LDSBus Isolated IO Controller Datasheet

1 Introduction

The LDSBus Isolated IO Controller offers 2 isolated channels of digital and analog inputs and a variety of associated power source options to achieve 3.3V, 5V, 10V, 12V referenced signals besides sourcing power from external voltage sources. Each channel (input and output) is isolated from the rest.

Each digital output can switch between 0V and 3.3V, 5V, 12V or referenced to an external voltage source. Each digital input can be between 0V and 1.8V to 12V. A 5V voltage source is provided for common applications that switch between 0-5V.

Each analog output can produce a voltage between 0-10V and each analog input supports voltage or current controlled input sources ranging between 0-10V.

The controller may be used in numerous and diverse applications such as simple IO control, or 0-10V dimmers, weather station, water level detector or sensor, etc.

1.1 Features

- 2 isolated digital output channels
- 2 isolated digital input channels
- 2 isolated analog output channels
- 2 isolated analog input channels
- Built-in power supply (3.3V/ 5V/ 10V/ 12V) and external power supply option
- Flexible combination of internal or external power supply
- Supports Bridgetek LDSBus protocol
- Low power consumption
- Operating temperature range : 0°C to +55°C
- Flush mount and DIN Rail mounting options
- Supported platforms: LDSBus Host, Bridgetek IoTPortal, and PanL Smart Living products. Visit http://bit.ly/ldsbus-resources for more information

2 Part Numbers

Part#	Naming
LC060101A	LDSBus Isolated IO Controller
LA120101A	LDSBus DIN Rail Mount Set

Table of Contents

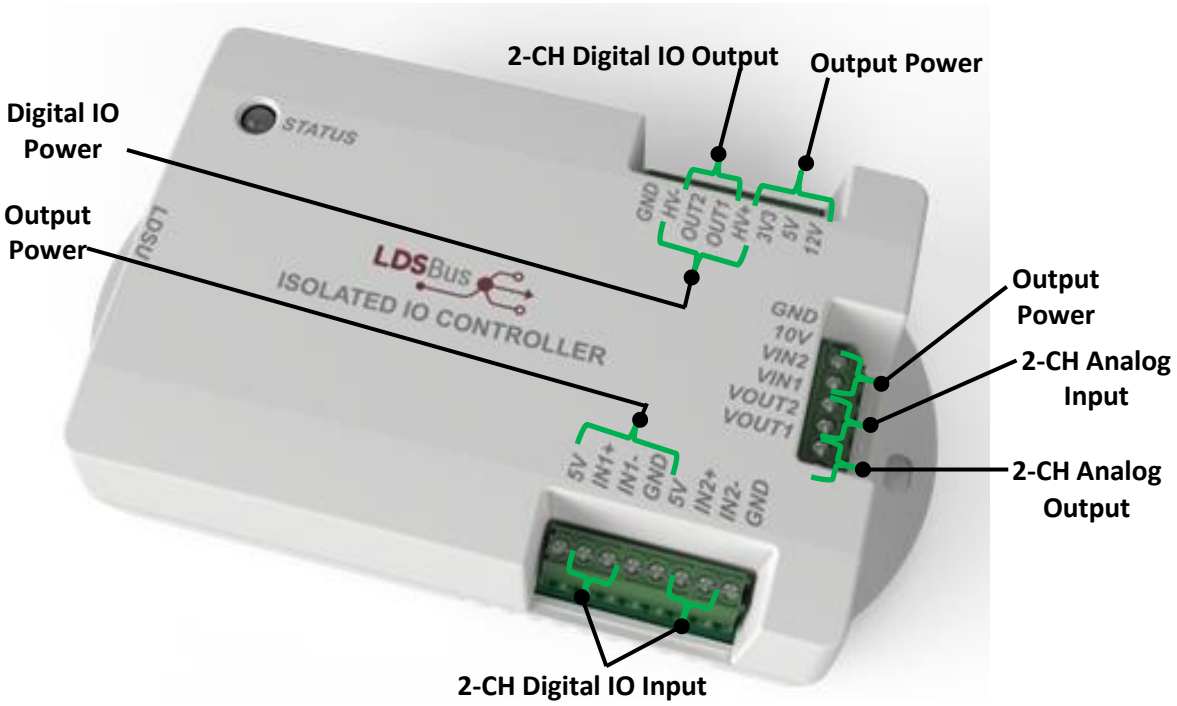
3 Product Specifications

Features	Interface	RS485
	System Status Indicator	1x RGB LED
	Mounting	Flush Mount
		DIN-Rail Mount
Power	Input Voltage	5V DC Bus Power
	Power (Typ)	1.15W
	Power (Max)	1.20W
	Output Power*	3.3V/30mW
		5V/50mW
		10V/400mW
		12V/240mW
Analog Input	Number of Channels	2
	Analog Input range	0V - 10V
	Analog Input resolution	10mV
	Analog Input Accuracy	Typical: +/- 3%; For 0V - 1V, Accuracy: +/- 10mV (typical)
Analog Output	Number of Channels	2
	Analog Output range	0V - 10V
	Analog Output resolution	10mV
	Analog Output Accuracy	Typical: +/- 3%; For 0V - 1V, Accuracy: +/- 10mV (typical)
Digital IO Input	Number of Channels	2
	Digital Input Voltage	1.8VDC - 12VDC (refer to external power voltage)
Digital IO Output	Number of Channels	2
	Digital Output Voltage	1.8VDC - 12VDC (refer to external power voltage)
Physical Characteristics	Color	White
	Housing	Polycarbonate
	Dimension	L138.2mm x W76.0mm x H31.9mm
Environmental Limits	Operating Temperature	0 to 55°C
	Storage Temperature	-20 to 85°C
	Ambient Relative Humidity	5 to 95% (non-condensing)
Package Contents	Device	1x LDSBus Isolated IO Controller
	Installation (Optional)	1x Din Rail Bracket set
	Wire Assembly	1X 5m RJ11 Cable
	Warranty label	1

* Output power current output up to 60mA.

Table 1 - LDSBus Isolated IO Controller Specifications

4 Hardware Features



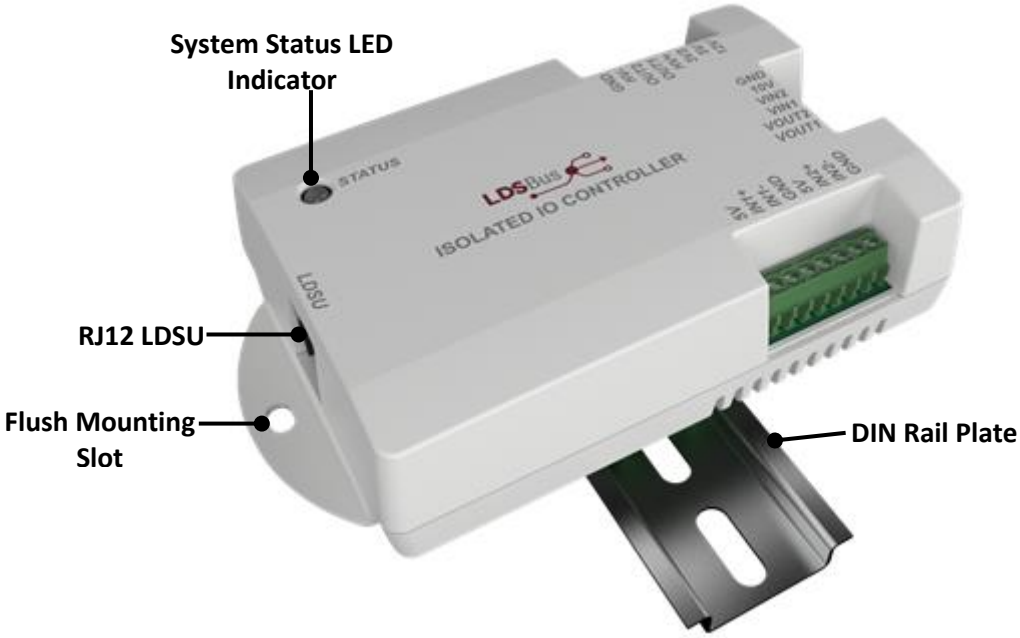


Figure 1 - LDSBus Isolated IO Controller

5 Isolated IO Controller Configuration and Installation

Please visit http://bit.ly/ldsbus-resources to access the LDSBus Configuration Utility guide on how to configure the device name, device address and termination settings before using it in your application.

