



Low Noise, High Resolution Programmable Sensor Power

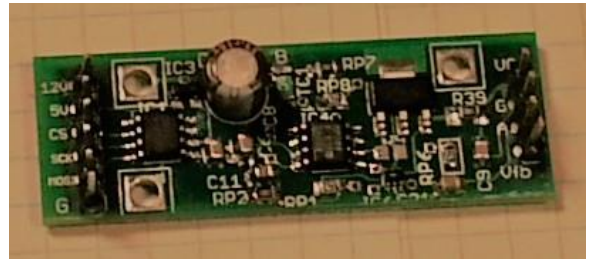
Manufactured by On Measurements 4U LLC

General Specifications

- 12 Bit DAC (Digital to Analog Converter)
- 0V to 10V Programmable Voltage
- Rail-to-Rail Output
- SPI interface
- On Board 2.5V Voltage Reference
- On Board Power Transistor
- On Board PTC Fuse Rated to 50mA
- On Board Current Measurement Amplifier
- Programming examples at onmeasurements.com

Applications

Driving Constant Current Sensors
Powering Bridge Circuits
Testing Arduino Analog Inputs
Arbitrary Signal Generator
Motor Control Feedback



Function

The DAC12B is based on the MCP4921 from Microchip with an on board reference voltage of 2.5V. A non-inverting amplifier with gain = 4.1 increases the MCP4921 output from ~0 to 2.5 to ~0 to 10.25V.

A nominal programmable output: $V_{out} = 10.25V/4096 = 2.5mV$ per count.

A power transistor allows the DAC12B to power sensor circuits up to 40mA.

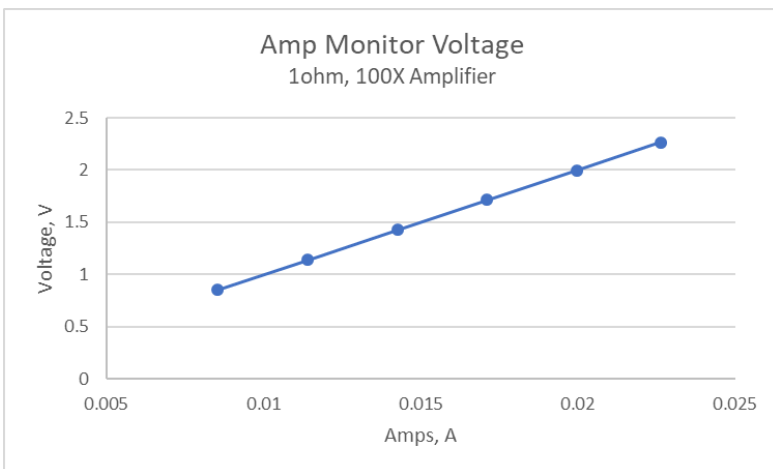
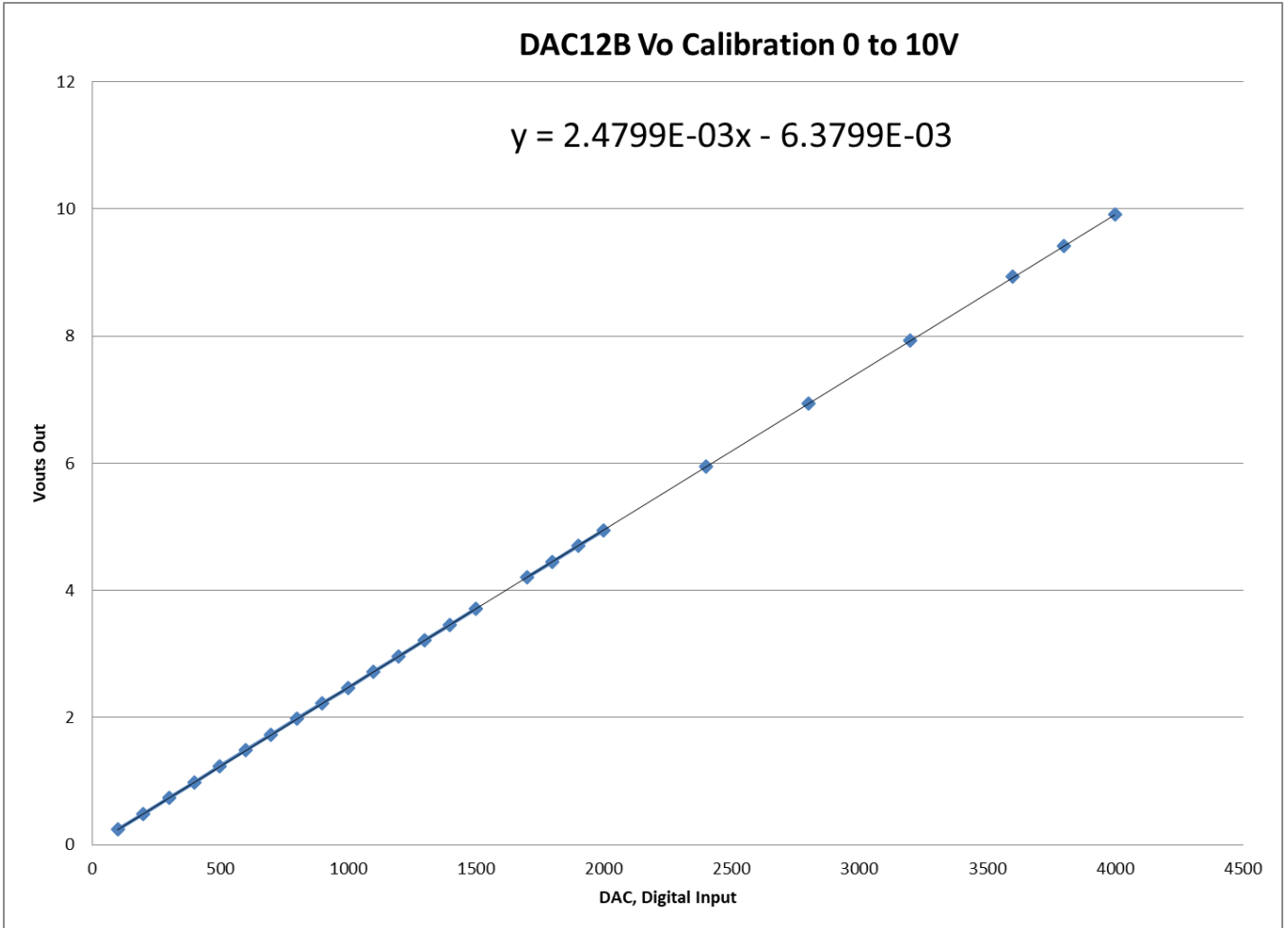
The current monitor amplifier (INA214) using a series 1ohm output resistor. The INA214 has a gain of 100X. This voltage is supplied on pin 3 of the output. This allows the Arduino to set the output voltage and monitor the current OR to set the current and monitor the voltage. The INA214 requires a V_{out} of 3.3V.

