PCAL6408 driver – User Guide

Revision History

Revision	Date	Author	Changes
1_0	28th September 2017	MM	First release
1_0	2nd October 2018	MM	Add SBC-B68-eNUC boards support

1. Introduction

This guide show how install and use Linux and Windows 10 drivers for PCAL6408 GPIO Expander.

PCAL6408 GPIO Expander is present on the following SECO board:

- SBC-A80-eNUC
- SBC-B68-eNUC

2. Bios setting

SBC-A80-eNUC boards:

PCAL6408 GPIO Expander ACPI device must be enable in BIOS settings following thees steps:

1. Press **Esc** to enter in BIOS setup
2. Press **SCU** menu
3. Set Advanced\Chipset Configuration\LPSS&SCC Configuration\DMA#2 Support as **Enabled (ACPI)**
4. Set Advanced\Chipset Configuration\LPSS&SCC Configuration\I2C #2 – GPIO Expander as **Enabled (ACPI)**
5. Press **F10** to save end exit

SBC-B68-eNUC boards:

PCAL6408 GPIO Expander ACPI device must be enable in BIOS settings following thees steps:

1. Press **Esc** to enter in BIOS setup
2. Verify that the following items are set on **ACPI Mode** or **PCI Mode**:

1. **Chipset\South Cluster Configuration\LPSS Configuration\I2C #0 (D22:F0)**
2. **Chipset\South Cluster Configuration\LPSS Configuration\I2C #3 (D22:F3)**

3. Press **F4** to save end exit

3. Linux installation

PCAL6408 GPIO Expander Linux driver has been tested on ***Ubuntu17.04 64bit*** with ***kernel 4.10.0-19***.

You can compile, install and use following these steps:

1. Open a terminal with ctrl+T and enter on driver folder
2. Type **make** into the teminal to compile the driver
3. Type **sudo insmod gpio-pcal6408.ko** to load the driver
4. On folder **/sys/class/gpio** will be added a new gpio device as **gpiochipXXX** where **XXX** is the number assigned to gpio device from OS. The numbers from **XXX** to **XXX + 7** are the 8 gpio of PCAL6408 GPIO Expander
5. Type **echo YYY | sudo tee /sys/class/gpio/export** to export the specific single GPIO **YYY** (**YYY** from **XXX** to **XXX+7**).
6. On folder **/sys/class/gpio** will be added a new gpio as **gpio YYY**.
7. Read **/sys/class/gpio/gpioYYY/direction** value to know the current GPIO **YYY** direction
8. Read **/sys/class/gpio/gpioYYY/value** value to know the current GPIO **YYY** status
9. Use the command: **echo in | sudo tee /sys/class/gpio/gpioYYY/direction** to set GPIO **YYY** direction as input
10. Use the command: **echo out | sudo tee /sys/class/gpio/gpioYYY/direction** to set GPIO **YYY** direction as output
11. Use the command: **echo 1 | sudo tee /sys/class/gpio/gpioYYY/value** to set GPIO **YYY** status as high
12. Use the command: **echo 0 | sudo tee /sys/class/gpio/gpioYYY/value** to set GPIO **YYY** status as low
13. Type **echo YYY | sudo tee /sys/class/gpio/unexport** to unexport the specific single GPIO **YYY**.
14. Type **sudo rmmod gpio-pcal6408** to unload the driver

4. Window 10 installation

PCAL6408 GPIO Expander W10 driver can be installed and use following these steps:

1. Install the latest Serial_IO controller driver for your board, downloadable from SECO web site.
2. Verify the presence of **Unknow Device** with Device ID as **ACPI\PCAL6408** (depending on you BIOS settings) in Device Manager
3. Press mouse right-buttot on **PCAL6408_TestTool.inf** and select **install**

4. On Device Manger, will be added a "**PCAL6408 Peripheral Driver**" device under Sample section.
5. Open a command shell with Administrator privilege.
6. From driver folder type the following command: **PCAL6408_TestTool.exe**
7. Type the command **open** to open the device
8. Type the command **gpiogetdirection** to get the direction of the 8 GPIOs (1 for Input and 0 for Output)
9. Type the command **gpiosetdirection {xx}** to set the direction of the 8 GPIOs (1 for Input and 0 for Output) where **xx** is the bit mask to manage each single GPIOs
10. Type the command **gpiogetoutstatus** to get the output value of the 8 GPIOs
11. Type the command **gpiosetoutstatus {xx}** to set the output value of the 8 GPIOs where **xx** is the bit mask to manage each single GPIOs
12. Type the command **gpiogetinputstatus** to get the input value of the 8 GPIOs
13. Type the command **close** to close the device
14. Type the command **help** to show tool help

You can use **PCAL6408_TestTool** source code present on **\W10_Driver\SourceCode\PCAL6408_TestTool** folder as sample code to integrate it on your software.

PCAL6408_TestTool application requires Visual Studio redistributable libraries.