

# How to use the demo software

# Overview

This manual is intended for users who are new to the RPR-0720-EVK. It describes how to install the software, check operation, and set values in detail.

For detailed product specifications, please refer to the product specifications.

# ROHM

# QUICK START GUIDE

### 1 How to install the software

- 1. Copy "BD37311CH\_v1.0.0.1\_beta.zip" to your computer.
- 2. Unzip the folder and execute "setup.exe".
- 3. Follow the prompts to perform the installation. "Sensor Application" software will be installed.
- 4. The software installation process is completed.

#### Notes.

- •Please execute with an administrator account.
- ·If that doesn't work, check the status of your security settings.
- •The program will remain in the location where you opened the exe file, so move it to a local disk before using it.

## 2 How to install the USB driver

- 1. Copy "Drivers.zip" to your computer.
- 2. Unzip "Drivers.zip".
- 3. Insert the USB demo board into the USB port.



4. Search "Computer Management" in "Type here to search" and click Open.



5. Select "Device Management".



6. Select "Universal Serial Bus (USB) Controller".



\* If you do not see the USB demo board plugged into the "Universal Serial Bus (USB) Controller", it may be recognized as an unknown device in "Other Devices".



7. Right-click on the target device and select "Properties".



8. Click "Update Driver" and then "OK".

Unknown d	levice	Properti	es X				
General D	Driver	Details	Events				
2	Unknov	vn device	e				
	Driver F	rovider:	Unknown				
I	Driver [	)ate:	Not available				
Driver Version:			Not available				
1	Digital S	Signer:	Not digitally signed				
Driver	r Detail:	3	View details about the installed driver files.				
Updat	te Drive	r	Update the driver for this device.				
Roll Back Driver			If the device fails after updating the driver, roll back to the previously installed driver.				
Disable Device			Disable the device.				
Uninstall Device			Uninstall the device from the system (Advanced).				
			OK Cancel				

9. Click "Browse" under "Search for drivers in the following location".

€	Indate Drivers - Unknown Device	~
	Browse for drivers on your computer	
	Search for drivers in this location:	
	C:\Users\Desktop\Proximity Sensor\Drivers\Drivers\Win7_x64 V Browse	
	☑ Include subfolders	
	→ Let me pick from a list of available drivers on my computer This list will show available drivers compatible with the device, and all drivers in the same category as the device.	1
	Next	Cancel

1 0. Open the "Win7 x64" or "Win7 x84" folder in the copied "drivers" folder, and execute "Browse".

D	6	Browse For Folder		
DIC	owse for anivers on your computer	Select the folder that co	ntain	ns drivers for your hardware.
Sear	rch for drivers in this location:		_	
C:\	Users\kreyes\Desktop\Proximity Sensor\Drivers			Other Product Presentations
	ncluda subfalders	>		Projects
™	include subiolities	~		Proximity Sensor
			>	BD37311CH_v1.0.0.1_beta
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	<ul> <li>Let me pick from a list of available This list will show available drivers compatibl</li> </ul>	E	`	V Drivers
	same category as the device.		>	Software and Driver and Manua RPR-0720
				PTM Material
		>	Ē. F	Receipts
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		>	. :	Serdes EVK Project File
			1	Target Customers

 $1\ 1$  . The driver will be updated, click "Close.

		$\times$
÷	Update Drivers - Cypress CYUSB FX2 (68613) - EEPROM missing	
	Windows has successfully updated your drivers	
	Windows has finished installing the drivers for this device:	
	Cypress CYUSB FX2 (68613) - EEPROM missing	
	Close	

## **3** How to use the demo software

 $1\,.\,$  Click the "Search" icon at the bottom right of your desktop.



2. Type Sensor Application, and click Open SensorApplication App.



3. Plug the demo unit into the USB port of your PC.

The USB Status in the lower right corner of the screen will change from NG to OK.



4. Click "Load Register File".

Select "BD37311CH\_Rev. \* " in "BD37311CH\_v1.0.0.1\_beta" folder we sent and click "Open". The register setting screen is displayed. (%Please use the latest version of Rev as it may be updated.)

