STM8S-TOUCH-LIB

STM8S touch sensing library

Data brief

Features

- Complete C source code library with firmware examples for STM8S and STM8A microcontrollers
- Resistor-capacitor (RC) acquisition principle supported
- Multifunction capability to combine capacitive sensing functions with traditional MCU features (communications, LED/beeper/ LCD control)
- Flexible touchkey/linear/rotary touch sensors configuration and combination with up to 24 touchkeys and 2 linear/rotary.
- Acquisition, filtering and calibration functions
- Enhanced processing features for optimized sensitivity and immunity
- MCU resources
  - Minimized number of external components
  - Reduced MCU memory space
- Up to 8-bit linear/rotary resolution
- Active shield feature
- Compliant with MISRA
- Compliant with Cosmic, IAR and Raisonance C compilers

Description

STMicroelectronics STM8S-TOUCH-LIB is a touch sensing library that provides a complete and robust free source-code solution to transform any 8-bit microcontroller into a capacitive touch sensing controller. This solution allows designers familiar with the use of standard microcontrollers to create higher-end human interfaces by replacing conventional electromechanical switches by touch sensing keys.

The STM8 touch sensing library is part of the application firmware. It allows combining various capacitive sensing touchkey/linear/rotary touch sensors with traditional MCU features (communications, control of LEDs, beeper or LCD) in the same application.

1 Resistor-capacitor (RC) acquisition principle

The RC acquisition principle consists in measuring the charge and discharge time duration of a RC cell made of the electrode capacitance (C_X) and a load resistor (R_L). For further information on this capacitive sensing acquisition principle, please refer to the application note AN2927.

The RC acquisition is supported by all STM8S and STM8A microcontrollers and requires a direct connection of the device to earth to operate properly.
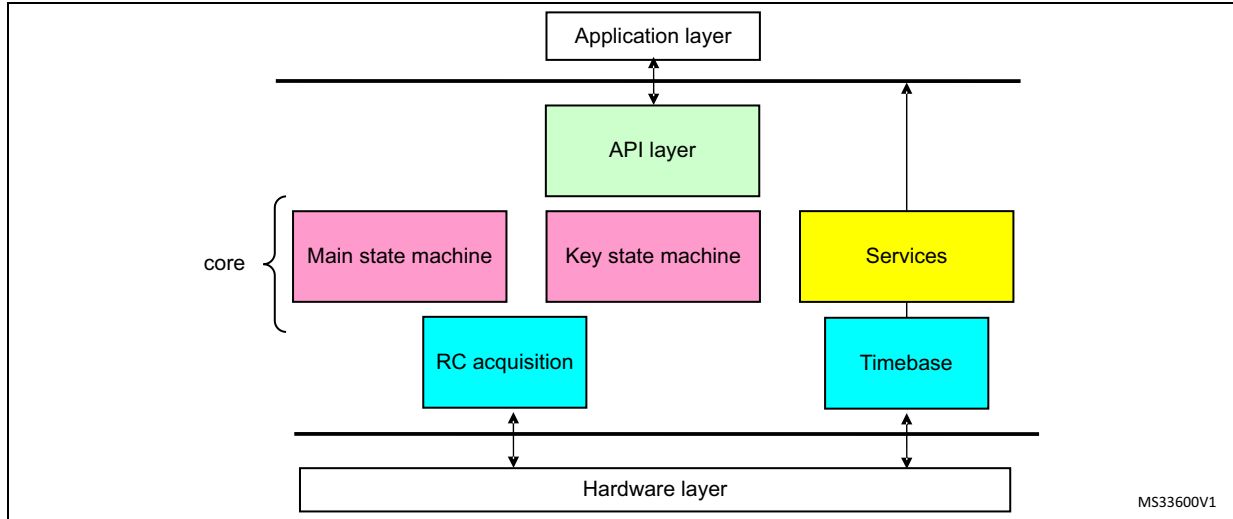
The main features are the following:

- Up to 24 touchkeys distributed over 3 GPIO ports
- Up to 2 linear or rotary with 2 different hardware implementations (5 or 8 capacitive sensing channels)
- Capacitive sensing channels are acquired sequentially

2   Library architecture

Figure 1 shows the STM8S-TOUCH-LIB firmware layers.

Figure 1. STM8S-TOUCH-LIB architecture

3 MCU resources

Table 1 shows the STM8 peripherals that are used by the STM8S-TOUCH-LIB. Care must be taken when using them to avoid any misbehavior.

Table 1. List of STM8 peripherals used by the STM8S-TOUCH-LIB

Peripheral	Function
GPIOs	I/O control
16-bit timer with 8-bit prescaler (TIM2 or TIM3)	V_{IH}/V_{IL} measurement
8-bit timer (TIM4)	Generic timebase for the state machine

4 Memory resources

The STM8S-TOUCH-LIB size depends on the following parameters:

- C compiler and options: memory model, size or speed optimization
- Number of capacitive sensing channels used and type (touchkey or/and wheel or slider).

4.1 RC acquisition memory resources

Prerequisites

- COSMIC STM8 C Compiler release 4.3.9 dated 06 December 2012
- Compiler options: +modsl0 +compact +split
- Sections counted for RAM: TSL_IO_RAM0, TSL_RAM0, TSLMCK_RAM0, CONFIG_RAM0, TSL_IO_RAM, TSL_RAM, TSLMCK_RAM, CONFIG_RAM
- Sections counted for ROM: TSL_IO_CONST, TSL_CONST, TSLMCK_CONST, CONFIG_CONST, TSL_IO_CODE, TSL_CODE, TSLMCK_CODE, CONFIG_CODE

RAM and ROM requirements

Table 2 gives the RAM and ROM memory space required to use the STM8S-TOUCH-LIB.

Table 2. Typical RAM and ROM memory space required for RC acquisition[1]

Configuration	RAM (bytes)	ROM (bytes)
1 SCKey (1/0/0)	~60	~2500
8 SCKeys (8/0/0)	~170	~2540
16 SCKeys (8/8/0)	~290	~2650
5 SCKeys (4/1/0)	~120	~2640
1 SCKey (1/0/0)+ 1 MCKey	~120	~4600
2 SCKeys (1/1/0)+ 2 MCKeys	~180	~5020

1. SCKey stands for single channel key and is used for a touchkey. MCKey stands for multi-channels key and is used by linear or rotary

5 Revision history

Table 3. Document revision history

Date	Revision	Changes
12-Nov-2013	1	Initial release.

Please Read Carefully: