI-2 D4i Requirements				
IEC 62386 Standard	DALI Standard	Description	Required for DALI-2	Required for D4i
IEC-62386-101	DALI Part 101	General DALI Requirements	X	X
IEC-62386-102	DALI Part 102	General Control Gear Requirements	X	X
IEC-62386-207	DALI Part 207	DALI for LED Modules	X	X
-	DALI Part 250	Integrated DALI Bus Supply	-	X
-	DALI Part 251	Memory Bank 1 Extension	-	X
-	DALI Part 252	Energy Reporting	-	X
-	DALI Part 253	Diagnostics and Maintenance	-	X
-	DALI Part 150	Auxiliary Supply	-	-

DALI Part 150 standardizes driver auxiliary power supplies. While not explicitly required by DALI-2 D4i, DALI Part 150 compliant auxiliary supplies are commonly included in DALI-2 D4i drivers. All Inventronics DALI-2 D4i drivers include an auxiliary supply that complies to this standard.

DALI Bus Supply Application Note:

DALI Bus Supply Introduction:

A DALI Bus Supply is a required part of every DALI network, and without it, the DALI network will not function. DALI Part 101 (IEC-62386-101:2014) states that the maximum DALI bus current must not exceed 250mA. The maximum bus supply current of a DALI network can be calculated by the summation of the maximum supply current of each DALI bus supply device. Multiple DALI bus supplies can co-exist on a DALI network, but only if the combined bus supply current is less than or equal to 250mA. To aid in designing DALI networks, Inventronics lists the maximum supply current of a DALI bus each products datasheet, as shown in Figure 1.

Output Specifications (Continued)				
Parameter	Min.	Typ.	Max.	Notes
Integrated DALI-2 Bus Power Supply Voltage	12 Vdc	16 Vdc	20 Vdc	Voltage is depending on loading.
Integrated DALI-2 Bus Power Supply Current	50 mA	-	60 mA	Return terminal is "DA-"

Notes: (1) DALI-2 bus power supply is enabled by default and can be disabled via programming interface.
 (2) DALI-2 bus power supply supports automatic shut-down and restart after short-circuit.

Figure 1: Example of Bus Supply Specifications in Datasheet

The relationship between rated minimum supply current, rated maximum supply current, and maximum DALI bus current is shown below in Equation 1. This equation is defined by IEC-62386-101:2014.

Equation 1: Compliant DALI Bus Supply Relationship

$$\sum DALI\ Bus\ Supply\ Current_{Min} \leq \sum DALI\ Bus\ Supply\ Current_{Max} \leq 250mA$$

If the maximum bus supply current is exceeded, there is a risk of damage to devices connected to the DALI bus.

DALI Part 250 standardizes the enabling and disabling of DALI Bus Supplies. According to the DALI Alliance, to be D4i compliant, the DALI bus supply must be enabled by default from the manufacturer. Therefore, all Inventronics DALI-2 D4i drivers have the DALI bus supply enabled by default.

More information about DALI Bus Supplies can be found in section 4.7 of IEC-62386-101:2014, and DALI Part 250.

Disabling Inventronics DALI Bus Supplies, and When to Disable:

When to Disable

All Inventronics DALI-2 D4i drivers supply a maximum DALI bus current of 60mA, and the DALI bus supply is enabled by default. Therefore, if more than four drivers are connected to the DALI network, the DALI bus supply of subsequent drivers or other DALI devices must be disabled. If other DALI bus supplies are present on the network, then these devices will need to be taken into consideration in the bus supply current calculation. If a DALI network has already been installed, and the bus current supply limit is exceeded, it will be necessary to split the system into smaller compliant segments, and program each segment individually.

How to Disable the DALI Bus Supply

The DALI bus supply of an Inventronics DALI-2 D4i driver can be disabled using a compatible Inventronics programmer and the Inventronics Multi-Programmer software. DALI Part 250 compliant bus supplies may also be disabled or enabled with standardized DALI commands, but these methods are outside the scope of this application note.

To disable the DALI bus supply using the Inventronics Multi-Programmer software, the below steps should be followed.

1. Connect a compatible Inventronics programmer to your PC. Compatible programmers include
 - a. Inventronics PRG-MUL2*
 - i. The PRG-MUL2 can program up to 3 drivers at once. If you wish to use this method, use step 6.
 - b. ZHAGA Book 24 compliant NFC Reader**
 - i. For NFC, use step 5.

*If using the Inventronics PRG-MUL2, the driver must be powered.

