Lighting Communications Development Platform
Product Highlights & Demonstrations

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Revision 1.2

Lighting Communications Development Platform

Universal Lighting Protocol Development
FREE 'C' Library Stack (DALI, DMX512A)
Dimming & Color Mixing Control
Customizable Capabilities

Platform Features

Main Communication Board Highlights (DM160214)

- Populated with PIC16F1947 controlling:
    - Communications
    - User Interface: LCD, buttons, slider
    - LED constant current drive
- Populated with Cree XLamp MC-E Color LED
- Populated with the LEDnLIGHT optic and holder

Prototyping Communication Board Highlights (AC160214)

- Populated with PIC16F1947 for user interface and communications
- Bread boarding space for customized lighting development

Universal Communications Adapter Interface

- DALI Adapter (DM160214-1)
- DMX512A Adapter (DM160214-2)
- Support for future protocol adapters (eg. RF)

Available for purchase separately or as a kit…

DALI Starter Kit (DV160214-1)
DMX512A Starter Kit (DV160214-2)

- (2) DALI or (2) DMX512A Adapters
- (2) Main Communication Boards
- (1) Prototyping Communication Board
- 9V International power supply
- RJ45 Patch cable

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Lighting Communications Development Platform
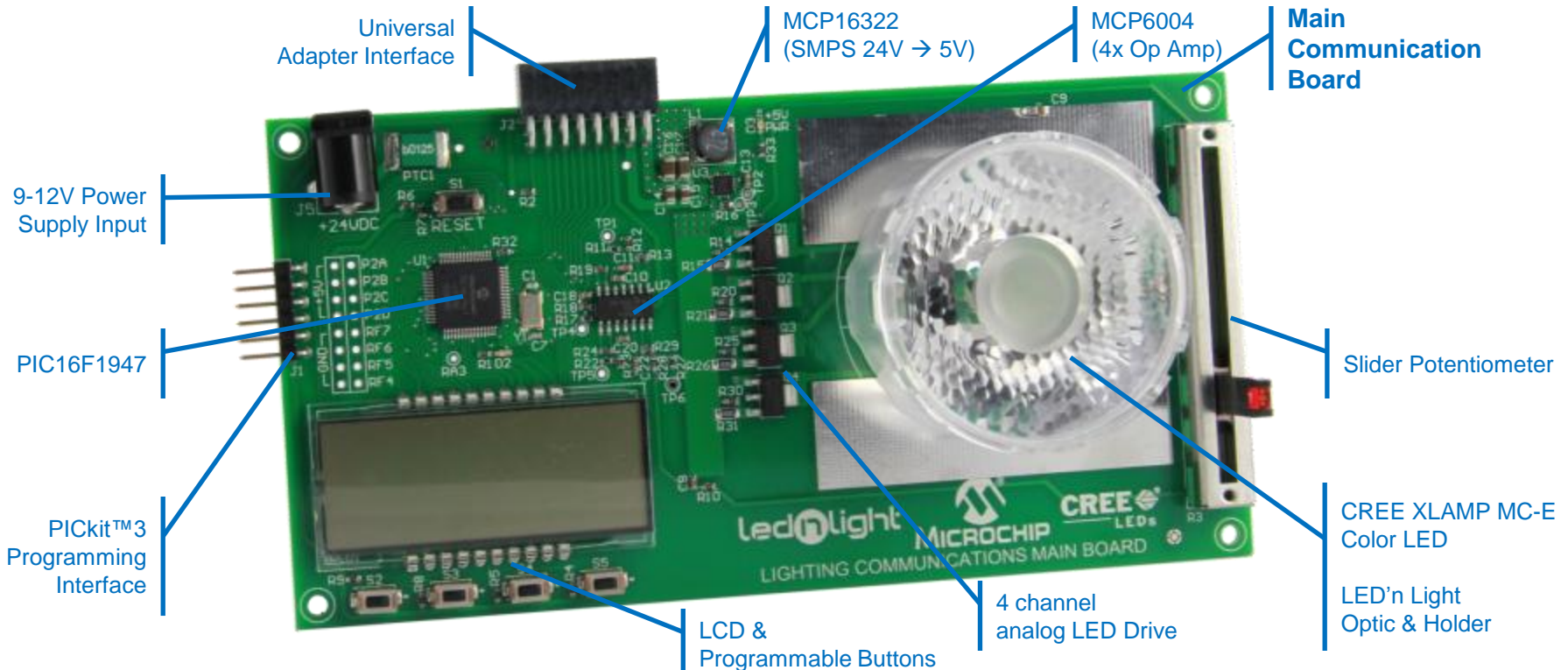## Main Communication Board & Adapters