5.1 Connection Diagram

Figure 2 illustrates the connection of the LDSBus Isolated IO Controller (LDSBus Device) to the LDSBus. Please visit http://bit.ly/ldsbus-resources to view the full device application, setup and installation guides.

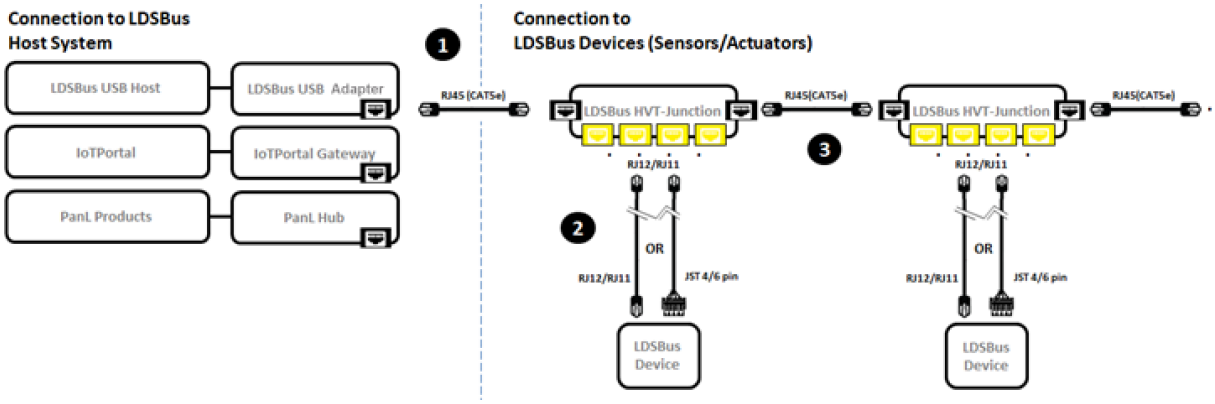


Figure 2 - LDSBus Isolated IO controller - Connection Diagram

Setup Instructions:

1. Connect the first LDSBus HVT-Junction to any of the LDSBus Host Systems using a RJ45(CAT5e) cable.
2. Connect the configured LDSBus Isolated IO controller to the LDSBus HVT-Junction as shown in Figure 2.
3. If there is more than one LDSBus HVT-Junction, chain them together as shown in Figure 2.
4. Enable terminator on the last device in LDSBus.

6 Mounting Options

6.1 Flush Mount

The LDSBus Isolated IO Controller can be flush mounted directly on a wall or any flat surface using 2 M3.5*16mm (thread) screws.

Figure 3 - LDSBus Isolated IO Controller Flush Mount

6.2 DIN Rail Mount

The LDSBus Isolated IO Controller can be mounted on a DIN Rail using the LDSBus DIN Rail Mount set. This set is optional and includes the bracket and mounting screws.

Figure 4 - LDSBus Isolated IO Controller DIN Rail Mount

7 Terminal Wiring Instructions

Terminal blocks are connected with screws. To clamp the wire to the terminal block, insert a 0.4mm x 2.5mm slotted screwdriver and rotate in a clockwise direction. To release the wire, turn the handle in an anticlockwise direction.

Figure 5 - Clamping wire with screwdriver in clockwise direction

Table 2 provides a list of American Wire Gauges (AWGs) that can be used in Terminal Blocks.

