UM10815

参考資料

NXP Smartphone Quick-Jack Solution quick start guide

Rev. 1 — 19 May 2014 User manual

Document information

Info	Content
Keywords	LPC8xx, LPC800, LPC812, Smartphone Quick-Jack Solution, HiJack, MCU, Mobile phone, Headset, Audio, smartphone
Abstract	This quick start guide explains how to get up and running with the Smartphone Quick-Jack Solution.

Revision history

Rev	Date	Description
1	20140519	Initial version.

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1. Introduction

Inspired by the University of Michigan's Project HiJack, the NXP Smartphone Quick-Jack Solution repurposes the standard 3.5 mm stereo audio jack found on most smartphones into a self-powered data channel that makes communication with these smartphones as easy as plugging a headset jack into the audio port.

The Quick-Jack demo board integrates a joystick, temperature sensor, LEDs and an expansion header. The app running on the smartphone is able to interface with these on-board peripherals via the Quick-Jack interface.

Quick-Jack's main features:

- Demo board uses the low-power LPC812 microcontroller in TSSOP20 package
- Board is powered by either the smartphone or a small button battery
- SE98 I^2C temperature sensor integrated on the demo board
- Control the four on-board LEDs from the smartphone
- Read input from on-board joystick
- Quick-Jack app available for iOS and Android smartphones
- Expansion header featuring most of the LPC800 GPIO pins
- Board features standard ARM SWD debug interface (10 pins, 1.27 mm)

The Quick-Jack board can be ordered through a variety of distributors using order number OM13069.

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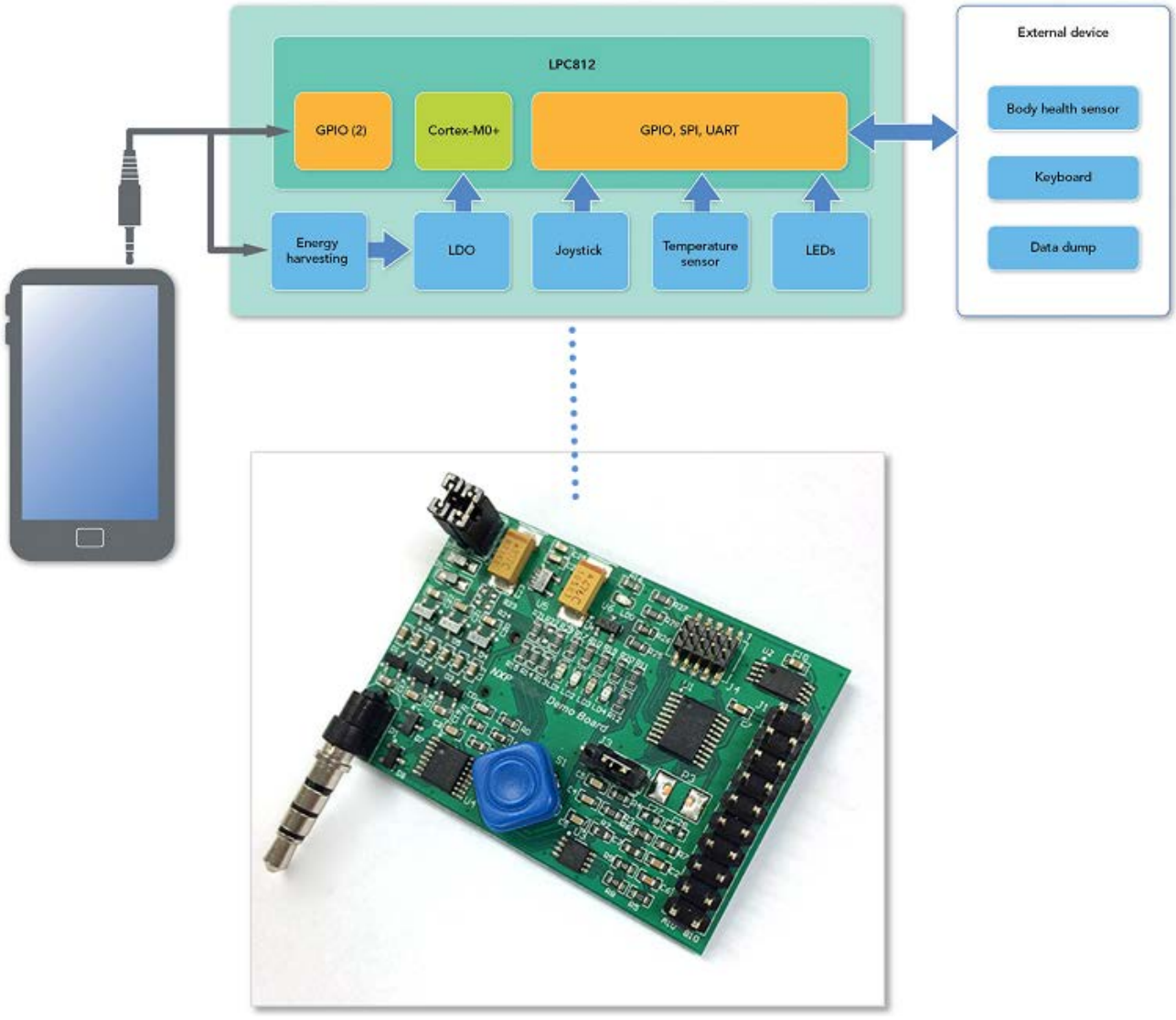


