# AT42QT1010

# AT42QT1010 - Evaluation Kit User's Guide

## Preface

**Important: Notice to customers:**
All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our website (www.microchip.com) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXXA”, where “XXXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE online help. Select the Help menu, and then Topics to open a list of available online help files.

### Introduction

The *AT42QT1010 Evaluation Kit* shows touch and proximity capabilities of the AT42QT series of touch turnkey products.

The kit has one self-capacitance touch button with the option to connect an external sensing electrode using SMD test pad (TP). An on-board LED indicates the touch status.

### Recommended Reading

For the latest information on the device, refer to https://www.microchip.com/wwwproducts/en/AT42QT1010.

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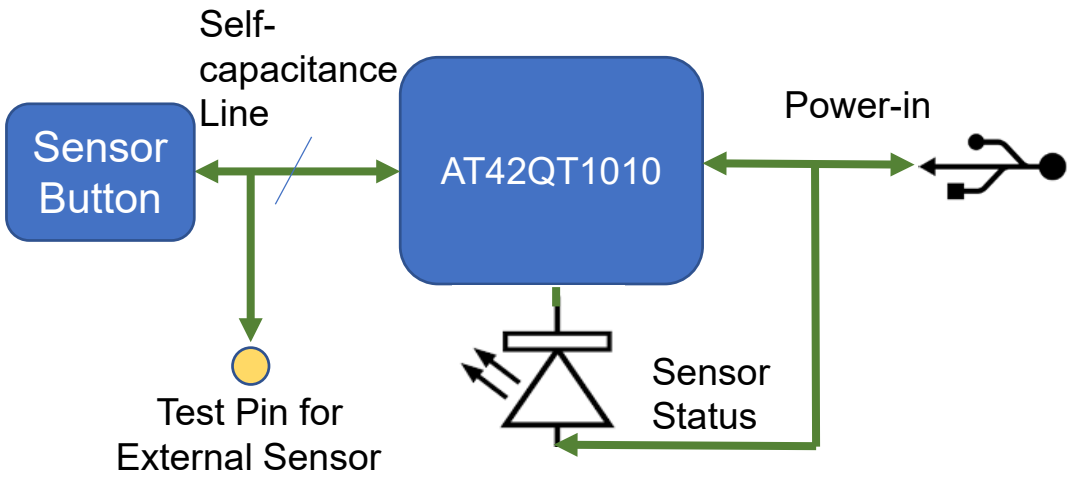
# 1. Introduction

## 1.1 Features and Overview

- One Touch Sensor – configurable as either a single key or a proximity sensor (configurable sensitivity)
- Option to Connect External Sensing Electrode
- Mode of Operations:
  - Sync
  - Normal
  - Low Power
- Technology: Spread-Spectrum Charge-Transfer (Direct mode)
- Status LED to indicate Touch
- On-Board Self-Capacitance Sensor
  - size: 9x16 mm
- USB Power Input

## 1.2 Functional Block Diagram

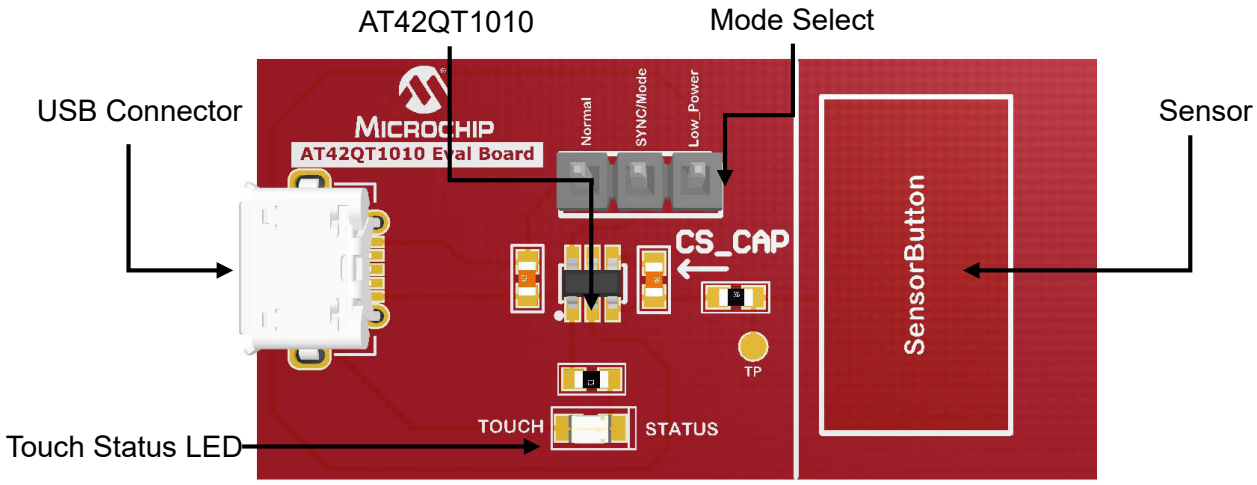
**Figure 1-1. Functional Block Diagram**



