

# Memory Mapped GPIO

You can deal with GPIO pins by mapping physical memory for GPIOs.

Refer to [GPIO Register Map](#) document to code.

## Source Code

Download the example source code below and compile/run that.

[n2\\_mmap\\_gpio.c](#)

```
#include <stdio.h>
#include <fcntl.h>
#include <sys/mman.h>
#include <stdint.h>
#include <unistd.h>

#define GPIO_REG_MAP          0xFF634000
#define GPIOX_FSEL_REG_OFFSET 0x116
#define GPIOX_OUTP_REG_OFFSET 0x117
#define GPIOX_INP_REG_OFFSET  0x118
#define BLOCK_SIZE            (4*1024)

static volatile uint32_t *gpio;

int main(int argc, char **argv) {
    int fd;

    if ((fd = open("/dev/gpiomem", O_RDWR | O_SYNC | O_CLOEXEC)) < ) {
        printf("Unable to open /dev/gpiomem\n");
        return -1;
    }

    gpio = mmap(, BLOCK_SIZE, PROT_READ | PROT_WRITE, MAP_SHARED, fd,
GPIO_REG_MAP);
    if (gpio < ) {
        printf("Mmap failed.\n");
        return -1;
    }

    // Print GPIOX FSEL register
    printf("GPIOX_FSEL register : 0x%08x\n",
        *(unsigned int *) (gpio + (GPIOX_FSEL_REG_OFFSET)));

    // Set direction of GPIOX.4 register to out
    *(gpio + (GPIOX_FSEL_REG_OFFSET)) &= ~(1 << 4);
}
```

```
printf("GPIOX_FSEL register : 0x%08x\n",
      *(unsigned int*)(gpio + (GPIOX_FSEL_REG_OFFSET)));
// Set GPIOX.4 to high
*(gpio + (GPIOX_OUTP_REG_OFFSET)) |= (1 << 4);
printf("GPIOX_INP register : 0x%08x\n",
      *(unsigned int*)(gpio + (GPIOX_INP_REG_OFFSET)));

usleep(1000000);

// Set GPIOX.4 to low
*(gpio + (GPIOX_OUTP_REG_OFFSET)) &= ~(1 << 4);
printf("GPIOX_INP register : 0x%08x\n",
      *(unsigned int*)(gpio + (GPIOX_INP_REG_OFFSET)));

return ;
}
```

## Example

Note that all GPIO pins we can deal with are set to **input mode** before executing the example.

The example will set the **GPIOX.4** to **output mode** using **GPIOX\_FSEL** register.

```
root@odroid:~# gcc -o mmap_gpio mmap_gpio.c
root@odroid:~# ./mmap_gpio
GPIOX_FSEL register : 0xffffffff
GPIOX_FSEL register : 0xfffffffef
GPIOX_INP register : 0x00070091
GPIOX_INP register : 0x00070081
```

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