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Haptic 5 Click

PID: MIKROE-6576

Haptic 5 Click is a compact add-on board designed to provide high-performance haptic feedback using Linear Resonant Actuators (LRA), making it ideal for creating precise and responsive tactile effects in embedded applications. It is based on the IQS390 haptic driver IC from Azoteq, which features both I2C and PWM control modes. The IQS390 supports real-time closed-loop auto-resonance tracking in I2C mode, automatic power management with ultra-low power operation, and selectable drive frequency. Haptic 5 Click is best suited for applications such as touchpad feedback, mouse wheel scrolling, membrane keypads, and haptic notifications in consumer or industrial devices.

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

How does it work?

Haptic 5 Click is based on the IQS390 haptic driver IC from Azoteq, designed to provide high-performance haptic feedback using Linear Resonant Actuators (LRA). This board supports two operating modes— I2C and PWM— selectable via the COMM SEL jumpers. To ensure proper operation, all jumpers must be aligned to the same mode side. In I2C mode, the IQS390 employs a real-time closed-loop auto-resonance algorithm that dynamically tracks and matches the resonant frequency of the connected LRA motor, ensuring efficient and consistent vibration output. Haptic 5 Click is ideal for applications that require precise and responsive tactile feedback, such as mouse wheel scrolling effects, trackpad interactions, doorbell notifications, and membrane keypads.
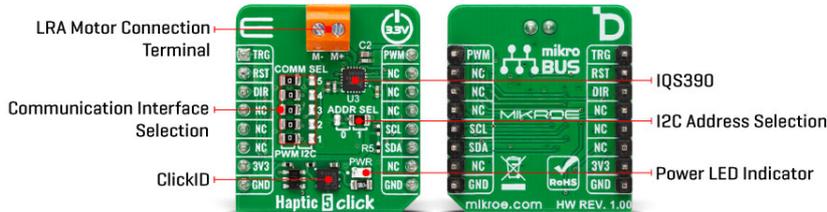
The I2C interface supports communication speeds of up to Fast Mode Plus (1 MHz), with a selectable I2C address configured via the ADDR SEL jumper, enabling flexible integration into various systems. Additionally, the IQS390 includes a dedicated RST pin for hardware reset, and haptic pulses can be triggered either through I2C commands or externally via the TRG pin. In PWM mode, the board accepts an external Pulse Width Modulated signal along with a motor drive direction input via the DIR pin. Both operating modes feature automatic power mode management, including an ultra-low power state to reduce energy consumption during inactivity.

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.

Specifications

Type	Haptic
Applications	Ideal for touchpad feedback, mouse wheel scrolling, membrane keypads, and haptic notifications in consumer or industrial devices
On-board modules	IQS390 - LRA haptic driver from Azoteq
Key Features	Support for Linear Resonant Actuator (LRA) control, dual operating modes (I2C and PWM), real-time closed-loop auto-resonance algorithm in I2C mode, configurable I2C address, external trigger input, hardware reset, PWM input with motor direction control, automatic power mode management with ultra-low power operation, and more
Interface	I2C,PWM
Feature	ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Haptic 5 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS			Pin	Notes
Haptic Pulse Trigger	**TRG**	1	AN	PWM	16	**PWM**	PWM Signal
Reset / ID SEL	**RST**	2	RST	INT	15	NC	
Direction Control / ID COMM	**DIR**	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
JP1-JP5	COMM SEL	Left	Communication Interface Selection PWM/I2C: Left position PWM, Right position I2C
JP6	ADDR SEL	Right	I2C Address Selection 0/1: Left position 0, Right position 1

Haptic 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
PWM Input Frequency	-	-	300	Hz

Software Support

Haptic 5 Click demo application is developed using the NECTO Studio, ensuring compatibility 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 control of the Haptic 5 Click board. In I2C mode, the example toggles the haptic trigger pin periodically to generate vibration pulses. In PWM mode, it gradually increases and decreases the output duty cycle to modulate the vibration intensity, while toggling the direction when the duty reaches 0%.

Key Functions

- haptic5_cfg_setup This function initializes Click configuration structure to initial values.

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- haptic5_init This function initializes all necessary pins and peripherals used for this Click board.
- haptic5_default_cfg This function executes a default configuration of Haptic 5 Click board.
- haptic5_set_duty_cycle This function sets the PWM duty cycle.
- haptic5_toggle_dir This function toggles the state of the DIR pin.

Application Init

Initializes the logger and the Click board driver, and applies the default configuration.

Application Task

Depending on the selected communication interface (I2C or PWM), toggles the haptic trigger (I2C), or changes PWM duty cycle and direction (PWM).

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

Click boards™

ClickID

Downloads

Haptic 5 click example package

Haptic 5 click 2D and 3D files v100

IQS390 datasheet

Haptic 5 click schematic v100