# 2. Getting Started

## 2.1 Quick Start

**Figure 2-1. Quick Start**




## 2.2 Touch Status LED

By default, the LED will illuminate during power-up and will turn off upon touching the self-capacitance key.

# 3. User Guide

## 3.1 Powering the Board

The kit is powered from the micro-USB connector. The kit can be powered by connecting the micro-USB cable to the USB connector on the board and to the computer.

On initial power-up, the QT1010 requires approximately 100 ms to power on, to allow power supplies to stabilize. During this time, the OUT-pin state is not valid and should be ignored.

## 3.2 Operation Modes

The kit operates in three different operation modes, which depend on the state of the SYNC pin (High or Low).

### 3.2.1 Fast Mode

The QT1010 runs in Fast mode if the SYNC pin is permanently high. In this mode, the QT1010 runs at maximum speed at the expense of increased current consumption. Fast mode is useful when speed of response is the prime design requirement. The delay between bursts (= touch scans) in Fast mode is approximately 1 ms.

### 3.2.2 Low-Power Mode

The QT1010 runs in Low-Power (LP) mode if the SYNC pin is held low. In this mode, it sleeps for approximately 80 ms at the end of each burst, saving power but slowing response. On detecting a possible key touch, it temporarily switches to Fast mode until either the key touch is confirmed or found to be spurious (via the detect integration process). It then returns to LP mode after the key touch is resolved.

### 3.2.3 Sync Mode

It is possible to synchronize the device to an external clock source by placing an appropriate waveform on the SYNC pin. SYNC mode can synchronize multiple QT1010 devices to each other to prevent cross-interference, or it can be used to enhance noise immunity from low-frequency sources such as 50 Hz or 60 Hz mains signals. The SYNC pin is sampled at the end of each burst.

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# 4. Documentation and Relevant Links

**Software/IDE**

- Microchip Touch Design Center:
  http://www.microchip.com/design-centers/capacitive-touch-sensing
- Microchip MPLAB + MCC:
  http://www.microchip.com/mplab/mplab-x-ide

  http://www.microchip.com/MCC
- Atmel Studio + Start:
  http://www.microchip.com/mplab/avr-support/atmel-studio-7

  http://www.microchip.com/START
- Data Visualizer:
  https://gallery.microchip.com/packages/AtmelDataVisualizerInstaller-Standalone/

**Turnkey Touch Devkits**

- Turnkey Evaluation Kits:
  - CAP1188 Evaluation Kit
    http://www.microchip.com/DevelopmentTools/ProductDetails/PartNo/dm160222
  - CAP1298 Evaluation Kit
    http://www.microchip.com/DevelopmentTools/ProductDetails/PartNo/dm16022
  - MTCH108 Evaluation Board
    http://www.microchip.com/DevelopmentTools/ProductDetails/PartNo/dm160229

**Design Documentation**:
Package containing CAD source, schematics, BOM, assembly drawings, 3D plots, layer plots, etc.

**Hardware User's Guide**:
PDF version of this user's guide.

**AT42AT1010 Kit on Microchip Page**:
Microchip website link.

# 5. Hardware Revision History and Known Issues

## 5.1 Identifying Product ID and Revision

Kits have stickers that have the identifier and revision printed in plain text as A09-nnnn/rr, where 'nnnn' is the identifier and 'rr' is the revision. Boards with limited space have a sticker with only a data matrix code, which contains a serial number string.

The serial number string has the following format:

| |
|---|
| "nnnnrrssssssssss" |
| n = product identifier |
| r = revision |
| s = serial number |

The product identifier for the AT42QT1010 Evaluation Kit is A09-3207.

## 5.2 Revision 4

Revision 4 of AT42QT1010 (A09-3207/04) is the initial released version. There are no known issues.

# 6. Document Revision History

| Document Revision | Date | Comment |
|---|---|---|
| A | 09/2018 | Initial release of document |

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- Technical Support

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