PanL Mood Lighting (ML) DALI/DMX 512 Controller (PC0011)
Datasheet

1 Introduction

The PanL **M**ood **L**ighting (ML) **C**ontroller brings digital technology into lighting controls through DALI/DMX protocols enabling each individual light to hold a unique address for dimming, RGB hue controls and selective on/off without the need for re-wiring. Used together with the PanL Hub, smart lighting controls can be enabled for existing or new lighting installations.

1.1 Features

The PanL ML Controller has the following features:

- 32-bit RISC microcontroller FT903 with 100MHz system clock

- DMX Output supports up to 512 RGB channel

- DALI Output supports up to 64 DALI drivers

- Rotary switch for ID configuration

- RJ45 Ports support RS485 Interface to PanL Hub, PanL Terminator, daisy chain to another PanL ML Controller or other PanL Devices

- Powered by PanL Hub at 24V DC Input through either P1 or P2 RJ45 port

- Max 1 watt power consumption

- Operating temperature range: 0°C to +55°C

2 Part Numbers/Ordering Information

Part#	Description
PC-0011-00A	PanL Mood Light (ML) Controller with DALI and DMX512 Interface

Table 1 - Part Numbers / Ordering Information

Table of Contents

3 Specifications

Platform	Microcontroller	FT903Q
Features	Interface1	DALI
	Interface2	DMX512
	Reset Button	Push Switch
	Power Indicator	Red LED
	Status Indicator	4x RGB LEDs
	One Wire (1W) Interface	Reserved for factory use only
Power	Input Voltage	+9V to +24V DC (P1/P2 RJ45 in Parallel)
	Micro USB	Reserved for factory use only
Physical Characteristics	Color	White
	Housing	Polycarbonate
	Dimensions	145.70 x 96.70 x 29.00 mm
	Weight	155g
Environmental Limits	Operating Temperature	0 to 55°C
	Storage Temperature	0 to 70°C
	Ambient Relative Humidity	20 to 85% (non-condensing)
Standards & Certifications	EMC (FCC/CE)	EN 55032:2015+AC:2016 Class B CISPR 32:2015+C1: 2016 Class B EN 55035:2017 FCC PART 15, Subpart B
Package Contents	Device	1x PanL ML Controller
	Documentation	1x Quick Start Guide

Table 2 - PanL ML Controller Specifications

4 FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) These devices may not cause harmful interference, and

(2) These devices must accept any interference received, including interference that may cause undesired operation.

NOTE: The equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF exposure guidelines, at least 20cm of separation distance between the device and the user's body must be always maintained.

FCC Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and consider removing the no-collocation statement.

Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
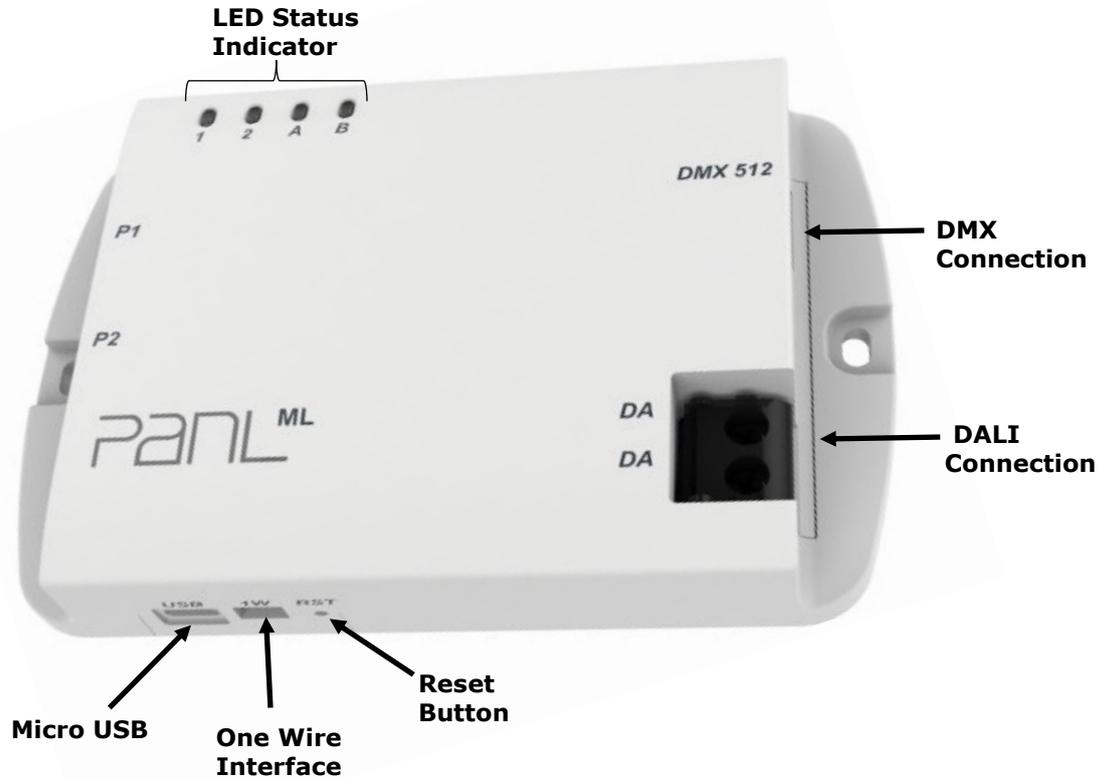
5 Hardware Features

Figure 1 - PanL ML Controller Front View
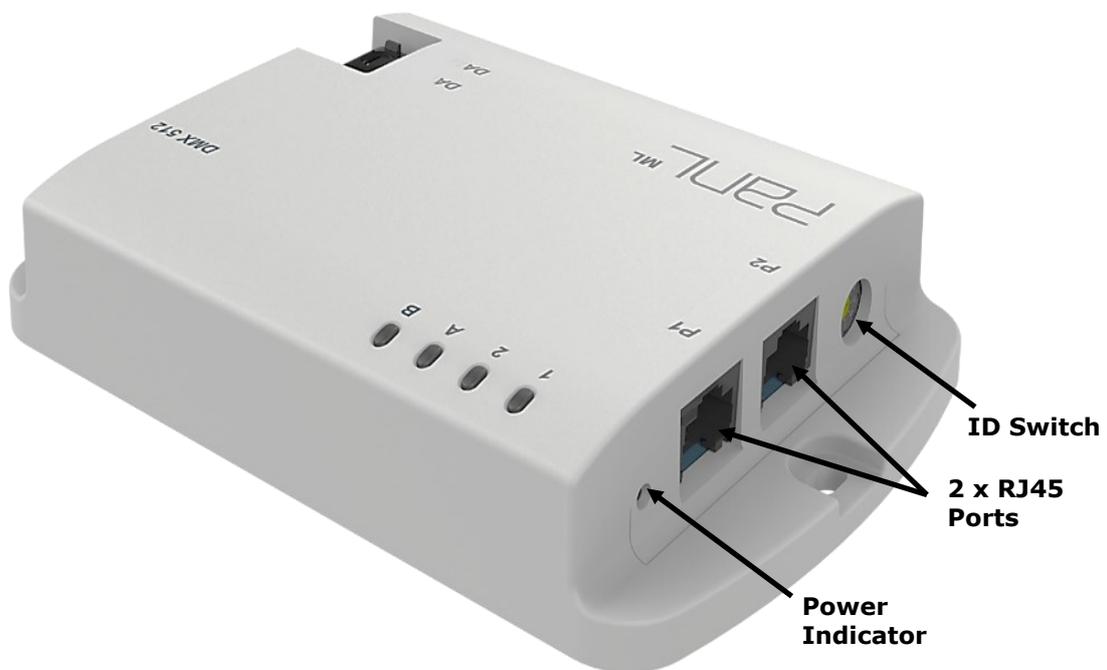

Figure 2 - PanL ML Controller Side View

5.1   Power Supply

The PanL ML Controller receives power externally from PanL Hub through the P1/P2 RJ45 ports. Input supply voltage is 9VDC to 24VDC (nominally 24VDC, 500mA from PanL Hub).

5.2   Micro-Controller

The FT903Q 100-pin QFN microcontroller which is provided on the board belongs to the 32-bit FT90X Super Bridging Microcontroller family.

