

AT COMMAND

Thingstream click

MANUAL

VERSION 1.42

September, 2019.

Introduction

These notes correspond to v1.42 of the firmware for the Thingstream click by MikroE.
For more information about hardware on which this document can be applied please visit [product page](#).

1. Connections

The Thingstream click can be connected on several ways:

- using the USB connector on the side of the board
- by using the RX/TX pins in the mikroBUS™ connector

The Thingstream click is currently using the following pins on the mikroBUS™:

Notes	Pin	 mikroBUS				Pin	Notes
Analog Enable GPIO	AN	1	AN	PWM	16	PWM	PWM Output
Reset	RST	2	RST	INT	15	INT	Hardware Interrupt
SPI Chip Enable	CS	3	CS	RX	14	TX	UART Transmit
SPI Clock	SCK	4	SCK	TX	13	RX	UART Receive
SPI Slave Data Out	SDO	5	MISO	SCL	12	SCL	I2C Clock
SPI Slave Data In	SDI	6	MOSI	SDA	11	SDA	I2C Data
Power Supply	3V3	7	3.3V	5V	10	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

RST Board Reset [hold low for > 1s]

TX Responses from TS Click [at baud rate 115200]

RX AT+IOTXXX commands to TS Click [at baud rate 115200]

Other pins are reserved for future use through firmware updates.

2. Activation

Before the Thingstream Click can communicate with the network it must be activated on your account using the Thingstream portal portal.thingstream.io

If you have a redemption code for your Click board then you can add it to your **account** using the "Add Thing" button in the top right.

If you need a redemption code for the Thingstream click or any firmware update – please contact Mikroe **Technical support**.

3. Thingstream AT Command Set

The Thingstream AT commands use the same syntax and work in the same way as standard AT commands.

Every command has:

- **"Test Command"** which returns a string describing the arguments,
- **"Write Command"** which executes the command,
- **"Read Command"** which returns information about the current state of the command.

The LED indicator will show a green fading pattern while the command executes, with green or red flashes to indicate success or failure.

3.1 IOTCREATE

Create and Initialize the Thingstream client and power ON the modem.

Write Command	Response
AT+IOTCREATE	+IOTCREATE: SUCCESS if command succeeded; +IOTCREATE: ERROR if not

3.2 IOTDESTROY

Destroy the Thingstream client and free up resources and turn off the modem.

Write Command	Response
AT+IOTDESTROY	+IOTDESTROY: SUCCESS if command succeeded; +IOTDESTROY: ERROR if not

Restriction: This command can only be issued after an AT+IOTCREATE command

3.3 IOTCONNECT

Connect and begin a session with the Thingstream connectivity platform.

Write Command	Response
AT+IOTCONNECT=<drop_messages[true false]>[, <keep_alive_mins>]	+IOTCONNECT: SUCCESS if command succeeded; +IOTCONNECT: ERROR if not

Example

```
AT+IOTCONNECT=true  
+IOTCONNECT: SUCCESS
```

Restriction: This command can only be issued after an AT+IOTCREATE command

NOTE: If "true" is passed the server will drop any stored messages and discard any previous subscriptions.

Read Command	Response
AT+IOTCONNECT?	+IOTCONNECT: {TRUE FALSE}

Restriction: This command can only be issued after an AT+IOTCREATE command

NOTE: This also asks the server to send any available messages for the device. See +IOTRECEIVE.

3.4 IOTDISCONNECT

Disconnect and end the Thingstream session.

Write Command	Response
AT+IOTDISCONNECT	+IOTDISCONNECT: SUCCESS if command succeeded; +IOTDISCONNECT: ERROR if not

Restriction: This command can only be issued after an AT+IOTCONNECT command

3.5 IOTPUBLISH

Publish a message to the specified topic.

