

BRTSYS_AN_001

LDSBus Configuration Utility Guide

Version 1.4

Issue Date: 08-07-2024

Use of BRTSys devices in life support and/or safety applications is entirely at the user's risk, and the user agrees to defend, indemnify, and hold BRTSys harmless from any and all damages, claims, suits, or expense resulting from such use.

> BRT Systems Pte Ltd (BRTSys) 1 Tai Seng Avenue, Tower A, #03-01, Singapore 536464 Tel: +65 6547 4827 Web Site: <u>http://www.brtsys.com</u> Copyright © BRT Systems Pte Ltd



Table of Contents

1 In	troduction
1.1	LDSU (LDS Unit) Project5
1.2	LDSBus Project5
2 Ha	ardware Setup Pre-requisites6
2.1	LDSU (LDSUnit) Project6
2.2	LDSBus Project7
3 In	stalling LDSBus Configuration Utility
3.1	First Time Installation8
3.2	Update to a new version12
4 LC	OSBus Configuration Utility – GUI Overview 14
4.1	Default Menu bar14
4.1	14 File Menu
4.1	.2 Settings Menu / Interface
4.1	Additional Menu (based on the selected Project)
5 LC	DSU (LDSUnit) Project16
5.1	Creating a New LDSU Project16
5.2	Firmware Update19
5.3	LDSU Command Interface22
5.4	Saving LDSU (LDSUnit) Project24
5.5	Opening a LDSU Project25
6 Cr	eating a New LDSBus Project
6.1	LDSBus Command Interface30
6.2	Saving LDSBus Project30
6.3	Opening a LDSBus Project30
6.4	LDSBus Right Click Functions31
6.5	LDSBus Firmware Update33
7 Ca	alibration Procedure
7.1	LDSBus pH Sensor Adapter Calibration35
7.2	LDSBus EC/Salinity Sensor Adapter Calibration43



7.3	LDSBus DO Sensor Adapter Calibration50
7.4	LDSBus ORP Sensor Adapter Calibration55
7.5	LDSBus CO2 Sensor Adapter Calibration60
8 Aj	oplication Type Configuration
8.1	Relay Controller Application Type Configuration63
8.2	IO Controller Application Type Configuration65
8.3	Trailing Edge Dimmer Profile Setting70
8.4	RFID Configuration Settings72
8.5	Soil Sensor Configuration Settings73
9 Co	ontact Information78
Appe	ndix A – Command List 79
Con	mands with payload / response79
RE	ADN
WF	RITEN
RE	AD 80
EC	10
Con	mands without payload /response81
Com RE	mands without payload /response81 SET
Com RE ID	mands without payload /response81 SET
Com RE ID I20	mands without payload /response
Com RE ID I20 Com	mands without payload /response 81 SET 81 ENTIFY 81 CREGOFF 82 Imands with payload / without response 82 CREGON 82
Com RE ID I20 Com I20 SE	Imands without payload /response81SET81ENTIFY81CREGOFF82Imands with payload / without response82CREGON82CREGON82STI2CSPEED83
Com RE ID I20 Com I20 SE SE	Imands without payload /response81SET81ENTIFY81CREGOFF82Imands with payload / without response82CREGON82CREGON82STI2CSPEED83RITE83
Com RE ID I20 Com I20 SE SE WF Com	Mands without payload / response81SET81ENTIFY81CREGOFF82mands with payload / without response82CREGON82CREGON82GREGON83RITE83Mands without payload / with response83
Com RE ID I20 Com I20 SE WF Com IN	Imands without payload /response81SET81ENTIFY81CREGOFF82Imands with payload / without response82CREGON82CREGON82TI2CSPEED83RITE83Imands without payload / with response84FO84
Com RE ID I20 Com SE WF Com IN	Imands without payload / response81SET81ENTIFY81CREGOFF82Imands with payload / without response82CREGON82CREGON82CREGON83RITE83Imands without payload / with response84FO84ATUS84
Com RE ID Com I20 SE WF Com IN ST GE	Set81SET81ENTIFY81CREGOFF82Imands with payload / without response82CREGON82CREGON82CIZCSPEED83RITE83Imands without payload / with response84FO84FO84FUUID85
Com RE ID Com I20 SE WF Com IN ST GE	mands without payload /response 81 SET 81 ENTIFY 81 CREGOFF 82 mands with payload / without response 82 CREGON 82 CREGON 82 CREGON 83 RITE 83 umands without payload / with response 84 FO 85 Indix B - References 86
Com RE ID I20 Com I20 SE WF Com IN ST GE Appe	mands without payload /response 81 SET 81 ENTIFY 81 ENTIFY 81 CREGOFF 82 mands with payload / without response 82 CREGON 82 CREGON 82 TI2CSPEED 83 Without payload / with response 84 FO 84 FO 84 ATUS 84 FUUID 85 Indix B - References 86
Com RE ID I20 Com I20 SE WF Com IN ST GE Appe Doc Acre	mands without payload /response 81 SET 81 ENTIFY 81 ENTIFY 81 CREGOFF 82 mands with payload / without response 82 CREGON 83 RUTE 83 Mands without payload / with response 84 FO 84 FO 84 FOUID 85 Indix B - References 86 Onyms and Abbreviations 86
Com RE ID I20 Com I20 SE VF Com IN ST GE Appe Acro	mands without payload / response 81 SET 81 ENTIFY 81 CREGOFF 82 imands with payload / without response 82 CREGON 82 CREGON 82 CREGON 82 GREGON 82 CREGON 82 CREGON 82 GREGON 83 Mands without payload / with response 84 GON 84 GON 84 GON 84 GON 85 Indix B - References 86 Indix B - References 86 Indix B - List of Figures & Tables 87

3



List of Tables	
Appendix D – Revision	History 88

4



1 Introduction

The Long-Distance Sensor Bus (LDSBus) Configuration Utility (V.1.2.2) enables configuration of an LDSBus to be connected to an LDSBus host system.

The tool has two main menu functions:

- LDSU (LDS Unit) Project
- LDSBus Project

1.1 LDSU (LDS Unit) Project

An LDSU Project can be created to configure LDSBus Devices (Sensors/Actuators) before they are connected to the LDSBus. Only one LDSBus Device can be configured at a time. The configuration page provides information about LDSBus Devices and their sensors as well.

1.2 LDSBus Project

The LDSBus Project is capable of simulating an LDSBus host system environment in which it identifies how many LDSBus devices are online. Additionally, the tool provides an estimate of the total power consumed over the LDSBus, which is useful when considering the power limitations of the LDSBus Host to which the LDSBus is attached. It is possible to view the detailed information about any LDSBus device on the bus.

LDSBus also has other features, such as the ability to read and write registers in LDSBus Devices, as well as the ability to update firmware.



2 Hardware Setup Pre-requisites

The following components are required to create a LDSU or LDSBus Project:

- Windows based PC
- USB Type A to Type C Cable
- LDSBus USB Adapter
- LDSBus Device(s) using RJ12/11 cable(s) to RJ12/11 cable(s) or RJ12/11 cable(s) to JST 4/6 cable(s)

For LDSBus Project Only:

- LDSBus HVT Junction (s)
- CAT 5e RJ45 to RJ45 Cable (s)
- 24VDC/18W Power Adapter

2.1 LDSU (LDSUnit) Project



Figure 1 – LDSU Device (Sensors / Actuators) Connection Diagram

- **Step 1:** Connect the LDSBus USB Adapter to the Windows PC using the USB-C to USB-A cable. (Or a USB-C to USB-C cable, if the PC has Type-C USB Ports)
- Step 2: Connect the LDSBus Device to the cable at one end.
- **Step 3:** Connect the other end of the cable to the LDSBus USB Adapter as shown in Figure 1.
- **Step 4:** For instructions on configuring the LDSBus device, refer to the Software section.



2.2 LDSBus Project



Figure 2 – LDS Bus – HVT Junction in LDSBus System – Connection Diagram

- **Step 1:** Connect the LDSBus USB Adaptor to the Windows PC using the USB-C to USB-A cable (or a USB-C to USB-C cable if the PC has Type-C USB Ports).
- **Step 2:** Connect a 24VDC/18W power adapter to the DC jack and turn it ON. The LDSBus and devices will be powered by software.
- **Step 3:** Using an RJ45 (CAT5e) cable, connect the first HVT-Junction to the USB Adapter. LDSBus devices connected to the LDSBus HVT-Junction must be preconfigured through LDSU Project.
- **Step 4:** In case of more than one LDSBus HVT-Junction, chain the connections together using RJ45 (CAT5e) cables. Ensure that termination is enabled for the last LDSBus device in the bus through the LDSU Project.
- **Step 5:** For details on how to access the bus, see the Software section.

3 Installing LDSBus Configuration Utility

3.1 First Time Installation

Following are the steps to install LDSBus Configuration Utility for the first time -

1. Run the **Setup.exe** file provided with the installation package.



2. A Welcome message appears along with LDSBus Configuration Utility Installer Wizard. Click **[Next]**.



Figure 3 – Setup Wizard – Welcome Screen

3. A License Agreement is displayed. Click [I Agree] to proceed.



Figure 4 – Setup Wizard – License Agreement

8



<u>NOTE:</u> At any point of time, during the installation, users may click [Back] to navigate to the previous window or click [Cancel] to abort the installation process.

4. Select or edit the Start Menu Folder Name. Click [Next].

LDSBus Configur	ation Utility			_		×
M	Choose	Start Men	J Folder			
	Choose shortcu	e a St <mark>a</mark> rt Meni its.	u folder for the L	DSBus Config	uration Ut	ility
Select the Start Me can also enter a na	nu folder in which me to create a ne	you would lik	e to create the p	program's <mark>s</mark> ho	rtcuts. Yo	u
LDSBus Configura	tion Utility					
7-Zip						~
Accessibility						
Accessories	le.					
Administrative roo	ns.					
Atlassian						
Bandicam						
Bridgetek						
CMake	-					
Device Monitoring	Studio					
Electronic Team						~
	COMPONE					-
SBus Configuration	Utility					
		-	< Back	Next >	Cape	el
			< Back	Deve >	Carro	

Figure 5 – Setup Wizard – Start Menu Folder Selection

5. Select a "*Destination Folder*" for installing the files. Accept the default folder or click **[Browse]** to specify a different location. Click **[Install]** to start the installation.



Figure 6 – Setup Wizard – Installation Location Selection



6. A progress bar indicates that the installation is in progress.



Figure 7 – Setup Wizard – Installation Progress

7. Upon successful installation, click **[Finish]** to close the setup. Select the check box to run the utility (optional).



Figure 8 – Setup Wizard – Installation Complete



8. By default, the LDSBus Configuration Utility is installed in this path - "\Program Files (x86)\BRTSystems\LDSBus Configuration Utility."

I I 2 I BRTSystems File Home Share View				37	:
⊢ → ~ ↑ 🦲 « Program Files (x86) → BF	RTSystems 👻	5 V	, Search BRTSystem	ns	
Quick access OneDrive - Personal This PC J 3D Objects Desktop	^	y	Date modified 13/10/2022 1:23 PM	Type File folder	Size
Documents					

Figure 9 – LDSBus Configuration Utility Installation Folder location

9. The LDSBus Projects folder is the default folder that contains the projects saved by the utility.



Figure 10 – LDSBus Projects Folder Location

Update to a new version 3.2

NOTE: While updating to a new version, an uninstaller will run and this will remove the previous package and information from the registry information. First time installation will not show the uninstaller.

Following are the steps to update to a latest version of LDSBus Configuration Utility –

- 1. Run the Setup.exe file.
- 2. The LDSBus Configuration Utility Uninstaller is displayed. Click [Next].



Figure 11 – LDSBus Configuration Utility - Uninstaller

3. Click [Uninstall] to start uninistalling the old version. The uninstallation will be in progress.

N	Uninstall LDSBus Configu	uration Utility		
	Remove LDSBus Configuration	on Utility from your co	omputer.	
LDSBus Configuration the uninstallation.	Utility will be uninstalled from the fol	llowing folder. Click U	ninstall to s	start
Uninstalling from:	C:\Program Files (x86)\BRTSystems	LDSBus Configuration	n U <mark>ti</mark> lity\	
95Bus Configuration Uti	lity		-	

Figure 12 – LDSBus Configuration Utility – Uninstallation in Progress



4. Click **[Finish]** to complete the uninstallation.



Figure 13 – LDSBus Configuration Utility – Uninstallation Completed



4 LDSBus Configuration Utility – GUI Overview

File Settings About	DSBus Configuration Utility	x
	File Settings About	

Figure 14 – LDSBus Configuration Utility User Interface

4.1 Default Menu bar

By default, the menu bar contains *File, Settings* and *About* menu options.

File Settings About

4.1.1 File Menu

In the menu bar, the first item is the *File* menu. It contains commands that are used to manage Projects, such as *New Project*, *Open Project*, *and Save Project* etc.