Sensor Application			a x
Load Register File Load Calculation File	Cpen		×
ROHM Log Directory	← → × ↑ 🖡 < BD3 > BD37311CH_v V	U	
Start Address Number of Bytes: 1	Organize * New folder		🎚 • 🗆 🜒
Register Monitor	2. LCD Display_20. A Name		
Address negater Name Parameters Read	Aug 22		
	Tilt Angle Resource		
	BD37311CH_Rev.2.xml		
	OneDrive - Persona		
	🗢 This PC		
	3D Objects		
	- · · · ·	>	
	File name: BD37311CH Rev 2 yml		XML file (* xml*)
			Open Cancel
	Write Read Continuous Read		
Ready			USB Status: OK

5. Click "Load Calculation File".

Select "calculation.lux" in "BD37311CH\_v1.0.0.1\_beta" folder we sent and click "Open".

Sens RC	or Application	d Register File Load Calculation File Directory	Dpen	- O ×
-	Star	Address 0 0 0 0 0 0 Number of Bytes: 1	← → ✓ ↑ ]= « BD3_ → BD37311CH_v ∨ U	✓ Search BD37311CH_v1.0.0.1
Registe Addres	r Monitor s Register Name		Organize - New folder	🏼 • 🗆 👔
0x40 0x41 0x42 0x43 0x44	SISTEM_CONTROL MODE_CONTROL MODE_CONTROL MODE_CONTROL PS_DATA	904, MSRT - 00 eat * 100 eat * 100 eat * 100 eat * 100 eat *	This PC 3D Objects Dekktop Documents Downloads Maik Pictures	No preview available.
0x45	PS_DATA	PSUNT_DHUF AMBURURAAC PS_THUE ' Infrared '	Videos V C	Calculation file (* los*)
Ox46	PS_OFFSET		rite harrie. Lakunationuux	Open  Cancel
Os47	PS_OFFSET		00000000	
Ox4A	INTERRUPT	PS_INT_STATI Interrupt ~ Interrupt status is u	l INT_TRIG pdi * 00100000	
Ox48	PS_TH_HIGH		5,7H_H6H (7/8) DdF 11111111	
0x4C	PS_TH_HIGH		PS_TH_HIGH (11.8) 000011111	~
			Write Read Continuous Read	

6. Specify the storage location of the output data.

Click "Load Directory". Select the folder where you saved the output data and click Select Folder.

Image: State of the state	× 11CH_v1.0.0.1 # • • • • 1 1 • • • • 1 1 • • • 1 1 • • • 1 1 • • • 1
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Folder:	
DAA INTERUPY PS.NT.SND Internat 1 Int	Cancel
DAR PS,DUHGH	
PS, TU HOH PS, TU HOH 00001111	
Voite Read Continuous Read	

#### 7. Select "0x39" for Slave Address.

France Institution		- <b>A</b> X	
sensor appreation		Frequency (kHz)	_ A V
Load	Register File Load Calculation File	400kHz ~	~
	rectory C3/Users/121487/iDesktop///21/9z7	Slave Address	
Start.	ddress Number of Bytes: 1	0x38 × 0x38 0x39	Frequency (kHz)
Register Monitor			
Address Register Name	Parameters	Read	400kHz ~
0x40 SYSTEM_CONTROL	SW_RESET PART_ID [5:0] • (Ne act * Out C	00011100	
0x41 MODE_CONTROLD	P5_GAN         P0_SIL(1.0)           1x mode *         Near photodiode *	00000010	Slave Address
0x42 MODE_CONTROL1	MEAS_TIME[20]         PS_PULSE[10]         VC_CUR[1:0]           10 ms mode         V         50 µs mode         6 mA mode	00000000	
0x43 MODE_CONTROL2	P5,5N Disable I	00000000	0x38 ~
0x44 PS_DATA	PS_DATA(7.0) 0x00	00000000	0x38
0x45 PS_DATA	PS_INT_TH_F AND_IR_FLAC PS_DATA(11.0) PS_TH_H ~ Infrared ~ 0x00	00000000	0x39
0x46 PS_OFFSET	P5_0F/5072-01 0x00	00000000	
0w47 PS_OFFSET	PS_OFFSCTI 0x00	0000000	
0x4A INTERRUPT	PS_INT_STATI PS_PERSIST[1:0] INT_TRIG Interupi ~ Interupi status is updi ~ INT pin i ~	00100000	
0w48 PS_TH_HIGH	P5,TH,HIGH (7.0) 0xFF	1111111	
0x4C PS_TH_HIGH	P5,7H,HIGH (11.8)	00001111	
	White Read Continuo	s Read	
Ready		USB Status: OK	N N

