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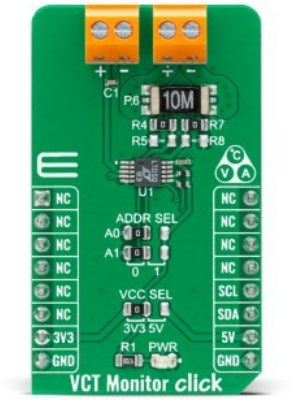
VCT Monitor Click





PID: MIKROE-4353

VCT Monitor Click is a compact add-on board that contains a highly integrated monitoring solution without compromising accuracy. This board features the LTC2990, an I2C configurable high-performance temperature, voltage, and current monitor from Analog Devices. The LTC2990 incorporates a 14-bit ADC and a 10ppm/°C voltage reference to provide sub-millivolt voltage resolution, as well as +1°C accuracy internally and +0.5°C accuracy remotely when making temperature measurements. This Click board™ is suitable for applications like supply voltage monitoring and remote diode temperature measurement, e.g., in industrial systems where thermal management is crucial for maximizing performance.

VCT Monitor Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

How does it work?

VCT Monitor Click is based on the LTC2990, a high-performance temperature, voltage, and current monitor with the I2C serial interface from Analog Devices. The LTC2990 can be configured to measure many combinations of internal temperature, remote temperature, remote voltage or current, and internal VCC with single or repeated measurements. It fits in systems needing sub-millivolt voltage resolution, 1% current measurement, and 1°C temperature accuracy or any combination of the three.

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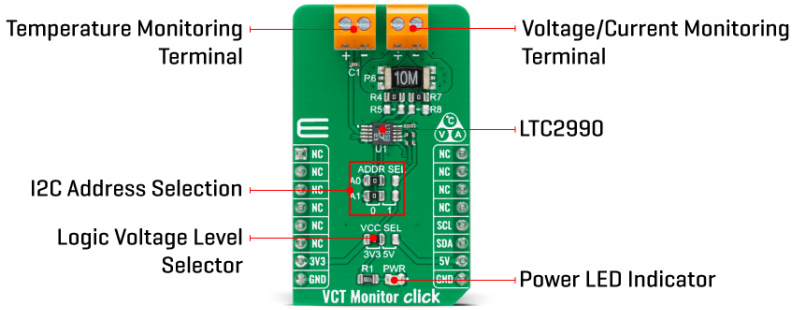

The input signals are selected with an input MUX, controlled by the control logic block. The control logic uses the mode bits in the control register to manage the sequence and types of data acquisition. The control logic also controls the variable current sources during remote temperature acquisition. The ADC performs the necessary conversion(s) and supplies the data to the control logic for further processing in the case of temperature measurements or routing to the appropriate data register for voltage and current measurements.

Remote measurements are performed on terminals labeled as TEMP and LOAD using multiple ADC conversions and source currents to compensate for sensor series resistance. The LTC2990 is calibrated to yield the correct temperature for a remote diode with an ideality factor of 1.004.

This Click board™ is designed to be operated with both 3.3V and 5V logic voltage levels that can be selected via VCC SEL jumper. This allows for both 3.3V and 5V capable MCUs to use the I2C communication lines properly. However, the Click board™ comes equipped with a library that contains easy to use functions and an example code that can be used as a reference for further development.

Specifications

Type	Current sensor,Measurements
Applications	Can be used for applications like supply voltage monitoring and remote diode temperature measurement, e.g., in industrial systems where thermal management is crucial for maximizing performance.
On-board modules	VCT Monitor Click is based on the LTC2990, a high-performance temperature, voltage, and current monitor with the I2C serial interface from Analog Devices.
Key Features	Low power consumption, high precission
Interface	I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)

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Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on VCT Monitor Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	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

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power Supply Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP3	ADDR SEL	Left	I2C Address Selection: Left position 0, Right position 1

VCT Monitor Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.3	-	6	V
Accuracy (Local)	-	-	±3.5	°C
Accuracy (Remote)	-	-	±1.5	°C
Resolution	-	14	-	bits
Operating Temperature Range	0	-	70	°C

Software Support

We provide a library for the VCT Monitor Click on our LibStock page, as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Library Description

The library contains a basic functions for using VCT monitor click.

Key functions:

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- float vctmonitor_read_voltage_differential (void) - Differential voltage function
- float vctmonitor_read_current (void) - Current function
- float vctmonitor_read_temperature (void) - Temperature function

Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C module
- Application Initialization - Initializes driver init
- Application Task - Reads temperature, current value, and differential voltage every 4 seconds.
- note - We used the next sets for the test: - Power supply - 4V - Current (Load) - 0A to 3A - The temperature reads from the external MMBT3904 sensor

The full application code, and ready to use projects can be found on our LibStock page.

Other mikroE Libraries used in the example:

- I2C Library
- Conversions Library
- UART Library

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 click or RS232 click to connect to your PC, for development systems with no UART to USB interface available on the board. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

mikroSDK

This Click board™ is supported with mikroSDK - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

VCT Monitor click 2D and 3D files

VCT Monitor click example on Libstock

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[VCT Monitor click schematic]

[LTC2990 datasheet]

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