DALI Adapter with 2-wire & RJ45 connections

DMX512A Adapter with 5-pin barrel & RJ45 connections

Support for future adapters (eg. Wireless)

Universal Adapter Interface

MCP16322 (SMPS 24V → 5V)

MCP6004 (4x Op Amp)

Main Communication Board

9-12V Power Supply Input

PIC16F1947

PICkit™3 Programming Interface

Slider Potentiometer

CREE XLAMP MC-E Color LED

LED'n Light Optic & Holder

LCD & Programmable Buttons

4 channel analog LED Drive

Lighting Communications Development Platform
Prototyping Communication Board & Adapters

DALI Adapter with 2-wire & RJ45 connections

DMX512A Adapter with 5-pin barrel & RJ45 connections

Support for future adapters (eg. Wireless)
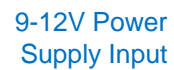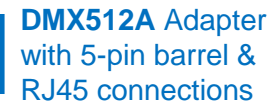
Universal Adapter Interface

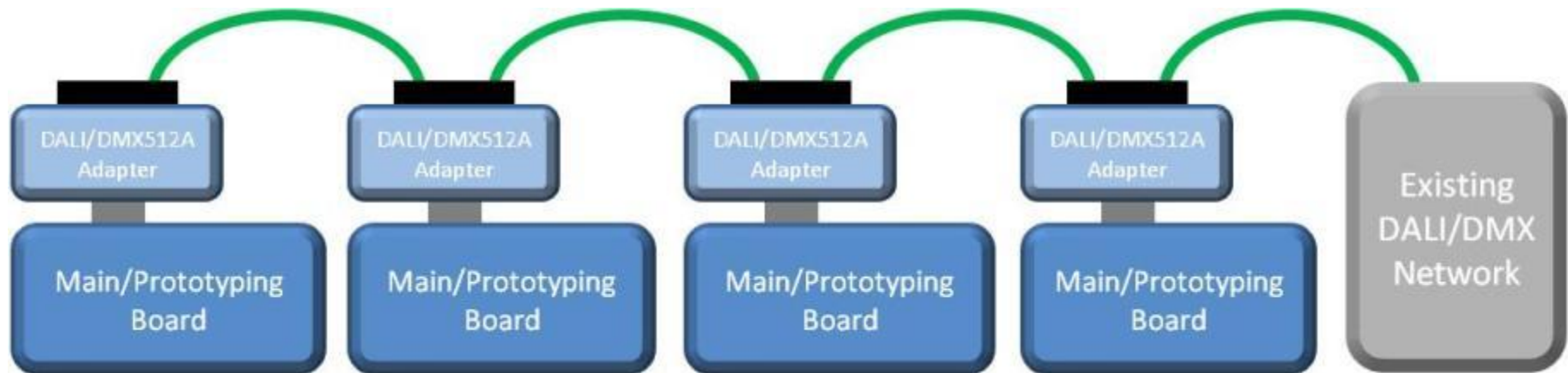MCP16322 (SMPS 24V → 5V)

Prototyping Communication Board

9-12V Power Supply Input

PIC16F1947

Bread boarding space

PICkit™3 Programming Interface

Configuration

- Minimum of (2) main or (2) prototyping boards
- Minimum of (2) adapters
  - connected via appropriate cabling
    - RJ45 patch cable
    - DMX512A 5-pin barrel cable
    - DALI 2-wire

DALI

DALI – "Digital Addressable Lighting Interface"

- Designed primarily for Commercial & Industrial lighting
- 2-wire connection and offers individual lamp or group addressability in a bus configuration

FREE DALI Firmware Library

- 'C' based firmware library
- Control Device (master) & Control Gear (slave) libraries
- Automated Commissioning
- Simple API for ease of use
- Firmware implementation on any 8-bit PIC Microcontroller
    - PIC Microcontroller Requirements
        - (1) 8-bit timer / (1) 16-bit timer
        - EEPROM or Emulated EEPROM (self-write Flash)
        - ~4KW Flash Program memory footprint (final code size TBD)
- Compliance
    - IEC 62386-101 (DALI general system requirements)
    - IEC 62386-102 (DALI general system requirements – control gear)
    - Future support for IEC 62386-2xx implementation (particular requirements for control gear; eg. LED, Fluorescent, etc.)

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DMX512A

DMX512 – "Digital Multiplex with 512 pieces of information"

- Designed primarily for Theatrical & Architectural lighting
- Increased reliability over that of 0-10V

FREE DMX512A Firmware Library

- 'C' based firmware library
- Controller (master) & Receiver (slave) in a single library
- Simple API for ease of use
- Firmware implementation on any PIC Microcontroller
  - PIC Microcontroller Requirements
    - (1) EUSART
    - (1) 16-bit timer
    - ~1W Flash Program memory footprint
- Compliance
  - ANSI E1.11-2008 (USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories)

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Partner Overview

Cree®, Inc. leads the industry through performance and application optimized lighting-class LEDs that simplify design and lower system costs to obsolete energy-wasting traditional lighting. Cree's relentless innovation drives the LED lighting revolution with products designed to accelerate LED adoption and push the boundaries of what's possible with LED lighting. Cree's LED product families include Cree® XLamp® and High Brightness LEDs.

