R_10077

Driving LPC5410x with EPSON Crystals

Rev. 1.0 — 06 October 2015   **Report**

Revision history

Rev	Date	Description
1.0	20151006	Initial version

Contact information

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1. Introduction

The LPC5410x series microcontrollers are ARM Cortex-M4F-based MCUs designed to handle the space and power constraints of sensing applications, from simple, ultra-low-power sensor listening, to data aggregation, sensor fusion or other sensor data processing, and external communication.

This microcontroller family supports four different clock sources: internal IRC oscillator, watchdog oscillator, external CLKIN and 32.768 kHz RTC oscillator. The nominal IRC frequency is 12 MHz. Upon power-up or any chip reset, the LPC5410x starts up with IRC as the clock source. Software may later switch to one of the other available clock sources.

We have evaluated/characterized EPSON make 32.768 kHz (RTC) crystals with LPC5410x oscillator and the results/recommendations are given below.

2. Characterization results

2.1 Oscillator circuit

Fig 1. Oscillator circuit
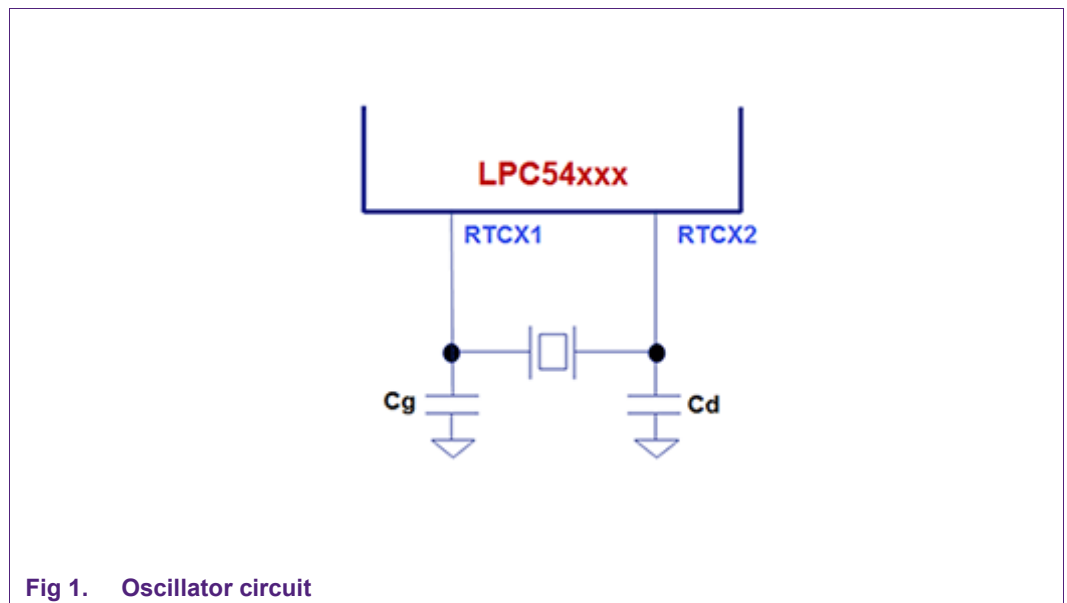
2.2 Recommended crystals and external components

Based on the characterization results, following crystals and external components are recommended for LPC5410x series microcontrollers. Note that equivalent crystals from other manufacturers can also be used instead.

Table 1.   Recommended crystals and external components

Product Name	Frequency [kHz]	Product Code	CL [pF]	External Components Cd [pF]	Cg [pF]	Drive Level [uW]	|-R| [kΩ]
		X1A0001410003xx	12.5	22	18	0.008	430
FC-135R	32.768	X1A0001410002xx	9.0	15	12	0.005	820
		X1A0001410001xx	7.0	10	10	0.003	1000
		X1A0001410006	6.0	8	8	0.003	1000

Table 2.   Recommended crystals and external components
Table description (optional)

Product Name	Frequency [kHz]	CL [pF]	External Components Cd [pF]	Cg [pF]	Drive Level [uW]	|-R| [kΩ]
		12.5	18	18	0.007	510
FC1610AN	32.768	9.0	12	12	0.005	1000

Notes:

1. Above recommendations are based on the actual evaluation results and solely intended to help users in picking the right components.

2. Note that these results are based on a particular hardware board (design) and a particular LPC MCU sample. So, it does not cater to part to part variation, be it MCU or the external components.

3. As the actual board layout (design) and choice of external components greatly influences the best suitable crystal load capacitance, we do not assume any responsibility and grant warranty for above recommendations.

4. It is always recommended that the end users evaluate their own designs to ensure the best performance desired.

For more information on these crystals and guidelines, please visit the EPSON website.
http://www5.epsondevice.com/en/ic_partners/nxp/lpc1x.html

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