5.3   Power Indicator

A red color LED indicates the power status (ON/OFF) of the PanL ML Controller.

5.4   P1 and P2 (RJ45) Port

P1 and P2 (RJ45) ports are used either as input or output terminal connected to the PanL Hub, other PanL Devices or another PanL ML Controller device as illustrated below. When a single PanL ML Controller is connected to a PanL Hub port, the maximum length of the RJ45 8P8C cable shall not exceed 100 meters. For multiple PanL ML Controllers connected to a single PanL Hub port, the first connection to PanL Hub and the subsequent connections in between the PanL ML Controller devices must not exceed 50 meters in cable length each. A single PanL Hub port can support up to three PanL ML Controllers. The total combined cable length must not exceed 100 meters. Connect the PanL terminator provided in PanL Hub box to the last unconnected PanL ML Controller's P1 or P2 port.
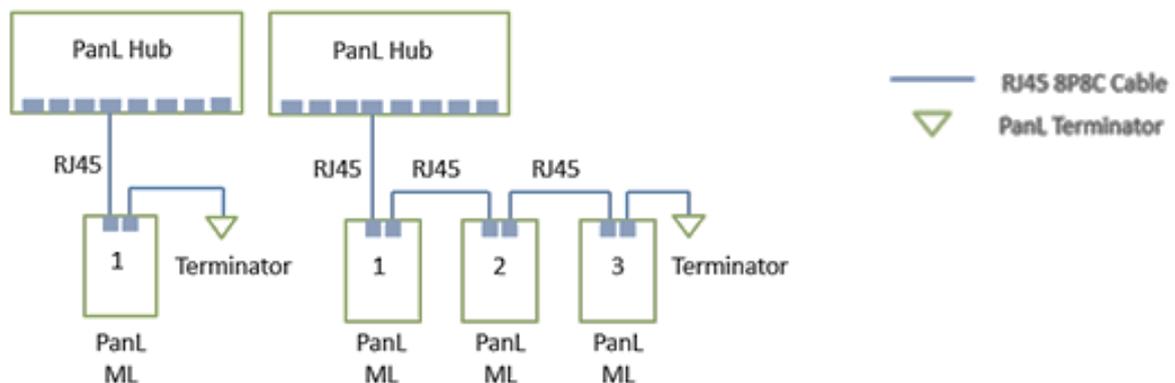
Figure 3 - Daisy Chain Network

5.5   ID Switch

For multiple PanL ML Controllers or mixed PanL Device daisy chain connection to a single PanL Hub port, the ID switch must be configured to be unique. Using a Philip head screwdriver, set a unique number for each device between 0-7 (8-9 are reserved). For example, if connecting 3 PanL ML Controller to a PanL Hub port, you may set it as 0, 1, and 2. PanL ML Controllers connected to different PanL Hub ports can share the same unique number.

5.6   Reset Button

A device reset pin (within the pin hole) may be used to reset the PanL ML Controller.

5.7   USB Interface

This is reserved for factory use only.

5.8   One Wire Interface

This is reserved for factory use only.

5.9   DALI Interface

Connect the DALI bus wires to the two DA terminals on PanL ML Controller and tighten the screws for a secure connection. The DALI bus is polarity-free and so the two wires may be connected to either port. The recommended maximum length of the bus is 300 meters when 16AWG wire is used. PanL ML Controller supports up to 64 DALI drivers with the use of an external DALI bus power supply. See Figure 4:
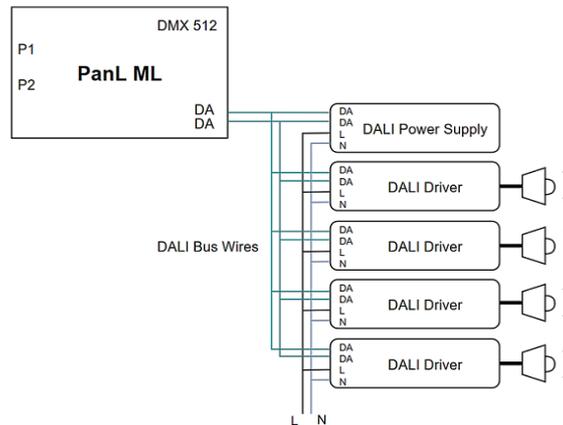

Figure 4 - Wiring Structure

Wiring Structure:

It is recommended that the 2 DALI wires be closely placed to each other in a cable conduit to prevent unintended coupling to other signals. To balance the voltage drops across all the DALI driver wires, the DALI Bus PSU should be central to all the connections.

