



# UM10317

PCA9633 demonstration board OM6282

Rev. 01 — 15 December 2008

User manual

## Document information

Info	Content
<b>Keywords</b>	I2C, PCA9633, RGB, RGBA, 2 x 8-bit PWM
<b>Abstract</b>	The OM6282 is an add-on to NXP's I2C 2005 -1 demo board. This daughter board makes it easy to test and design with the PCA9633, a 4-bit Fast-mode Plus (Fm+) LED driver. These boards, along with the I2CUSB Lite GUI (PC based), provide an easy to use evaluation platform.

**Revision history**

Rev	Date	Description
01	20081215	user manual; initial release

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## 1. Introduction

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The PCA9633 evaluation board features LEDs for color mixing, blinking and dimming demonstrations. A graphical interface allows the user to easily explore the different functions of the driver. The board can be connected in series with other I<sup>2</sup>C demo-boards to create an evaluation system.

The IC communicates to the host via the industry standard I<sup>2</sup>C-bus/SMBus port. The evaluation software runs under MicroSoft Windows PC platform.

## 2. Features

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- A complete evaluation platform for the PCA9633 4-bit LED driver
- Easy to use GUI based software demonstrates the capabilities of the PCA9633
- On-board LEDs for visual experience
- Convenient test points for easy scope measurements and signal access
- USB interface to the host PC
- No external power supply required

## 3. Getting started

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### 3.1 Assumptions

Familiarity with the I<sup>2</sup>C-bus is helpful but not required.

### 3.2 Static handling requirements

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling. You must use a ground strap or touch the PC case or other grounded source before unpacking or handling the hardware.

### 3.3 Minimum system requirements

- PC Pentium 60 processor (or equivalent), 8 MB RAM, 10 MB of hard drive space
- One USB port (either 2.0 or 1.1 compatible)
- Windows 98SE, ME, 2000, XP, or Vista
- I2C 2005-1 demonstration board (OM6275)

### 3.4 Power requirements

The NXP demonstration board I2C 2005-1 and OM6282 hardware obtain power from the PC USB port. Care should be taken not to exceed the USB port current capabilities.

## 4. Installation

### 4.1 I2C 2005-1 board and WIN-I2CUSB Lite software

The OM6282 is a daughter card to the OM6275 I2C 2005-1 demo board. You may download the WIN-I2CUSB Lite Software, the OM6275 user manual UM10206, and find ordering information at the NXP web site <http://www.standardics.nxp.com/support/boards/i2c20051/>.

### 4.2 OM6282 connection to I2C 2005-1 board

The I2C 2005-1 demo board should be disconnected from your PC before mounting the OM6282 board on to it. The OM6282 board has a 9-pin female connector that connects to the JP1 male connector on the I2C 2005-1 board.

With both boards facing you, connect the OM6282 board to the I2C 2005-1 board before connecting the USB cable. Once the board is connected, connect the USB cable and start the WIN-I2CUSB Lite software. You are now ready to evaluate the PCA9633.

