

Project #12(Pjt12_ADC_TC1047)

◆ ADC(Analog-Digital Converter) Application: TC1047A Driver

◆ Overview of TC1047A

– Interface(3 pin)

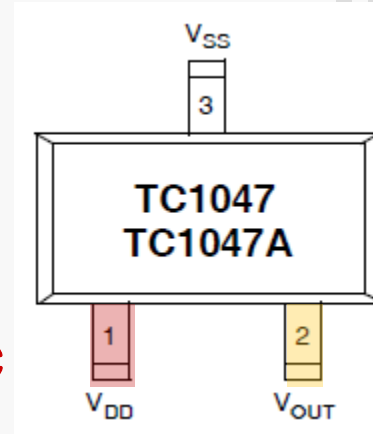
. Vss(ground)

. Vdd(power)

. Vout(output voltage) ← ADC(Analog-Digital-Converter) 필요

* $100\text{mV} \rightarrow -40^{\circ}\text{C}$, $500\text{mV} \rightarrow 0^{\circ}\text{C}$, $750\text{mV} \rightarrow +25^{\circ}\text{C}$, $1.75\text{V} \rightarrow +125^{\circ}\text{C}$

* $\text{Degree} = (\text{Vout} - 500\text{mV}) / 10\text{mV}$



– Connection with Atmega2560

. ADC : 입력 0~1.1V 대하여 0~1024(1024등분)로 대응. 즉, 출력을 입력의 (1024/1.1) 배로 확대, 반대로 입력은 출력의 (1.1/1024) 배임

→ $\text{output} = \text{input} * 1024/1.1$ $\text{input} = \text{output} * 1.1/1024$

. Ground : 2, 26, 44번 pin(J3 핀 소켓)

. Power : 1, 13, 25번 pin(J3 핀 소켓)

. ADC0(PF0) : 21번 pin(J3 핀 소켓)

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◆ ADC Driver

```
void adc_init()
{
    cbi(DDRF, PF0); // make input PF0(=ADC0) GPIO
    ADMUX = 0x80 | 0x00; // Ref. : 1.1v, Port : PF0
}

void adc_start()
{
    sbi(ADCSRA, ADEN); // ADC enable
    _delay_us(120);
    sbi(ADCSRA, ADIE); // Interrupt Enable
    sbi(ADCSRA, ADSC); // Start conversion
}
```

```
ISR(ADC_vect)
{
    struct task task;
    uint16_t data;

    data = ADCW & 0x03ff;
    cbi(ADCSRA, ADEN);

    task.fun = task_tc1047a;
    sprintf(task.arg, "%d", data);

    task_insert(&task);
}
```

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◆ Analog Output Sensor Application : task_tc1047a

```
void task_tc1047a(void *arg)
{
    int value;

    if (!strcmp(arg, "")) // called from task_cmd or timer task
        adc_start();
    else { // called from ISR()
        value = atoi(arg) * (1.1/1024) * 1000;
        value = (value - 500) / 10;
        printf("task_tc1047a() : current temperature ➡ %d degree.Wn", value);
    }
}

void task_cmd(void *arg)
{
    ...
    ...
    else if (!strcmp(cp0, "tc1047a"))
        task_tc1047a("");
    ...
    ...
}
```

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◆ PIN Layout

