**BMP180 Linux Kernel Driver Documentation**

**Overview**

This Linux kernel driver provides an interface for the Bosch BMP180 temperature and pressure sensor using the I2C bus. It supports reading temperature and pressure through custom IOCTL commands from user-space applications.

**Features**

* I2C communication with BMP180 sensor
* Device file interface (/dev/bmp180)
* IOCTL interface for:
  + Reading temperature
  + Reading pressure
* Automatic calibration data loading on driver probe
* Compatible with Device Tree via of\_match

**Device Tree Binding**

dts

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i2c@... {

bmp180@77 {

compatible = "invensense,bmp180";

reg = <0x77>;

};

};

**IOCTL Commands**

Defined in bmp180\_ioctl.c:

| **Command Name** | **Macro** | **Description** |
| --- | --- | --- |
| Read Temperature | BMP180\_IOCTL\_READ\_TEMP | Reads and returns temperature in 0.1°C |
| Read Pressure | BMP180\_IOCTL\_READ\_PRES | Reads and returns pressure in Pa |

Usage in userspace (example):

c

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int temp;

ioctl(fd, BMP180\_IOCTL\_READ\_TEMP, &temp);

**Sysfs/Devnode**

After successful probing:

* Character device registered as /dev/bmp180
* Major number assigned dynamically

**File Operations**

* .open – Logs device open
* .release – Logs device release
* .unlocked\_ioctl – Handles temperature/pressure IOCTLs

**Kernel Driver API**

**Initialization & Cleanup**

* bmp180\_init() – Registers I2C driver
* bmp180\_exit() – Unregisters I2C driver

**I2C Driver Structure**

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static struct i2c\_driver bmp180\_driver = {

.driver = {

.name = "bmp180\_driver",

.of\_match\_table = of\_match\_ptr(bmp180\_of\_match),

},

.probe = bmp180\_probe,

.remove = bmp180\_remove,

};

**Probe Sequence**

1. Store i2c\_client pointer
2. Read calibration data
3. Register character device
4. Create device class and device file

**Dependencies**

Ensure the following kernel config options are enabled:

bash

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CONFIG\_I2C=y

CONFIG\_I2C\_CHARDEV=y

**Build and Load**

**Compile as a Module**

Add to Makefile:

makefile

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obj-m += bmp180\_ioctl.o

Build:

bash

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make -C /lib/modules/$(uname -r)/build M=$PWD modules

Insert:

bash

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sudo insmod bmp180\_ioctl.ko

Remove:

bash

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sudo rmmod bmp180\_ioctl

**License**

GPL v2

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