## 5. Hardware description

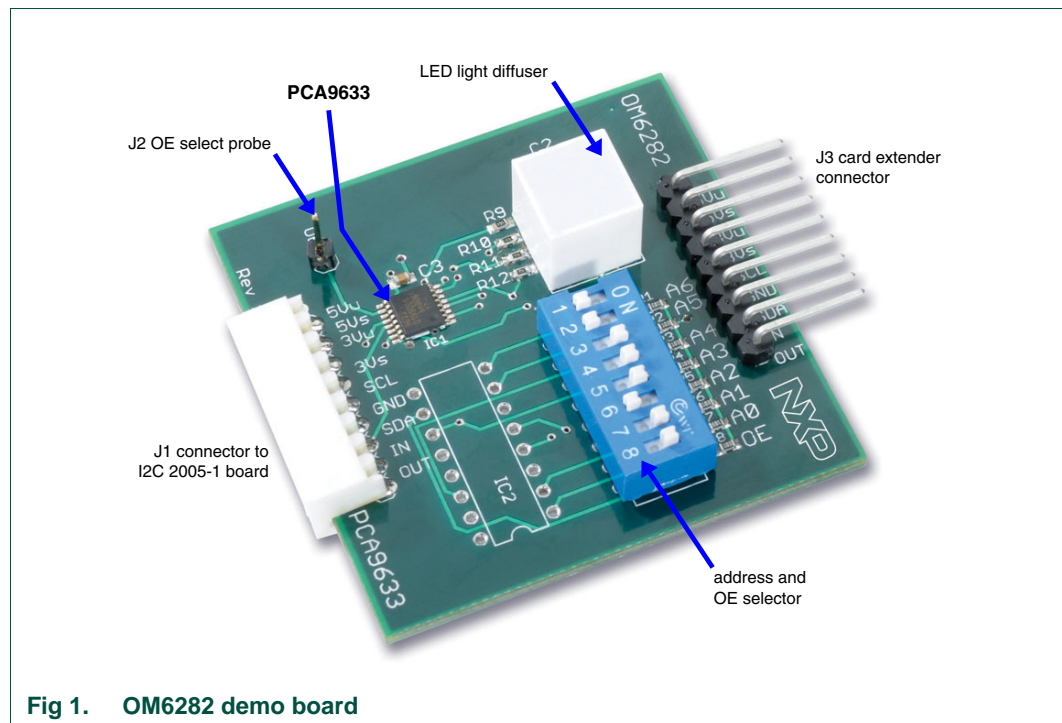


Fig 1. OM6282 demo board

The OM6282 board has 3 jumper headers:

- J1 is for connection to JP1 on I2C 2005-1 demo board.
- J2 allows an external OE to be connected to the board.
- J3 is for pass-through signals from the I2C 2005-1 demo board.
- IC2 is an unpopulated area for signal access. All address, I<sup>2</sup>C, LED signals are available.