Conductor Type	**Wire dimeter/AWG**
Solid conductor	0.2~1.5mm^2/26~16 AWG
Stranded conductor	0.2~1.5mm^2/26~16 AWG
Stranded conductor; with insulated ferrule	0.25~0.75mm^2

Table 2 - AWG to use in terminal block

As shown in Figure 6, the wire strip is 3mm to 5mm long.

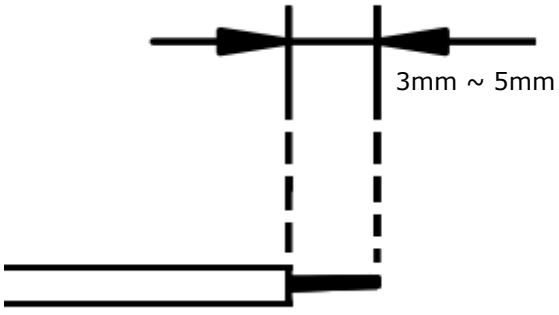


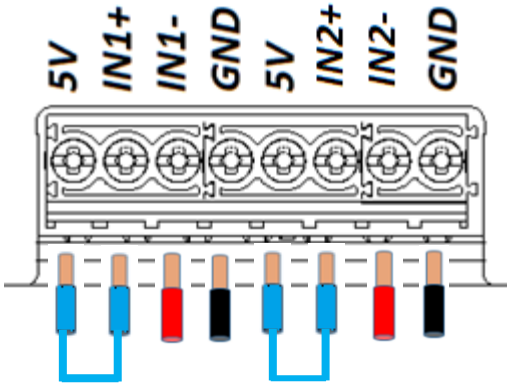
Figure 6 - 3mm to 5mm wire strip

7.1 Isolated IO Digital INPUT Setup

The 2CH isolated digital input supports external digital signals ranging from 1.8 to 12V. The two options for connecting are as follows:

Note: As each channel is independent, Channel 1 and Channel 2 can use different configurations.

IO Digital Input with 5V Application



Use AWG 26~16; The RED wire indicates that it comes from an external IO source

→ Connect to the IN1- or IN2-

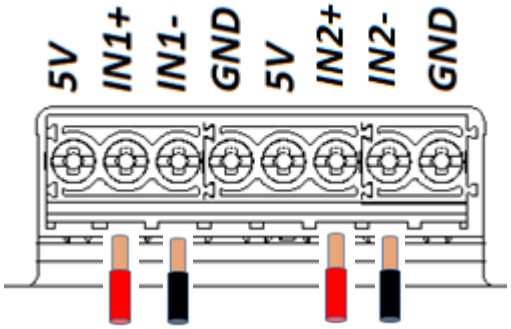
Use AWG 26~16; The BLACK wire indicates that it comes from external GND

→ Connect to the GND

Use AWG 26~16; The BLUE wire connects to the 5V source on board

→ Connect to the IN1+ or IN2+

IO Digital Input with External Pull-up



Use AWG 26~16; The RED wire indicates that it comes from External IO source

→ Connect to the IN1+ or IN2+

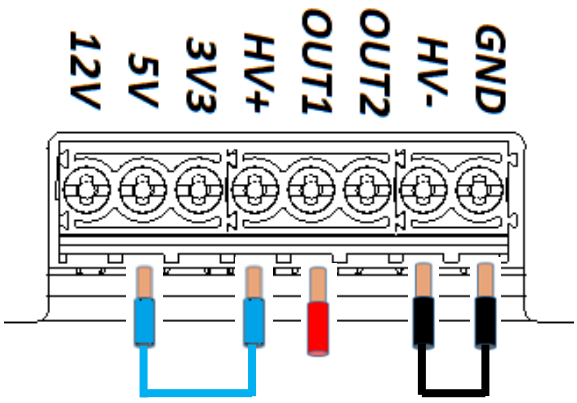
Use AWG 26~16; The BLACK wire indicates that it comes from external GND

