TOUCH/LRACOMBOGEVB
Evaluation Board User's Manual

ON Semiconductor®

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EVAL BOARD USER'S MANUAL

Scope

The TOUCH/LRACOMBOGEVB demo showcases ON Semiconductor's High-Accuracy Capacitive Touch Sensor (LC717A10AR) along with Linear Vibrator Driver (LC898301XA) for haptic feedback and an 8-bit Microcontroller (LC87F1M16A). The following is an instruction manual for the operation of this evaluation board.

Necessary Equipment

- 1 Mini-B USB Cable with PC (Figure 1) or
- 1 AC to DC 5 V USB Adapter (Figure 2)

Figure 1. Mini-B USB Cable

Figure 2. USB Adapter

Overview

Microcontroller (LC87F1M16A) distinguishes the keys of Touch Switch (LC717A10AR) by using I^2C and control the actuator of Haptics (LC898301XA), LED and speaker. The power supply is supplied from USB.

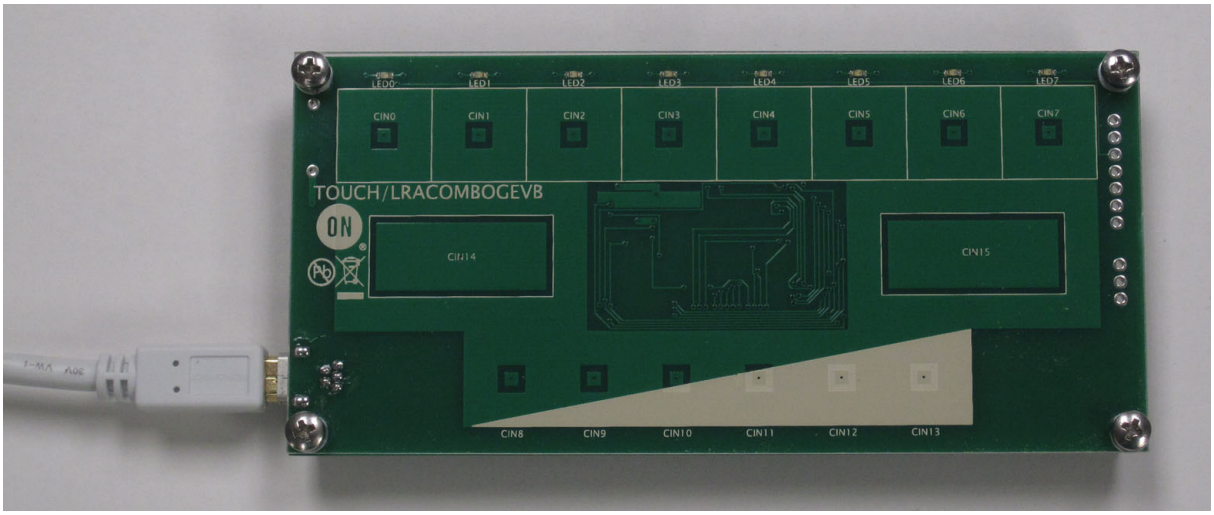


Figure 3. Board with USB Cable

BLOCK DIAGRAM

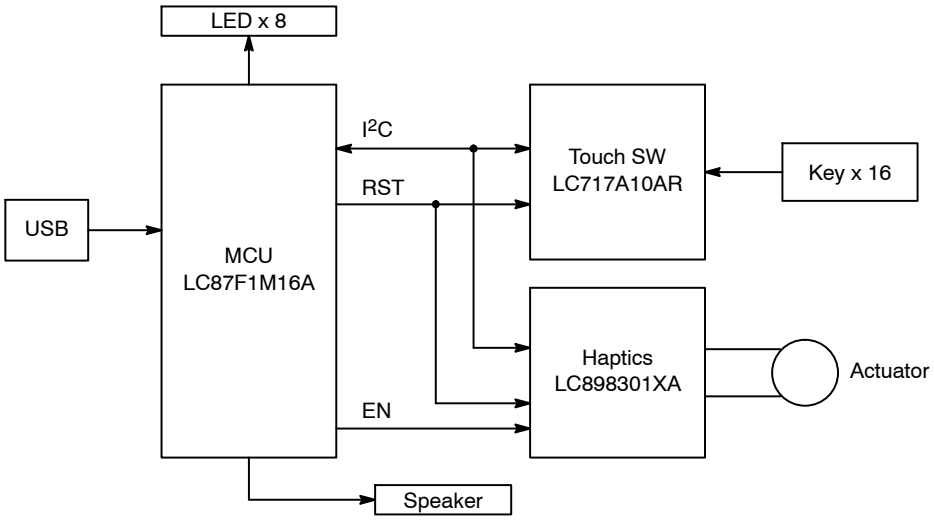
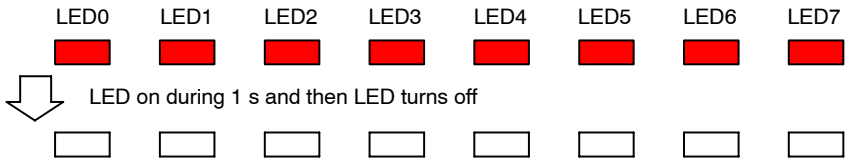