Write Command	Response
AT+IOTPUBLISH=" <i><topic></i> ", <i><qos[-1 0 1 2]></i> , " <i><message></i> "[,retain[true false]]	+ IOTPUBLISH: SUCCESS if command succeeded; + IOTPUBLISH: ERROR if not

3.5.1 Write command

Example

```
AT+IOTPUBLISH="home/temperature",1,"23 degrees"  
+IOTPUBLISH: SUCCESS
```

Restrictions:

- To publish with a QoS of -1, the topic must have a predefined alias created in the Thingstream portal and that alias must have been registered on the Click with an AT+IOTREGPRE command, or the topic name must be 1 or 2 characters in length.
- This command can only be issued after an AT+IOTCREATE command
- If the QoS is not -1 then this command can only be issued after an AT+IOTCONNECT command

3.6 IOTSUBSCRIBE

Subscribe to the specified topic.

Write Command	Response
AT+IOTSUBSCRIBE=" <i><topic></i> ", <i><qos[-1 0 1 2]></i>	+IOTSUBSCRIBE: SUCCESS if command succeeded; +IOTSUBSCRIBE: ERROR if not

Example

```
AT+IOTSUBSCRIBE="home/temperature"  
+IOTSUBSCRIBE: SUCCESS
```

Restriction: This command can only be issued after an AT+IOTCONNECT command.

3.7 IOTUNSUBSCRIBE

Unsubscribe from the specified topic.

Write Command	Response
<code>AT+IOTUNSUBSCRIBE=<topic></code>	<code>+IOTSUBSCRIBE: SUCCESS</code> if command succeeded; <code>+IOTSUBSCRIBE: ERROR</code> if not

Restriction: This command can only be issued after an AT+IOTCONNECT command

3.8 IOTREGPRE

Register a topic on the Click with a pre-defined alias before subscribing to the topic.

The topic and alias number must have been created in <https://portal.thingstream.io/app/topics>

This command is needed for AT+IOTPUBLISH with QoS -1 since it requires a predefined topic.

Write Command	Response
<code>AT+IOTREGPRE=<topic>,<alias></code>	<code>+ IOTPUBLISH: SUCCESS</code> if command succeeded; <code>+ IOTPUBLISH: ERROR</code> if not

Example

```
AT+IOTREGPRE="home/temperature",100
+IOTREGPRE: SUCCESS
```

Restriction: This command must be issued after an AT+IOTCREATE but before a AT+IOTCONNECT command. After the +IOTREGPRE: SUCCESS has been received the topic name can be used in any AT+IOTPUBLISH, AT+IOTSUBSCRIBE, or AT+IOTUNSUBSCRIBE.

Example

```
AT+IOTCREATE
+IOTCREATE: SUCCESS
AT+IOTREGPRE="click/status",100
+IOTREGPRE: SUCCESS
AT+IOTPUBLISH="click/status",-1,"Good"
+IOTPUBLISH: SUCCESS
```

3.9 IOTSLEEP

Place the connection to the Thingstream server to sleep for the specified period. The server will store messages [at any QoS] while the connection is asleep.

Write Command	Response
AT+IOTSLEEP=<sleep_mins>	+ IOTSLEEP: SUCCESS if command succeeded; + IOTSLEEP: ERROR if not

Example

```
AT+IOTSLEEP=10  
+IOTSLEEP: SUCCESS
```

Restriction: This command must be issued after an AT+IOTCONNECT

3.10 IOTINFO

Return information about the Sim868 module and the embedded SIM ID number.

Write Command	Response
AT+IOTINFO	+IOTINFO: IMSI=<imsi> IMEI=<imei> Version=v1.xx

3.11 IOTCGNSPWR

Power on [or off] the GNSS unit on the Thingstream click board

Write Command	Response
AT+IOTCGNSPWR=<0 1>	+ IOTCGNSPWR: SUCCESS if command succeeded; + IOTCGNSPWR: ERROR if not

Example

```
AT+IOTCGNSPWR=1  
+IOTCGNSPWR: SUCCESS
```

Restriction: This command can only be issued after an AT+IOTCREATE command

3.12 IOTCGNSINF

The GNSS unit on the Thingstream click board can be asked for a location. The response has the same format as the Sim868 AT+CGNSINF command.

