FDI   PCA9633DEMO
User Manual   FDI

Overview

The PCA9633 Demo Board demonstrates the Philips PCA9633 Fast Mode Plus 4-bit I²C LED Dimmer IC. Four LEDs are connected to the PCA9633 and through individual pulse width modulation (PWM) of each LED show different levels of intensity.

To use, push SW8 to the ON position. The LEDs will immediately flash and glow.   To select a different mode of operation, press the MODE button (PB1). The LED will flash amber a number of times to denote which mode was entered. Use the other 3 buttons (SELECT, PLUS, & MINUS) to change the settings. Six different modes of operation are provided and described below.

If the battery is low, the red LED will flash every 3 seconds.

Mode 1: Auto Demonstration Mode
First shows Mode 2 for 10 seconds, then shows Mode 3 for 10 seconds, and then repeats.

MODE	Next mode
SELECT	Does nothing
PLUS	Does nothing
MINUS	Does nothing

Mode 2: Color Wash Mode
Goes through blends of different colors continuous.

MODE	Next mode
SELECT	Toggle between smooth transitions and sharp transitions.
PLUS	Faster
MINUS	Slower

Mode 3: Random Color Mode
Randomly shows different colors without blending transitions.

MODE	Next mode
SELECT	Toggle between two color sets, darker and lighter
PLUS	Faster
MINUS	Slower

Mode 4: User Color Mode

Allows the user to choose a color by selecting the amount of each LED's PWM output as well as the 5th group PWM that is used to dim or blink the combined colors at the same time.

MODE	Next mode
SELECT	Select color PWM component: Red, Green, Blue, Amber, or White (5th Group PWM) flashes as that PWM is selected.
PLUS	More of that color component
MINUS	Less of that color component

Note: If the 5th Group PWM is set at minimum then no colors will be displayed

Mode 5: Multiple Card Chase Mode

Uses multiple cards and the group call feature of the PCA9633 to generate a chase pattern of 2 (yellow/red), 3 (yellow/red/green), or 4 (yellow/red/green/blue) colors for up to 8 boards (master plus seven slave boards) connected via the RJ45 jacks.

MODE	Next mode
SELECT	Chooses a 2, 3, or 4 color chase pattern.
PLUS	Faster blinking
MINUS	Slower blinking

Mode 6: Output Enable Control Mode

Demonstrates the /Output Enable control pin input that Hi-Zs the LED outputs. This mode changes the LED diffuser color to purple and blinks all LEDs at the same rate.

MODE	Next mode
SELECT	Selects frequency (duty cycle fixed at 50%/50%) or duty cycle (frequency fixed at XX)
PLUS	Faster frequency (doubles each push) or longer ON duty cycle
MINUS	Slower frequency (halves each push) or shorter ON duty cycle

Switch Layout

Switch	Function	Description
1	Board Address 0 1<>0	Board Address input to CPU and PCA9633
2	Board Address 1 1<>0	Board Address input to CPU and PCA9633
3	Board Address 2 1<>0	Board Address input to CPU and PCA9633
4	Cable LED OEn N<>Y	Connect the OEn of the PCA9633 to the cable
5	Bus SDA Pull-up Enable N<>Y	Enable Pull-up of the SDA signal on the cable
6	Bus SCL Pull-up Enable N<>Y	Enable Pull-up of the SCL signal on the cable
7	Cable Power Off/On Off/On	Connect the battery to the cable
8	Board Power Off/On Off/On	Board power control

Switch Details

Board Address

SW3	SW2	SW1	Board	Description	Notes
ON	ON	ON	0	Master (default)	There must be one and only one master board set
ON	ON	OFF	1	Slave 1	
ON	OFF	ON	2	Slave 2	
ON	OFF	OFF	3	Slave 3	
OFF	ON	ON	4	Slave 4	
OFF	ON	OFF	5	Slave 5	
OFF	OFF	ON	6	Slave 6	
OFF	OFF	OFF	7	Slave 7	

The MASTER board should be at one end of the Ethernet cable for proper operation of the I²C-bus. Subsequent SLAVE boards are not required to be in any certain order. Also, there may be gaps in the SLAVE board addresses (e.g., it is possible to have SLAVE Boards 2, 4, 6 and no SLAVE Board 3 or 5).

Cable LED OEn

This switch connects the OEn of the PCA9633 to pin 6 of RJ45 cable so that the master board can control the PCA9633 /OE pin on each slave board. This MUST be set to ON for proper operation.

Bus SDA & SCL Pull-up Enable

These two switches disable/enable the cable-side pull-ups for the I²C-bus. These switches must be ON for the MASTER Board (0) and the LAST SLAVE board in the chain. All other boards in-between should have these switches set to OFF. If there are only two boards connected (MASTER and SLAVE), both boards should have these switches set to ON.

Cable Power Off/On

This switch enables the battery power connection to the RJ45 cable on pin 1 of the RJ45 jack. This allows a single power source for the complete chain of boards when all the boards have this switch ON. Note: When this is utilized, a single bench or wall power supply should be used, as the typical 9V battery cannot supply enough current to power multiple boards. The 9V battery should be removed from the holder on all boards.

The input power requirements are: 6VDC to 12VDC, 100mA per board MAX.

Board Power Off/On

This switch turns power OFF/ON for the board. Board Power should be turned OFF whenever the board is not in use, as the battery drain would result in a dead battery.

It is also recommended to remove the battery from the board when not in use to avoid inadvertent battery drain if the OFF/ON switch is bumped ON. The battery may be placed in the holder with the contacts "away" from each other as a storage method.
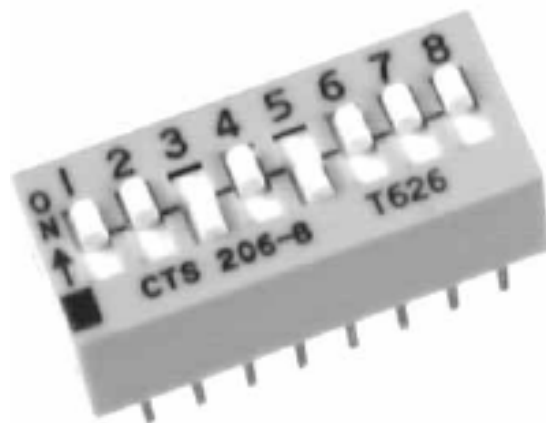
Power Connectivity

The PCA9633DEMO Board requires input power of 6VDC to 9VDC at 100mA. This power may be supplied via the 9V battery holder, or via the external power connector, J2. Extreme care should be taken when connecting and external power source to the board to insure proper polarity.

Off-Board LED Drivers

The PCA9633DEMO Board includes high-current FET drivers for off-board LED circuitry. These devices, Q1-Q4, and capable of switching up to 60V @ 300mA. The part number utilized is BSH112 from Philips Semiconductors. These outputs are connected to solder pads L1 – L4 with adjacent 5V and GND connections. They are connected as "low side" switches to ground configuration.

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Demo Board Schematics