Figure 4. Block Diagram

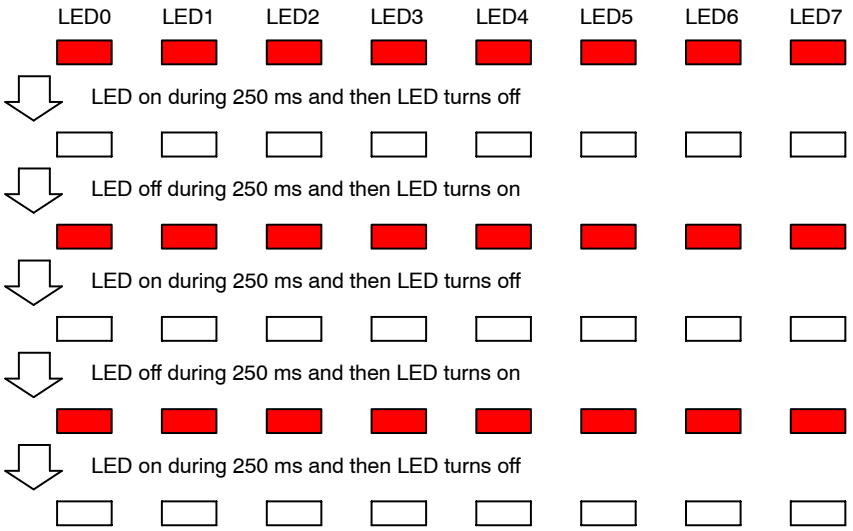
TOUCH KEY FUNCTIONS

Connect USB Cable

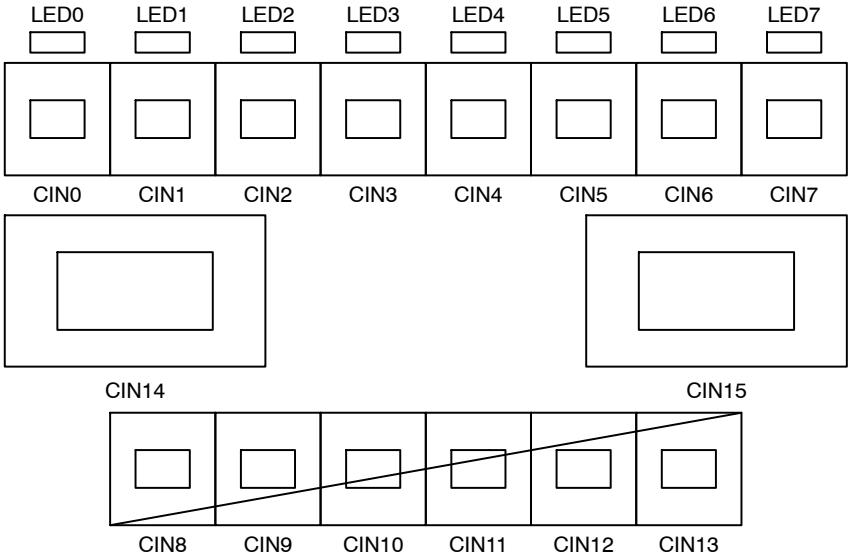
LED turns on for one second when 5 V is applied to VDD.



LED blinks three times when USB is connected if the USB driver is available. (USB driver is optional. It is necessary when updating the firmware.)