Menu Item	Description
New Project	To create a new LDSU / LDSBus projects
Open Project	To open or retrieve an existing LDSU / LDSBus project.
Save	To save the project. The file is saved with an ".ldsuproj" extension for
	LDSU projects and an ".ldsbusproj" extension for LDSBus projects.
Save As	To choose a different destination and file name to save the current
	project. The file is saved with the extension ".ese".
Close	To close the utility

4.1.2 Settings Menu / Interface

From the menu, click the **Settings** option to access the Settings interface. The settings screen lists the available *LDSBus USB Adapter's serial number*. Click Refresh icon 2 to get the new devices (if any).

Settings			
ĩ		Adaptop	
D	T5NLBW4		
Color		Cancal	
DETEC	2	Cancer	
Figu	re 15 – Settings	s Interface	

- 1. Select the required adapter from the dropdown list.
- 2. Upon selecting the adapter, click **[Select]** to use the adapter. Alternately, click **[Cancel]** to return to the previous screen.

4.1.3 Additional Menu (based on the selected Project)

LDSU Project





5 LDSU (LDSUnit) Project

5.1 Creating a New LDSU Project

To create an LDSU Project -

1. Choose the LDSBus USB Adapter from the Settings menu. Refer to Section 4.1.2.

File Settings Abd	ion Utility	- ×
	Settings	
	LDSBus USB Adapter DT5NLBW4 1 ~ 🕥 Select Cancel	

Figure 16 – LDSBus USB Adapter Selection

2. To create an LDSU project, click **File** → **New Project** → **LDSU Project**.







3. Based on the selected project, the application title will be displayed. For example, if the selected project type is "LDSU Project," then the title displayed will be "LDSBus Configuration Utility – LDSU Project." Enable the LDSU port power on the LDSBus Device connected to the LDSBus USB Adapter. Click [Scan].

D LDSBus Configuration	Utility-LDSU Projec	t			_ ×
File LDSU Commands	Firmware Update	Settings	About		
LDSU Port Power Status: Off		Enable		Scan	
		3			

Figure 18 – LDSU Project Interface

4. Upon finding a device, the information related to the connected LDSBus Device will be displayed. The details of the sensor device are displayed at the bottom of the interface. Except for LDSU ID; LDSU Termination Status and Nickname all the other fields are non-editable.

LDSBus Configuration Utility-LDSU Project					
File LDSU Commands Fir	mware Update Settings	About			
LDSU Port Power Status: On	☑ Enable		Scan		
LDSU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Voltage (mV) Calibrated Temperature (°C) Calibrated Temperature (°C) Calibrated Date Number of I2C Devices Software Version	L \$630101031521000005 3A24E659 LDSBus Thermocouple Sensor 0x8001 2021-Aug-27 63 5040 25 Not Applicable 2 2.3	LDSU ID LDSU Termination Nickname	10		
- I2C Devices Manufacturer : Bridgetek Pte PartNumber : BRT-VDEV Address : 0×80 Capability : 0 Report Rate : 1000 ms Class ID : 0x0100	Ltd. Manufacturer : MICROCH PartNumber : MCP9600 Address : 0x60 Capability : 0 Report Rate : 1000 m Class ID : 0x0100	4			

Figure 19 – LDSU Project Interface



5. Configure the following LDSU Device settings, if required:



Figure 20 - LDSU Device Settings

<u>LDSU ID</u>: Default is set as '126'. Change the ID accordingly based on the number of devices that will be connected to the LDSBus. For example, if you will be connecting more than one LDSBus Device on the bus, configure the first device with an ID of '1', second device with an ID of '2' and so on. Each LDSBus Device must have a unique ID.

LDSU Termination: Default is set as 'Off.' Ensure termination for the last LDSBus Device on the bus is set as 'On.'

Nick Name: Default is set as the product name. Change the device name accordingly. The device name set will be reflected in the LDSBus Host System.

Click [Update] to save any changes.

Click [Calibrate] to start the calibration. Refer to Section 7 for more information on the Calibration procedure.



5.2 Firmware Update

This function allows users to update the device firmware. To update firmware,

1. Select **Firmware Update** from the menu. A file browser dialogue box is displayed. Browse for the device update package (.unv) and click **[Open]**.



Figure 21 – Firmware Update / File Browser Interface

2. Upon selecting a valid firmware package, a confirmation window is displayed. Click **[OK]** to proceed with the firmware update. Alternately, click **[Abort]** to cancel.



Figure 22 – Firmware Update Confirmation Window

19



If the device is already updated with the latest firmware, an appropriate warning message is displayed. Click **[Yes]** to overwrite the existing version or **[No]** to cancel the firmware update.



Figure 23 – Firmware Overwrite Alert Window

3. A dialog window with the information about the current firmware version and the new firmware version that will be installed, is displayed. Click **[OK]** to proceed.



Figure 24 – Firmware Version Information



4. An appropriate message indicating that the firmware update is successful or not is displayed. Click **[OK]** to close the window.







Figure 26 - Firmware Update Unsuccessful Message Window



Figure 27 – Firmware Update Error Message Window



5.3 LDSU Command Interface

The LDSU command interface is used to communicate with the LDSU module by selecting the command from the list of support commands. The command settings are available only if the device is found on the bus. To access the Commands window,

1. Select **Commands** from the menu.

LDSBus Configuration Utility-LDSU Project	_ x
File LDSU Commands	
Target LDSU	
LDSU ID 126 (0x7E)	
Commonds [Response	
Command	
RESET	
LDS Message Logger - 13:54:48.4680636	
	Clear

Figure 28 – LDSU Project – Commands Interface

2. The Commands interface is displayed.

LDSU ID - Displays the selected Device ID

Command – Displays a list of LDS Commands in a drop-down box *Response* – Upon selecting a command and clicking **[Send]**, the device response will extract the packets and display them in the response box. Refer to Table 1 for the list of commands with response and without response. Refer to Figure 30 for a sample command with response. Refer to Figure 31 for a sample command without

Commands	<pre></pre>
Command	
RESET	
RESERVICE	
IDENTIFY	
INFO 2	
ECHO	
I2CREGON	
SETI2CSPEED	
READ	
READN	
WRITEN	

LDS Message Logger – Displays the query and response logger.

response.

22

Figure 29 – LDSU Project – Commands List



Refer to Table 1 for the list of commands.

Commands with payload and response	READN; WRITEN; READ; ECHO
Commands without payload and no response	RESET; IDENTIFY; I2CREGOFF
(Same UI)	
Commands with payload and no response	I2CREGON; SETI2CSPEED; WRITE
Commands without payload and with response	INFO; STATUS; GETUUID

Table 1- List of Commands

LDSBus Configuration U	Utility-LDSU Project		×
File LDSU Commands	Firmware Update Settin	ngs About	
LDSU ID 126 (0x	7E)		
Commands	2 Send	Response Device ID : 126 Length : 16 Bytes Payload :4C:53:31:31-30-31-30-31-30-33-33-31-32-32-07-00 Checksum : 0x8D5A	
LDS Message Logger - 13: [34375]>> [GETUDID] 20 [34393]<< FE-10-4C-53-31-	54:48.4680636 	2-32-07-00-8D-5A	ear

Figure 30 – Sample Command with Response



Figure 31 – Sample Command without Response



5.4 Saving LDSU (LDSUnit) Project

Upon creating an LDSU Project, users may save the project. To save a project -

1. Click **File** → **Save**.

LDSBus Configuration Utility-LDSU Project _ X					
File LDSU Commands Fir	rmware Update Settings	About			
New Project ►					
Open Project	🗹 Enable		Scan		
Save				1	
Save As	LS11010108312200007	LDSU ID	126	~	
Close	00000466	LDSU Ter	rmination Off	~	
Product Name	LDSBus CO2 Sensor	Nickname	LDSBu	is CO2 Sensor	
LDSU Class	0x8011		Undate		
Manufacture Date	2022-Oct-03				
Calibrated Current (mA)	58				
Calibrated Voltage (mV)	5140				
Calibrated Temperature (°C)	25				
Calibrated Date	2022-Oct-12]			
Number of I2C Devices			Calibrate		
Software Version	2.2				
Manufacturer : BRT Systems P PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0304 C	Pte Ltd. Manufacturer : ROH PartNumber : BH173 Address : 0x29 Capability : 0 Report Rate : 1000 Class ID : 0x0401	M Semiconductor ØFVC ms	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0304	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0100	

Figure 32 - Save LDSU Project

2. By default, the project will be saved under this location - /My Documents/BRTSystems/LDSBus Projects. However, users may select a preferred to location to save the project. The LDSU project will be saved with a file extension - .ldsuproj.

LDSU Port Power Status: On Scan DSU DUTD Serial Number Product Name LDSU Class Manufacturer (mA) Calibrated Current (mA) Calibrated Status Manufacturer : Settype DSU Digits Filename DSU Digits Filename DSU Digits Filename DSU Digits Filename DSU Digits Filename DSU Digits Filename DSU Digits Filename DSU Digits Filename DSU Digits Filename DSU Digits Filename Calibrated Data Manufacturer : Settype DSU Project PartNumber : SCD44 Address : 0x02 Capability : 1 Benordt File : 1980 ms Filename Calibrate : 1980 ms Filename Calibrated Data Manufacturer : Settype Calibrated Data Calibrated Data Manufacturer : Settype Calibrated Data Calibrated Data Manufacturer : Settype Calibrated Data Calibrated Data C	LDSBus Configuration Utility	r-LDSU Project are Undate Settings About		_ x
Status: On Serial Number Scan LDSU UUTD Signature Serial Number Signature	IDEU Prote Process			
LDSU UUID G Sive LDSU Project Files 2 warch LDSGus Projects C Serial Number GG Herofolde 2 warch LDSGus Projects C C Product Name C Organize New Folder 2 warch LDSGus Projects C C USU Class 0 Digits New Folder Demodified T C C Sensor C C Sensor C Sensor C Sensor C C C Sensor C C C C Sensor C C C C C C C C C C C C C Sensor C <th>Status: On</th> <th>☑ Enable</th> <th>Scan</th> <th></th>	Status: On	☑ Enable	Scan	
UUID G See LOSU Project Files 2 arcch LOSUs Projects 2 Serial Number Product Name C Serial Number Product Name C DSU Class Product Name C Disk modified Type C DSU Class Product Name Disk modified Type C C DSU Class Product Name Disk modified Type C C Calibrated Current (mA) Series Products Products Products Products Calibrated Temperature (°C) Products File name Oproject file ("Moupro) Products Products Products Number of I2C Devices Save as type DSU Project file ("Moupro) Save as type Save as type Save as type Save as type PartNumber : SCD40 PartN	с I DSU			
Serial Number 00 Image	UUID	Save LDSU Project Files	×	
Product Name Coganice * Newfolder IEF * 0 CO2 Sensor LDSU Class ************************************	Serial Number 06	← → · · ↑ 📙 « BRTSys → LDSBus Projects	2 Search LDSBus Projects P	
LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Current (mA) Calibrated Current (mA) Calibrated Temperature (°C) Calibrated Temperature (°C)	Product Name	Organize 👻 New folder		
Manufacture Date 26 Pattop Pattop Calibrated Current (mA) 56 Calibrated Current (mA) 56 Calibrated Current (mA) 56 Calibrated Temperature (*C) 25 Software Version 26 Vides V Software Version 21 Number of I2C Devices 5 Software Version 22 Variation (Current : BRT Systems Pte Itcl. Manufacturer : Sensition PartNumber : BRT-VDEV Address : 0x29 Address : 0x62 Capability : 1 Report Rate : 1000 ms Report Rate : 1000 ms	LDSU Class	This PC Name	Date modified Type	_
Calibrated Current (mA) 58 Calibrated Vultage (mV) 50 Calibrated Temperature (*C) 25 Calibrated Date 26 Number of I2C Devices 5 Software Version 2. Manufacturer : BRT Systems Pte ICG. Rentrict files ("Mouped) V Address : 80:02 Capability : 0 PartNumber : SCD04 Address : 80:02 Capability : 1 Renord: Rate : 1900 ms	Manufacture Date 20	3D Objects CO2Sensor.ldsuproj Desktop	11/10/2022 10:06 AM LDSUPROJ File	
Calibrated Voltage (mV) 51 Muic Calibrated Temperature (*C) 25 Muic Calibrated Temperature (*C) 25 Pitures Calibrated Date 7 Pitures Calibrated Date 7 Pitures Software Version 20 Sive at type 12C Devices 5 Sive at type Manufacturer : BRT Systems Pte TextNumber : BRT-VDEV Address : 0x02 Address : 0x02 Capability : 1 PartNumber : SCD40 Capability : 0 Capability : 1 Report Rate : 1900 pm	Calibrated Current (mA) 58	Documents		
Calibrated Temperature (°C) 25 Calibrated Date 72 Number of I2C Devices 5 Software Version 2. Manufacturer : BRT Systems Pte IEG. Rearry Semiconductor Rearry Semiconductor Rearry Semiconductor PartNumber : Semisirion PartNumber : SCD40 Address : 8x62 Capability : 0 Rearry Refe : 1800 ms Rearry Refe : 1800 ms	Calibrated Voltage (mV) 51	Downloads Music		
Calibrated Date 26 Indes V C Number of I2C Devices 5 Filename V Software Version 2. Swe as type DSUP inject file ("Idsupeo) V 12C Devices	Calibrated Temperature (°C)	Pictures		
Number of I2C Devices 5 Software Version 2. I2C Devices - Manufacturer : BRT Systems Pte ICO. Manufacturer : RT Systems Pte ICO. Manufacturer : BRT-VDEV Address : 0x00 Address : 0x00 - Capability : 0 - Renort Rate : 1000 ms - Renort Rate : 5000 ms -	Calibrated Date 20	Videos v <	>	
Software Version 2. 12C Devices A Hidefolders Manufacturer : BRT Systems Pte Itd. Hanufacturer : Restriction PartNumber : BRT-VDEV Address : 8000 Address : 8000 Capability : 1 Capability : 0 Capability : 1 Renort Rate : 1000 ms Renort Rate : 1000 ms	Number of I2C Devices 5	File name: LDSU Project files (*.ldsuproj)		
I2C Devices Size Cancel Manufacturer : BRT Systems Pte ICa. Hanufacturer : KURH Semiconductor Hanufacturer : Sensirion PartNumber : BRT-VDEV PartNumber : BHIJ30FVC PartNumber : SCD40 PartNumber : SCD40 Address : 80x02 Address : 80x62 Address : 80x62 Address : 80x62 Capability : 0 Capability : 1 Capability : 1 Capability : 1 Renort Rate : 1000 ms Renort Rate : 5000 ms S000 ms	Software Version 2.			
Manufacturer: BRT Systems Pte Ltd. Manufacturer: Rufm Semiconductor Manufacturer: Sensirion PartNumber: BRT/VDEV PartNumber: BRT/30FVC PartNumber: SCD40 Address: 8x62 Address: 8x62 Address: Sx62 Capability: 0 Capability: 1 Capability: 1 Renort Rate: SA04 ms Renort Rate: SA04 ms SA04	I2C Devices	∧ Hide Folders	Save Cancel	
Address: 0x00 Address: 0x29 Address: 0x62 Address: 0x62 Capability: 0 Capability: 1 Capability: 1 Renort Rate: 1000 ms Renort Rate: 1000 ms Senort Rate: 5000 ms	Manufacturer : BRT Systems Pte PartNumber : BRT-VDEV	Ltd. Manufacturer : KUHM Semiconduc PartNumber : BH1730FVC	tor Manufacturer : Sensirion Manufacturer PartNumber : SCD40 PartNumber :	r : Sensirion : SCD40
Capability:0 Capability:0 Capability:1 Capability:1 Capability:1 Capability:1 Capability:1 Capability:1	Address : 0x00	Address : 0x29	Address : 0x62 Address : 0x	<62
Kenopt Kate · 1000 ms Kenopt Kate · 1000 ms Kenopt Kate · 5000 ms	Capability : 0	Capability : 0	Capability : 1 Capability :	: 1
Class ID - 9y0304 Class ID - 9y0401 Class ID - 9y0404	Class TD : 0x0304	Class TD · 0x0401	Class TD · 0x0304 Class TD · 0	: 5000 ms
		01033-10-1-020401		
14 S	ć			2