If using a ZHAGA Book 24 compliant NFC Reader, the driver must **not be powered.

2. Launch the Inventronics Multi-Programmer Software
3. Select and start the DALI Driver software, shown in Figure 2 below.

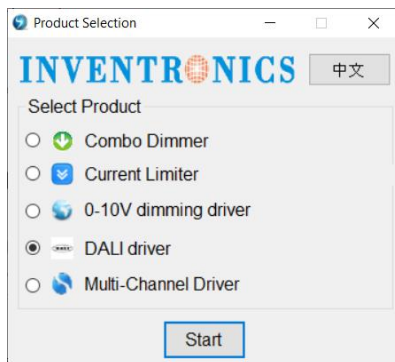


Figure 2: Software Options

4. Connect the driver to the PRG-MUL2 programmer or place the NFC reader near the driver NFC antenna.
5. **NFC and 1:1 Programming Only**
 - a. Select “Read” as shown in Figure 3 below

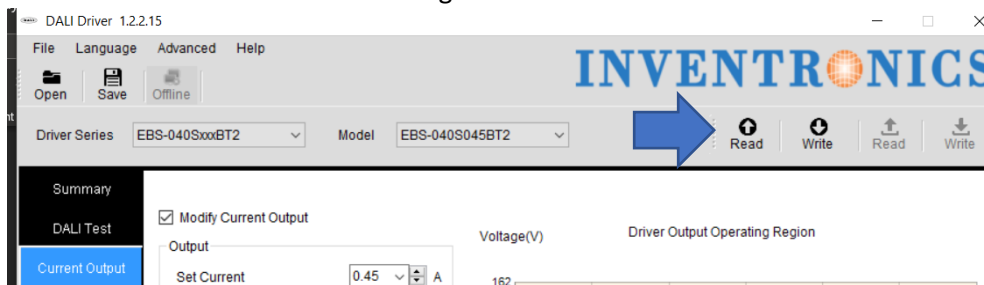


Figure 3: Read Driver

6. PRG-MUL2 Multi-Program Only:

- a. If using the PRG-MUL2 to disable the DALI Bus supply of multiple drivers at once, click “Driver Series” and select the correct driver, as shown in Figure 4.

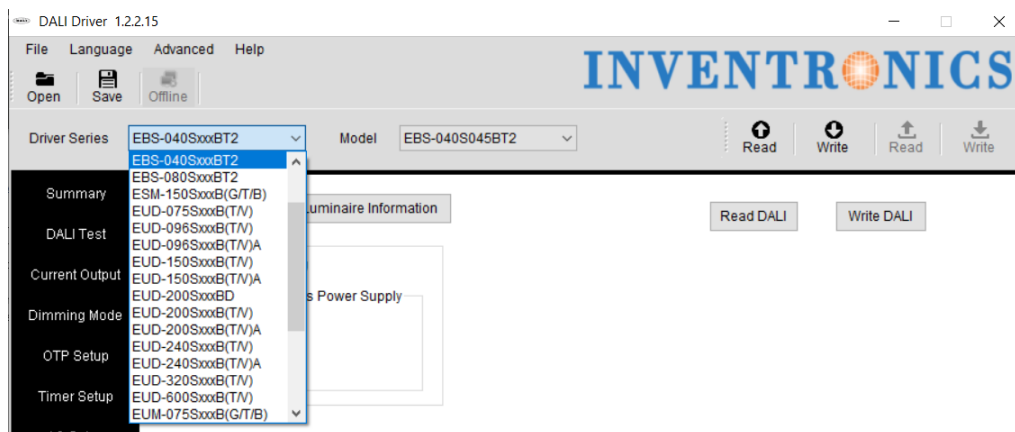


Figure 4: Series Selection for Multi-Program

7. Program the Driver (Figure 5)

- a. Select “DALI-2 D4i”
- b. Check the “Modify Driver” Check box
- c. Select the “Disable” radio button
- d. Select “Write DALI”
 - i. Write DALI will only write the DALI parameters shown on the screen. If you are changing other driver parameters, use the “Master Write” button, shown in the yellow square.
 - ii. “Write DALI” is only available when using the PRG-MUL2. The “Write DALI” button will broadcast the command to disable DALI power supplies to the DALI network. Up to 3 Inventronics DALI-2 D4i drivers may be programmed at once.