Write Command	Response
AT+IOTCGNSINF	+IOTCGNSINF: <location string>

Example

```
AT+IOTCGNSINF
+IOTCGNSINF: 1,1,20190729224430.000,50.7214446,-
1.8805652,18.379,1.63,120.5,1,,3.3,3.5,1.0,,7,4,,,35,,
```

NOTE: The second number in the response is "1" if there is a GNSS fix and is "0" if no GNSS fix is available.

Restriction: This command can only be issued after an AT+IOTCREATE command and is only useful after an AT+IOTCGNSPWR=1 command.

3.13 IOTDEBUG

There is additional debug information that is not normally shown that can be enabled to appear either on the MikroBus TX/RX pins [mask 1], the virtual com port USB [mask 2], or both [mask 3].

Write Command	Response
AT+IOTDEBUG=<mask>	+IOTDEBUG: SUCCESS if command succeeded; +IOTDEBUG: ERROR if not.

Example

```
AT+IOTDEBUG=1
+IOTDEBUG: SUCCESS
```

Restriction: There are no restrictions with this command.

3.14 IOTTEST

Perform a connectivity test. Equivalent to IOTCREATE (if that has not already been performed), followed by IOTCONNECT and IOTPUBLISH, then IOTDISCONNECT and IOTDESTROY if it created a temporary instance. The LED will flash yellow as each step completes, with the usual green or red flashes on completion.

Write Command	Response
AT+IOTTEST	+IOTTEST: SUCCESS if command succeeded; +IOTTEST: ERROR if not.

Restriction: There are no restrictions with this command.

4. Asynchronous Events

Whilst a Click is connected (or while executing a AT+IOTCONNECT? command) the Click may receive asynchronous messages from the server.

4.1 Received Message

A message sent by the server to the device will be reported as:

Write Command	Response
+IOTRECEIVE: "<topic>","<message>",<qos(0 1 2)>	The LED (LD2) will flash yellow 4 times.

Example `+IOTRECEIVE: "home/temperature","23 degrees",1`

4.2 Server Disconnect

The server disconnecting the client will be reported as:

Syntax: `+IOTSERVERDISCONNECT: OK`

4.3 Client Busy

The Thingstream click will only handle one command at a time.

If another command is given before the first command has completed, then the Click will respond with:

Syntax: `BUSY`

5. RGB LED indicators

The LED uses a fading pattern to show ongoing activity, with flashes to indicate change of state. For example:

- A blue fading pattern indicates that the system is idle
- A magenta fading pattern is shown while waiting for the modem to power up/down
- A green fading pattern is shown while Thingstream activity is taking place.
- Red flashes generally indicate an error
- Green flashes generally indicate success
- Yellow flashes show asynchronous activity (such as for an incoming message).

6. How to Create Thingstream Client

This example will create a Thingstream client, connect, subscribe and publish a message.

6.1 Create Thingstream Client

Before using the Thingstream client it must be created and initialised:

```
AT+IOTCREATE
```

which should produce a response:

```
+IOTCREATE: SUCCESS
```

6.2 Connect to Thingstream Platform

To perform most operations on the Thingstream platform, the client must connect and create a session with the server [in this example we request a clean session and the server will discard any stored messages and discard any previous subscriptions]:

```
AT+IOTCONNECT=true
```

which should produce a response:

```
+IOTCONNECT: SUCCESS
```

6.3 Subscribe to a Topic

Once connected, the client can subscribe to a topic in order to asynchronously receive messages posted to that topic by other clients:

```
AT+IOTSUBSCRIBE="home/temperature",1
```

which should produce a response:

```
+IOTSUBSCRIBE: SUCCESS
```

6.4 Publish to a Topic

Once connected, the client can publish messages to a topic, which will be received by clients that are subscribed to the topic:

```
AT+IOTPUBLISH="home/temperature",0,"23 degrees"
```

which should produce a response:

```
+IOTPUBLISH: SUCCESS
```

Followed by an asynchronous reply as the server reflects the message back to us [because we have subscribed to the same topic that we used for the AT+IOTPUBLISH]

```
+IOTRECEIVE: "home/temperature","23 degrees",0
```



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