VREG click
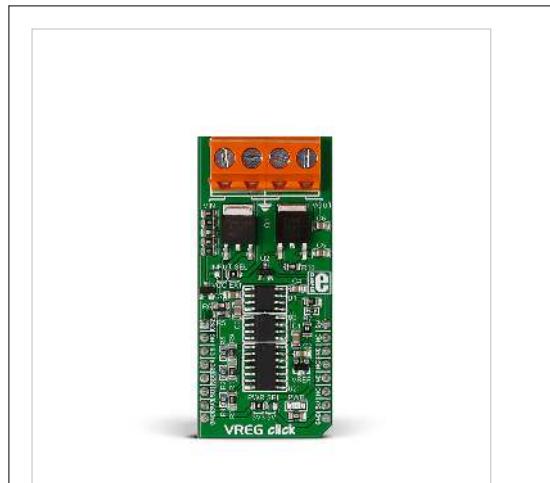
**VReg click**

VReg click	
IC/Module	LM317 [1] MCP4921 12-bit DAC [2] MCP3204 12-bit ADC [3] ZXMP7A17K MOSFET [4] LMx58 [3]
Interface	SPI
Power supply	3.3V, 5V
Website	www.mikroe.com/click/vreg [5]

VREG click is a digitally controlled DC Voltage regulator in mikroBUS™ form factor. The design is based on the well-known LM317 circuit, with the addition of a 12-bit DAC, 12-bit ADC, and an Operational Amplifier. Two pairs of screw terminals serve as inputs and outputs.

Features and usage notes

Schematic also available in PDF [6]
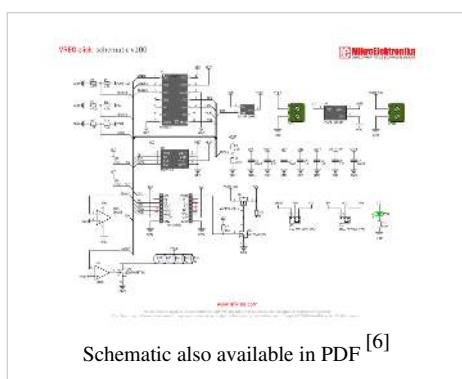
The LM371 IC is a reliable regulator with typical line regulation of 0.01% and load regulation of 0.1%. It also has internal short-circuit current limiting and thermal overload protection.

The circuit regulates voltage by turning all input/output difference into heat (effectively dissipating all the excess power). If it gets too hot it may damage the board or cause unexpected behaviour.

Because of that, the board's operating range is defined by two factors. 1) maximum input voltage and current (should not exceed 20V/1A); and 2) maximum wattage arising from current and I/O voltage difference (should not exceed 2W, measured as I x (Input V - Output V).

The board also carries a MOSFET chip to toggle the output on and off.

VREG click communicates with the target board MCU through the SPI interface (CS, SCK, MISO, MOSI). The board can use either a 3.3V or a 5V power supply.

It is also possible to use the board's power supply as the Input, by resoldering the onboard INPUT SEL jumper.

Programming

This code checks if the output value is equal to the desired set_value. If it is not, it sets the desired value and sends it to the DAC of the VREG click, which then sets the output voltage to the desired value.

```
while(1)
{
    if(output < set_value)
    {
        value = value + 1;
        if(value>4095) {value = 4095;}
    }

    if(output > set_value)
    {
        value = value - 1;
        if(value<1) {value = 2;}
    }

    DAC_Output(value);
    output = getADC(1)/1.82;
    ProcessValue(output,2);    // Writes measured value to Lcd
    Delay_ms(10);                    // Wait 10ms


}
```

Code examples that demonstrate the usage of VREG click with MikroElektronika hardware and compilers are available on Libstock [7].

Resources

- LM317 Voltage regulator [8]
- MCP4921 12-bit DAC [9]
- MCP3204 12-bit ADC [3]
- ZXMP7A17K MOSFET [4]
- LMx58 Low-Power, Dual-Operational Amplifier [3]
- mikroBUS™ standard specifications [10]

References

[1] http://www.ti.com/lit/ds/slvs044x/slvs044x.pdf

[2] http://ww1.microchip.com/downloads/en/DeviceDoc/22248a.pdf

[3] http://ww1.microchip.com/downloads/en/devicedoc/21298c.pdf

[4] http://www.diodes.com/_files/datasheets/ZXMP7A17K.pdf

[5] http://www.mikroe.com/click/vreg

[6] http://cdn-docs.mikroe.com/images/c/ce/VREG_click_schematic_v100.pdf

[7] http://libstock.mikroe.com/projects/view/1929/vreg-click-example

[8] http://www.ti.com/general/docs/lit/getliterature.tsp?baseLiteratureNumber=slvs044

[9] https://www.microchip.com/wwwproducts/en/en020398

[10] http://download.mikroe.com/documents/standards/mikrobus/mikrobus-standard-specification-v200.pdf

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