8. Enter "14" for Number of Bytes.

Sensor Applicati	ion				- σ ×	
	Load Register File Load Cal	culation File			Frequency (kHz)	
ронт	Log Directory C:#Users¥1214	87¥Desktop¥ソフトウェア			Slave Address	
BEMICONDUCTOR	Start Address	umber of Bytes: 1			0x38 ~	
Register Monitor	1					
Address Regist	ter Name	Parameters		Read	~	
0140 SYSTEM_I	CONTROL SW_RESET	PART_ID [5 0x1C	5:0]	00011100		
0x41 MODE_C	ONTROLD	P	S_GAIN PD_SEL[1:0]	00000010		
0x42 NODE_C		Sensor Applic	ation			
0x43 MODE_C	ONTROL2					
0x44 PS_DATA						
0x45 PS_DATA	PS_INT_TH_PLAY PS_TH_PLY IN		Load	Register File	Load Calculati	ion File
0x46 PS_OFFSE	ET					
0x47 PS_OFFSE	п	ROHM	Log D	C:¥L	Jsers¥102105.RC	)HM¥Desktop¥lest
0x4A INTERRUI	PT	SEMICONDUCTOR	Cart	Address		
0x48 PS_TH_HI	ISH		Start	Address		(D. )
0x4C PS_TH_HI	кн		01		0 Numb	er of Bytes: 14
Ready		anistan Martin				

#### 9. Set each register.

Please set the red frame in the "Reference" below.

 $^{*}$  Please check the usability of the sample submitted this time with this setting.

We will contact you as soon as the corrected sample is ready.

		Load Register F	ile	Load Calcula	tion File						400kHz
RC	ОНМ	Log Directory									Slave Addres
SEMIC		Start Address	000	Numb	per of Bytes:	14					0x39
gister	Monitor										
dress	Register Na	me				Param	eters				Read
ĸ40	SYSTEM_CONT	ROL - (No a	ESET act Y				PART_ 0x	ID [5:0] 1C			00011100
1.62								PS_GAIN	PD_SEL[1:	0]	00000010
K41	MODE_CONTR	OLO						1x mode     Y	Far photodiode	~	0000010
x42	MODE_CONTR	OL1	ſ	10 ms mode	MEAS_TIME[2:0]	v	PS_PUI	.SE[1:0]	VC_CUR[1 3 mA mode	:0]	00000000
ĸ43	MODE_CONTR	OL2							En	PS EN able P 💙	00000000
x44	PS_DATA					PS_DAT	[A[7:0]				00000000
x45	PS_DATA	PS_INT PS_TH	_TH_F	AMB_IR_FLAC				PS_DAT	[A[11:8] 00		0000000
46	PS_OFFSET		PS_OFFSET[7:0] 0x00					00000000			
x47	PS_OFFSET								PS_	OFFSET[8 0x00	00000000
(4A	INTERRUPT	PS_INT	_STAT		PS_PERSIST	[1:0] is upda   ×			ii IN	NT_TRIG T pin i Y	00100000
×4B	PS_TH_HIGH					PS_TH_H	GH [7:0]				1111111
ĸ4C	PS_TH_HIGH							PS_TH_HI	GH [11:8] 0F		00001111

Ready

USB Status: OK

#### 1 0. Click "Write" to write the register to the product.

	PS_PERSIST[1:0]	INT_TRIG	00100000
Seen Application	Interrupt status is upda 👻	INT pin i 👻	00100000
Territoria Contractioner Contr	PS_TH_HIGH [7:0]		
Addition         Representation         Read         In         In<	OxFF		11111111
Add         VL/Link         VL	DC		
640 MORCONTRO2 000000		In-mon (1.0)	00001111
All PLOTED	Write	Read Continuou	us Read
Au attitut 79,01,010 97,000010 01,00000			
Add         P(1)(Add         P(1)(Add <thp(1)(add< th="">         P(1)(Add         <thp(< td=""><td></td><td></td><td></td></thp(<></thp(1)(add<>			
When Read Continuous Read			

1 1 . Click "Continuous Read" to start measurement.

