

# Matchbox Demo User Manual

## Intelligent Proximity Sensing

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# Matchbox Demo Manual

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# 1. Demo Kit Contents

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Sensor demo  
with Micro USB  
jack



Battery pack with  
Micro USB  
connector



USB cable



3 x AAA  
batteries



## 2. Getting Started

Use the battery pack or USB cable to power the demo.

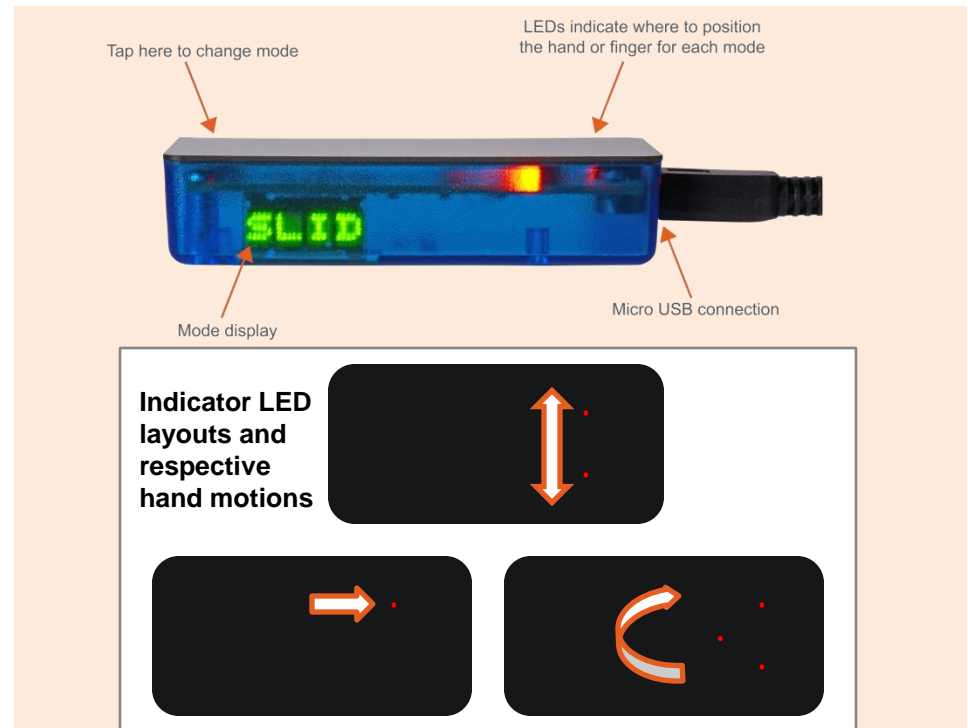
### 1a. Battery Pack

- Insert AAA batteries in the battery pack
- Connect the battery pack to the demo
- Switch on battery pack

### 1b. USB Cable

- Connect the USB cable to demo and a computer
- See *4. Software Installation* and *5. Graphical User Interface*

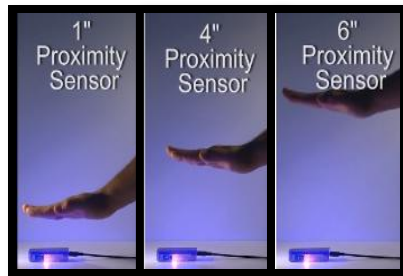
### 2. Operating the demo



# 3. Modes

## Proximity sensing (1", 4" & 6")

Place hand over indicator LED at respective distance for on. Remove hand for off.



## Slide

Slide finger across the two indicator LEDs for on. Slide finger across in the opposite direction for off.



## Rotary

Rotate finger counter clockwise around the three indicator LEDs to increase brightness. Rotate finger clockwise to reduce brightness.



## Touch

Tap indicator LED to turn on/off. Hold finger down to increase/decrease brightness.



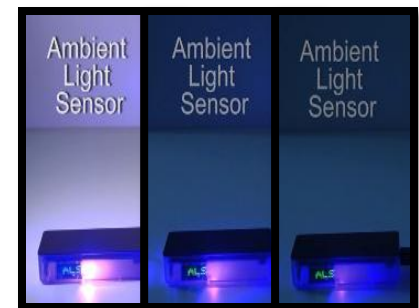
## Wave

Wave hand left- right- left once for on. Wave a second time for off.



## Ambient Light Sensor

Ambient light will increase brightness. The reduction of ambient light will decrease brightness.



## 4. Software Installation

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Go to: <http://ledlight.osram-os.com/matchboxdemo>

# 5. Graphical User Interface

Top Level Application Using Events

File Edit Operate Tools Window Help

**Calibration:**  
Screen input  
Write to board  
Store to EEPROM

Write to Board

Store to EEPROM

Read EEPROM

Register Functions

Run Mode: Screen values

Save Settings: c:\data\Settings.xls

Load Settings: c:\data\Settings.xls

Customer: Preset Values default hidden:  
Store to EEPROM  
Read EEPROM  
Write to board

Application Mode: 1 inch Prox.

ALS Mode: Triggered all data

Ambient Light Sensor

ALS lower Thresh: 10    ALS upper Thresh: 20    ALS Reading: 37

Data Retrieval: Start Run

Save Data:

Writes to Board first

Abort Run

Display Data:

Exit / Exit after Run

Proximity Sensor Channels

LED 3  LED 2  LED 1

Prox Mode: Triggered all data

Current Sample: 467

Sample Limit: 50000

Create new Files:

File Path ALS: c:\data\ALS.xls

File Path Prox 1: c:\data\Prox1.xls

File Path Prox 2: c:\data\Prox2.xls

File Path Prox 3: c:\data\Prox3.xls

Average short dist.: 10 x

Short Dist. Prox. Slide Lamp

LED 1 current: 50 mA

LED 2 current: 50 mA

LED 3 current: 50 mA

Prox 1 Thresh.: 30    Prox 1 Reading: 9

Prox 2 Thresh.: 30    Prox 2 Reading: 0

Prox 3 Thresh.: 30    Prox 3 Reading: 0

Long Dist. Prox. Rotary Wave

Average long dist.: 30 x

Average wave: 5 x

Prox Thresh. I.d.: 50    LED current I.d.: 200 mA

Prox Integration I. d.: 1500 us

Measurement

**OSRAM**  
Opto Semiconductors

Part ID: 97

V-06-2013

ALS:

PS1:

PS2:

PS3:

# 5. Graphical User Interface

**Top Level Application Using Events**

File Edit Operate Tools Window Help

**Calibration:**  
Screen input  
Write to board  
Store to EEPROM

Write to Board

Store to EEPROM

Read EEPROM

Save Settings

Load Settings

Customer:  
Preset Values default hidden:  
Store to EEPROM  
Read EEPROM  
Write to board

Register Functions

Run Mode: Screen values

Save Settings: c:\data\Settings.xls

Load Settings: c:\data\Settings.xls

Application Mode: 1 inch Prox.

ALS Mode: Triggered all data

Ambient Light Sensor

ALS lower Thresh.: 10

ALS upper Thresh.: 20

ALS Reading: 37

LED 3

LED 2

LED 1

Prox Mode: Triggered all data

Proximity Sensor Channels

Average short dist.: 10 x

Short Dist. Prox. Slide Lamp

Long Dist. Prox. Rotary Wave

Average long dist.: 30 x

Average wave: 5 x

LED 1 current: 50 mA

LED 2 current: 50 mA

LED 3 current: 50 mA

Prox 1 Thresh.: 30

Prox 1 Reading: 9

Prox 2 Thresh.: 30

Prox 2 Reading: 0

Prox 3 Thresh.: 30

Prox 3 Reading: 0

Prox Thresh. I.d.: 50

LED current I.d.: 200 mA

Prox Integration I. d.: 1500 us

Data Retrieval: Start Run

Save Data: [Toggle]