6. Schematic

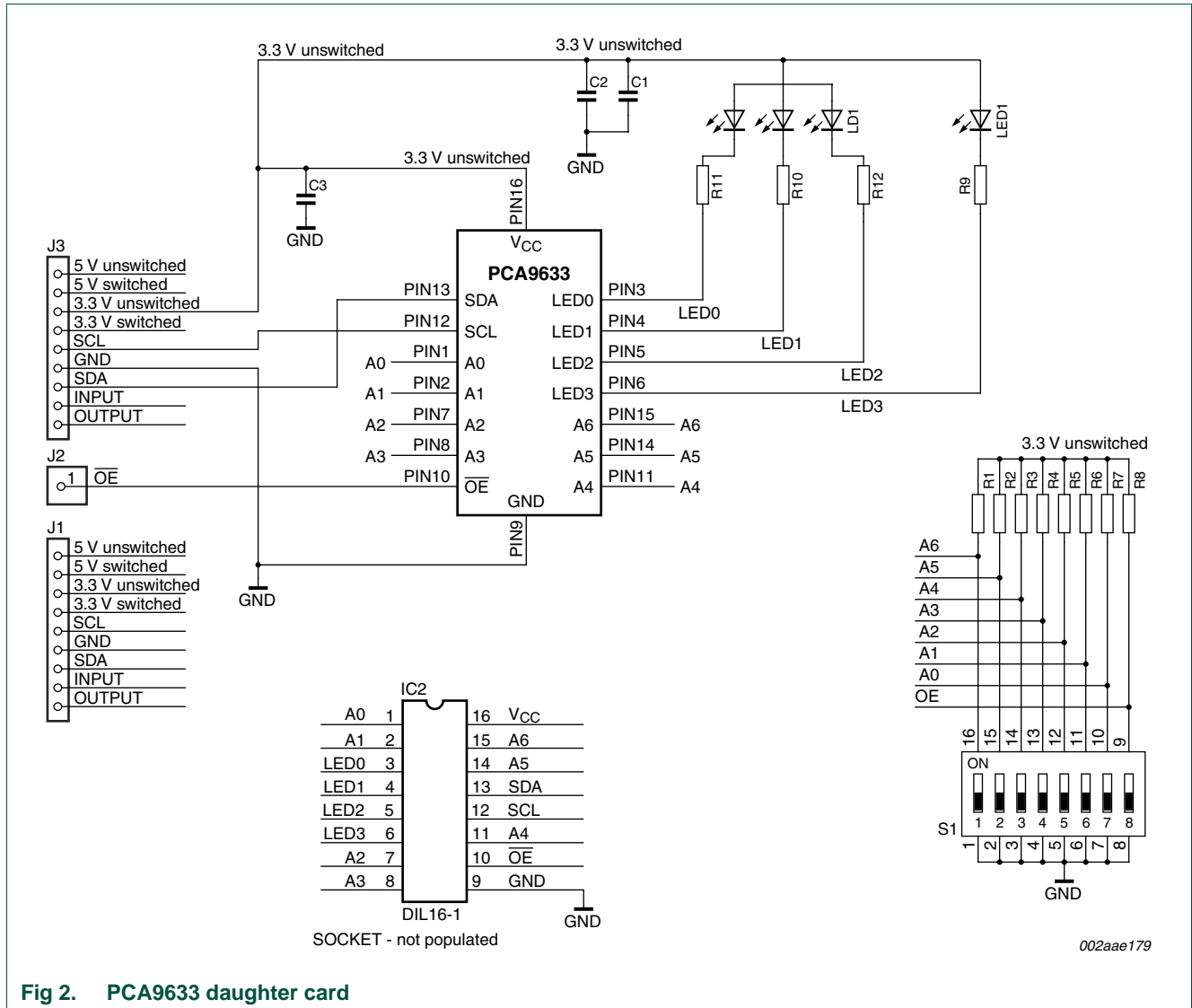


Fig 2. PCA9633 daughter card

## 7. OM6282 demonstration board main components

Table 1. OM6282 demo board main components

Device	Description	Address	Location
PCA9633PW	4-bit Fm+ I <sup>2</sup> C-bus LED driver	0xC4 for I2C 2005-1 interface	IC1

## 8. PCA9633 evaluation steps

The PCA9633 functions are controlled by WIN-I2CUSB Lite GUI. Refer to the PCA9633 data sheet for additional information on the registers and functionality.

### 8.1 Color mixing and dimming LEDs

1. Connect the hardware as described in [Section 4](#). The PCA9633 address is set to 0xC4.
2. Start the GUI software.
3. The main screen will appear.
4. From the 'Device' drop-down menu select 'LED Blinkers and Dimmers', and from the subsequent drop-down menu select 'PCA9633 4-bit LED driver' as in [Figure 3](#).
5. The device configuration screen will be displayed as in [Figure 4](#).
6. Un-check the 'Sleep Enabled (oscillator off)' box to enable the device, check the 'Auto Write' box (lower right), and click the 'Write All' button.
7. Go to the LED Driver Outputs pull-down tabs and for LED0 to LED3 select 'LEDn controlled by PWMn and GRPPWM'.
8. With the cursor, move the PWMn bars to change the colors on the OM6282 board.  
PWM0 controls the red LED.  
PWM1 controls the green LED.  
PWM2 controls the blue LED.  
PWM3 controls the amber LED.
9. Once you set a color with the PWM values, move the GRPPWM cursor and observe the dimming effect ([Figure 5](#)).