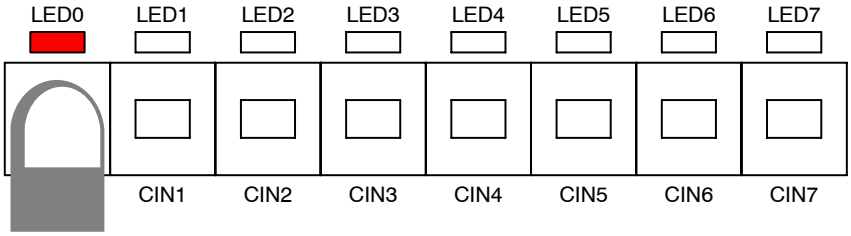


Key Layout

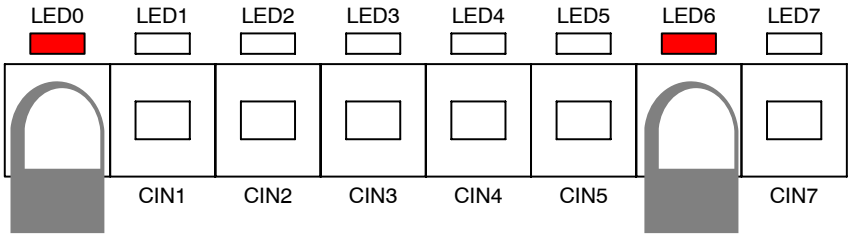


Normal Key Action

When key is touched upper LED of each key turns ON.
e.g. CIN0 is touched LED0 turns ON.



When multiple keys are touched.

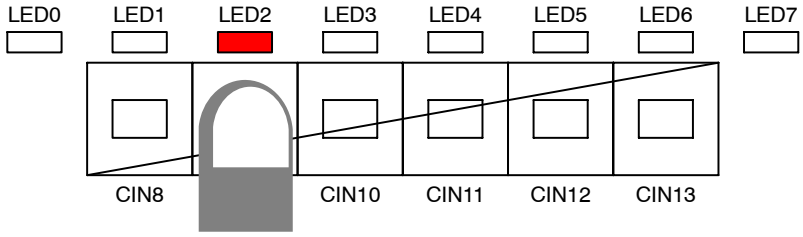


When key is touched, speaker plays respected musical scale. CIN0 is “Do”, CIN1 is “Re”…CIN6 is “Si”, and CIN7 is upper “Do”.

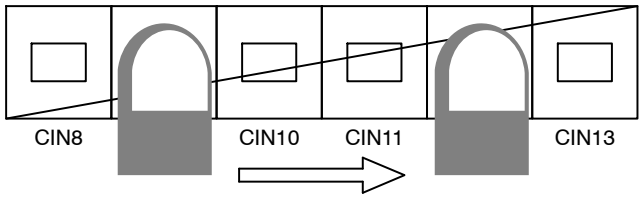
Slide Key Action

These slide keys can change the sensitivity (AMP gain and threshold level) of the Proximity Keys (CIN14, CIN15).

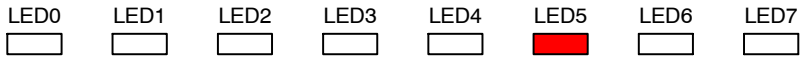
The slide keys have 11 kinds of sensitivity levels. When touch the slide key, the LED of each level is ON. e.g. Level 3



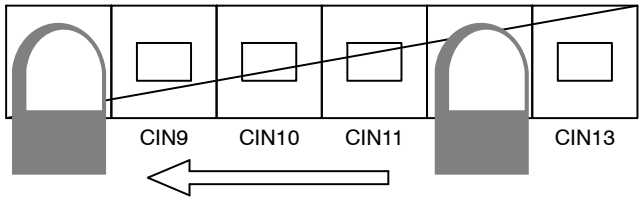
move right on the Touch key,



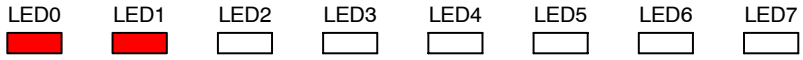
to increase the sensitivity level.



move left on the Touch key,



to decrease the sensitivity level.

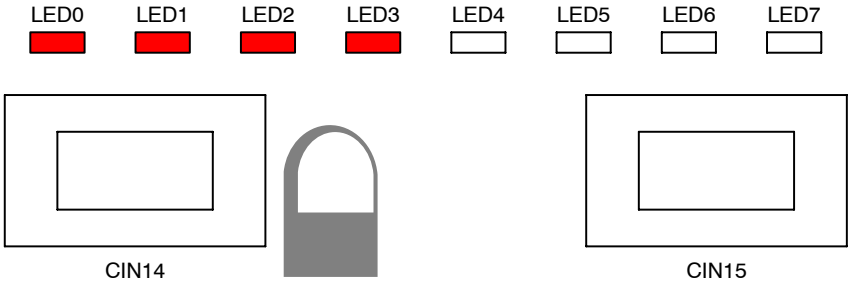


Correspondence of the sensitivity levels of LED and touch key.