Figure 33 - Default Location to Save LDSU Project



3. Figure 34 shows a sample LDSU Project saved under the default location.



Figure 34 – Sample LDSU Project Saved under default location

<u>NOTE</u>: A copy of the file can be made in a different folder or with a different name by clicking the File \rightarrow Save As.

5.5 Opening a LDSU Project

To open an existing LDSU Project,

1. Click File → Open Project.

LDSBus Configuration Utility-LDSU ProjectX					
File LDSU Commands Fi	irmware Update Settings	About			
New Project >		_			
Open Project	🗹 Enable		Scan		
Save	1511010108312200007	1			
Save As	00000155	LDSU ID	126	~	
Close	00000466	LDSU Ter	mination Off	~	
Product Name	LDSBus CO2 Sensor	Nickname	LDSBu	s CO2 Sensor	
LDSU Class	0x8011		Undate		
Manufacture Date	2022-Oct-03				
Calibrated Current (mA)	58				
Calibrated Voltage (mV)	5140				
Calibrated Temperature (°C)	25				
Calibrated Date	2022-Oct-12				
Number of I2C Devices]	Calibrate		
Software Version	2.2				
I2C Devices					
Manufacturer : BRT Systems PartNumber : BRT-VDEV Address : 0x800 Capability : 0 Report Rate : 1000 ms Class ID : 0x0304	Pte Ltd. Manufacturer : ROHM PartNumber : BH1730 Address : 0x29 Capability : 0 Report Rate : 1000 Class ID : 0x0401	Semiconductor FVC ms	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0304	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0100	
٢				>	

Figure 35 – File – Open Project Menu

25



2. Browse for the project in the File browser and select the LDSU Project. By default, the *Files of type* filter box display LDSBus Projects (*.ldsbusproj). Click the box and select a LDSU Project. Click and open the LDSU Project.

D LDSBus	Configuration Uti	lity-LDSU Proj	ect				_	x
File LDS	U Commands F	irmware Update	Settings	About				
LDSU Po	rt Power							
Status	: On		☑ Enable			Scan		
		Browse LDS F	Project			×		5
Senial	Number	Look in:	LDSBus Configuration Utilit	у ~	9 👂 📂 🛄 •	126	~	
Produc	t Name	10 🖈	Name DefaultCalibrationData		Date modified 13/10/2022 1:46 PM	Type Off File fo	×	
LDSU C	lass	Quick access	settings		13/10/2022 1:46 PM 13/10/2022 1:46 PM	File fc LDSBus CO2 So	ensor	
Manufa	cture Date	20 Desktop				late		
Calibr	ated Current (mA)	58 🐂						
Calibr	ated Voltage (mV)	51						
Calibr	ated Temperature (°C) 25 💦 This PC						
Calibr	ated Date	20	<		000	> 71		
Number	of I2C Devices	5 Network	Files of type: LDSBus Pr	ojects(*.ldsbusproj*)	2 Cano	cel		
Softwa	re Version	2.	Open as	read-only				
I2C Dev	ices ———							
Manufa PartNu	cturer : BRT Systems mber : BRT-VDEV	Pte Ltd. Manu Part	facturer : ROHM S Number : BH1730FV	em.conductor C	Manufacturer : PartNumber : SC	Sensirion Manufa D40 PartNu	cturer : Sensirio mber : SCD40	on
Addres Capabi	s : 0x00 lity : 0	Addr Capa	ess : 0x29 bility : 0		Address : 0x62 Capability : 1	Addres Capabi	s : 0x62 lity : 1	
Report Class	Rate : 1000 ms ID : 0x0304	Repo Clas	rt Rate : 1000 m s ID : 0x0401		Report Rate : 5 Class ID : 0x03	000 ms Report 04 Class	Rate : 5000 ms ID : 0x0100	
<								>
Browse LDS F	Project		,	Browse LD	S Project			×
Look in:	Projects	× G	Ø 🕫 🖽 -	Look jr	n: LDSBus Projects	~	G 🔊 🖻 🗔 -	
*	Name	Date	e modified Type	*	Name	^	Date modified	Туре
Quick access	No	items match your search	* / I	Quick access		9	THE THE DECEMENT	2030
				Deckton				
Desktop				2				
Libraries				Libraries				
			/					
This PC	<	/	,	This PC	<			>
Network	File name:	V	∨ <u>O</u> pen] Vetwork	File name:		~ 0	pen
INCLINUTE	Files of type: LDSBus Project	cts(*.ldsbusproj*) (*.ldsuproj)	Cancel		Files of type: LDS	U Projects(*Jdsuproj)	√ Ca	ancel
	LDSBus Project	ts(*.ldsbusproj*)				oen as lead-only		

Figure 36 - File Browser - LDSU Project Selection



3. The LDSU project is opened in the project window.

LDSBus Configuration Util	ity-LDSU	Project			_ x
File LDSU Commands Fi	rmware Upo	ate Settings	About		
LDSU Port Power Status: On		⊠ Enable		Scan	
LDSU	1 5110101	29212200007			
UUID	13110101	06512200007	LDSU ID	126	~
Serial Number	00000466		LDSU Ter	mination Off	~
Product Name	LDSBus C	02 Senso	Nicknow	LDSB	us CO2 Sensor
LDSU Class	0×8011			llodate	
Manufacture Date	2022-Oct	-03		opudee	
Calibrated Current (mA)	58				
Calibrated Voltage (mV)	5140				
Calibrated Temperature (°C)	25				
Calibrated Date	Not Appl	icable			
Number of I2C Devices					
Software Version	2.2				
- T2C Dovices					
Manufacturer : BRT Systems F PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0304	Pte Ltd.	Manufacturer : ROHM PartNumber : BH1730F Address : 0x29 Capability : 0 Report Rate : 1000 m Class ID : 0x0401	Semiconductor VC 15	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0304	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0100
¢					,

Figure 37 – LDSU Project Window

Refer to Section 5.1 for more information on creating the LDSU project.



6 Creating a New LDSBus Project

To create an LDSBus Project -

1. Click File → New Project → LDSBus Project.

LDSBus Configuration Utility File Settings About	- ×
New Project + LDSU Project	
Open Project LDSBus Project 1	
Save	
Save As	
Close	

Figure 38 – Project Type Selection Menu

2. Based on the selected project, the application title will be displayed. For example, if the selected project type is "LDSBus Project," then the title displayed will be "LDSBus Configuration Utility – LDSBus Project." Enable the LDSU port power on the LDSBus Device connected to the LDSBus USB Adapter. Click [Scan] to scan the devices in the bus.

1 Lt	LDSBus Configuration Utility-LDSBus Project						<u></u>	x	
File	LDSBus	Commands	Settings	About					
LD:	Bus Power				-				
s	tatus: On			🖾 Enable		2			

Figure 39 – LDSBus Project Interface

 Upon finding the device(s), information related to LDSBus Device will be displayed. There are two view options available, namely LDSU IDs View and LDSU List View. By default, LDUS IDs view is displayed.

LDSBus Configuration Utility-LDSBus	Project		_ x
LDSBus Power			
Status: On	🗹 Enable	Scan	
LDSU IDs LDSU List			
Total Online LDSUs: 3 New Online LDSUs: 3	3	Estimated Power Consumption (mW) :	1602
Filtor: <u>411</u>			

Figure 40 – LDSBus Project Interface (LDSU IDs View)



- 4. The following details are displayed as part of the LDSU IDs view -
 - *Total number online LDSU devices:* Displays the total number of LDSBus Devices which are physically connected and detected on the bus.
 - *New online LDSU devices:* Displays the total number of new LDSBus Devices which are physically connected and detected on the bus.
 - *Estimated Port Power Consumption:* Displays the estimated total power consumed by the bus
 - Online/Offline Device Filter: To filter all, online, offline, or new online LDSBus Devices. LDSBus Devices ID displayed based on filtering results.

LDSU IDs L	LDSU List				
Total Online	e LDSUs: LDSUs:	4	Estimated Power Consumption	(mW) :	1602
Filter: All	-				

 Switch to LDSU List to view the basic device information. The list view displays all the LDSBus Devices connected in the bus with some device information. The LDSU List view displays the following information – Device UUID; Device's Nickname; Date on which the device was last calibrated; Termination Status (ON / OFF).

LDSBus Configuration Uti	llity-LDSBus Project			_ x
File LDSBus Commands	Settings About			
LDSBus Power Status: On	⊠ Enable		Scan	
LDSU IDs LDSU List				
ID UUID	Nickname	Last Calibrated	Termination	Details
2 LS01010159082212340	Leve17C02Sensor	2022-Jun-08	Off	
13 LC01110101042200090	LDSBus 2CH Relay	Not Applicable	Off	Details
97 LC06010101042200097	LDSBus Isolated IO Controller	Not Applicable	Off	Details
5				5

Click **Details** to view the detailed information about the device.

Figure 41 – LDSU List Interface



6. Upon clicking the **Details** link, the detailed LDSU information is displayed.

LDSU Information	X	LDSU Information	X
UUID	L51101XXXXXXX22616	UUID	LC01110101042200090
Serial Number	00000466	rial Number	58D365A5
Product Name	LDSBus CO2 Sensor	6 Joduct Name	LDSBus 2CH Relay
LDSU Class	0x8011	LDSU Class	0×4001
LDSU Termination	Off	LDSU Termination	Off
Nickname	LDSBus CO2 Sensor	Nickname	LDSBus 2CH Relay
Calibrated Current (mA)	58	Calibrated Current (mA)	64
Calibrated Voltage (mV)	5140	Calibrated Voltage (mV)	5000
Calibrated Temperature (°C)	25	Calibrated Temperature (°C)	65
Number of I2C Devices		Number of I2C Devices	2
Commands	Calibration	Commands	lete Application

Figure 42 – LDSU Information

Click [Commands] to access the command interface.