Click on the Monitor tab to display the output screen.

	0100		
Adv         MOX_200043         0.00070         000070           Adv         MOX_20004         0.00070         0.00070           MOX_200041         0.00070         0.00070         0.00070           MOX_200041         0.00070         0.00070         0.00070	Register Monitor		
M         Apple         Constrained         Constrained           M         Apple         Apple <td< td=""><td>Address Register Name</td><td></td><td></td></td<>	Address Register Name		
All         R_SIMPL         R_SIMPL <thr_simpl< th=""> <thr_simpl< th=""> <thr_sim< td=""><td></td><td></td><td></td></thr_sim<></thr_simpl<></thr_simpl<>			
And         P(1,1)(ab))         0001111           Bits         Red         Contract Red           Intel         Contract Red         100 Mars (0.1000)			
	PS_PERSIST[1:0]	INT_TRIG	00100000
	Interrupt status is upda 👻	INT pin i ~	00100000
	PS_TH_HIGH [7:0] 0xFF		1111111
	PS_TH_HIGH (11:8)		00001111
	Write Read	Continuou	s Read

1 2. The horizontal axis shows time, and the vertical axis shows sensor output.
 You can check the output change by bringing the object (finger, etc.) close to the product.
 Click "STOP" to stop the measurement and save the csv data in the desired folder.



1 3. Hover the pointer over the vertical axis to display the icon.
 The "+" icon allows you to expand the range, and the "-" icon allows you to decrease the range.
 The "x" icon is a range setting reset.

1 4. The value in response to reflected light is output on the vertical axis as a Count value (integer).

With the default setting, the vertical axis varies according to the output.

If you want to fix the vertical axis

- (1) Turn the scroll button of the mouse.
- (2) Move the cursor to the upper left corner of the screen and press the zoom in button out button in the figure below.

The axis is fixed by either operation.

Once fixed, the axis can be adjusted by either scrolling, zooming in, or zooming out buttons. The height of the axis can also be adjusted by dragging the axis.



# 4 Details of register setting values

🔜 Sens	- 🗆 ×		
RO	Load R	egister File Load Calculation File ectory C:¥Users¥102105.ROHM¥Desktop¥Test	Frequency (kHz) 400kHz
	3 Start Ad	Idress	0x39 ¥
Register	Monitor		*4
Address	Register Name	Parameters	Read
0x40	SYSTEM_CONTROL	SW_RESET - (No act *	00011100
0x41	MODE_CONTROL0	PS_GAIN PD_SEL[1:0] 1x mode * Near photodiode *	00000010
0x42	MODE_CONTROL1	MEAS_TIME[2:0] 10 ms mode	00000000
0x43	MODE_CONTROL2	PS_EN Disable f >	00000000
0x44	PS_DATA	PS_DATA[7:0] 0x00	00000000
0x45	PS_DATA	PS_INT_TH_F         AMB_IR_FLAC         PS_DATA[11:8]           PS_TH_H ~         Infrared ~         0x00	00000000
0x46	PS_OFFSET	P5_OFFSET[7:0] 0x00	00000000
0x47	PS_OFFSET	PS_OFFSET[8 0x00	0000000
0x4A	INTERRUPT	PS_INT_STATI Interrupt v ID PS_PERSIST[1:0] Interrupt status is updz v III III III IIII IIII IIII IIII III	00100000
0x4B	PS_TH_HIGH	PS_TH_HIGH [7:0] 0xFF	1111111
0x4C	PS_TH_HIGH	PS_TH_HIGH [11:8] Ox0F	00001111
0x4D	PS_TH_LOW	PS_TH_LOW (7:0) 0x00	0000000
0x4E	PS_TH_LOW	PS_TH_LOW [11:8]	0000000
0x92	MANUFACTURER_ID	MANUFACTURER_ID [7:0] 0xE0	11100000
			v
		Write Read Continuous Read	
Ready		*1 *2 *3	USB Status: OK

1) Frequency(kHz)

I2C communication frequency can be set.