LEDnLIGHT optics are made by Gaggione SAS the LaCluse, France plastic optics manufacturer, who produces the very narrow beam collimator providing excellent color mixing properties to address stage lighting, entertainment lighting and architectural lighting applications to name a few.
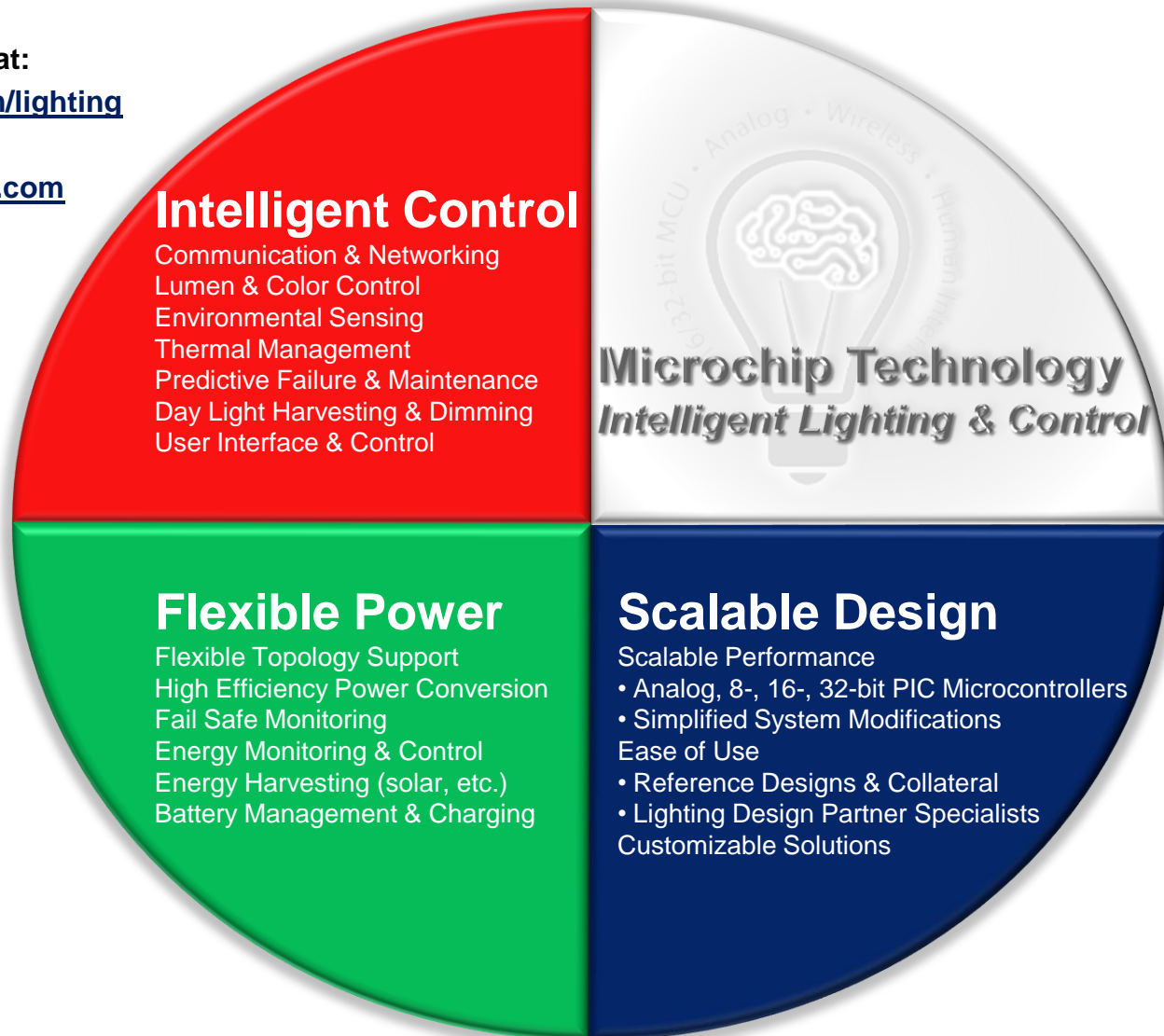
Intelligent Lighting & Control
Enabling Innovation in Lighting…

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Predictive Failure & Maintenance
Day Light Harvesting & Dimming
User Interface & Control

Microchip Technology
Intelligent Lighting & Control

Flexible Power

Flexible Topology Support
High Efficiency Power Conversion
Fail Safe Monitoring
Energy Monitoring & Control
Energy Harvesting (solar, etc.)
Battery Management & Charging

Scalable Design

Scalable Performance
• Analog, 8-, 16-, 32-bit PIC Microcontrollers
• Simplified System Modifications
Ease of Use
• Reference Designs & Collateral
• Lighting Design Partner Specialists
Customizable Solutions

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Demonstrations

Stand-Alone RGBW

DMX512A Controller & Receiver

DALI Control Device & Control Gear

Stand-Alone RGBW
Demonstration Overview

Demonstration Overview

- Self contained demonstration WITHOUT communications control
- Main Communication Board performing RGBW (RED, GREEN, BLUE, WHITE) color mix
- PIC16F1947 Controlled Features
    - RGBW LED color mixing via constant current control
    - Slider & button interface
    - LCD drive & control

Hardware Requirements

- (1) Main Communication Board
- 9-12V Power Supply

Firmware Requirements

- Demonstration code
    - StandAloneDemo.X.production.hex

Downloadable at www.microchip.com/lightingcomms

1 **Program Main Board**

● Utilize PICkit3 to program Main Communication Board with StandAloneDemo.X.production.hex

2

Provide Power

● Insert 9-12V DC power cord
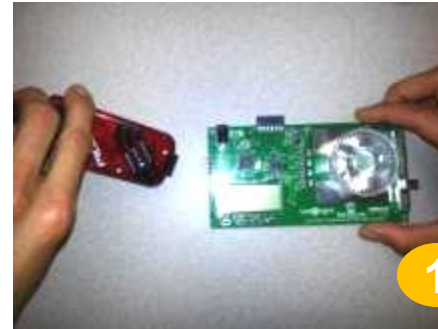
Stand-Alone RGBW
Demonstration Operation

