

Elo SDK (Linux) Supporting ADM00419 (MCP2210 Breakout Module)

Elo Touch Solutions

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1. Change History:

2020-06-18: support one MCP2210

2020-06-28: support two MCP2210

2020-08-11: change pin7-blue, pin8-green to pin7-green, pin8-blue.

2. Summary

This user manual is for helping Linux developers to use Elo SDK to control MCP2210 breakout module (used by Elo lightbar kit).

This build supports up to two MCP2210 breakout modules.

3. Steps to use the Elo APIs in your Linux project

All Elo library files are under:

/elo-mcp2210-api-demo/elo-apis/.

Files below (3 C files and 3 header files) should be added to your project:

3.1 elo_api.c / elo_api.h:

Elo API implementations and header file. To be used by user's app development: config GPIO pins and turn on/off lights.

2.2 hid.c / hidapi.h:

Open source API for retrieving hidraw instance. Used Internally by Elo's APIs.

2.3 mcp2210_api.c / mcp2210_api.h:

Microchip API implantation and header. Used internally by Elo's APIs.

User's project should include elo_api.h and call the APIs listed within it.

4. List of Elo APIs

3.1 EloOpenDevices:

Get file descriptor for connected MCP2210 module.

3.2 EloSetGpioPinOutputDirection:

Set requested GPIO pins direction to Output.

3.3 EloSetGpioPinValues:

Set pin values for pin# 0,7,8 (red, green, blue).

3.4 EloGetGpioPinValues:

Retrieve pin values for pin# 0,7,8 (red, green, blue).

3.5 EloCloseDevice:

Close device at end of session.

For sample usage of these APIs, please look into **/demo/demo.c**.

5. Control a Targeted Device

When two ADM00419 devices are connected to the system, it might be useful for developers to control particular device (lightbar). For this

purpose, the Elo API `EloOpenDevice(.)` returns an array of 2 file descriptors (`fds`), the first file descriptor (`fds[0]`) always represents the ADM00419 device with smaller device serial number; the other descriptor `fds[1]` represents the ADM00419 device with larger device serial number.

One possible use of the mapping of device's file descriptor to serial number: if the device serial number is printed on the lightbar kit and visible to the installer, the application can be developed with different controls for each of the lightbars. For example, if Elo set a rule to always install lightbar with larger serial number on the right, the developer knows how to turn on/off either the left or the right lightbar.

6. Running the demo app "elo-mcp2210-demo"

The demo has both 32-bit and 64-bit app binaries:

```
./elo-mcp2210-api-demo/demo/elo-mcp2210-demo32
```

```
./elo-mcp2210-api-demo/demo/elo-mcp2210-demo64
```

Please change the file access permission to enable it's execution:

```
chmod +x ./elo-mcp2210-demo64
```

- 6.1 An MCP2210 breakout module should be connected to the system.
- 6.2 Linux root privilege is required to run the demo otherwise the demo exits.
- 6.3 Sample run of the demo app

Below are two sample runs of the demo app to show how to pass required parameter. The demo takes a binary bit string as parameter. Bit value 0 turns off the light, bit value of 1 turns on the light.

For system with one MCP2210 breakout module connected, the parameter is a 3-bit binary string (represent red, green and blue colors). For example, to turn on all 3 lights, the parameter would be “111”.

For system with two MCP2210 breakout modules connected, the parameter is a 6-bit binary string, with first 3 bits for the ADM00419 with smaller serial number, and the rest of the 3 bits are for the other ADM00419 module with larger serial number. For example, to turn on all 6 lights on both ADM00419 devices, the parameter would be “111111”.

In photos below, the module with smaller device serial number is on the left side of the breadboard; the device with larger serial number is located on the right side of the breadboard.

Example 1:

Run the demo to turn on all 6 lights on both modules (Fig-1):

```
sudo ./elo-mcp2210-demo 111111
```

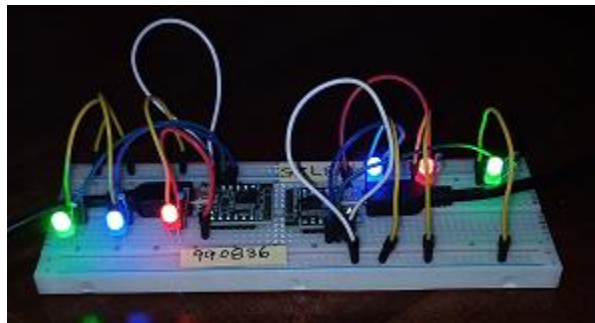


Fig-1: All 6 lights turned on for 2 MCP2210 breakout modules

Example 2:

Run the demo to turn off green, blue lights on MCP2210 with smaller serial number (the ADM00419 on the left in below photo); turn off red light on the other module (right). (Fig-2):

```
sudo ./elo-mcp2210-demo 100011
```

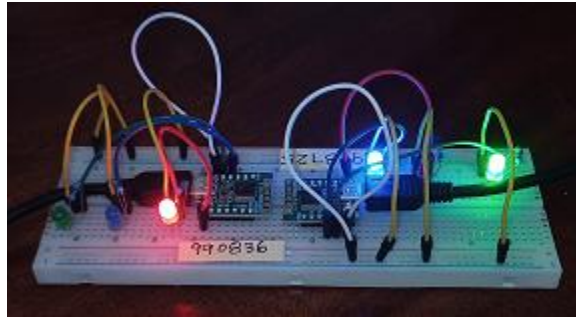


Fig-2: Module on the left: red light on, module on the right: blue, green lights on

7. Limitations

- 7.1 The demo app matches GPIO Pins 0, 7, 8 to light colors Red, Green, Blue.
- 7.2 The demo app has been developed on Ubuntu 18.4 (64bit). It has been tested on Linux distributions below:
 - 7.2.1.1 Ubuntu 18.4 (64bit)
 - 7.2.1.2 Fedora 31 (64bit)
 - 7.2.1.3 CentOS 7.6.1810 (64bit)
- 7.3 The demo and Elo APIs support up to two MCP2210 breakout modules on Linux.

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