DAC12B



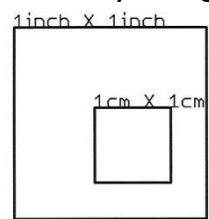
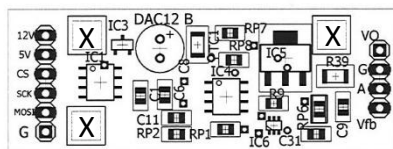
Programming examples at Onmeasurements.com

Nominal Specifications. Your device may vary



Note. The current monitoring amplifier doesn't operate at DAC voltage outputs less than 3V.

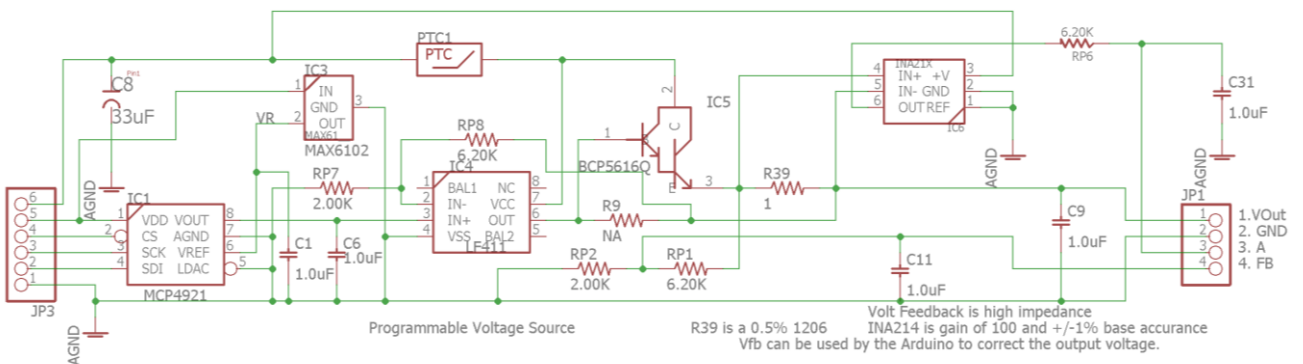
The DAC12B board layout below can be cut and used to layout your measurement system. Print using the actual size function of your printer and verify using the test square. The squared "X"s mark the mounting holes.



DAC12B Circuit

Input Pins

- 1 12V --- 5 to 12V to power the output voltage
- 2 5V --- Logic voltage
- 3 CS --- Chip select for MCP4921
- 4 Clk --- Serial Clock for SPI
- 5 MOSI --- Master Out, Slave In for SPI
- 6 Gnd



Output Pins

- 1 Vout --- Power voltage
2. Gnd
3. Amps --- Voltage output of the INA214
4. Vfb – Divider off of Vout for feedback control