→ Connect to the IN1- or IN2-

7.2 Isolated IO Digital OUTPUT Setup

The 2CH isolated digital output supports external digital signals ranging from 1.8 to 12V. The two options for connecting are as follows:

Digital Output with 5V Application



Use AWG 26~16; The RED wire indicates that it outputs an IO signal

→ Connect to the OUT1 or OUT2

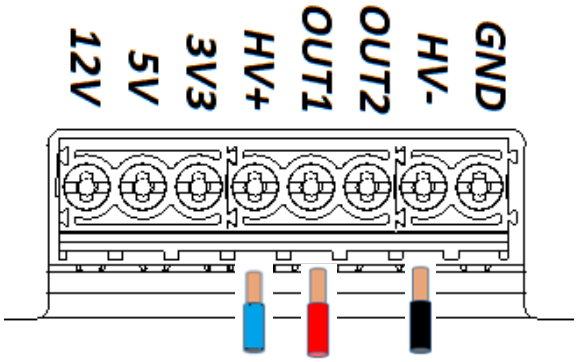
Use AWG 26~16; The BLACK wire connects to on board GND

→ Connect to HV-

Use AWG 26~16; The Blue wire connects to the 5V source on board

→ Connect to the HV+

Digital Output with External Source



Use AWG 26~16; The RED wire indicates that it outputs IO signal

→ Connect to the OUT1 or OUT2

Use AWG 26~16; The BLACK wire indicates that it comes from External GND

→ Connect to HV-

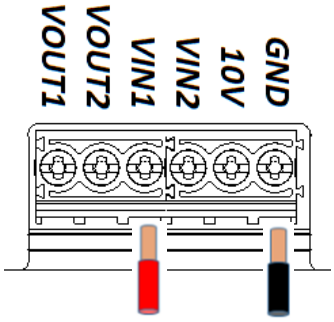
Use AWG 26~16; The BLUE wire indicates that it comes from External Source

→ Connect to HV+

7.3 Isolated Analog INPUT Setup

The 2CH isolated analog input supports external analog signals ranging from 0 to 10V. The two options for connecting are as follows:

Analog Input with External Voltage Source



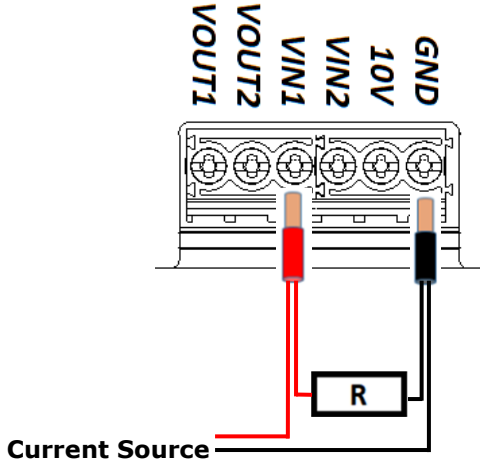
Use AWG 26~16; The RED wire indicates that it comes from external voltage source

→ Connect to VIN1 or VIN2

Use AWG 26~16; The BLACK wire indicates that it comes external GND

→ Connect to GND

Analog Input with External Current Source



Use AWG 26~16; The RED wire indicates that it comes from external current source

→ Connect to VIN1 or VIN2

Use AWG 26~16; The BLACK wire indicates that it comes from external GND

→ Connect to GND

R

Serial Resistor value depends on current source

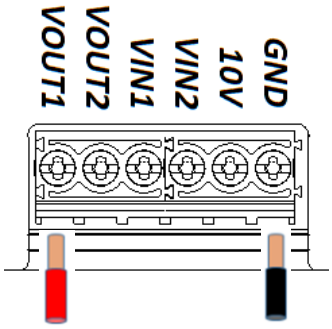
→ Connect in between VIN1/VIN2 and GND

For example: Application current source 4mA to 20mA, recommend to use 450ohm resistor

7.4 Isolated Analog OUTPUT Setup

The 2CH isolated analog output supports external analog signals ranging from 0 to 10V. The two options for connecting are as follows:

Analog Voltage Output



Use AWG 26~16; The RED wire indicates that it outputs 0V - 10V power

→ Connect to VOUT1 or VOUT2

Use AWG 26~16; The BLACK wire indicates that it comes external GND

→ Connect to GND

8 System Status LED Indicators

LDSU devices come with a tri-color LED, and LED status are mentioned in the table below.