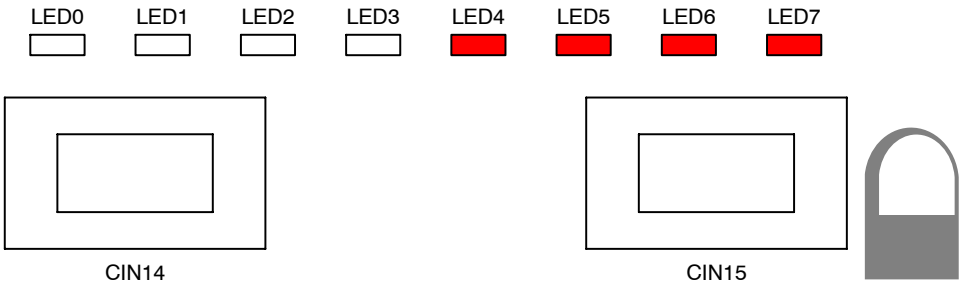
Level	LED0	LED1	LED2	LED3	LED4	LED5	LED6	LED7	Touch Key
1	■	■							CIN8
2		■	■						CIN8 and CIN9
3			■						CIN9
4			■	■					CIN9 and CIN10
5				■					CIN10
6				■	■				CIN10 and CIN11
7					■				CIN11
8					■	■			CIN11 and CIN12
9						■			CIN12
10						■	■		CIN12 and CIN13
11							■	■	CIN13

Proximity Key Action

These proximity keys react without touch. Bleep sounds when keys are approached. When close to CIN14 LEDs on left side turn ON.



When close to CIN15 LEDs on right side turn ON.



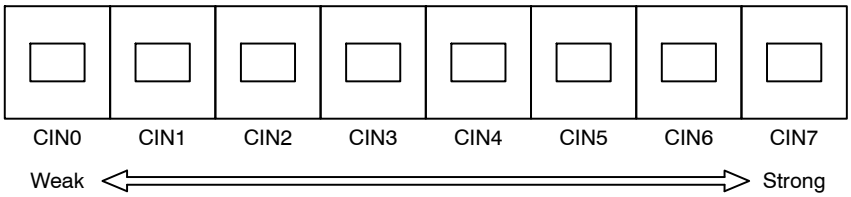
HAPTIC FUNCTIONS

When any key is touched, Linear Resonant Actuator (LRA) vibrates. There are several types of vibrations.

Vibration Level

When any key is touched, Linear Resonant Actuator (LRA) vibrates.

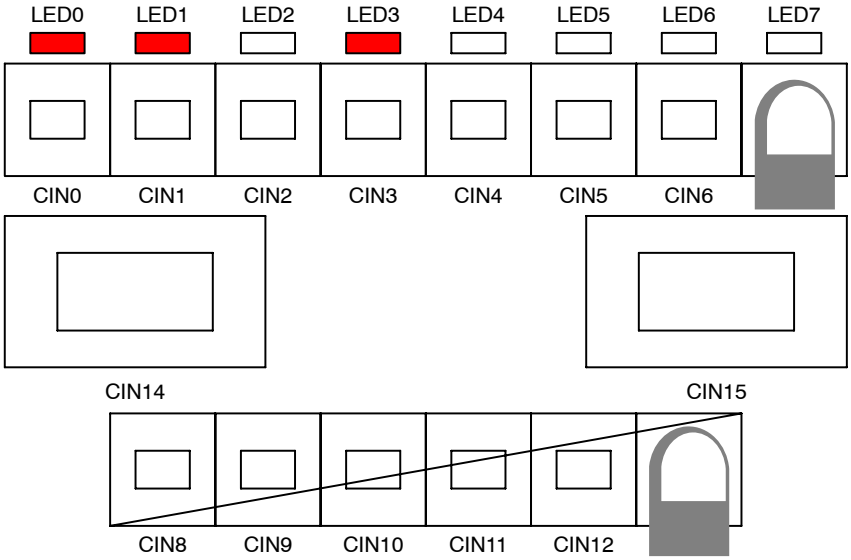
Vibration level changes depending on touch key of CIN0 to CIN7.