Click [Delete] to remove any of the device from the list.

Click [Calibration] to start the calibration process.

Click [Application] to configure the application types.

6.1 LDSBus Command Interface

The LDSBus command interface is used to communicate with the LDSBus module by selecting the command from the list of supported commands. The command settings are available only if the device is found on the bus. Refer to Section 5.3 for more information.

6.2 Saving LDSBus Project

Upon creating an LDSBus Project, users may save the project. The steps for saving a LDSU Project and LDSBus Project is the same. Refer to Section 5.4 for more information.

6.3 Opening a LDSBus Project

The steps for opening a LDSU Project and LDSU Project is the same. Refer to Section 5.5 for more information.



6.4 LDSBus Right Click Functions

To access the dropdown menu of the device under LDSBus project.

1. Right click the device green square box.



Figure 43 – LDSBus Project - LDSU IDs

2. The dropdown menu will be displayed.

J LDSBus Configuration Utility-LDSBus File LDSBus Commands Settings	Project About		_ ×
LDSBus Power Status: On	🛛 Enable	Scan	
LDSU IDs LDSU List			
Total Online LDSUs: 3 New Online LDSUs: 3		Estimated Power Consumption (mW) :	1602
Filter: All 2 13 97 2 Identify Device Info Calibration Firmware Update Export			

Figure 44 – LDSBus Right Click Drop Down Menu



Common items shown in the dropdown menu are "Identify," "Device Info," "Firmware Update," "Export," "Calibration," "Application Setting," "Profile Setting," "RFID Setting" and "Sensor Configuration" are device related.

Identify – To send identify command.

Device Info – To view the LDSU device as shown in Figure 42.

Firmware Update – To update device firmware. Refer to <u>Section 6.5</u> for more details. On firmware update.

Export – To save the selected unit's data to LDSU project file.

Calibration – To perform calibration. Refer to <u>Section 7</u> for more details on calibration procedure.

Application Setting – To configure application Type. Refer to <u>Section 8</u> for more information related to application type configuration.

Profile Setting – To configure profile setting. Refer to <u>Section 8.3</u> for more information on Profile Setting.

RFID Setting – To configure RFID Setting. Refer to <u>Section 8.4</u> for more information on Configuring RFID Setting.

Sensor Configuration – To configure Senor Setting. Refer to <u>Section 8.5</u> for more information on Sensor Configuration Setting.

LDSBus Configuration Utility-LDSBus File LDSBus Commands Settings	Project About		_ ×
LDSBus Power Status: On	⊠ Enable	Scan	
LDSU IDs LDSU List			
Total Online LDSUs: 3 New Online LDSUs: 3		Estimated Power Consumption (mW) :	1602
Filter: All • 2 13 97 1 dentify Device Info Calibration Firmware Update Export			

Figure 45 – LDSBus Dropdown Menu



6.5 LDSBus Firmware Update

To update device's firmware under LDSBus project -

1. Right click and select the device for which the firmware needs to be updated; From the resulting drop-down menu, click on **[Firmware Update]** to start the firmware update process.

11 07	
Identify	
Device Info	
Calibration	
Firmware Update 1	
Export	

Figure 46 – Drop Down Menu – Firmware Update

 Open File Dialog window will pop up for users to select the unv file; choose the correct unv file and click [Open] to continue. Alternately, click [Cancel] to cancel firmware update.

Browse unv	/ Files				×
Look in	: LS1301		~	G 🗊 😕 🛄-	
Aurick access	Name Name LDSBus_S	∼ alinity_Sensor		Date modified 2/8/2023 11:25 an	Type n UNV
Desktop		2			
This PC	<				,
Network	File <u>n</u> ame:			~	<u>O</u> pen
THEEWOIR .	Files of type:	unv files (*.unv)		~	Cancel



3. A confirmation window will pop up. Click **[Yes]** to confirm the firmware update operation or click **[No]** to cancel the update.



4. LDSBus Firmware update status window will pop up to show the progress of the firmware update.



5. Upon successful completion of update, an appropriate message indicating the same will be displayed. Click **[OK]** to return back LDSBus Project window.





7 Calibration Procedure

From V1.2.2 of the configuration utility, sensor calibration may be performed in-situ on the LDSBus, i.e. the sensor adapter and probe need not be removed from the bus and prevents any disruption to the existing setup in the field. For in-situ calibration, detach the RJ-45 cable from the gateway LDSBus Port and attach it to the RJ-45 interface of the LDSBus USB Adapter and open an LDSBus Project in the utility, instead.

7.1 LDSBus pH Sensor Adapter Calibration

To calibrate pH Sensor Adapter, follow these steps -

1. Click [Calibrate] from the LDSU / LDSBus Project interface.

		1 a	
Status: On	🖬 Enable		
55U			
AUD	1.504010104212100032	1050 10	12
ierial Number	4398C3A2	INTERNAL CONTRACTOR	off
Product Name	LOSBus pH Sensor	Luge remination	LESENS OF Sector
050 Class	0x8008	ALCONOMIC .	a research bu mercelle.
lanufacture Date	2021-Oct-29		Martana .
alibrated Current (mA)	43		
alibrated Voltage (mV)	5148		
alibrated Temperature (*C)	25		
alibrated Date	2021-Oct-28		
umber of I2C Devices			Calibrate
oftware Version	1.3		
C Devices			
amufacturer : Bridgetek Pte FartNumber : BRT-VDEV ddress : 8:88 Mpobility : 0 Seport Rate : 1880 ms Jess TD : 0x0000	. 18d.		

2. An information window prompting the users for Power Selection is displayed. LDSU Calibration requires 24V Power supply. Remove the sensor module and attach to the HVT-Junction connected to the LDSBus Port. Click [Ok] to continue or [Cancel] to guit the calibration process.





 Upon clicking [Ok], a confirmation window prompting the user to switch from LDSU Port Power to LDSBus Port Power is displayed. Click [Ok] to switch. Alternately, click [Cancel] to exit the calibration process.



4. Upon clicking **[Ok]**, the project window will be in disabled mode and the countdown timer starts as shown in the picture indicating that the power switching is in progress.



First Point Calibration

5. Upon successful power switch, system will prompt the users to start the calibration. Click **[OK].** The interface for the First point calibration for 7pH is displayed. Prepare Buffer solution (7pH and one more optional). There should be two sets of beakers for each solution. Beaker 1 is used to clean the probe before a calibration and Beaker 2 is used for the actual calibration measurement. *Temperature* can be edited if required. Upon preparing the solutions, click on the *Beaker-2 for Calibration 7pH* checkbox.


Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038



6. Remove the electrode from its storage solution and rinse it with distilled water in an empty waste beaker. Upon rinsing the probe with distilled water, click on the *Rinse the probe with distilled water* check box.



7. After rinsing, wipe dry with Kimwipes or Shurwipes and click on the *Dry the probe* with Kimwipes or Shurwipes checkbox. (Avoid rubbing the electrode because it has a sensitive membrane).





8. Use Beaker 1 (7pH) to rinse the electrode. Use Beaker 2 (7pH) to place the electrode to start the calibration. Rinse the probe in beaker 1 (7pH), then click the *Rinse the probe in beaker-1* checkbox.



9. An information window will appear. Click **[Ok]** to proceed. The calibration window will be in disabled mode and the countdown timer starts as shown in the picture. Wait for 60 seconds to stabilize the readings.



10. Check the result. If the first point calibration is unsuccessful, an error message is displayed. Click **[Retry]** to start the first point calibration again (Repeat Steps 5 – 10 until the first point calibration is successful).







11. Upon successful calibration, an appropriate message indicating the same is displayed. Click **[Ok]** to continue. The Calibration result will be displayed. Click **[Next]** to proceed with the Second point calibration.



Second Point Calibration

12. Upon successfully completing the First Point Calibration, the Second Point Calibration interface is displayed. Prepare Second buffer solution. There should be two sets of beakers for each solution. Beaker 1 is used to clean the probe before a calibration and Beaker 2 is used for the actual calibration measurement. Upon preparing the solutions, click on the *Beaker-2 for Calibration 4.00pH* checkbox.

pH - Second point calibration - 4pH		Х
Second buffer solution	4.0	рН
Prepare solutions in 2 beakers > Beaker-1 for probe cleaning 7pH > Beaker-2 for calibration 4.00pH		·
	Can	cel

13. Remove the electrode from its storage solution and rinse it with distilled water in an empty waste beaker. Upon rinsing the probe with distilled water, click on the *Rinse the probe with distilled water* check box.



39



14. After rinsing, wipe dry with Kimwipes or Shurwipes and click on the *Dry the probe* with Kimwipes or Shurwipes checkbox.



15. An information window will appear. Click **[Ok]** to proceed. The calibration window will be in disabled mode and the countdown timer starts as shown in the picture. Waiting for 60 seconds to stabilize the readings.



16. Check the result. Upon successful calibration, an appropriate message indicating the same is displayed. Click **[Ok]** to continue.





17. The Calibration result will be displayed. Click **[Update]** to flash the calibration data into the device. System will switch power from LDSBus Port to LDSU Port.



18. If the calibration fails, then appropriate error message is displayed. Click [Ok].



19. Click **[Retry]** to do the second point calibration again. (Repeat Steps 13 – 19 until the calibration is successful) or click **[Cancel]** to exit the calibration process. Upon cancelling the calibration process, system will switch power from LDSBus Port to LDSU Port.

pH - Second point calibration - 4pH	x
Second buffer solution 4.	0 рН
Prepare solutions in 2 beakers > Beaker-1 for probe cleaning 7pH > Beaker-2 for calibration 4.00pH	
Rinse the probe with distilled water	
Dry the probe with Kimwipes or Shurwipes	
Rinse the probe in beaker-1	
Immerse the probe into beaker-2	<u></u>
Slope (Range 90%-105%)	
Retry 19	Cancel

Post Completion or Cancellation of Calibration Process

41

BRTSys

BRTSYS_AN_001 LDSBus Configuration Utility Guide Version 1.4

Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

- 20. Upon successful completion or cancellation of calibration process, system will switch power from LDSBus Port to LDSU Port.
- 21. An information window prompting the users to detach the LDSBus pH Sensor Adapter from the LDSBus HVT-Junction and attach to the LDSBus USB Adapter RJ11 Port is displayed. Click **[Ok]**.



22. Upon clicking **[OK]**, the project window will be in disabled mode and the countdown timer starts as shown in the

	-		ing is in progress	•	
LDSBus Configuration Util	L ity-LDSU Project irmware Update	Settings	About		_ ×
		ど Ensble		Scan	
	LS01010101222112 000003EA LDSBus pH Sensor 0x8008 Switch 2021-No 47 5140 25 2021-No 1 2.0	2848	LDSU ID LDSU Termination 52 Secs. 22	2 Off LDSBus pH Sensor Update Calibrate	
12C Devices Manufacturer : BridgeTek P PartNumber : BRT-DEV Address : BXRD					



7.2 LDSBus EC/Salinity Sensor Adapter Calibration

To calibrate EC / Salinity Sensor Adapter, follow these steps -

1. Click [Calibrate] from the LDSU / LDSBus Project interface to start the calibration.

LDSBus Configuration Util:	ity-LDSU Project	About		_ x
LDSU Port Power Status: On	rmware update settings ☑ Enable		Scan	
UUID	L505010101042200058	LUSU ID	58	~
Serial Number	E1FC1231	IDSU Termination	Off	~
Product Name	LDSBus EC Sensor	Nicknamo	LDSBus EC Sensor	
LDSU Class	0x8009		(12) Provide State	_
Manufacture Date	2022-Jun-16		opuace	
Calibrated Current (mA)	40			
Calibrated Voltage (mV)	5140			
Calibrated Temperature (°C)	25			
Calibrated Date	2022-Oct-19]		
Number of I2C Devices	1		Calibrate	
Software Version	2.1			
Manufacturer : Bridgetek Pte PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0901	e Ltd.			

BRTSys

Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

Calibration requires 24V LDSBus Power.

Remove and attach Sensor adapter to a LDSBus HVT-

- 2. An information window prompting the users for Power Selection is displayed. LDSU Calibration requires 24V Power supply. Remove the sensor module and attach to the HVT-Junction connected to the LDSBus Port. Click **[Ok]** to continue or **[Cancel]** to quit the calibration process.
- Upon clicking [Ok], a confirmation window prompting the user to switch from LDSU Port Power to LDSBus Port Power is displayed. Click [Ok] to switch. Alternately, click [Cancel] to exit the calibration process.
- Upon clicking [OK], the project window will be in disabled mode and the countdown timer starts as shown in the picture indicating that the power switching is in progress.

First Point Calibration

5. Upon successful power switch, system will prompt the users to start the calibration. Click **[Ok]**. The interface for the First point calibration for EC Sensor is displayed. Prepare Buffer solution (EC Sensor and one more optional). There should be two sets of beakers for each solution. Beaker 1 is used to clean the probe before a calibration and Beaker 2 is used for the actual calibration measurement.