Status display colors

1. RED - Device in error conditions
2. YELLOW - Unconfigured device
3. GREEN - Device in normal state (Device termination is OFF)
4. BLUE - Device in normal state (Device termination is ON)

Device Status	LED Color		Flashing Frequency	Description
Unconfigured device	YELLOW		LED flashing @1Hz	Unconfigured device with factory default address (126)
Configured device	GREEN		Steady – Non-flashing	Configured device (Device ID 1-125) and device is idle
	BLUE			
Addressed device	GREEN		LED flashing @5Hz	Device is busy communicating
	BLUE			
Identified device	GREEN		LED flashing @1Hz	Device in identify state
	BLUE			
Device error	RED		Steady – Non-flashing	Device error has occurred
Firmware update	YELLOW		Steady – Non-flashing	Device firmware update

Table 3 - LDSBus Isolated IO Controller – System Status LED Indicator

9 Mechanical Dimension

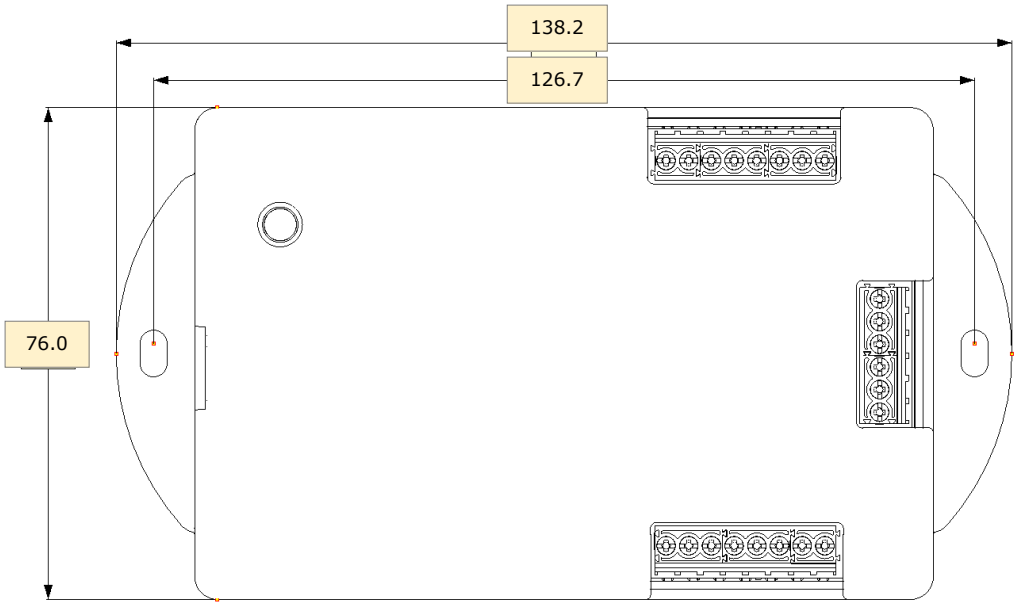


Figure 7 - LDSBus Isolated IO Controller Dimension – Top View

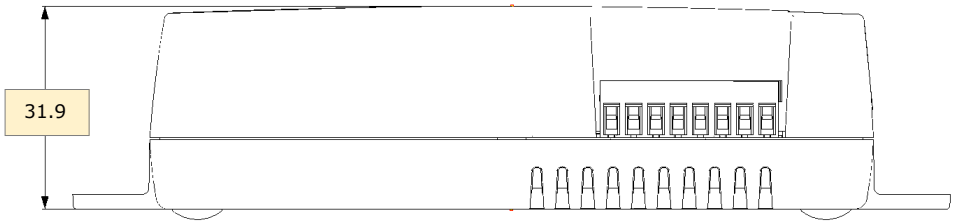


Figure 8 - LDSBus Isolated IO Controller Dimension – Side View

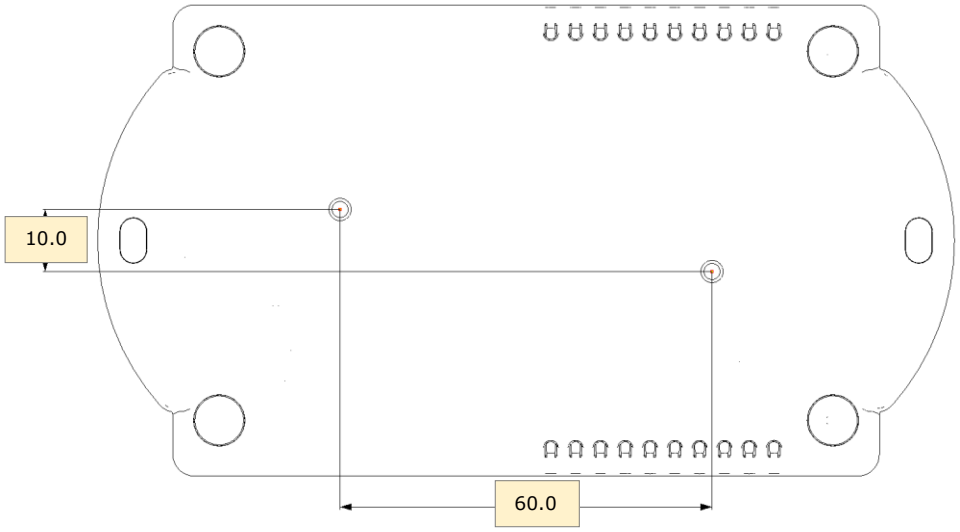


Figure 9 - LDSBus Isolated IO Controller Dimension – Bottom View

10 Contact Information

Head Quarters – Singapore

Bridgetek Pte Ltd
178 Paya Lebar Road, #07-03
Singapore 409030
Tel: +65 6547 4827
Fax: +65 6841 6071

E-mail (Sales) sales.apac@brtchip.com
E-mail (Support) support.apac@brtchip.com

Branch Office – Taipei, Taiwan

Bridgetek Pte Ltd, Taiwan Branch
2 Floor, No. 516, Sec. 1, Nei Hu Road, Nei Hu District
Taipei 114
Taiwan, R.O.C.
Tel: +886 (2) 8797 5691
Fax: +886 (2) 8751 9737

E-mail (Sales) sales.apac@brtchip.com
E-mail (Support) support.apac@brtchip.com

Branch Office - Glasgow, United Kingdom

Bridgetek Pte. Ltd.
Unit 1, 2 Seaward Place, Centurion Business Park
Glasgow G41 1HH
United Kingdom
Tel: +44 (0) 141 429 2777
Fax: +44 (0) 141 429 2758

E-mail (Sales) sales.emea@brtichip.com
E-mail (Support) support.emea@brtchip.com

Branch Office – Vietnam

Bridgetek VietNam Company Limited
Lutaco Tower Building, 5th Floor, 173A Nguyen Van Troi,
Ward 11, Phu Nhuan District,
Ho Chi Minh City, Vietnam
Tel : 08 38453222
Fax : 08 38455222

E-mail (Sales) sales.apac@brtchip.com
E-mail (Support) support.apac@brtchip.com

Web Site

http://brtchip.com/

Distributor and Sales Representatives

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Appendix A – References

Document References

LDSBus Configuration Utility Guide

Acronyms and Abbreviations

Terms	Description
AC	Alternating Current
AWG	American Wire Gauges
DC	Direct Current
IoT	Internet of Things
LED	Light Emitting Diode
LDSBus	Long Distance Sensor Bus

Appendix B – List of Tables & Figures

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Appendix C – Revision History

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