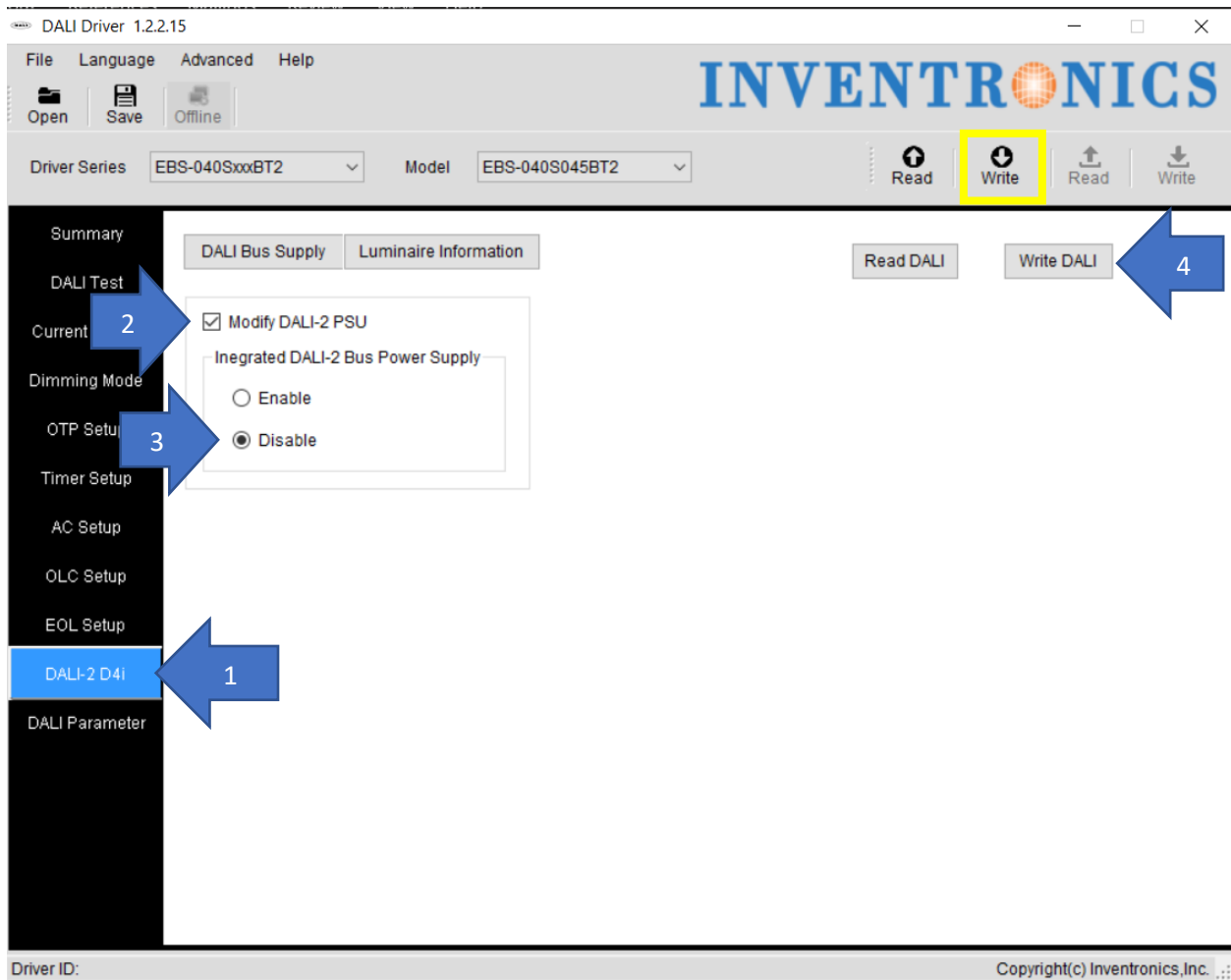


Figure 5: Programming the Driver

8. If the PRG-MUL2 is used, the driver, or drivers, must be power cycled after programming. If the NFC programmer is used, such steps do not need to be taken.

Application Note: DALI Part 150 Auxiliary Supplies

All Inventronics DALI-2 D4i drivers include a 24Vdc DALI Part 150 compliant auxiliary supply. Connecting multiple auxiliary supplies together is not supported more than one D4i LED driver is used in an intraluminaire network, then only one LED driver shall power the 24Vdc bus. **Connecting multiple auxiliary supplies together will damage the driver.** Shown below in Figure 6 below is an example wiring diagram for a ZHAGA D4i fixture with multiple drivers.

