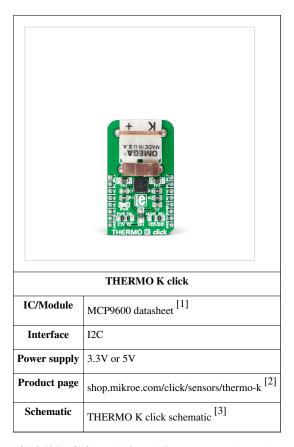
THERMO K click

THERMO K click



THERMO K click carries the **MCP9600 IC from Microchip** and and depending on the type of probe it uses, the click can measure temperatures from –200 °C to +1372 °C. THERMO K click is designed to run either on 3.3V or 5V power supply. It communicates with the target MCU through I2C interface.

Features and usage notes

Temperature range

With the type-K probe, available in our store [4], this click can measure temperature up to +480 °C.

MCP9600 from Microchip

The MCP9600 IC converts thermocouple EMF to degree Celsius with integrated Cold-Junction compensation. It corrects the thermocouple nonlinear error characteristics of eight thermocouple types and outputs ± 1.5 °C accurate temperature data.

4 alert outputs

THERMO K click has 4 alert outputs onboard that can be used to detect multiple temperature zones. You can define on which specific temperature the THERMO K click will send an alarm.

Low power modes

Low-Power modes are available for battery-powered applications. In shut-down mode the module uses only 2 µA.

Thermocouple probe

In order to use THERMO K click you need to connect the appropriate K-type thermocouple probe (not included in the package) into the PCC-SMP connector.

Key features

• MCP9600 IC from Microchip

• Four Programmable Temperature Alert Outputs

Operating Current: 300 μA (typical)
Shutdown Current: 2 μA (typical)

• Interface: I2C

• 3.3V or 5V power supply

Jumpers and settings

Designator	Name	Default Position	Default Option	Description: describe the use + list all options with respective descriptions
JP1	PWR.SEL.	Left	3V3	Power Supply Voltage Selection 3V3/5V, left position 3v3, right position 5V
JP2	ADDR. SEL.	Right	GND	I2C address Selection. Left position (VDD) is 1100111x and right position (GND) is 1100000x .

Additional information

Our store ^[5] offers Thermocouple Type-K Glass Braid Insulated probes.

Pinout diagram

This table shows how the pinout on THERMO K click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin		• •				Pin	Notes
		mikroBUS tm			S tm			
Alert 4 output	ALERT4	1	AN		PWM	16	ALERT2	Alert 2 output
Alert 3 output	ALERT3	2	RST		INT	15	ALERT1	Alert 1 output
Not connected	NC	3	CS		TX	14	NC	Not connected
Not connected	NC	4	SCK		RX	13	NC	Not connected
Not connected	NC	5	MISO		SCL	12	SCL	I2C Clock
Not connected	NC	6	MOSI		SDA	11	SDA	I2C Data
Power supply	+3.3V	7	+3.3V		+5V	10	+5V	Power supply
Ground	GND	8	GND		GND	9	GND	Ground

Programming

The demo shows the temperature on the TFT or LCD display.

It measures every half a second.

We have examples for PIC, dsPIC, PIC32, ARM, AVR and FT90x compilers.

The code snippet is from the Example folder of the PIC compiler and P18F87K22 MCU.

This example is a temperature reading routine.

First, we are reading the "Thermocouple Temperature Register" and then we are converting the value to a temperature in the Celsius scale.

```
float Read_Temperature()
   float Temperature;
   tmp_data[0] = MCP9600_TH;
   I2C1_Start();
   I2C1_Wr( MCP9600_I2C_ADDR );
   I2C1_Wr( tmp_data[ 0 ] );
   I2C1_Stop();
   Delay_us( 50 );
   I2C1_Start();
   12C1_Wr( MCP9600_I2C_ADDR | 1 );
   tmp_data[0] = I2C1_Rd(1);
   tmp_data[1] = I2C1_Rd(0);
   I2C1_Stop();
   if((tmp_data[0] & 0x80) == 0x80)
   {
       tmp_data[0] = tmp_data[0] & 0x7F;
       Temperature = 1024 - (tmp_data[0]*16 + tmp_data[1] / 16);
   }
   else
   {
       Temperature = (tmp_data[0] * 16 + (float)tmp_data[1] / 16);
   }
   return Temperature;
```

Resources

- THERMO K schematic [3]
- MCP9600 datasheet ^[1]
- Libstock Library ^[6]
- mikroBUSTM standard specifications ^[7]

References

- [1] http://ww1.microchip.com/downloads/en/DeviceDoc/20005426B.pdf
- [2] https://shop.mikroe.com/click/sensors/thermo-k
- [3] http://cdn-docs.mikroe.com/images/3/3e/THERMO_K_click_schematic.pdf
- $[4] \ https://shop.mikroe.com/accessories/sensors/thermocouple-type-k-glass-braid-insulated$
- $[5] \ https://shop.mikroe.com/accessories/sensors/thermocouple-type-k-glass-braid-insulated?search_query=thermocouple\&results=2.$
- [6] http://libstock.mikroe.com/projects/view/1976/thermo-k-click
- [7] http://download.mikroe.com/documents/standards/mikrobus/mikrobus-standard-specification-v200.pdf

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