Change Resonance Frequency

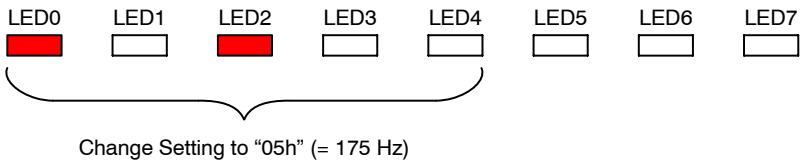
Our Haptics IC can use 32 pattern of resonance frequency for LRA. This evaluation board uses two patterns 175 Hz and 205 Hz. (default is 205 Hz)

When touching both CIN7 and CIN13, current resonance frequency is displayed. e.g. Current frequency is 205 Hz. (setting data is “0Bh”)

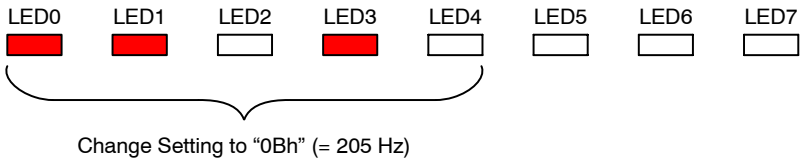


Hold keys during 5 seconds, then resonance frequency will change. Bleep noise will sound at the same time.

If current resonance frequency is 205 Hz, then resonance frequency will change to 175 Hz.



If current resonance frequency is 175 Hz, then resonance frequency will change to 205 Hz.



OTHER FUNCTIONS

Touch ON Automatic Cancellation

LC717A10AR does not have Touch ON automatic cancellation function. So, the software implements the auto touch-off function for a fail-safe. Auto off time is about 8 seconds.

Reset Switches

If you observe the board is not a normal condition, push the Reset Switch (SW2) of the backside.

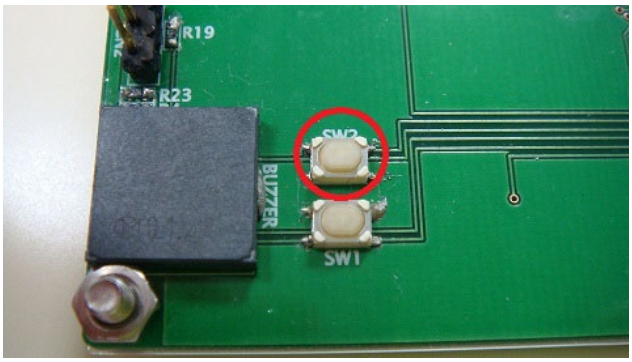


Figure 5. Reset Switch of MCU

SW1 is reset switch for LC717A10AR and LC898301XA. However MCU resets these ICs during the initialization process when MCU program starts up. So, normally SW1 is not used.

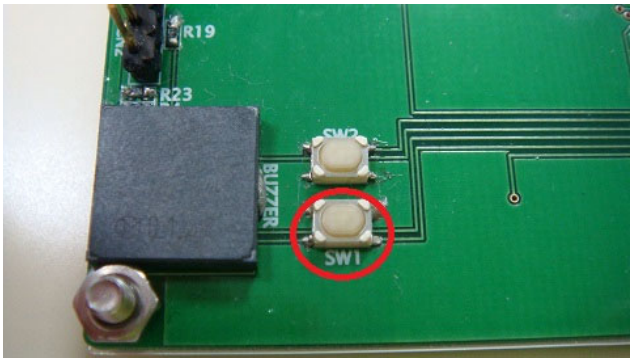


Figure 6. Reset Switch of LC717A10AR and LC898301XA

RELATED DOCUMENTS

Supporting materials such as: Datasheets, Application Notes, Evaluation Kits/Boards, Evaluation Board Documents and Software are available for all three featured ON Semiconductor components. To obtain the most updated documentation please visit the ON Semiconductor Web site at www.onsemi.com and search part numbers: LC717A10AR (Touch Sensor), LC898301XA (Linear Vibrator Driver), and LC87F1M16A (Microcontroller).

ON SEMICONDUCTOR IC LINKS

- LC717A10AR: http://onsemi.com/PowerSolutions/product.do?id=LC717A10AR
- LC898301XA: http://onsemi.com/PowerSolutions/product.do?id=LC898301XA
- LC87F1M16A: http://onsemi.com/PowerSolutions/product.do?id=LC87F1M16A

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