- Slave Address
   Slave address can be set. 0x39 should be specified for RPR-0720.
- ③ Start Address Number of bytes

You can specify the starting address for writing and the number of addresses. For example, if you want to write only [0x42 MODE\_CONTROL1] ~ [0x45 PS\_DATA], Set 0x42→01000010 (binary number) of the start item to Start Address, and set 4 to Number of bytes since it is the fourth item including that item. For normal usage, use Please use "Start Address: 01000000 Number of bytes: 14" and rewrite all items.

④ SW\_RESET

Select "Perform software reset" and press "Write" to initialize the settings. Notes: Do not use the "PS\_GAIN" setting.

5 PS\_GAIN

Adjusts the gain of the light-receiving sensitivity. 1x and 2x can be set. When the reflectance of an object is low, the sensitivity can be adjusted by increasing the gain.

6 PD\_SEL

•No Photodiode : The photodetector area is not used.

•Near photodiode : The photodetector area on the Near side is used.

•Far Photodiode : The photodetector area on the Far side is used.

•Both Photodiode : Use both Near and Far Photodetector (Returns the sum of the Near and Far values)

Normally, either Near or Far setting is used.

RPR-0720 has two photosensitive areas, Near and Far, as shown below.

The Near setting is more sensitive because it is closer to the VCSEL light source, while the Far setting tends to be less sensitive because it is farther from the light source.

Please select the setting according to the distance to the object and the reflectance to the object.



⑦ MEAS TIME

Sets the measurement cycle. (10, 50, 100, 500, 5,000msec)

- 8 PS\_PULSE The pulse width of VCSEL can be set. (50, 100, 200, 400µsec)
- 9 VC\_CUR

The current value of VCSEL can be set (3, 4, 5 mA)

#### 10 PS\_EN

The proximity function can be set to ON or OFF. Select "Enable" for normal evaluation.

#### ID PS\_OFFSET

The count value to be OFFSET can be set (binary number). Can be set from  $0\sim511$ Count.

#### PS\_PERSIST

Interrupt function can be set.

Interrupt function is a function that raises a flag when a certain threshold value (HIGH or LOW) is exceeded or lowered.

Here, you can set the flagging conditions.

·Interrupt pin active at all values (normally not used)

•When the threshold is exceeded once, the interrupt pin becomes active.

•When the threshold is exceeded 4 times consecutively, the interrupt pin becomes active.

 $\cdot \ensuremath{\mathsf{When}}$  the threshold is exceeded for 16 consecutive times, the interrupt pin becomes active.

The user can select from the above four items.

In the RPR-0720, active = Low.

INI\_TRIG

Do not operate the INT pin
The INT terminal is triggered by the measurement result of PS.
Two types of settings can be made.

PS\_TH\_HIGH

The HIGH threshold of the interrupt function can be set. PS\_TH\_HIGH[7:0]: Set up to the 0~7th bit in binary. PS\_TH\_HIGH[8:11]: Set up to the 8th~11th bit in binary.

ID PS\_TH\_LOW

The LOW threshold of the interrupt function can be set. PS\_TH\_LOW[7:0]: Set up to the 0~7th bit in binary. PS\_TH\_LOW[8:11]: Set up to the 8th~11th bit in binary.

After the above settings, press the Write button (\*1) to write the register settings.

When the Read button (\*2) is pressed, the measured value is displayed in binary at the Read column (\*4). Press the Continuous Read button (\*3) to start acquiring measurement log data. (Real-time data observation is possible with Monitor). For other details, please refer to the product specifications.

# **5** Revision History

Rev.	Date	Details	Notes
1	2023/04/17	New	-
			-

Notes					
1)	The information contained herein is subject to change without notice.				
2)	Before you use our Products, please contact our sales representative and verify the latest specifica- tions :				
3)	Although ROHM is continuously working to improve product reliability and quality, semicon- ductors can break down and malfunction due to various factors. Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Poducts beyond the rating specified by ROHM.				
4)	Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.				
5)	The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.				
6)	The Products specified in this document are not designed to be radiation tolerant.				
7)	For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.				
8)	Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.				
9)	ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.				
10)	ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.				
11)	Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.				
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