Writes to Board first: Abort Run

Display Data: [Toggle]

Exit / Exit after Run: [Toggle]

Current Sample: 467

Sample Limit: 50000

Create new Files: [Toggle]

File Path ALS: c:\data\ALS.xls

File Path Prox 1: c:\data\Prox1.xls

File Path Prox 2: c:\data\Prox2.xls

File Path Prox 3: c:\data\Prox3.xls

PS Output

ALS Output

Measurement

**OSRAM**  
Opto Semiconductors

V-06-2013

Part ID: 97

ALS: [Status]

PS1: [Status]

PS2: [Status]

PS3: [Status]

**Proximity sensor parameters:**

- Active LED indicator
- Display mode:
  - shows all events
  - shows events above threshold only



# 5. Graphical User Interface

**Top Level Application Using Events**

File Edit Operate Tools Window Help

Register Functions

Run Mode: Screen values

Save Settings: c:\data\Settings.xls

Load Settings: c:\data\Settings.xls

Customer: Preset Values default hidden: Store to EEPROM, Read EEPROM, Write to board

Application Mode: 1 inch Prox.

Data Retrieval: Start Run, Abort Run, Exit / Exit after Run

Save Data: [Toggle]

Display Data: [Toggle]

Current Sample: 467

Sample Limit: 50000

Create new Files: [Toggle]

File Path ALS: c:\data\ALS.xls

File Path Prox 1: c:\data\Prox1.xls

File Path Prox 2: c:\data\Prox2.xls

File Path Prox 3: c:\data\Prox3.xls

ALS Mode: Triggered all data

Ambient Light Sensor

ALS lower Thresh.: 10

ALS upper Thresh.: 20

ALS Reading: 37

Proximity Sensor Channels

LED 3, LED 2, LED 1

Prox Mode: Triggered all data

Average short dist.: 10 x

Short Dist. Prox. Slide Lamp

Long Dist. Prox. Rotary Wave

Average long dist.: 30 x

Average wave: 5 x

LED 1 current: 50 mA

LED 2 current: 50 mA

LED 3 current: 50 mA

Prox 1 Thresh.: 30

Prox 2 Thresh.: 30

Prox 3 Thresh.: 30

Prox 1 Reading: 9

Prox 2 Reading: 0

Prox 3 Reading: 0

Prox Thresh. I.d.: 50

LED current I.d.: 200 mA

Prox Integration I. d.: 1500 us

PS Output: 0 to 25

ALS Output: 0 to 535

Measurement

OSRAM Opto Semiconductors

V-06-2013

Part ID: 97

ALS, PS1, PS2, PS3

**Ambient light sensor parameters:**

- ALS lower threshold
- ALS upper threshold
- Actual ALS readings in counts
- Display mode:
  - shows all events
  - shows events above upper or below lower threshold only

# 5. Graphical User Interface

Top Level Application Using Events

File Edit Operate Tools Window Help

Register Functions

Run Mode Screen values

Calibration:  
Screen input  
Write to board  
Store to EEPROM

Write to Board

Save Settings

Save Settings c:\data\Settings.xls

Load Settings

Load Settings c:\data\Settings.xls

Data Retrieval

Start Run

Writes to Board first

Abort Run

Exit / Exit after Run

Save Data

Display Data

Current Sample 467

Sample Limit 50000

Create new Files

File Path ALS c:\data\ALS.xls

File Path Prox 1 c:\data\Prox1.xls

File Path Prox 2 c:\data\Prox2.xls

File Path Prox 3 c:\data\Prox3.xls

- Counter of measurements
- Counter limit
- Save data: Active / non active
- Display data: Active / non active
- Data saved in shown excel files
- Data in new file or appended
- Display of measured prox and ALS values

Store to EEPROM

Read EEPROM

LED 3

LED 2

LED 1

Average short dist. 10 x

Short Dist. Prox. Slide Lamp

Long Dist. Prox. Rotary Wave

Average long dist. 30 x

Average wave 5 x

LED 1 current 50 mA

LED 2 current 50 mA

LED 3 current 50 mA

Prox 1 Thresh. 30

Prox 2 Thresh. 30

Prox 3 Thresh. 30

Prox 1 Reading 9

Prox 2 Reading 0

Prox 3 Reading 0

Prox Thresh. I.d. 50

LED current I.d. 200 mA

Prox Integration I. d. 1500 us

PS Output

ALS Output

Measurement

OSRAM Opto Semiconductors

V-06-2013

Part ID 97

ALS

PS1

PS2

PS3

# 5. Graphical User Interface

**Top Level Application Using Events**

File Edit Operate Tools Window Help

**Register Functions**

Run Mode: Screen values

Save Settings: c:\data\Settings.xls

Load Settings: c:\data\Settings.xls

Customer: Preset Values default hidden: Store to EEPROM Read EEPROM Write to board

Application Mode: 1 inch Prox.

**Data Retrieval**

Start Run

Writes to Board first

Abort Run

Display Data

Exit / Exit after Run

Current Sample: 467

Sample Limit: 50000

Create new Files

File Path ALS: c:\data\ALS.xls

File Path Prox 1: c:\data\Prox1.xls

File Path Prox 2: c:\data\Prox2.xls

File Path Prox 3: c:\data\Prox3.xls

ALS Mode: Triggered all data

Ambient Light Sensor

ALS lower Thresh.: 10

ALS upper Thresh.: 20

ALS Reading: 37

LED 3

LED 2

LED 1

Prox Mode: Triggered all data

Proximity Sensor Channels

Average short dist.: 10 x

Short Dist. Prox. Slide Lamp

Long Dist. Prox. Rotary Wave

Average long dist.: 30 x

Average wave: 5 x

LED 1 current: 50 mA

LED 2 current: 50 mA

LED 3 current: 50 mA

Prox 1 Thresh.: 30

Prox 2 Thresh.: 30

Prox 3 Thresh.: 30

Prox 1 Reading: 9

Prox 2 Reading: 0

Prox 3 Reading: 0

Prox Thresh. I.d.: 50

LED current I.d.: 200 mA

Prox Integration I. d.: 1500 us

**Run Mode:**

- Preset: Takes values stored on demo board
- Screen Values: Takes values from GUI

**Settings:**

- Saves GUI values in excel file
- Reads GUI values from excel file

PS Output

Measurement

OSRAM Opto Semiconductors

V-06-2013

Part ID 97

ALS

PS1

PS2

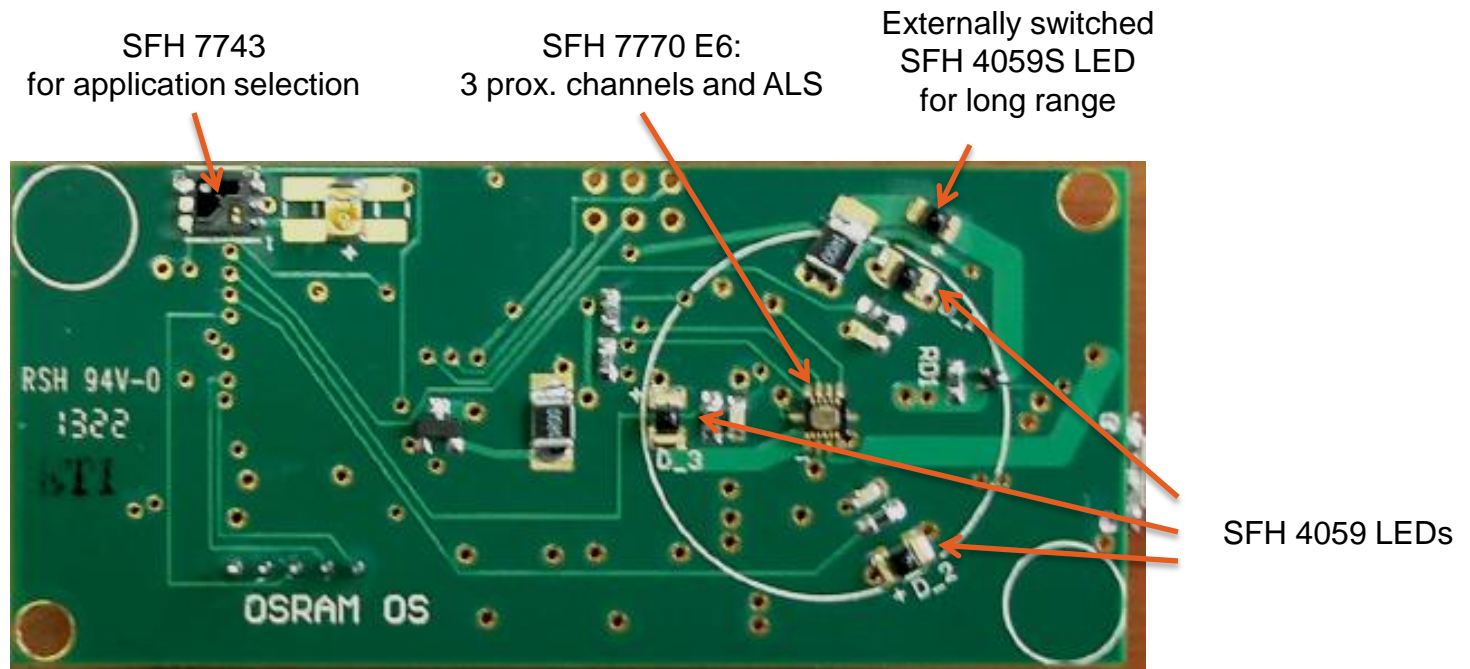
PS3

# 5. Graphical User Interface

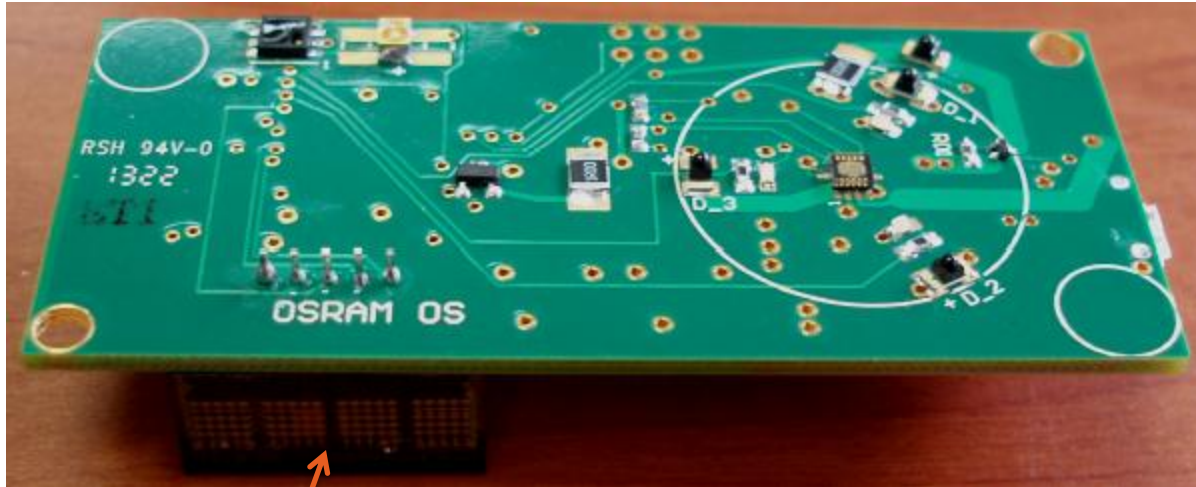
The screenshot shows the 'Top Level Application Using Events' GUI. The interface is divided into several functional areas:

- Calibration:** Includes buttons for 'Screen input', 'Write to board', and 'Store to EEPROM'. There are also 'Write to Board' and 'Store to EEPROM' buttons.
- Settings:** Features 'Save Settings' and 'Load Settings' buttons, along with text boxes for file paths (e.g., 'c:\data\Settings.xls').
- Customer:** A section for 'Preset Values default hidden' with 'Store to EEPROM', 'Read EEPROM', and 'Write to board' options.
- Application Mode:** A dropdown menu currently set to '1 inch Prox.', which is circled in red. A callout box lists the available modes: 1 inch Prox., 4 inch Prox., 6 inch Prox., Slide, Rotary, Touch function, Wave detection, and ALS.
- ALS Mode:** Includes 'Triggered all data' and 'Ambient Light Sensor' options, with adjustable 'ALS lower Thresh.' (10) and 'ALS upper Thresh.' (20), and an 'ALS Reading' of 37.
- Proximity Sensor Channels:** Includes 'LED 3', 'LED 2', and 'LED 1' indicators, and a 'Prox Mode' dropdown set to 'Triggered all data'.
- Measurement:** A graph showing 'PS Output' (left y-axis, 0-25) and 'ALS Output' (right y-axis, 0-535) over time. The x-axis is labeled 'Measurement' with values 38977 and 39177.
- OSRAM Opto Semiconductors:** The company logo and name are displayed at the bottom.
- Part ID:** The part number '97' is shown.
- ALS Status:** A small display shows the status of ALS, PS1, PS2, and PS3 channels.

## 6. PCB: Top view



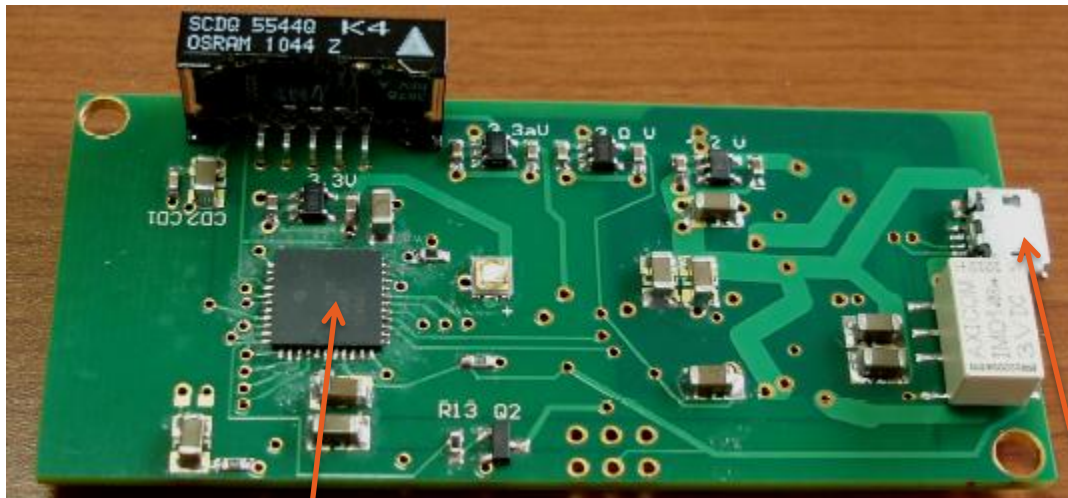
## 6. PCB: Side view



Display SCDQ 5544 Q  
for application mode display

## 6. PCB: Bottom view

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Microcontroller Microchip  
PIC18F46J50  
for I<sup>2</sup>C and USB communication

USB Micro connector

**Thank You.**



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