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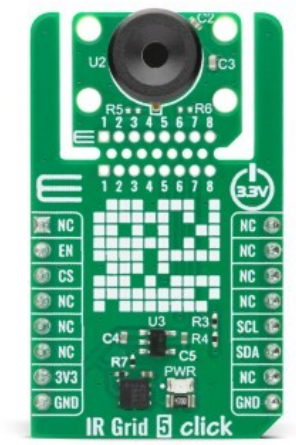
IR Grid 5 Click



PID: MIKROE-6764

IR Grid 5 Click is a compact add-on board that provides precise thermal imaging and non-contact temperature measurement capabilities for various embedded applications. It is based on the MLX90642, a fully calibrated 32x24-pixel thermal infrared (IR) array imager from Melexis, which integrates 768 FIR pixels and an internal temperature reference sensor for accurate ambient compensation and linearized temperature output accessible via I2C interface. The sensor features selectable field-of-view options of 55°x35° and 110°x75°. Designed with the unique Click Snap feature, it allows the sensor area to be separated and mounted independently, offering flexible implementation in different systems. This Click board™ is ideal for visual IR thermometers, motion and intrusion detection, industrial process monitoring, HVAC systems, and other non-contact temperature sensing applications.

For more information about **IR Grid 5 Click** visit the official product page.

How does it work?

IR Grid 5 Click is based on the MLX90642, a fully calibrated 32x24 pixels thermal infrared (IR) array imager from Melexis, that provides precise thermal imaging and non-contact temperature measurement. This sensor integrates 768 FIR pixels and an internal temperature reference sensor that measures the cold junction temperature of the chip, allowing accurate ambient compensation. Each pixel is factory-calibrated to ensure linearized temperature output (To), while both raw IR data and ambient temperature data (Ta) are stored in internal RAM and made accessible through a standard I2C interface, enabling simple communication with various microcontroller platforms.

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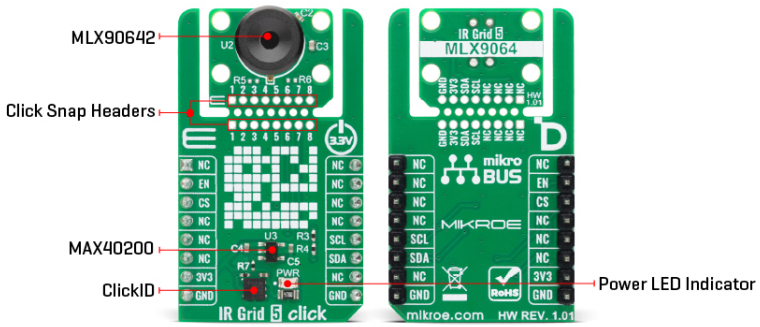

The MLX90642 offers selectable field-of-view configurations of 55°x35° and 110°x75°, providing flexibility for applications that range from narrow-area precision monitoring to wide-angle environmental scanning. Designed for high-performance thermal detection, the MLX90642 supports use in visual IR thermometers, industrial temperature control of moving parts, intrusion and motion detection systems, microwave oven sensing, busbar temperature monitoring, and HVAC systems in residential, commercial, and industrial environments.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening many new possibilities for implementation. Thanks to the Snap feature, the MLX90642 can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

To optimize power control and operational management, IR Grid 5 Click integrates the MAX40200 ideal diode controller from Analog Devices, which enables or disables the MLX90642 through a dedicated enable pin (EN), providing efficient power switching and protection.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the official page dedicated to this feature.

Specifications

Type	Temperature & humidity
Applications	Ideal for visual IR thermometers, motion and

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	intrusion detection, industrial process monitoring, HVAC systems, and other non-contact temperature sensing applications
On-board modules	MLX90642 - 32x24 pixels thermal IR array imager from Melexis
Key Features	Fully calibrated 32x24 pixel thermal infrared array imager, 768 FIR pixels, integrated temperature reference sensor for ambient compensation, selectable field-of-view options of 55°x35° and 110°x75°, linearized temperature output accessible via I2C interface, Click Snap design, and more
Interface	I2C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on IR Grid 5 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	
Device Enable	**EN**	2	RST	INT	15	NC	
ID COMM	**CS**	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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

IR Grid 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Measurement Range	-40	-	+300	°C
Field of View (FoV)	55x35 / 110x75			deg
Pixel Resolution	32x24			px

Software Support

IR Grid 5 Click demo application is developed using the NECTO Studio, ensuring compatibility

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with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of the IR Grid 5 Click board by reading and displaying the sensor temperature as well as the object temperature image from the 32x24 pixel array.

Key Functions

- irgrid5_cfg_setup This function initializes Click configuration structure to initial values.
- irgrid5_init This function initializes all necessary pins and peripherals used for this Click board.
- irgrid5_default_cfg This function executes a default configuration of IR Grid 5 Click board.
- irgrid5_get_device_id This function reads the device ID from the IR Grid 5 EEPROM.
- irgrid5_get_fw_version This function reads the firmware version from the IR Grid 5 flash memory.
- irgrid5_get_measurement This function reads object temperature image and sensor internal temperatures from the IR Grid 5 device.

Application Init

Initializes the log interface and the IR Grid 5 Click driver. Reads and displays the device ID and firmware version.

Application Task

Reads the sensor internal temperature and the object temperature image from the pixel array and displays them on the USB UART terminal every 500ms.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter. For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

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Click boards™

ClickID

Downloads

IR Grid 5 click example package

MLX90642 datasheet

IR Grid 5 click schematic v101

IR Grid 5 click 2D and 3D files v101