Temperature/Probe Type/EC Solution can be edited if required. Upon preparing the solutions, click on the *Beaker-2 for Calibration* checkbox.





6. Remove the electrode from its storage solution and rinse it with distilled water in an empty waste beaker. Upon rinsing the probe with distilled water, click on the *Rinse the probe with distilled water* check box.



 After rinsing, wipe dry with Kimwipes or Shurwipes and click on the Dry the probe with Kimwipes or Shurwipes checkbox. (Avoid rubbing the electrode because it has a sensitive membrane).



8. Use Beaker 1 to rinse the electrode. Use Beaker 2 to place the electrode to start the calibration. Rinse the probe in beaker 1, then click the *Rinse the probe in beaker-1* checkbox.





- 9. An information window will appear prompting for immersing the probe in beaker 2. Click **[Ok]** to proceed.
- 10. Upon immersing the probe, click on the corresponding checkbox. Wait for 60 seconds to stabilize the readings.

- 11. Upon successful calibration, an appropriate message indicating the same is displayed. Click **[Ok]** to continue. The Calibration result will be displayed.
- 12. Click **[Next]** to proceed with the Second point calibration.





Second Point Calibration

- 13. Upon successfully completing the First Point Calibration, the Second Point Calibration interface is displayed. Prepare Second buffer solution. There should be two sets of beakers for each solution. Beaker 1 is used to clean the probe before a calibration and Beaker 2 is used for the actual calibration measurement. Upon preparing the solutions, click on the *Beaker-2 for Calibration* checkbox.
- 14. Remove the electrode from its storage solution and rinse it with distilled water in an empty waste beaker. Upon rinsing the probe with distilled water, click on the *Rinse the probe with distilled water* check box.



15. After rinsing, wipe dry with Kimwipes or Shurwipes and click on the *Dry the probe with Kimwipes or Shurwipes* checkbox.

47



Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

16. Rinse the probe in beaker solution. Once done, click on the *Rinse the probe in beaker-1* checkbox.

- 17. An information window will appear prompting for immersing the probe in beaker 2. Click **[Ok]** to proceed.
- 18. Upon immersing the probe, click on the corresponding checkbox. Wait for 60 seconds to stabilize the readings.

19. Upon successful calibration, an appropriate message indicating the same is displayed. Click **[Ok]** to continue. The Calibration result will be displayed.





Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

20. The second point calibration result will be displayed. Click **[Update]** to flash calibration data into EEPROM or click **[Cancel]** to avoid saving data.

- 21. Upon successful update, an appropriate message indicating the same is displayed.
- 22. LDSBus Power will be switched off.

 Connect the sensor back to the USB adapter after removing it from the HVT junction, and then click [Ok]. For power switching, wait 60 seconds.



24. In the main window, the calibration date will be updated after the utility scans the device again.

2022-Dec-13

LDSU Port Power	⊠ Enable		Scan	
LDSU				
UUID	LS05010101042200058	LUSU ID	58	×
Product Name	LDSBus EC Sensor	LDSU Termination Nickname	Off LDSBus EC Sensor	~
ge LDSU Class Fee Manufacture Date	0x8009 2022-Jun-16		Update	
Calibrated Current (mA)	40			



7.3 LDSBus DO Sensor Adapter Calibration

To calibrate DO Sensor Adapter, follow these steps -

1. Click [Calibrate] from the LDSU / LDSBus Project interface to start the calibration.

	LDSBus Configuration	Utility-LDSU Project			_ x	
	File LDSU Commands	Firmware Update Settin	gs About			
	LDSU Port Power					
	Status: On	⊻ Enabl		Scan		0
Product P	UUID	LS10010101042200051		51		c Dto I td
Document	Serial Number	784406E6		off	~	S PLE LLU
	Product Name	LDSBus DO Sensor	Nickname	LDSBus DO Sensor		
	LDSU Class	0×800C		Undate		
	Manufacture Date	2022-Jun-04				



- 2. An information window prompting the users for Power Selection is displayed. LDSU Calibration requires 24V Power supply. Remove the sensor module and attach the HVT-Junction to connected to the LDSBus Port. Click [Ok] to continue or [Cancel] to quit the calibration process.
- Upon clicking [Ok], a confirmation window prompting the user to switch from LDSU Port Power to LDSBus Port Power is displayed. Click [Ok] to switch. Alternately, click [Cancel] to exit the calibration process. Upon clicking [OK], the project window will be in disabled mode and the countdown timer starts.







Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

- 4. Upon successful power switch, system will prompt the users to start the calibration. Click [Ok].
- 5. Calibration interface for DO Sensor is displayed. Using pure water, wet the probe and click on the checkbox accordingly.

6. After shaking off excess water, click the check box.

7. Make sure the probe is exposed to the air, then click the check box.



8

Product Page Document Feedback

continue.



9. The calibration result will be displayed. Click **[Update]** to flash calibration data into EEPROM or click **[Cancel]** to avoid saving data.



10. Upon successful update, an appropriate message indicating the same is displayed.

Information
()
Update Successful

11. LDSBus Power will be switched off.



12. Connect the sensor back to the USB adapter after removing it from the HVT junction, and then click **[Ok]**. For power switching, wait 60 seconds.



13. In the main window, the calibration date will be updated after the utility scans the device again.

LDSBus Configuration Util:	ity-LDSU Project			_ ×
File LDSU Commands Fi	rmware Update Settings	About		
LDSU Port Power				
Status: On	🗹 Enable			
UUID	L510010101042200051		51	
Serial Number	784406E6		off	
Product Name	LDSBus DO Sensor	LDSU Termination		
LDSU Class	0x800C	Nickname		
Manufacture Date	2022-Jun-04] -	υραατο	
Calibrated Current (mA)	40			
Calibrated Voltage (mV)	5140	13		
Calibrated Temperature (°C)	25			
Calibrated Date	2022-Dec-13]		
Number of I2C Devices]	Calibrate	
Software Version	2.2			
Tac Devices				
Manufacturer : Bridgetek Pte PartNumber : BRT-VDEV	! Ltd.			
Address : 0x00				
Capability : 0				
Report Rate : 1000 ms				
Class 10 : 0x0902				



7.4 LDSBus ORP Sensor Adapter Calibration

To calibrate ORP Sensor Adapter, follow these steps -

- 1. Make one beaker of pure water and connect an ORP sensor to a USB adapter.
- 2. To scan the ORP sensor, click **[Scan]**, if the sensor has not been calibrated, an alert will appear asking whether to calibrate. Click **[Yes]** to start the calibration process.



Clicking **[No]** will display the same calibration data screen as the sensor. Click **[Calibrate]** to start the calibration.

DSU Port Power		Sectings	-		
Status: On		🗹 Enable			
DSU	Υ.				
UUID	LS0101014017220	30002	LUSU 10	2	
Serial Number	000003EA			Off	
Product Name	LDSBus ORP Sen	sor		1959 000 5	
LDSU Class	0×800E		Nickname	LDSBUS OKP Sensor	
Manufacture Date	2022-May-17			Update	
Calibrated Current (mA)	25		1		
Calibrated Voltage (mV)	3300] [2]		
Calibrated Temperature (°C)	40				
Calibrated Date	2023-Jan-20				
Number of I2C Devices	1			Calibrate	
Software Version	2.3				
2C Devices					
Manufacturer : BridgeTek Pte PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0305	Ltd.				

3. An information window prompting the users for Power Selection is displayed. LDSU Calibration requires 24V Power supply. Remove the sensor module and the HVT-Junction attach to connected to the LDSBus Port. Click [Ok] to continue or [Cancel] to quit the calibration process.





Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

- Upon clicking [Ok], a confirmation window prompting the user to switch from LDSU Port Power to LDSBus Port Power is displayed. Click [Ok] to switch. Alternately, click [Cancel] to exit the calibration process. Upon clicking [Ok], the project window will be in disabled mode and the countdown timer starts.
- 5. Upon successful power switch, system will prompt the users to start the calibration. Click **[Ok].**
- Calibration interface for ORP Sensor is displayed. Enter the correct calibration *temperature* and *buffer solution*. Prepare the ORP buffer solution and click on the checkbox accordingly.



 Separate buffer solutions into two beakers, beaker 1 and beaker 2 and click on the checkbox accordingly.



BRTSys

BRTSYS_AN_001 LDSBus Configuration Utility Guide Version 1.4

Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

8. Remove the probe from its storage solution, rinse with distilled water, and blot dry with Kimwipes or Shurwipes. Upon doing so, click the check box.

 Rinse the probe with solution from beaker 1 and click on the check box.

10. Calibrate the probe by putting it in beaker 2 solution and click on the check box.





Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

- 11. Upon successful calibration, an appropriate message indicating the same is displayed. Click **[Ok]** to continue.
- 12. The calibration result will be displayed. Click **[Update]** to flash calibration data into EEPROM or click **[Cancel]** to avoid saving data.

13. Upon successful update, an appropriate message indicating the same is displayed.

14. LDSBus Power will be switched off.

15. Connect the sensor back to the USB adapter after removing it from the HVT junction, and then click **[Ok]**. For power switching, wait 60 seconds.





16. In the main window, the calibration date will be updated after the utility scans the device again.

DLDSBus Configuration Utili	ity-LDSU Project			_ ×
File LDSU Commands Fir	rmware Update Settings	About		
LDSU Port Power				
Status: On	🗹 Enable			
r LDSU				
UUID	LS10010101042200051		51	
Serial Number	784406E6	LDSU ID	off	
Product Name	LDSBus DO Sensor	Nickname	LDSBus DO Sensor	
LDSU Class	0×800C		Undata	
Manufacture Date	2022-Jun-04] [opuare	
Calibrated Current (mA)	40			
Calibrated Voltage (mV)	5140	16		
Calibrated Temperature (°C)	25			
Calibrated Date	2022-Dec-13]		
Number of I2C Devices			Calibrate	
Software Version	2.2			
r I2C Devices				
Manufacturer : Bridgetek Pte PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0002	: Ltd.			



7.5 LDSBus CO2 Sensor Adapter Calibration

To calibrate CO2 Sensor Adapter, follow these steps -

- 1. Prepare the reference CO2 meter and connect it to the USB adapter to achieve better accuracy. Make sure that the reading of the environment CO2 is greater than 400ppm.
- 2. To scan the CO2 sensor, click **[Scan]**, if the sensor has not been calibrated, an alert will appear asking whether to calibrate. Click **[Yes]** to start the calibration process.



Clicking **[No]** will display the same calibration data screen as the sensor. Click **[Calibrate]** to start the calibration.

e LDSU Commands Firm	LS11010149252200022	About	Scan	
LDSU Port Power Status: On	☑ Enable		Scan	
Status: On	☑ Enable			
	L511010149252200022			
LDSU	L511010149252200022			
UUID			22	
Serial Number	000003FE		055	
Product Name	LDSBus CO2 Sensor	LDSU Term	ination Off	*
IDSU Class	0×8011	Nickname	LDSBu	s CO2 Sensor
Manufacture Date	2022-Nov-25		Update	
Calibrated Current (mA)	58			
Calibrated Voltage (mV)	5140			
Calibrated Tomponature (%C)	25			
calibrated Temperature (C)	2022-Nov-25			
Calibrated Date	r	2	Calibrate	
Number of I2C Devices				
Software Version	2.2			
T2C Devices				
Manufacturer : BRT Systems Pto PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0304	e Ltd. Manufacturer : ROHM ! PartNumber : BH1730F' Address : 0x29 Capability : 0 Report Rate : 1000 m Class ID : 0x0401	Semiconductor VC s	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0304	Manufacturer : Sensirion PartNumber : SCD40 Address : 0x62 Capability : 1 Report Rate : 5000 ms Class ID : 0x0100
¢				>

3. An information window prompting the users for Power Selection is displayed. LDSU Calibration requires 24V Power supply. Remove the sensor module and attach to the HVT-Junction connected to the LDSBus Port. Click **[Ok]** to continue or **[Cancel]** to quit the calibration process.





4. Upon clicking [Ok], a confirmation window prompting the user to switch from LDSU Port Power to LDSBus Port Power is displayed. Click [Ok] to switch. Alternately, click [Cancel] to exit the calibration process. Upon clicking [OK], the project window will be in disabled mode and the countdown timer starts.



5. Upon successful power switch, system will prompt the users to start the calibration. Click **[Ok].** Wait for 180 seconds for CO2 reading to stabilize.



6. The calibration result will be displayed. Enter the CO2 reading from CO2 reference meter. Click **[Update]** to save calibration data into EEPROM.



7. Upon successful update, an appropriate message indicating the same is displayed.





8. LDSBus Power will be switched off.



9. Connect the sensor back to the USB adapter after removing it from the HVT junction, and then click **[Ok]**. For power switching, wait 60 seconds.