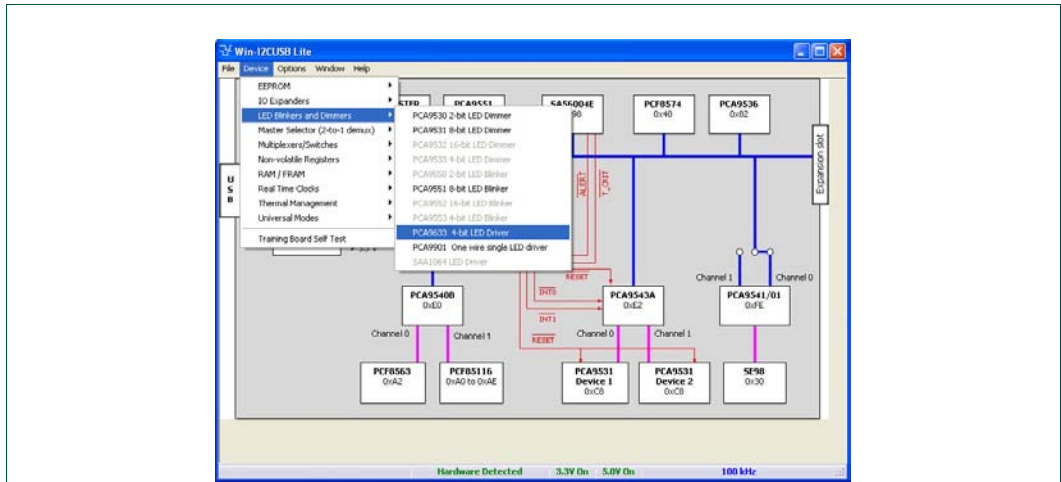


Fig 3. Drop-down menu selections

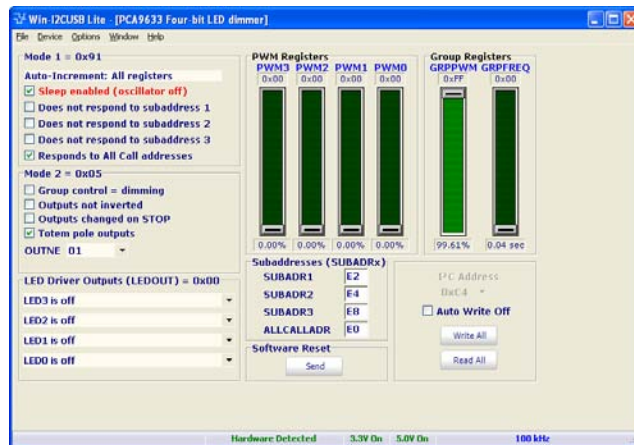


Fig 4. Device configuration screen

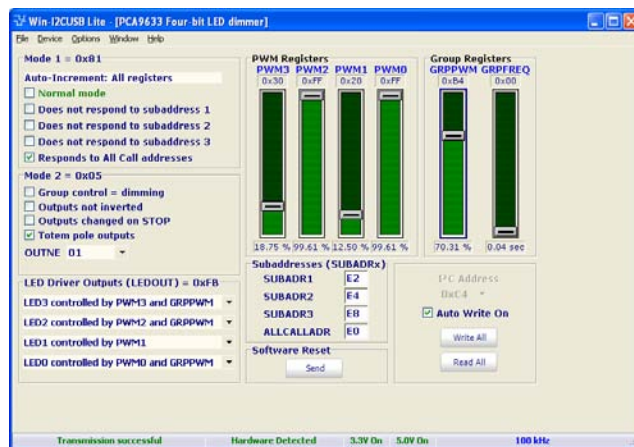


Fig 5. Dimming effect

## 8.2 Color mixing and blinking LEDs

To set-up a blinking demo, repeat step 1 through step 7 as in [Section 8.1](#), then do the following:

1. In the Mode 2 selection window, check the 'Group Control' box to change the mode to blinking.
2. Select a color using the PWM cursors.
3. To set a blink cycle, use the GRPPWM cursor to select the duty cycle and use the GRPFREQ to select the blink frequency.
4. For example, set the GRPPWM to 0x05 (1.95 % duty cycle) and the GRPFREQ to 0x17 (1 second) for a short blink every second (see [Figure 6](#)).
5. Change the GRPPWM to 0x80 (50 % duty cycle) and the LED will be on for 0.5 seconds, repeating every second.
6. Change the color of the LEDs by selecting a different PWM value for each LED.
7. Set the GRPPWM to 0x52 (32 % duty cycle) and the GRPFREQ to 0x01 (0.08 second) and observe the pattern.
8. Change the PWMn values, GRPPWM and GRPFREQ values to create different blink patterns.
9. Change the LEDOUT register on one LED output to be controlled only by its PWM, for example, 'LED1 controlled by PWM1'.
10. Change the blink rate and observe the results.

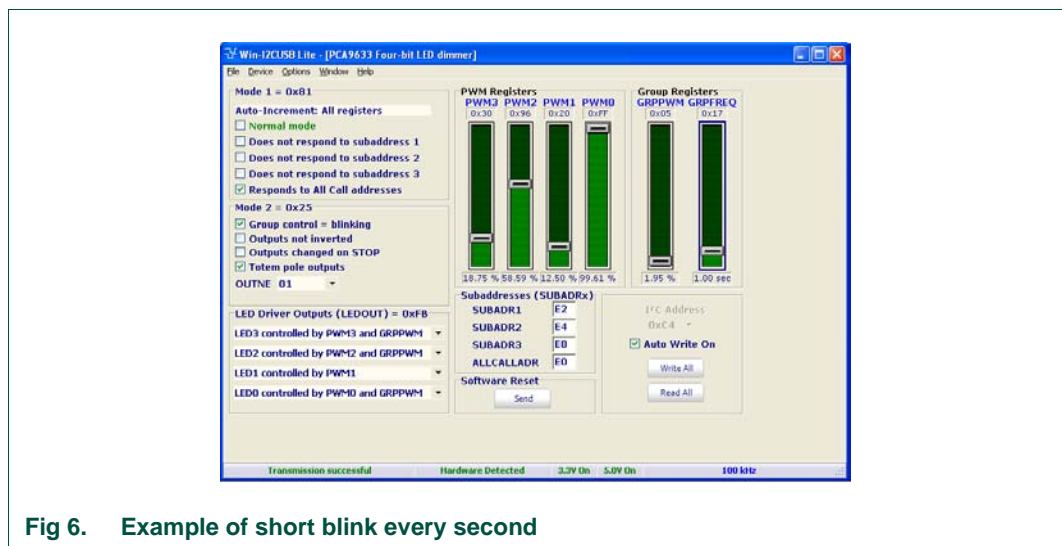


Fig 6. Example of short blink every second

## 9. Support

For support, please send an E-mail to: [i2c.support@nxp.com](mailto:i2c.support@nxp.com)



## 10. Abbreviations

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**Table 2. Abbreviations**

Acronym	Description
ESD	ElectroStatic Discharge
GUI	Graphical User Interface
I <sup>2</sup> C-bus	Inter-integrated Circuit bus
IC	Integrated Circuit
LED	Light Emitting Diode
PC	Personal Computer
PWM	Pulse Width Modulator
RAM	Random Access Memory
RGB	Red/Green/Blue
RGBA	Red/Green/Blue/Amber
SMBus	System Management Bus
USB	Universal Serial Bus

## 11. References

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- [1] **PCA9633, 4-bit Fm+ I<sup>2</sup>C-bus LED driver** — Product data sheet; NXP Semiconductors; [www.nxp.com/pip/PCA9633](http://www.nxp.com/pip/PCA9633)
- [2] **UM10206, I2C Demonstration Board 2005-1 Quick Start Guide** — NXP Semiconductors; [www.nxp.com/acrobat/usermanuals/UM10206](http://www.nxp.com/acrobat/usermanuals/UM10206)

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Date of release: 15 December 2008

Document identifier: UM10317\_1



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