

MCP4661T Breakout Module

CHIP: MCP4661T-104E/ST**SIZE:** 18.5mm x 22.5mm

DESCRIPTION:

This board features an MCP4661T, which is a 100 k Ω ($\pm 20\%$), 8-bit/257 step, Dual-Circuit Digital Potentiometer. The board operating voltage is 2.7v-5.5v, and features pin headers for I2C, ground, power, and analog terminals. Each Circuit (0 & 1) contains A and B terminals, which are electrically interchangeable for many rheostat applications, and W (acts as an access/wiper point). This board can act as a programmable resistor, between A or B terminals & W (access). This board can also act as a programmable voltage divider, using the terminals as a voltage range, and W (access) as the voltage output. This board features an LED for power, a 10uF ceramic and 100nF ceramic capacitors, along with 4.7k pull up resistors for SCL and SDA. (All address pins are tied to ground).

This MCP4661T breakout board will streamline your analog boards & give you effortless debugging.

Happy Building!

PINOUT:

PIN	NAME	DOES THIS
1	P1B	Circuit 1 B
2	P1W	Circuit 1 Access/Wiper
3	P1A	Circuit 1 A
4	SDA	I2C Serial Data
5	SCL	I2C Serial Clock
6	GND	Ground
7	P0B	Circuit 0 B
8	P0W	Circuit 0 Access/Wiper
9	P0A	Circuit 0 A
10	GND	Ground
11	VDD	2.7-5.5v (3.3v or 5v typically)
12	GND	Ground

WIPER RESISTANCE FORMULA:

MODE	FORMULA	NOTES
Programmable Resistance	$RWB = \sim(RAB * D) / 256 + RW$	D is the step setting from 0-256 (8-bit) RAB is 100k Ohm for this digi-pot RW is the internal wiper resistance (75 ohm) RWB is the resulting series resistance

Analog terminal limits:

Keep A, B and W terminal voltages within the permitted range relative to VSS and VDD, and observe the maximum terminal/wiper current specified by Microchip. This is a signal-level programmable resistance, not a power potentiometer.

APPLICATIONS:

- Setting channel levels and filtering parameters with dual-channel tracking
- Trimming analog sensor offsets and gain via non-volatile EEPROM
- Dynamically adjusting feedback networks for programmable DC-DC output voltage
- Controlling LED backlight brightness or LCD bias voltages via software commands

CHIPS ON BOARD:

COMPONENT	PART #	JOB	DATASHEET
Digital Potentiometer	MCP4661T	Digital Resistor & Voltage Control	[Manufacturer Datasheet]

EXAMPLE CODE:

```
#include <Wire.h>

// MCP4661: I2C address is 0101 A2 A1 A0.
// With A2=A1=A0=GND, that's 0b0101000 = 0x28
const uint8_t POT_ADDR = 0x28;

const uint8_t REG_WIPER0 = 0x00; // volatile wiper 0
const uint8_t CMD_WRITE = 0x00; // write command bits (C1:C0 = 00)

const uint16_t MAX_CODE = 256; // 8-bit device: 0..256 (257 steps)
const uint32_t SWEEP_MS = 10000; // 10 second sweep

void setWiper0(uint16_t code) {
  if (code > MAX_CODE) code = MAX_CODE;

  // Command byte: AD3:AD0 | C1:C0 | D9 D8
```

```

uint8_t cmd = (REG_WIPER0 << 4) | (CMD_WRITE << 2) | ((code >> 8) & 0x03);

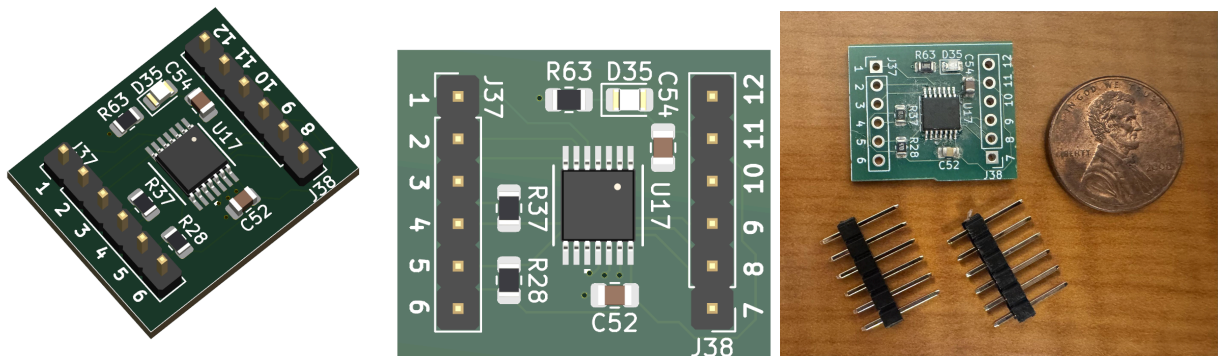
Wire.beginTransmission(POT_ADDR);
Wire.write(cmd);
Wire.write(code & 0xFF);          // low 8 bits
Wire.endTransmission();
}

void setup() {
  Wire.begin();
  Wire.setClock(400000);          // 400 kHz fast mode is fine
}

void loop() {
  // Sweep up: 257 steps spread across 10 s
  for (uint16_t code = 0; code <= MAX_CODE; code++) {
    setWiper0(code);
    delay(SWEEP_MS / (MAX_CODE + 1)); // ~39 ms per step
  }
  // Sweep back down
  for (int16_t code = MAX_CODE; code >= 0; code--) {
    setWiper0(code);
    delay(SWEEP_MS / (MAX_CODE + 1));
  }
}

```

PHOTOS:



NOTES & DEBUGGING:

- This chip has 257 steps on 100k ohm basis (+/- 20%)
- This chip can technically go as low as 1.8v but special care must be taken
- This board's LED has a hardwired resistor, but depending on voltage used to power the board, LED brightness may need to be decreased (optionally increasing resistance)
- The two circuits are 0 and 1
- The address pins are hardwired to ground (address is 0x28)