Information
1
Detach LDSBus Sensor Adapter from the LDSBus HVT- Junction
and attach to the LDSBus USB Adapter RJ11 port.
9 Ok

10. In the main window, the calibration date will be updated after the utility scans the device again.

LDSBus Configuration Util:	ity-LDSU Projec	t			
ile LDSU Commands Fir	rmware Update	Settings	About		
LDSU Port Power					
Status: On		🗹 Enable			
UUID	LS1101014925220	0022			2
Serial Number	000003FE			• • •	off v
Product Name	LDSBus CO2 Sens	or		mination	DSBus CO2 Senson
LDSU Class	0×8011		Nickname		DSbus Coz Sensor
Manufacture Date	2022-Nov-25] 🗕	Upda	Ce
Calibrated Current (mA)	58				
Calibrated Voltage (mV)	5140		10		
Calibrated Temperature (°C)	25			<u>,</u>	
Calibrated Date	2022-Dec-13]		
Number of I2C Devices]	Calibr	ate
Software Version	2.2				
I2C Devices					
Manufacturer : BRT Systems P PartNumber : BRT-VDEV	te Ltd. Manufac PartNur	turer : ROHM	Semiconductor	Manufacturer : Sensir PartNumber : SCD40	ion Manufacturer : Sensirio PartNumber : SCD40
Address : 0x00	Address : 0x00 Address : 0x29			Address : 0x62	Address : 0x62
Capability : 0 Report Rate : 1000 mm	Capabil	lity : 0 Rato : 1000	me	Capability : 1	Capability : 1 Report Rate : 5000
Class ID : 0x0304	Class 1	ID : 0x0401		Class ID : 0x0304	Class ID : 0x0100

8 Application Type Configuration

8.1 Relay Controller Application Type Configuration

To configure application type for Relay Controller -

1. Click [Application Type Configuration].

LDSBus Configuration Util	lity-LDSU Project				_ x
File LDSU Commands F	irmware Update	Settings	About		
LDSU Port Power					
Status: On		🗹 Enable			
_ LDSU					
UUID	LC011101010422000	990		13	_
Serial Number	58D365A5		LDSU ID	Off	~
Product Name	LDSBus 2CH Relay			DSDuc 2011 Rollow	
LDSU Class	0×4001		Nickname	Undate	
Manufacture Date	2023-Jan-30				
Calibrated Current (mA)	64				
Calibrated Voltage (mV)	5000				
Calibrated Temperature (°C)	65				
Calibrated Date	Not Applicable				
Number of I2C Devices					
Software Version	2.0		Applicat	fior Pration	
r I2C Devices					
Manufacturer : Bridgetek Pte PartNumber : BRI-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0000	e Ltd. Manufactur PartNumber Address : Capahility Report Rat Class ID :	er : Bridgete : 2CH Relay 0x58 : 0 e : 1000 ms 0x8000	∶k Pte Ltd.		

2. The Relay Controller Application Type configuration window is displayed.

neray board Appr	lication Type Configuration	on		Х
UUID LO	C01110101042200090	LDSU ID	13 0ff	
Relay Setting-	Wire Motor	2 Relay 2: 4	Wire Motor v	
	U	pdate		

- 3. Select the setting for each relay from the drop-down box. There are different input windows for the different relay settings. For example, for 4 wire motor, the setting input will look like the one shown in the picture.
 - a. The settings shown in the 4-wire Motor Setting, indicate that the motor is powered via the COM-NO contacts of Relay 1, i.e., when Relay 1's contacts are in COM-NC, the power is OFF.



b. Similarly, when Relay 2's COM-NO contacts are closed, the motor is driven in the forward (FWD) direction and when COM-NC contacts are closed, the motor is driven in the reverse (REV) direction. The user shall determine the forward and reverse directions of the motor.

Relay Board Ap	oplication Type Configuration	on		x		
	LC01110101042200090	LDSU ID	13			
Product Name	LDSBus 2CH Relay	LDSU Termination	Off			
Relay Setting	3					
Relay 1:	4 Wire Motor → None Generic DOUT	Relay 2: 4	Wire Motor			
	4 Wire Motor	odate	3			
4-Wire M	otor Setting			Х		
[Setting	s					
Relay 1	1:	Power	~			
Relay 2	2:	Direction				
Power:	3	NO = ON,	NC = OFF ~			
Direct:	ion:	NO = FWD,	NC = REV ~			
Timer:		Not timed	×			
Time_o	noff (secs):	65535				
Grd_Ti	<pre>ne_OnOff (secs):</pre>	0				
Grd_Ti	me_OffOn (secs):	0				
■ Set /	■ Set Application Reference?					
	Set	Data				

4. Once all relays are configured, click **[Update]** to save the settings to the device's EEPROM. A confirmation window will be displayed whether to update the application. Click **[Yes]** to update; **[No]** to cancel the update. Upon successful update, an appropriate message indicating the same will be displayed.





8.2 IO Controller Application Type Configuration

To configure application type for IO Controller Module -

1. Click [Application Type Configuration].

LDSU Commands Fir	mware Update	Settings	About			
DSU Port Power		☑ Enable			Scan	
DSU						
UUID	LC060101010422	00092	LDSU	10	Э	÷
Serial Number	D88AB98E				Off	
Product Name	LDSBus Isolate	d IO Controller	LDSU	lermination		
DSIL Class	0×C001		Nick	name	LDSBus Isolated IO Controlle	
	2022-Map-24				Update	
Manufacture Date	2022 1101 24					
Calibrated Current (mA)	240					
Calibrated Voltage (mV)	5000					
Calibrated Temperature (°C)	60					
Calibrated Date	Not Applicable					
Number of I2C Devices						
	2.0				7	
oftware Version	2.0			Applicat	ion Type Configuration	1
2C Devices						
Manufacturer : Bridgetek Pte PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x001	Ltd. Manufact PartNum Address Capabil: Report I Class II	turer : Bridget ber : DIO-CONTR : 0x58 ity : 0 Rate : 1000 ms D : 0x0C00	ek Pte Ltd. OLLER	Manufacturer : PartNumber : AI Address : 0x58 Capability : 0 Report Rate : 1 Class ID : <u>0x0</u> 8	Bridgetek Pte Ltd. IO-CONTROLLER 1000 ms IFF	

2. A window will appear asking for a new configuration if the IO controller board was configured previously. Click **[Yes]** to change the setting; **[No]** to not change the setting.



Alternatively, if the IO controller has not been configured previously, this window will not appear.

Click **[Yes]** to configure the IO controller application type. If no configuration is done on the board, the following window will appear.



Document Reference No.: BRTSYS_000014 Clearance No.: BRTSYS#038

UUID LC060101010	942200097	LDSU ID	97	
Product Name LUSBUS 150	lated 10 Controller	LUSU Terminatio		
Input ———		Coutput		
AIN1: Generic AIN	~	AOUT1:	Generic AOUT	v
AIN2: None	~ <mark>2</mark>	AOUT2:	lone	~
DIN1: Generic DIN		DOUT1:	Generic DOUT	~
DIN2: None	~	DOUT2:	None	~
	Number of	Bytes Left: 10	4	

In total, there are 8 channels that can be configured. Below is a list of the input definitions of all channels.

- AIN1 Analog input channel 1
- AIN2 Analog input channel 2
- DIN1 Digital input channel 1
- DIN2 Digital input channel 2
- AOUT1 Analog output channel 1
- AOUT2 Analog output channel 2
- DOUT1 Digital output channel 1
- DOUT2 Digital output channel 2

AIN 1 & AIN 2 Channels

Both AIN1 and AIN2 have the same drop-down options -

IO Contro	oller	Application Typ	e Configurati	on			X
UUID Product	Name	LC06010101042200 LDSBus Isolated	0097 IO Controller	LDSU LDSU	ID Terminatic	97 Off	
∟ ∟				ŕ	Output —		J
AIN1:	Gener	ric AIN	~		AOUT1:	1-10V Dimmer	~
AIN2:	None Gener	ric AIN			AOUT2:	None	~
DIN1:	None		~ ~		DOUT1:	None	~
DIN2:	None		~	20	DOUT2:	None	~
			Number of	Byte	s Left: 69)	
			Up	date			

- None Not Configured
- o Generic AIN General Analog input configuration



DIN 1 & DIN 2 Channels

UUID	LC06010101042200097	LDSU ID	97	
Product Name	LDSBus Isolated IO Controller	LDSU Termin	nation Off	
Input ———		_ Output		
AIN1: Gene	ric AIN ~	AOUT	1: 1-10V Dimmer	~
AIN2: None		AOUT	2: None	~
DIN1: None	~	DOUT	1: None	~
DIN2: Gene	ric DIN	DOUT	2: None	Ŷ
	Number of	Bytes Left	: 69	

Both DIN1 and DIN2 have the same drop-down options -

- None Not Configured
- Generic DIN General Digital input configuration

AOUT 1 & AOUT 2 Channels

Both AOUT1 and AOUT2 have the same drop-down options -

IO Controller	Application Type Configurat	ion		X
	LC06010101042200097	LDSU ID	97	
Product Name	LDSBus Isolated 10 Controller	LDSU Termination	0000	
_ Input ────		_┌ Output ——		H
AIN1: Gener	ric AIN 🗸 🗸	AOUT1: 1	-10V Dimmer	
AIN2: None	~ (2	AOUT2:	one eneric AOUT -10V Dimmer	
DIN1: None	~	DOUT1: 1	-10V Dimmer	
DIN2: None	Ŷ	DOUT2: N	one	
	Number of	Bytes Left: 69		
	Up	odate		

- None Not Configured
- Generic AOUT General Analog Output configuration
- 0-10V Dimmer To configure 0-10V Dimmer
- 1-10V Dimmer To configure 1-10V Dimmer



0-10V Dimmer / 1-10V Dimmer

The LDSBus Isolated IO Controller supports 0-10V and 1-10V application types. Upon selecting 0-10V / 1-10V Dimmer, the respective configuration interface is displayed.



The user has to input a brightness curve. A brightness curve attempts to compensate for the non-linearities of the lighting element (e.g., incandescent bulb, CCFL, LED). There are 2 steps to perform. In the first step, the user has to obtain the brightness curve from the manufacturer. This brightness curve shall provide information for Luminance (Brightness) in units of Lux versus the 0-10V or 1-10V input. In the second step, the user shall then divide the Brightness range (0 Lux to Maximum Lux) into 21 or 22 equal points. For each point the corresponding voltage may be picked from the brightness curve. Then this voltage (Analog_Voltage) shall be converted into an ADC value through the following formulae:

a. 0-10V:

ADC value = Analog_Voltage/10 * 1023

b. 1-10V: ADC value = Analog_Voltage/9 * 1023

For example, if the brightness curve of a 0-10V light has example value pairs as follows:

a. 0 Lux, 0V
b. 10 Lux, 1V
c. 50 Lux, 2V
d. 100 Lux, 3V
e. 200 Lux, 4V
f. 400 Lux, 5V
g. 400 Lux, 6V
h. 400 Lux, 7V
i. 400 Lux, 8V
j. 400 Lux, 9V
k. 400 Lux, 10V



Then the brightness range is between 0-400Lux and the 21 Lux points will each have a step of 20 Lux (400Lux/20). For each Lux point, the analog input voltage can be interpolated from the above table. For e.g. At 50% brightness, the Lux value is 200 and this corresponds to 4V. The corresponding ADC value is:

ADC = 4/10 * 1023 = 409 (rounded to the nearest integer)

For example, if the brightness curve of a 1-10V light has example value pairs as follows:

- a. 0 Lux, 1V
- b. 10 Lux, 2V
- c. 50 Lux, 3V
- d. 100 Lux, 4V
- e. 200 Lux, 5V
- f. 400 Lux, 6V
- g. 400 Lux, 7V
- h. 400 Lux, 8V
- i. 400 Lux, 9V
- j. 400 Lux, 10V

Then the brightness range is between 0-400Lux and the 22 Lux points will each have a step of 19 Lux (400Lux/21). For each Lux point, the analog input voltage can be interpolated from the above table. For e.g. At 75% brightness, the Lux value is 300 (linear interpolation) and this corresponds to 5.5V. The corresponding ADC value is:

ADC = 5.5/9 * 1023 = 625 (rounded to the nearest integer)

DOUT 1 & DOUT 2 Channels

Both DOUT1 and DOUT2 have the same drop-down options -

IO Controller	Application Type Configurat	ion		X
UUID	LC06010101042200097	LDSU ID	97	
Product Name	LDSBus Isolated 10 Controller	LDSU Termination	1 Off	
		Coutput		
AIN1: Gene	ric AIN 🗸	AOUT1: 1	L-10V Dimmer v	
AIN2: None	v (2 AOUT2:	lone v	
DIN1: None	~	DOUT1:	lone ~	
DIN2: None	×	DOUT2:	Generic DOUT	
	Number of	Bytes Left: 69		
	ų	pdate		

- None Not Configured
- Generic DOUT General Digital Output configuration





In the event that the configuration space is limited, an appropriate message will be displayed to indicate that there is not enough EEPROM space to configure the application type.