Button 1 (S2) – 'rGb' LCD Display (power-up mode)

- Auto rotates through RED, GREEN, BLUE, WHITE and custom color mix
- Slider not used

Button 2 (S3) – 'FAdE' LCD Display

- Auto rotates through RED, GREEN, BLUE, WHITE and custom color mix with transition fade
- Slider not used

Button 3 (S4) – 'SLId' LCD Display

- Slider controlled rotation through RED, GREEN, BLUE, WHITE and custom color mix

Button 4 (S5) – 'LItE' LCD Display

- RED, GREEN, BLUE, WHITE simultaneously 'ON'
- Slider controlled simultaneous dimming of RED, GREEN, BLUE, WHITE

DMX512A Controller & Receiver
Demonstration Overview

Demonstration Overview

- DMX512A uni-directional communications control
- Single Controller sending commands to multiple Receivers
- Receivers performing RGBW (RED, GREEN, BLUE, WHITE) color mix based on Controller commands
- PIC16F1947 Controlled Features
    - RGBW LED color mixing via constant current control
    - Slider & button interface
    - LCD drive & control
    - DMX512A command & control

Hardware Requirements

- (3) Main Communication Board
- (3) DMX512A Adapters
- (2) RJ45 Patch Cables
    - Optional: (2) XLR5 Barrel Cables
- 9-12V Power Supply

Firmware Requirements

- Controller Demonstration code: DMX512A_ControllerDemo.hex
- Receiver Demonstration code: DMX512A_ReceiverDemo.hex

Downloadable at www.microchip.com/lightingcomms

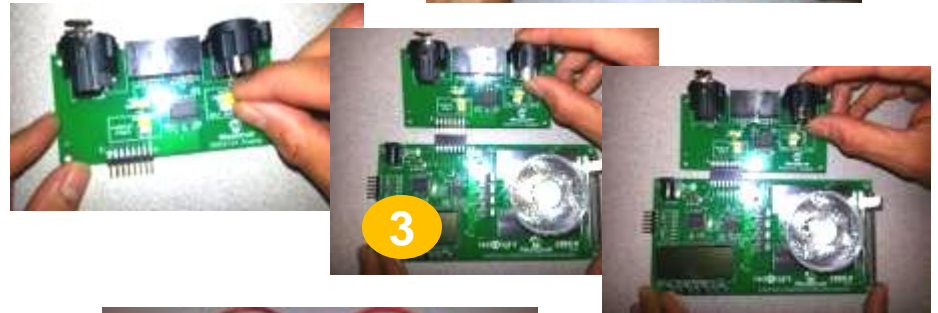# DMX512A Controller & Receiver
Demonstration Setup

1 **Program Controller**

- Utilize PICkit3 to program Main Communication Board with DMX512A_ControllerDemo.hex to create Controller

2 **Program Receivers**

- Utilize PICkit3 to program (2 or more) Main Communication Boards with DMX512A_ReceiverDemo.hex to create Receiver

3 **Setup & Attach Adapters**

- Set DMX512A Adapter Jumper Settings
  - J4 – ON
  - J5 – ON
  - J6 – ON
  - J7 – ON
  - J8 – ON
- Insert DMX512A adapters to all Main Communication Boards

