

Xilinx Zynq FPGA, TI DSP, MCU 기반의 프로그래밍 및 회로 설계 전문가 과정

PWM + ALL eQEP module
In FPGA zybo
based petalinux

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지금까지 설계한 HW bitstream을 가지고 petalinux kernel의 apps에 해당 IP 를 제어할 수 있는 PS 를 추가하여 /dev/device_driver 앱을 생성하여 결과를 관측하였다.

소스 코드는 다음과 같다.

```
printf("eCAP UIO Test\r\n");
printf("Loopback Test!\r\n");
uiod1 = argv[1];
uiod2 = argv[2];
uiod3 = argv[3];
fd1 = open(uiod1, O_RDWR);

if(fd1 < 1)
{
    perror(argv[0]);
    printf("Invalid UIO Device File: %s\n", uiod1);
    return -1;
}

printf("%s open success!\r\n", uiod1);
fd2 = open(uiod2, O_RDWR);

if(fd2 < 1)
{
    perror(argv[0]);
    printf("Invalid UIO Device File: %s\n", uiod2);
    return -1;
}

printf("%s open success!\r\n", uiod2);

fd3 = open(uiod3, O_RDWR);

if(fd3 < 1)
{
    perror(argv[0]);
    printf("Invalid UIO Device File: %s\n", uiod3);
    return -1;
}

printf("%s open success!\r\n", uiod3);

ptr1 = mmap(NULL, PWM_MAP_SIZE, PROT_READ|PROT_WRITE, MAP_SHARED, fd1, 0);
ptr2 = mmap(NULL, PWM_MAP_SIZE, PROT_READ|PROT_WRITE, MAP_SHARED, fd2, 0);
ptr3 = mmap(NULL, eQEP_MAP_SIZE, PROT_READ|PROT_WRITE, MAP_SHARED, fd3, 0);

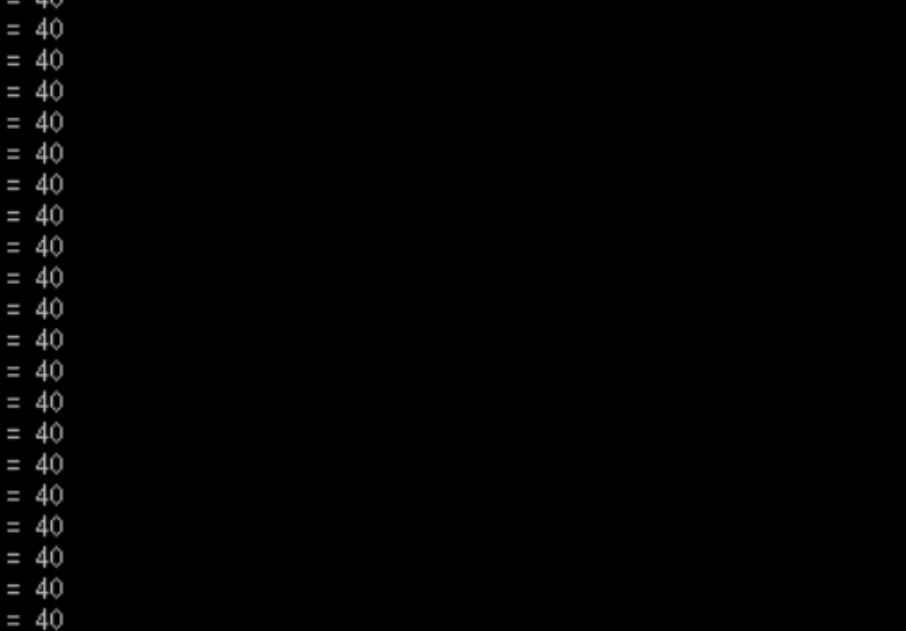
printf("ptr1 ptr2 memory allocation success!\r\n");
printf("ptr1 : 0x%x\r\n", ptr1); // PWM0
printf("ptr2 : 0x%x\r\n", ptr2); // PWM1
printf("ptr3 : 0x%x\r\n", ptr3); // eQEP

/*Infinit Loop*/
while(1)
{
    *((unsigned *)(ptr1 + PWM0_DATA_OFFSET)) = duty;
    *((unsigned *)(ptr2 + PWM1_DATA_OFFSET)) = duty;
    *((unsigned *)(ptr3 + eQEP_QUPRD_OFFSET)) = QUPRD;

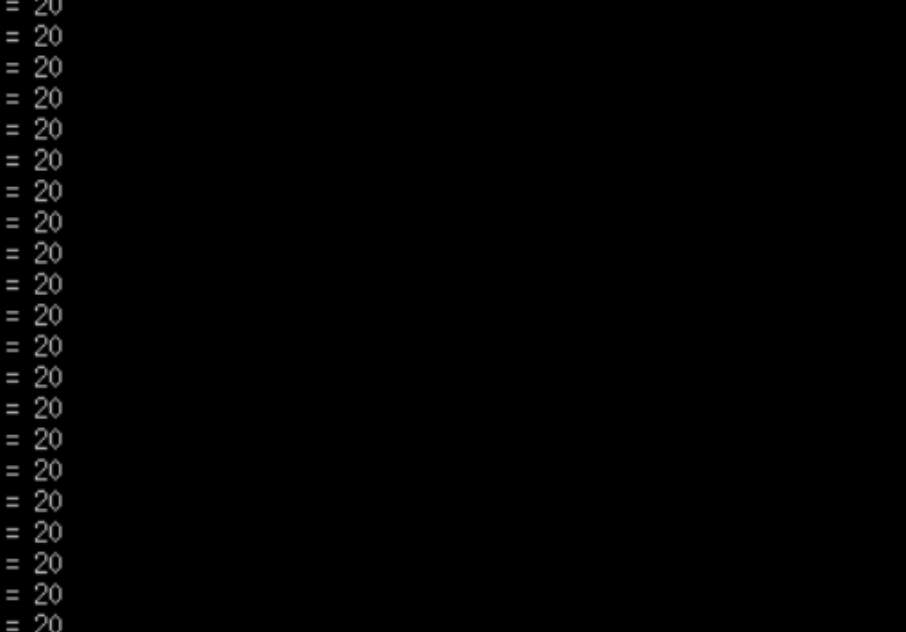
    printf("RPM is %d\r\n", *((unsigned int*)ptr3 + eQEP_QPOSLAT_OFFSET));
}

return 0;
```

sci통신을 활용하여 putty를 확인한 결과 SDK로 확인한 결과가 같다. 결과는 다음과 같다.



The screenshot shows a PuTTY terminal window titled "/dev/ttyUSB1 - PuTTY". The terminal displays a continuous stream of the text "QPSLAT = 40" on each line, indicating a loop or a constant output from a device. The text is white on a black background. The window's title bar includes standard OS icons for closing, maximizing, and minimizing.



The screenshot shows a PuTTY terminal window with a dark background. The title bar at the top reads "/dev/ttyUSB1 - PuTTY". The terminal content consists of 15 lines, each displaying the command "IPOS LAT = 20". A green cursor is visible at the end of the 15th line.