8.3 Trailing Edge Dimmer Profile Setting

To configure profile setting for LDSBus Trailing Edge Dimmer -

1. Click [Profile Settings].

SIL Port Power			
Status: On	☑ Enable		
DSU			
JUID	LC03010105102200003		100
Serial Number	D81CC06F		
Product Name	LDSBus Trailing Edge Dimmer	LDSU Termination	011
DSU Class	0×4000	Nickname	LDSBus Trailing Edge Dimmer
Nanufacture Date	2022-Oct-17		Update
Calibrated Current (mA)	125		
alibrated Voltage (mV)	5000		
Calibrated Temperature (°C)	65		
alibrated Date	Not Applicable		
lumber of I2C Devices			Profile Settings
Software Version	1.1		
C Devices			
Nanufacturer : Bridgetek Pte PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Neport Rate : 1000 ms	: Ltd. Manufacturer : Bridge PartNumber : Light Di Address : 0x58 Capability : 0 Report Rate : 1000 ms	tek Pte Ltd. mmer	

2. The profile selection panel will appear and the current setting will be displayed.

LDSBus Configuration Util:	ity-LDSU Proje	ct		_ x		
File LDSU Commands Fi	rmware Update	Settings	About			
LDSU Port Power			1			
Status: On		🗹 Enable		Scan		
UUID	LC030101051022	90003		199		
Serial Number	D81CC06F		LDSU ID	off v		
Product Name	LDSBus Trailing	g Edge Dimmer		DEBus Tasilias Edas Disma		
LDSU Class	0×4000		Nickname	Liodate		
Manufacture Date	2022-Oct-17		Colort Destile			
Calibrated Current (mA)	125		IKEA_LED1632G5			
Calibrated Voltage (mV)	5000		Brand: IKEA			
Calibrated Temperature (°C)	65		Model: LED1632G5			
Calibrated Date	Not Applicable			Update Setting		
Number of I2C Devices			2			
Software Version	1.1					
I2C Devices						
Manufacturer : Bridgetek Pte PartNumber : BRT-VDEV Address : 0x00 Capability : 0 Report Rate : 1000 ms Class ID : 0x0400	e Ltd. Manufact PartNumb Address Capabili Report F Class ID	turer : Bridget eer : Light Dim : 0x58 .ty : 0 tate : 1000 ms) : 0x0603	ek Pte Ltd. mer			

70



3. Click on the *Select Profile* drop down box and select a different default profile. Depending upon the selected profile, the details are displayed. For example, if the selected profile is *IKEA_LED1632G5*, then the *brand name* and *model* is displayed.

		About	
ile LDSU Commands Fi	rmware Update Settings /		
LDSU Port Power			
Status: On	🗹 Enable		
L		9	
UUID	LC03010105102200003	1050-10	100
Serial Number	D81CC06F	LDSU Termination	Off
Product Name	LDSBus Trailing Edge Dimmer		LDSBus Trailing Edge Dimmer
LDSU Class	0x4000	Nickname	COSDUS TRAILING CUGE DIMMER
Manufacture Date	2022-Oct-17		Update
Calibrated Current (mA)	125	Select Profile	
Calibrated Voltage (mV)	5000	IKEA_LED1632G5 Aeon_DZ0030NTE	
Calibrated Temperature (°C)	65	Aeon_HALO-V2 Acon_TSA_V3_Sand_White	
Calibrated Data	Not Applicable	Generic	
Number of T3C Devices	2	Oranlife_X0017EMCVV_LED	_240V_50Hz
Number of ize Devices		OSRAM_9633-SWH-600K Philips_4.9W	3
Software Version	1.1.	Philips_5923431U0 RS_PRO_Halogen_Lamos_24	10V 50Hz 400W
-12C Devices		Zhuhai_ShengChang_KVF-1	2060-TDWS
Class ID : 0x0400	Report Kate : 1000 ms Class ID : 0x0603		
Class ID : 0x0400	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project		
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings .	About	-
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi LDSU Port Power	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings .	About	-
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings . ☑ Enable	About	- Scan
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings . ☑ Enable	About	- Scan
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU UUID	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings . ☑ Enable	About LDSU 1D	- Scan 190
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU UUID Serial Number	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings . ■ Enable LC03010105102200003 D81CC06F	About LDSU ID LDSU Termination	Scan 190 Off
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU- UUID Serial Number Product Name	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings ☑ Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer	About LDSU ID LDSU Termination Nickname	Scan 100 Off LDSBus Trailing Edge Dimmer
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU UUID Serial Number Product Name LDSU Class	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000	About LDSU ID LDSU Termination Nickname	Scan 100 Off LDSBus Trailing Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU UUID Serial Number Product Name LDSU Class Manufacture Date	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-Oct-17	About LDSU ID LDSU Termination Nickname	Scan 100 Off LDSBus Troiling Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA)	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings E Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-Oct-17 125	About LDSU ID LDSU Termination Nickname Select Profile TKEA LEDI63265	Scan 100 Off LDSBus Troiling Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi LDSU Port Power Status: On LDSU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Voltage (mV)	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings E Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-Oct-17 125 5000	About LDSU ID LDSU Termination Nickname Select Profile IKEA_LEDI63265 Brand: IKEA	Scan 100 Off LDSBus Trailing Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi LDSU Port Power Status: On LDSU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Voltage (mV) Calibrated Temperature (°C)	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings E Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-Oct-17 125 5000 65	About LDSU ID LDSU Termination Nickname Select Profile IKEA_LED163265 Brand: IKEA Model: LED163265	Scan 100 Off LDSBus Trailing Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi LDSU Port Power Status: On CLDU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Voltage (mV) Calibrated Temperature (°C) Calibrated Date	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings E Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-Oct-17 125 5000 65 Not Applicable	About LDSU ID LDSU Termination Nickname Select Profile IKEA_LEDI63265 Brand: IKEA Model: LEDI63265	- Scan 100 Off LDSBus Trailing Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi LDSU Port Power Status: On LDSU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Voltage (mV) Calibrated Temperature (°C) Calibrated Date Number of I2C Devices	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings E Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-Oct-17 125 5000 65 Not Applicable 2	About LDSU ID LDSU Termination Nickname Select Profile IKEA_LED163265 Brand: IKEA Model: LED163265	- Scan 100 Off LDSBus Trailing Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Temperature (°C) Calibrated Date Number of I2C Devices Software Version	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings E Enable E Enable LC03010105102200003 D81CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-Oct-17 125 5000 65 Not Applicable 2 1.1	About LDSU ID LDSU Termination Nickname Select Profile IKEA_LED163265 Brand: IKEA Model: LED163265	- Scan 100 Off LDSBus Trailing Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi -LDSU Port Power Status: On -LDSU UUID Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Voltage (mV) Calibrated Temperature (°C) Calibrated Date Number of I2C Devices Software Version	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project mmware Update Settings Enable LC03010105102200003 081CC06F LDSBus Trailing Edge Dimmer 0x4000 2022-0ct-17 125 5000 65 Not Applicable 2 1.1	About LDSU ID LDSU Termination Nickname Select Profile IKEA_LED163265 Brand: IKEA Model: LED163265	- Scan 100 Off DSBus Trailing Edge Dimmer Update
Class ID : 0x0400 LDSBus Configuration Util le LDSU Commands Fi Status: On LDSU UUTD Serial Number Product Name LDSU Class Manufacture Date Calibrated Current (mA) Calibrated Voltage (mV) Calibrated Temperature (°C) Calibrated Date Number of I2C Devices Software Version	Report Kate : 1000 ms Class ID : 0x0603 ity-LDSU Project rmware Update Settings Image: Image control in the set of	About LDSU ID LDSU Termination Nickname Select Profile IKEA_LEDI63265 Brand: IKEA Model: LEDI63265	Scan 100 Off LDSBus Trailing Edge Dimmer Update pdate Setting 3

Upon selecting the profile, click **[Update Setting]** to update the profile to the EEPROM. Once the profile has been successfully updated, the utility will return to the main window.



8.4 **RFID Configuration Settings**

To configure RFID setting for LDSBus RFID Reader -

1. Click [RFID Settings].

42200006	Scan
42200006	
LDSU ID	126
	0ff
Reader	LDSBus RETD Reader
Nickname	Losous Krib Reader
	update
ble	
	RFID Settings
	Reader Nickname Nickname Nickname ble Nickname

2. The RFID setting window will pop up with the current settings as shown in the picture below.

RFID Setting		X
LDSU-		
UUID	LC05010107142200006	
Product Name	LDSBus RFID Reader	
LDSU ID	126	
LDSU Termination	Off	
-RFID Mode Setting-	2	
☑ Enable Buzzer		
☑ Enable Low Freq Mode Save		
☑ Enable High Freq	Mode	


3. Change the settings by clicking on the checkbox to enable or disable buzzer, low freq. mode and high freq. mode; Click **[Save]** to save the new settings to the device (if any).

RFID Setting		x
LDSU		
UUID	LC05010107142200006	
Product Name	LDSBus RFID Reader	
LDSU ID	126	
LDSU Termination	Off	Î
-RFID Mode Setting- ☑ Enable Buzzer ■ Enable Low Freq ☑ Enable High Freq	3 Mode Mode	

8.5 Soil Sensor Configuration Settings

To configure Soil sensor setting for LDSBus soil sensors -

1. Click [Sensor Configuration].

le LDSU Commands F	irmware Update	Settings	About		
.DSU Port Power					
Status: On		🗹 Enable			
DSU					
UUID	LS07010137072300	017	1050 70	17	~
Serial Number	000003F9			off	
Product Name	LDSBus_4in1_Soil	Sensor	LDSU Termination	LDSDug digt SoilSenson	
LDSU Class	0×801A		Nickname	205003_4111_30113@ISOF	-
Manufacture Date	2023-Aug-07			Update	_
Calibrated Current (mA)	52	(1)			
Calibrated Voltage (mV)	5140				
Calibrated Temperature (°C)	25				
Calibrated Date	Not Applicable				
Number of I2C Devices					
Software Version	2.3		Sen	sor Configuration	
2C Devices					
Manufacturer : BRT Systems F	Pte Ltd.				
Address : 0x00					
Capability · 0					
Class ID : 0x0800					



2. The soil sensor setting window will pop up.



3. Click on the *Sensor Type* drop down box and select a different type of soil sensor configuration.

Soil Sensor Sett	ting		х
-Current Settin	g —	an n	
UUID		LS07010137072300017	
Product Name		LDSBus_4in1_SoilSensor	
LDSU ID		17	
LDSU Terminat:	ion	Off	
LDSU Class		0x801A	
Change Setting		ar. 7	
Sensor Type:		~	
	JXC	T 4in1 Soil Sensor	
	JXC	T 7in1 Soil Sensor	
	Hon	de 2in1 Soil Sensor	
	Hon	de 7in1 Soil Sensor	
	Hon	de 81n1 Soll Sensor	



4. Upon selecting the Soil Sensor configuration, click **[Save]** to update the new setting to the sensor.

Soil Sensor Setting		x
-Current Setting	ur.	
UUID	LS07010137072300017	
Product Name	LDSBus_4in1_SoilSensor	
LDSU ID	17	
LDSU Termination	Off	
LDSU Class	0x801A	
-Change Setting		
Sensor Type: JXC	CT 7in1 Soil Sensor 🗸 🗸	
	Update 4	

5. Confirmation window will pop up for user input, click **[Yes]** update the configuration. Alternatively, click **[No]** to cancel the update.





 Open file dialog window will pop up for users to select the unv file; choose the correct unv file and click [Open] to start update; click [Cancel] to return back to Soil Sensor setting window.

Look in	: 📙 LS0701		🖂 🥝 🤌 📴 🔽 🗸	
Quick access Desktop	Name LDSBus_4 LDSBus_7 LDSBus_7 LDSBus_H LDSBus_H LDSBus_H	^ in1_SoilSensor in1_SoilSensor londe_2in1_SoilSensor londe_7in1_SoilSensor londe_8in1_SoilSensor	Date modified 4/7/2023 11:51 am 4/7/2023 11:52 am 6/7/2023 8:58 am 6/7/2023 8:59 am 6/7/2023 8:59 am	
This PC	< File <u>n</u> ame: Files of type:	unv files (*.unv)	× ×	<u>O</u> pen Cancel

7. A progress indicating that the update has started is displayed.

Soil Sensor Setting		x
Current Setting-	- ja	
UUID	LS07010137072300017	
Product Name	LDSBus_7in1_SoilSensor	
LDSU ID	17	
LDSU Termination	Off	
LDSU Class	0x801A 7	
Change Setting		
Sensor Type: JXC	T 7in1 Soil Sensor 🗸 🗸	
	44%	



8. Upon successful completion of the update, an appropriate message indicating the same will be displayed. Click **[Ok]** to return back to soil sensor setting window.