4 **Connect Controller to Receivers**

- Connect Main Communication Boards with DMX512A adapters in a "Daisy Chain" configuration with either RJ45 patch cable or XLR5 barrel cables
  - Note whether the board is Controller or Receiver
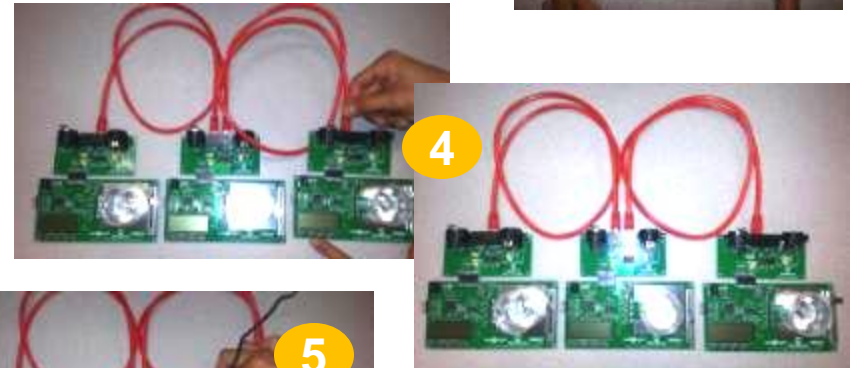
5 **Provide Power**

- Insert 9-12V DC power cord to Controller
  - Note that power to Receivers is provided via cabling "Phantom Power"

Receiver   Receiver   Controller

Receiver

LCD Displays

- 'r' for Receiver
- 3 Digit Base Address of Receiver: '000'

Button 1-3 (S2-S4)

- Sets Base Address of Receiver

Button 4 (S5)

- Not used

Slider

- Not used

1 Set base address of each Receiver to a unique or common address. Address 000 Not Used.

- Note that the base address of the Receiver sets the address of each individual color of the RGBW LED. The base address is assigned to RED with GREEN, BLUE and WHITE assigned incremental addresses.
- Example: Receiver base address set to 001 assigns address 001 to RED, 002 to BLUE, 003 to GREEN, 004 to WHITE of Receiver RGBW LED.
- Example: Receiver base address set to 005 assigns address 005 to RED, 006 to BLUE, 007 to GREEN, 008 to WHITE of Receiver RGBW LED.
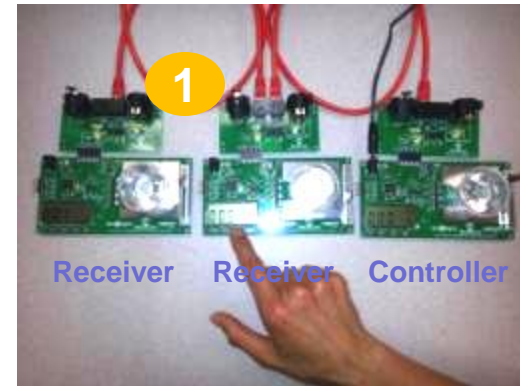
Receiver   Receiver   Controller

Controller

RGBW LED Not Used

LCD Displays

- 3 Digit Address of Specific Receiver LED: '000'
- Toggle Modes: 'C0', 'C1', 'C2'

Button 1-3 (S2-S4)

- Sets Address of Specific Receiver LED
  - Only used while in C2 mode

Button 4 (S5) – Rotates through modes

- C0 – 'OFF'
- **(1)** C1 – Sends commands to all Receivers to Auto rotate through RED, GREEN, BLUE, WHITE, and custom color mix (slider not used)
- **(2)** C2 – Controls specific Receiver LED colors based on Receiver address. Slider controlled dimming of individual RED, GREEN, BLUE, WHITE LEDs of the Receiver.
  - Example: Set Controller address display to '001'. Slider controls the RED LED of Receiver '001'
  - Example: Set Controller address display to '002'. Slider controls the GREEN LED of Receiver '001'
  - Example: Set Controller address display to '008'. Slider controls the WHITE LED of Receiver '005'

Receiver   Receiver   Controller

Receiver   Receiver   Controller
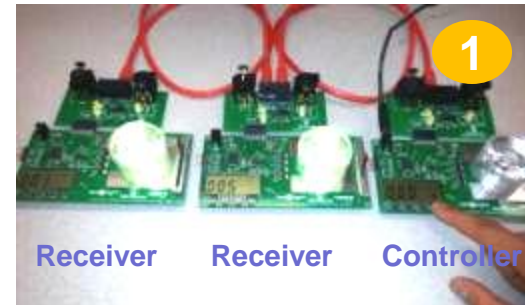
DALI Control Device & Control Gear
Demonstration Overview