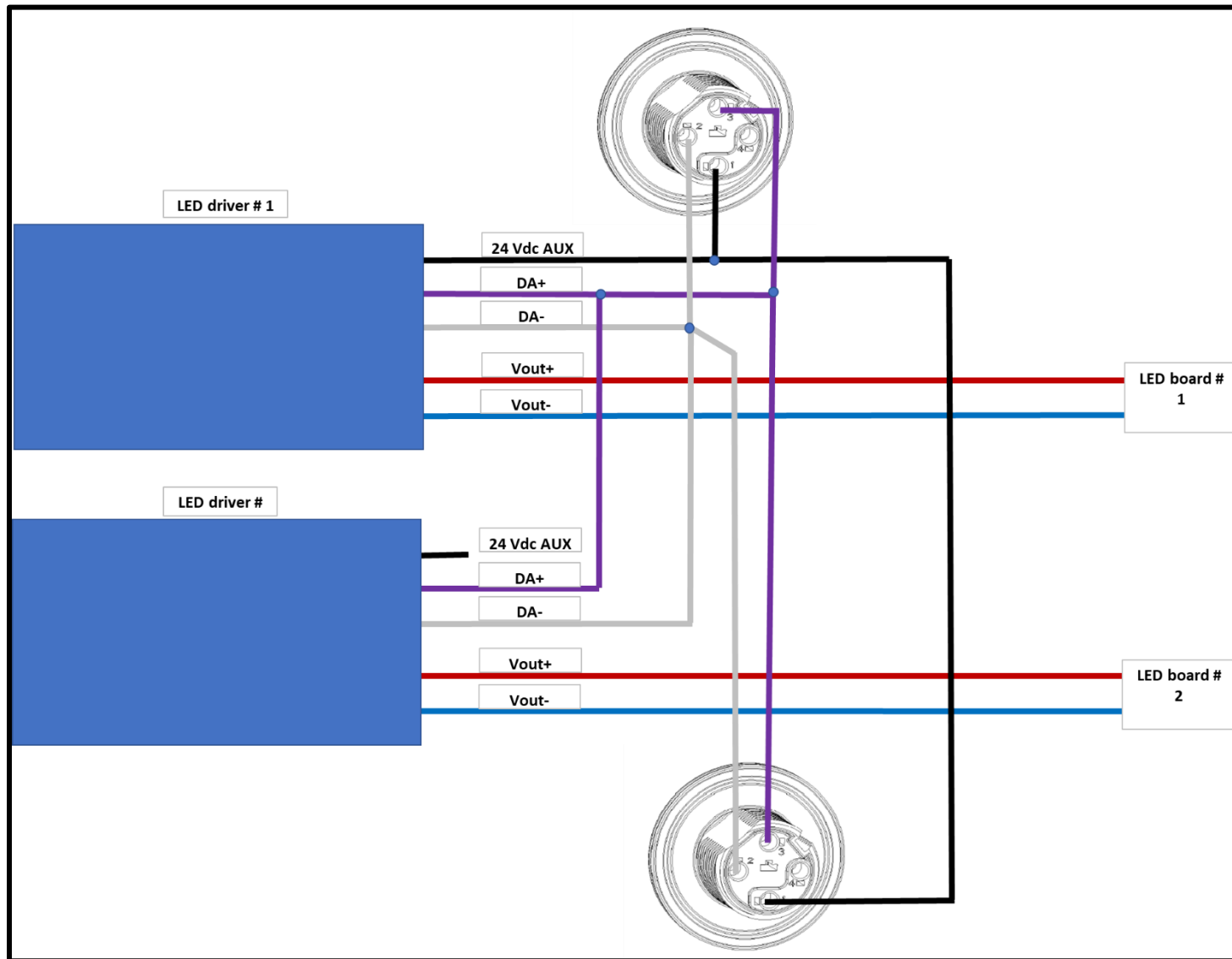


Figure 6: Vaux Wiring Diagram for Zhaga D4i Luminaire

Disclaimer

This note is for reference only. It is the responsibility of the customer to thoroughly analyze all aspects of the customers' proposed application for the products. The customer is solely responsible for making the final selection of the product(s) to be used and to assure that all performance and safety requirements of the application are satisfied. Inventronics makes no representation or warranty as to the completeness or accuracy of the information contained herein. The products and specifications set forth in this document are subject to change without notice and Inventronics disclaims any and all liability for such changes.

Information presented in this note is subject to change without notice