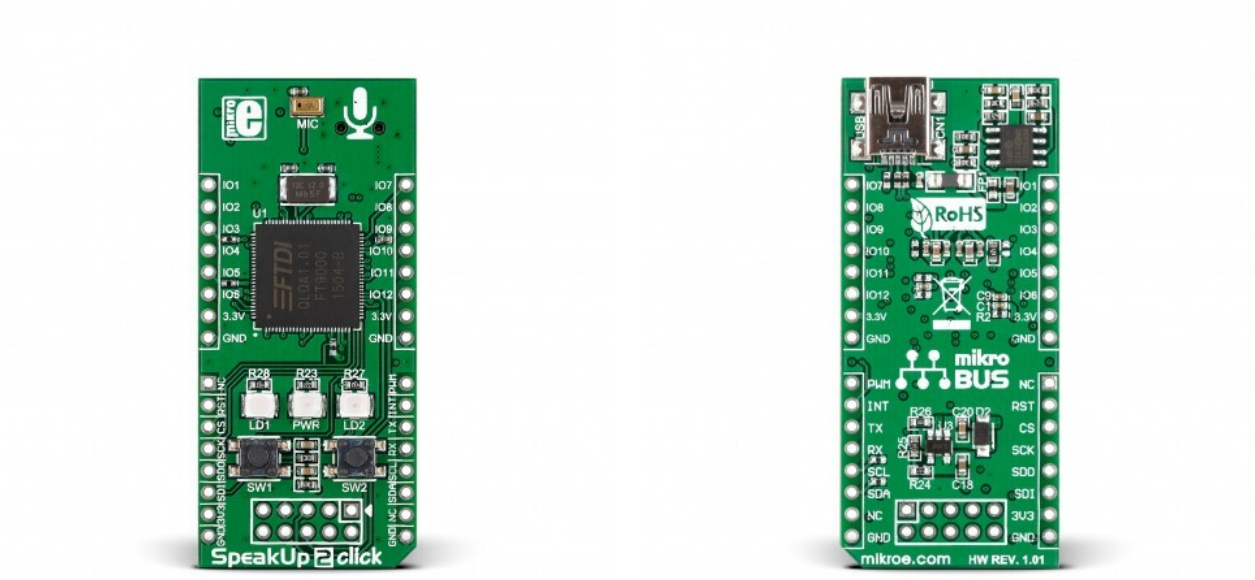
MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

SpeakUp 2 Click



PID: MIKROE-2375

SpeakUp 2 Click is a compact add-on board providing an offline speech recognition solution. This board features the FT900Q, a microcontroller from FTDI Chip. The SpeakUp 2 Click can be set to recognize up to 100 voice commands and have the FT900Q carry them out instantly. The FT900Q, which has stored voice commands, compares them with those received from the microphone, sends the data to the host MCU, or executes the command, thus enabling this board to act as a stand-alone solution. This Click board™ makes the perfect solution for the development of voice-controlled applications, home automation, or any human-machine interface.

How does it work?

SpeakUp 2 Click is based on the FT900Q, a microcontroller from FTDI Chip. The FT900Q is a complete SoC 32-bit RISC microcontroller that runs at a frequency of 100MHz and is accompanied by a 256KB Flash memory. The firmware inside of the FT900Q can be updated over an unpopulated 10-pin Prog connector. The SpeakUp 2 Click receives voice commands over the MM034202-11, an analog MEMS microphone from DB Unlimited. The microphone has omnidirectional directivity, a sensitivity of around -42dB, signal to noise ratio of 59dB, and works in a frequency range from 100 up to 10000Hz. The MCP6022, a rail-to-rail input/output 10MHz Op Amp from Microchip amplifies the microphone signal and passes the data to a 10-bit ADC of the FT900Q.

The FT900Q is responsible for processing received data and comparing stored voice data to received one. Moreover, the FT900Q in Standalone Mode can execute tasks according to the voice command through the HD1 and HD2 headers which contain GPIOs and 3.3V power rails. The GPIOs can have ON, OFF, Toggle, Pulse, and None states, with additional parameters for

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Pulse. In Click™ Mode, each recorded voice command is given an index number which can be sent to the host MCU over a USB or UART interface. Using onboard push buttons makes it possible to perform some basic configurations without using the software. Push button SW1 is used for recording voice commands that shouldn't last more than 1 second while pressing the SW2 pushbutton for more than 2 seconds erases all recorded voice commands. Both pressed push buttons will reset the Click board™. Two LEDs, amber and red, provide the board's visual status.

The SpeakUp Click establishes the connection with the host MCU via one of the selected mikroBUS™ interfaces (UART, SPI, or I2C). UART interface is set as default, while SPI/I2C can be an additional communication method if users want to create their own libraries. Also, the user is provided with other functions such as reset function, interrupt, and PWM from the mikroBUS™ socket.

We also provide a free SpeakUp application based on the Dynamic Time Warping (DTW) algorithm that lets you configure this Click board™ through the software. SpeakUp 2 Click board features a mini USB connector to connect the board to the PC and recognizes it as HID. After a successful connection, the SpeakUp 2 Click board™ will perform ambient noise detection and will calibrate itself, which is a process that will last about 10 seconds. The application for the PC allows you to add voice commands to the SpeakUp 2 Click with a predicted time limit per command. The recorded command will be automatically played so you can make sure it is ok and can be named to avoid future confusion. Application settings have the configuration for acceptance threshold, recording timeout, word length, and more.

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.

Specifications

Type	Speech recognition
Applications	Can be used for the development of voice-controlled applications, home automation, or any human-machine interface
On-board modules	FT900Q - microcontroller from FTDI Chip MM034202-11 - an analog MEMS microphone from DB Unlimited
Key Features	Recognize 100 different voice commands 1 second length, Standalone capabilities with user programmable GPIOs, onboard MCU, sound received through internal mic, comes with a dedicated software tool for easy configuration, selectable serial interface, ultra-fast operation, and more
Interface	I2C,SPI,UART,USB
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

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Pinout diagram

This table shows how the pinout on SpeakUp 2 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	**SYN**	PWM Signal
Reset	**RST**	2	RST	INT	15	**INT**	Interrupt
SPI Chip Select	**CS**	3	CS	RX	14	**TX**	UART TX
SPI Clock	**SCK**	4	SCK	TX	13	**RX**	UART RX
SPI Data OUT	**SDO**	5	MISO	SCL	12	**SCL**	I2C Clock
SPI Data IN	**SDI**	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	LD1	-	Record/Listen Ready Status LED Indicator
LD2	LD2	-	Operational Status LED Indicator
LD3	PWR	-	Power LED Indicator
SW1	SW1	Populated	Button for Recording the Voice Command
SW2	SW2	Populated	Button for Deleting Voice Command
HD1-HD2	-	Unpopulated	User-Programmable GPIOs Headers
CN2	PROG	Unpopulated	JTAG Programming Header

SpeakUp 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click Boards™

Downloads

SpeakUp 2 click Configuration software

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[SpeakUp 2 click 3D file]

[SpeakUp 2 click schematic]

[FT900Q datasheet]

[MCP6021 datasheet]