Demonstration Overview

- DALI bi-directional communications control
- Single Control Device sending commands to multiple Control Gear
- Control Gear performing WHITE dimming based on Control Device commands
- PIC16F1947 Controlled Features
  - WHITE LED dimming via constant current control
  - Slider & button interface
  - LCD drive & control
  - DALI command & control

Hardware Requirements

- (3) Main Communication Board
- (3) DALI Adapters
- (2) RJ45 Patch Cables
  - Optional: (2) 2-wire cable
- 9-12V Power Supply

Firmware Requirements

- Control Device Demonstration code: DALI_ControlDeviceDemo.hex
- Control Gear Demonstration code: DALI_ControlGearDemo.hex

Downloadable at www.microchip.com/lightingcomms

DALI Control Device & Control Gear
Demonstration Setup

1 Program Control Device

- Utilize PICkit3 to program Main Communication Board with DALI_ControlDeviceDemo.hex to create Controller

2 Program Control Gear

- Utilize PICkit3 to program (2 or more) Main Communication Boards with DALI_ControlGearDemo.hex to create Receiver

3 Setup & Attach Adapters

Set DALI Adapter Jumper Settings

- J1 – ON
- J3 – ON
- J4 – ON
- J5 – ON

- Insert DALI adapters to all Main Communication Boards

4 Connect Control Device to Control Gear

Connect Main Communication Boards with DALI adapters in a "Daisy Chain" configuration with either RJ45 patch cable or 2-wire cables

- Note whether the board is Control Device or Control Gear

5 Provide Power

Insert 9-12V DC power cord to Control Device

- Note that power to Control Gear is provided via cabling "Phantom Power"

Control Gear   Control Gear   Control Device

Control Gear

Only WHITE LED Used

LCD Displays

- 'CG' for Control Gear
- When Non-Commissioned (address not assigned)
  - 'dALI'
- When Commissioned
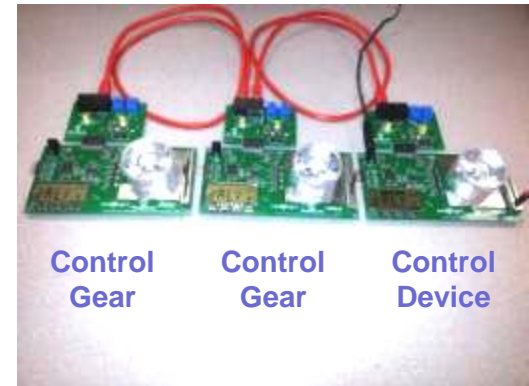 - 6 digit address of Control Gear: '0000^{00}'

Button 1-4 (S2-S5)

- Not used

Slider

- Not used

  Address of each Control Gear is set during the automated commissioning process initiated by the Control Device

Control Gear   Control Gear   Control Device

Control Device

RGBW LED Not Used

LCD Displays

- 'Cd' for Control Device
- Before/After Commissioning (addresses not assigned)
  - 'dALI'
- During Commissioning
  - 6 digit address of Control Gear: '0000^{00}'
- Status bar full: ▶▷▷▷▷▷▷▷▷

Button 1 (S2)

- Initiates automated commissioning

Button 2-4 (S3-S5)

- Assigned to specific Control Gear

Slider

- Dimming control of Control Gear

(1) Initiate automated commissioning process by pressing Button 1 of Control Device

- As the Control Device detects each Control Gear, the Control Gear WHITE LED will illuminate.
- Assign Control Gear to Button 2, 3, or 4 of Control Device – commissioning will continue. Repeat until all Control Gear are assigned to unique button.

(2) When commissioning is complete, Buttons 2-4 of Control Device will toggle "ON'/'OFF" specific Control Gear WHITE LED and enable slider controlled dimming

Control Gear **Control Gear** **Control Device**

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

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- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.

- Приемлемые сроки поставки, возможна ускоренная поставка.
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- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.

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- Наличие сертификата ISO.

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Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.