9 Contact Information

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

System and equipment manufacturers and designers are responsible to ensure that their systems, and any BRT Systems Pte Ltd (BRTSys) devices incorporated in their systems, meet all applicable safety, regulatory and system-level performance requirements. All application-related information in this document (including application descriptions, suggested BRTSys devices and other materials) is provided for reference only. While BRTSys has taken care to assure it is accurate, this information is subject to customer confirmation, and BRT Systems disclaims all liability for system designs and for any applications assistance provided by BRTSys. Use of BRTSys devices in life support and/or safety applications is entirely at the user's risk, and the user agrees to defend, indemnify, and hold harmless BRTSys from any and all damages, claims, suits, or expense resulting from such use. This document is subject to change without notice. No freedom to use patents or other intellectual property rights is implied by the publication of this document. Neither the whole nor any part of the information contained in, or the product described in this document, may be adapted, or reproduced in any material or electronic form without the prior written consent of the copyright holder. BRT Systems Pte Ltd, 1 Tai Seng Avenue, Tower A, #03-01, Singapore 536464. Singapore Registered Company Number: 202220043R.



Appendix A – Command List

Commands with payload / response

READN

This command is used to read multiple consecutive bytes from an I2C device.

LDSBus Configuration Utility-LDSU Project		▶ _ ×
File LDSU Commands Firmware Update	Settings About	
LDSU ID 3 (0x03)		
Commands Command KEADN 12C Address (Hexadecimal) pa Register Address (Hexadecimal) 7f Count (Decimal) 5 Send	<pre> Response Device ID : 3 Length : 5 Bytes Poyload :40 72 00 FT Checksum : 0x76B2 </pre>	
LDS Message Logger - 10:43:37.6419447 [140544]>> [05400].61-06-75-05 [140557]<< 83-05-40-72-00-FF-FF-76-B2		Clear

WRITEN

This command is used to write multiple consecutive register locations in an I2C device.

LDSBus C	onfiguratio	n Utility-LDSU Project	1.		_ x
File LDSU	Commands	Firmware Update	Settings	About	
LDSU ID	SU	x03)			
Commands - Command WRITEN I2C Adm 00 Register 7f Data (He 01 02 02	ess (Hexadeci Address (Hex xadecimal, By a 04 05	mal) sadecimal) rtes seperated with Space	e or ',')	Response Device ID : 3 Written : 1 Byte Checksum : 0x0493	
LDS Messa [107812]> [107845]<-	ge Logger - 1 [WRITEN] 63 < 83-01-04-93	0:53:54.0326812 			Clear



READ

This command is used to read an I2C device register.

LDSBus Configuration Utility-LDSU Project	_ x
File LDSU Commands Firmware Update Settings About	
Target LDSU LDSU ID 3 (0x03)	
Commands Command READ I2C Address (Hexadecimal) 00 Register Adress (Hexadecimal) 7F Send	
LDS Message Logger - 10:35:45.0326274 [85910]>>:[READ] 60-60-7F [85922]<< 83-40	Clear

ECHO

The addressed device, if present, shall echo the bytes from the host controller. This command is a special command to check the communication.

LDSBus Configuration Utility-LDSU Project			_ x
File LDSU Commands Firmware Update	Settings	About	
LDSU ID 3 (0x03)			
Commands Command ECHO Data (String - Max 32 Chars) D123456789 Send	~	Response Device ID : 3 Length : 10 Bytes Payload :30 31 32 33 34 35 36 37 38 39 Checksum : 0x617D	
LDS Message Logger - 15:55:50.5680174 [3809622]<< 83-01-EF-DF [4349523]>> [RESET] 01 [4412610]>> [ECH0] 23-0A-30-31-32-33-34-35-36-37 [4412620]<< 83-0A-30-31-32-33-34-35-36-37-38-39-	*-38-39-61-7 • 61-7 0	D	Clear



Commands without payload /response

RESET

This command will reset the LDSU module.

LDSBus Configuration	Utility-LDSU Projec	t		_ x
File LDSU Commands	Firmware Update	Settings	About	
LDSU ID 15 (0	x0F)			
Commands Command RESET	Send		Response <command response="" without=""/>	
LDS Message Logger - 10	0:41:33.1733914			Clear

IDENTIFY

This command will trigger the LED in the LDSU Device.

ים	DSBus C	onfiguration	Utility-LDSU Project	£		_ x
File	LDSU	Commands	Firmware Update	Settings	About	
r T	arget LD	su				Settings and more (#
		125 (9	x7E)			
	1020 10	120 (0				
- C	ommands-				□ ¬ ¬ Response	
					<command response="" without=""/>	
	Command				_ []	
	IDENTIFY			~		
			Send			



I2CREGOFF

This command will turn off the 16bit register access

DLDSBus Configuration Utility-LDSU Project	_	x
File LDSU Commands Firmware Update Sett	tings About	
Tanget LDSU LDSU ID 15 (θxθF)		
Commands Command SETI2CREGOFF Send	<pre></pre>	
LDS Message Logger - 11:05:21.4526389 [141966]>> [SETIZCREGON] 2C-E4 [215623]>> [READN] 61-62-88-03 [215643]<< 8F-03-00-00-81-35-4D (450654]>> [SETIZCREGOFE] 20	ب ب 	ear

Commands with payload / without response

I2CREGON

This command sets the I2C register addressing to 16-bit mode.

LDSBus Configuratio	n Utility-LDSU Projec	t		_ ×
File LDSU Commands	Firmware Update	Settings	About	
LDSU ID 15 (0x0F)			
Commands Command SETI2CREGON Register MSB (Hex) E4	Send		<pre>Response <command response="" without=""/> </pre>	
LDS Message Logger - 1 [7]1046]>> [SETI2CREGON [114992]>> [MRITEN]63 [115005]<< 8F-01-F0-E1 [141966]>> [SETI2CREGO	11:05:21.4526389 - [] 2C-3F - 62-86-01-00-F0-E1 N] 7C-E4	k		Clear



SETI2CSPEED

This command is used to set the I2C Speed (100 KHz or 400 KHz).

LDSBus Configuration	Utility-LDSU Projec	t		x
ile LDSU Commands	Firmware Update	Settings	About	
LDSU ID 3 (0)	(03)			
Commands Command SETI2CSPEED I2C Speed 400KHz	Send	, , ,	<command response="" without=""/>	
LDS Message Logger - 19 [5040027]>> [CCHO] 23-2 [5040041]<< 83-20-30-33 [5852293]>> [SETI2CSPEE <	5:55:50.5680174 0:30:31:32:33:34-35-36 -32-33-34-35-36-37-38- D] 2E-01	37-38-39-30- 39-30-31-32-3	31-32-33-34-35-36-37-38-39-30-31-32-33-34-35-36-37-38-39- 3-34-35-36-37-38-39-30-31-32-33-34-35-36-37-38-39-30-31-C ↓ ↓	

WRITE

This command is used to write a single register location in an I2C device.

LDSBus C	onfiguration	Utility-LDSU Project			_ x
File LDSU	Commands	Firmware Update	Settings	About	
LDSU ID	5U	x03)			
- Commands -				Response	
Command WR11E			~		
I2C Addr	ess (Hexadeci	mal)			
Register	Adress (Hexa	deciaml)	~		
7f	underside 1)				
41	xadecimai)				
		Send			
LDS Messar	e logger - 1	0:48:20.8467172			
[39586]>>	[WRITE] 62-00)-7F-41			Clear



Commands without payload / with response

INFO

This command will get the information about the LDSU Module.

le LDSU	Commands	Firmware Update	Settings	About	
Target LD	SU3 (0)	x03)			
Commands - Command INFO		Send		Response Device ID : 3 Length : 14 Bytes Payload :13-01-00-A1-C6-02-05-02-DC-00-ED-00-00 Checksum : 0x5445	
-LDS Messa [3861]>> [3882]<< 8	ge Logger - 14 [INFO] 21 33-0E-13-01-00	4:54:22.2022548	ED-00-00-00-5	1-45	

STATUS

This command will get the last sent command status.

DLDSBus Configurat	ion Utility-LDSU Project	t		_ x
File LDSU Commands	Firmware Update	Settings	About	
LDSU ID	(0x03)			
Commands Command STATUS	Send	~	Response Device ID : 3 Payload : 0x06	
LDS Message Logger [941909]<< 83-00 [1436946]>> LDENT [1444036]<< 83-06	- 15:55:50.5680174			° Clear



GETUUID

This command will get the device's unique UID.

LDSBus Configuration Utility-LDSU	Project	_ x;
File LDSU Commands Firmware Up	late Settings About	
Target LDSU		
Commands Command GETUUID Send	↓ CI	esponse ≜vice ID : 3 ength : 16 Bytes ayload :4C-53-30-31-30-31-30-31-30-31-32-37-32-31-4A-00 necksum : 0xC5A0
LDS Message Logger - 13:42:36.3836484 [11154]>> [GETUUID] 20 [11175]<< 83-10-4C-53-30-31-30-31-30-3	1-30-31-32-37-32-31-4A-00-C	:5-A0



Appendix B - References

Document References

BRTSYS API 001 LDSBus Python SDK Guide

BRTSYS AN 003 LDSBus Python SDK on IDM2040 User Guide

Acronyms and Abbreviations

Terms	Description
LDSU	LDSBus Units
LDSBus	Long Distance Sensor Bus
USB	Universal Serial Bus



Appendix C – List of Figures & Tables

List of Figures

Figure 1 – LDSU Device (Sensors / Actuators) Connection Diagram	6
Figure 2 – LDS Bus – HVT Junction in LDSBus System – Connection Diagram	7
Figure 3 – Setup Wizard – Welcome Screen	8
Figure 4 – Setup Wizard – License Agreement	8
Figure 5 – Setup Wizard – Start Menu Folder Selection	9
Figure 6 – Setup Wizard – Installation Location Selection	9
Figure 7 – Setup Wizard – Installation Progress	10
Figure 8 – Setup Wizard – Installation Complete	10
Figure 9 – LDSBus Configuration Utility Installation Folder location	11
Figure 10 – LDSBus Projects Folder Location	11
Figure 11 – LDSBus Configuration Utility - Uninstaller	12
Figure 12 – LDSBus Configuration Utility – Uninstallation in Progress	12
Figure 13 – LDSBus Configuration Utility – Uninstallation Completed	13
Figure 14 – LDSBus Configuration Utility User Interface	14
Figure 15 – Settings Interface	15
Figure 16 - LDSBus USB Adapter Selection	16
Figure 17 – Project Type Selection Menu	16
Figure 18 – I DSII Project Interface	17
Figure 19 - I DSII Project Interface	17
Figure 20 - I DSII Device Settings	18
Figure 21 - Firmware Undate / File Browser Interface	10
Figure 22 – Firmware Undate Confirmation Window	19
Figure 23 - Firmware Overwrite Alert Window	20
Figure 24 - Firmware Version Information	20
Figure 25 - Firmware Undate Successful Message Window	20
Figure 26 - Firmware Update Unsuccessful Message Window	21
Figure 27 – Firmware Update Onsuccessful Message Window	21
Figure 28 - I DSII Broject - Commands Interface	21
Figure 28 - LDSU Project - Commands List	22
Figure 29 - EDSO Project - Commands List	22
Figure 21 – Sample Command with Response	23
Figure 31 - Sample Command Without Response	23
Figure 32 - Save LDSO Floject	24
Figure 33 - Default Location to Save LDSO Project	24
Figure 34 - Sample LDSO Project Saved under delault location	25
Figure 35 - File - Open Project Menu	25
Figure 36 - File Browser - LDSU Project Selection	20
Figure 37 – LDSU Project Window	27
Figure 38 – Project Type Selection Menu	28
Figure 39 - LDSBus Project Interface	28
Figure 40 – LDSBUS Project Interface (LDSU IDS View)	28
Figure 41 - LDSU List Interface	29
Figure 42 – LDSU Information	30
Figure 43 – LDSBus Project - LDSU IDs	31
Figure 44 – LDSBus Right Click Drop Down Menu	31
Figure 45 – LDSBus Dropdown Menu	32
Figure 46 – Drop Down Menu – Firmware Update	33

List of Tables

able 1- List of Commands 23



Appendix D – Revision History

Document Title:	BRTSYS_AN_001 LDSBus Configuration Utility Guide
Document Reference No.:	BRTSYS_000014
Clearance No.:	BRTSYS#038
Product Page:	https://brtsys.com/ldsbus/
Document Feedback:	Send Feedback

Revision	Changes	Date
1.0	Initial release	29-11-2021
1.1	Updated release under BRTSys	27-04-2023
1.2	Updated the document as per version LDSBus Configuration Utility 1.2.0 (Section 6.4 - Added LDSBus right click dropdown menu; Section 6.5 - LDSBus Firmware Upgrade; Section 8.4 - RFID Configuration Setting; Section 8.5 - Soil Sensor Configuration Setting)	29-09-2023
1.3	Updated the document as per version LDSBus Configuration Utility Ver.1.2.1 (Section 8.2 – IO Controller Application Type Configuration – Removed references related to Water Level, Windvane options from AIN; Anemometer and Rain Guage options from DIN; Updated screenshots)	30-11-2023
1.4	Updated release for LDSBus Configuration Utility Ver.1.2.2	08-07-2024