5.10 DMX Interface

Connect a RJ45 cable from the PanL ML Controller port labelled DMX 512 to the first DMX decoder and connect a DMX terminator to the last unused decoder port as illustrated in the example below. The PanL ML Controller supports up to 512 DMX channels. Depending on the number of channel(s) per decoder used, the cumulative channels must not exceed 512 for all connected decoders. Please refer to the decoder's data sheet for any cable length specifications.
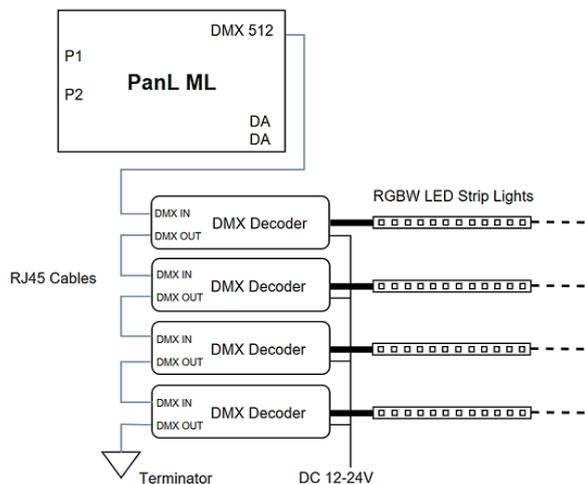
Figure 5 - DMX Setup

6 System Status LED Indicators

4 x RGB LEDs indicate the functioning status of the PanL ML Controller. Refer to the table below-

Normal Function Status	System Status (1)		Communications (2)		DALI Status (A)		DMX Status (B)	
Power On Status	Red	🔴	Red	🔴	Red	🔴	Red	🔴
Boot Success	Green	🟢	Red	🔴	Off	⚫	Off	⚫
No Communication	Green	🟢	Red	🔴	Off	⚫	Off	⚫
Communication	Green	🟢	Green*	🟢	Off	⚫	Off	⚫
DALI Data Transfer	Green	🟢	Green*	🟢	Green*	🟢	Off	⚫
DMX Data Transfer	Green	🟢	Green*	🟢	Off	⚫	Green*	🟢
Discover in Progress	Green	🟢	Green*	🟢	Green	🟢	Off	⚫

Failsafe Status	System Status (1)		Communications (2)		DALI Status (A)		DMX Status (B)	
Power On Status	Red**	🔴	Off	⚫	Off	⚫	Off	⚫
Boot Success	Red**	🔴	Off	⚫	Off	⚫	Off	⚫
No Communication	Red**	🔴	Red	🔴	Off	⚫	Off	⚫
Communication	Off	⚫	Green*	🟢	Off	⚫	Off	⚫
Waiting for Recovery	RED <-> GREEN**	🔴↔🟢	Green*	🟢	Off	⚫	Off	⚫
Discover in Progress	RED <-> YELLOW**	🔴↔🟡	Green*	🟢	Off	⚫	Off	⚫
Recovery Done	Green**	🟢	Green**	🟢	Off	⚫	Off	⚫

* - LED blinks during data transfer
**- LED blinks twice a second (2Hz rate)

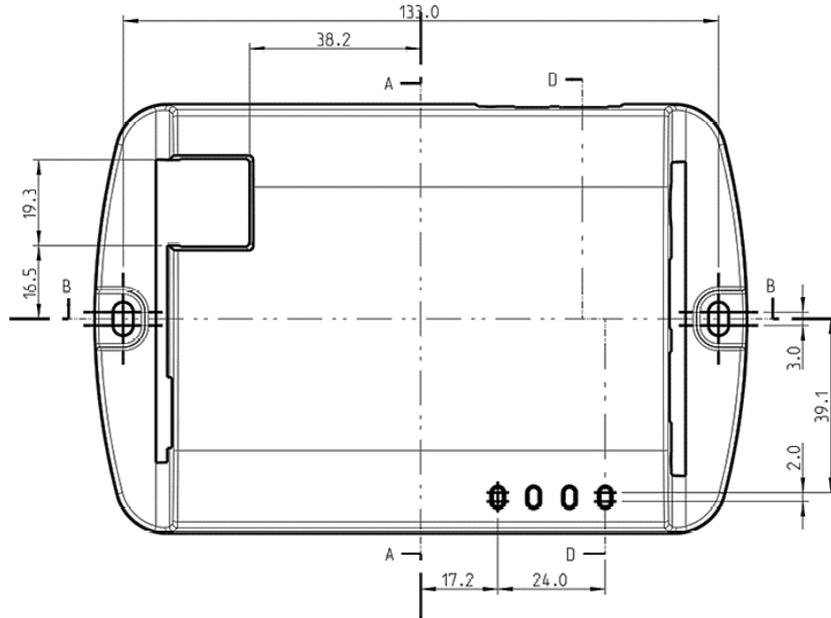**Table 3 - System Status LED Indicator**

7 Mechanical Dimensions

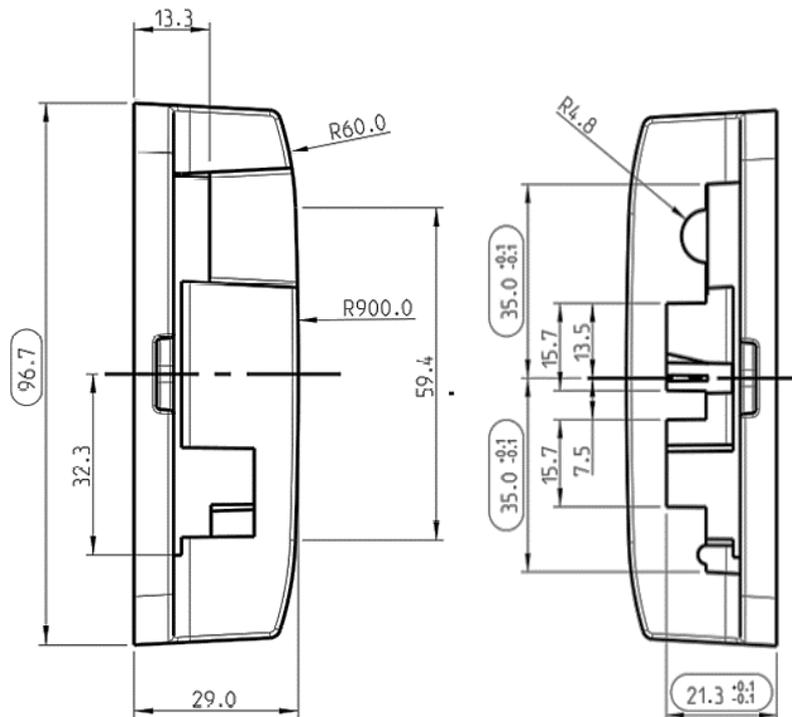**Figure 6 - PanL ML Controller Dimensions – Top View**

Figure 7 - PanL ML Controller Dimensions – Side View

8 Contact Information

Refer to https://brtsys.com/contact-us/ for contact information.

Appendix A – References

Document References

NA

Acronyms and Abbreviations

Term	Description
DALI	Digital Addressable Lighting Interface
DMX	Digital Multiplex
LED	Light Emitting Diode
ML	Mood Lighting
MCU	Microcontroller Unit
RGB	Red, Blue Green
RISC	Reduced Instruction Set Computer

Appendix B – List of Tables & Figures

List of Figures

List of Tables

Appendix C – Revision History

Document Title: PanL Mood Lighting (ML) DALI/DMX 512 Controller Datasheet

Document Reference No.:   BRTSYS_000095

Clearance No.:   BRTSYS#145

Product Page: https://brtsys.com/product/mood-lighting-controller/

Document Feedback: Send Feedback

Revision	Changes	Date
1.0	Initial Release	31-12-2019
1.1	Document migrated from BRT to BRTSYS and updated	12-01-2026