Fig 1. NXP Smartphone Quick-Jack Solution

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2. NXP Quick-Jack Quick Start Guide

This Quick Start Guide explains how to get up and running with the Quick-Jack solution.

2.1 Hardware requirements

The Quick-Jack solution requires the NXP Quick-Jack board (OM13069) and a compatible smartphone.

Quick-Jack has been tested and verified to work on the following smartphones:

- iOS: iPhone 4, iPhone 4S, iPhone 5, iPhone 5S
- Android: Samsung Galaxy S3.

Other phones are not currently guaranteed to work.

2.2 Software requirements

The Quick-Jack board ships pre-programmed. The latest version of the firmware, including the source code, can be found on http://www.lpcware.com/quick-jack.

The smartphone example app can be downloaded from the *App Store* (iOS). The Android App (APK) and source code can be downloaded from http://www.lpcware.com/quick-jack.

2.3 Getting up and running

To get up and running with Quick-Jack, follow these steps:

1. Download and install the app. The app can be downloaded from the *App Store* (iOS). The app can be found in the app-store by searching for 'NXP Quick-Jack'.
2. Make sure the coin cell battery (size CR1220) is inserted and that the jumpers on the Quick-Jack board are set to default (Fig 2).

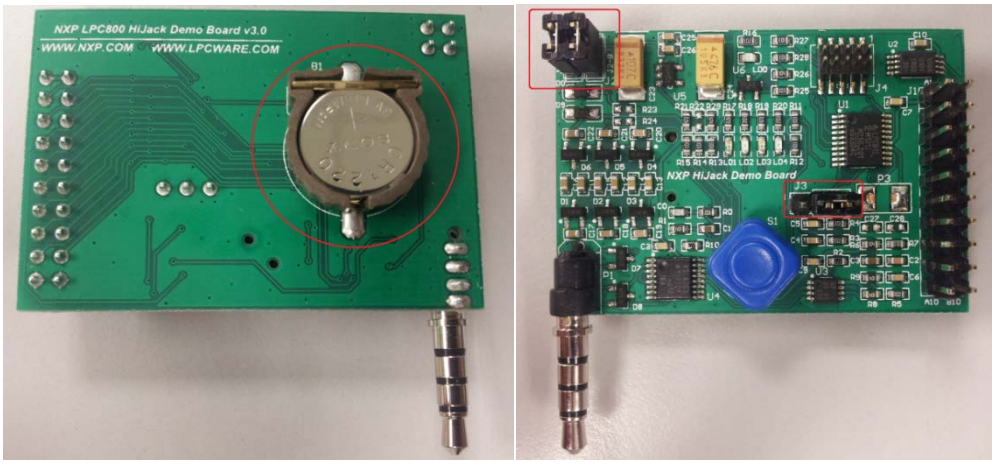


Fig 2. Coin cell battery inserted, jumpers set to default configuration (JP2 on both positions, JP3 placed on the right position)

3. Insert the Quick-Jack board in the phone's audio jack. Then, configure the media-volume/headset-volume on the phone to maximum volume (Fig 3).

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Fig 3. Phone's media-volume/headset-volume set to maximum (illustration shown for Samsung S3)

4. Start the app. As soon as the app is running, LED LD0 should be lit and LED LD4 should be blinking (Fig 4).



Fig 4. After starting the Quick-Jack app, LD0 will be lit and LD4 will be blinking

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After establishing initial connection (LD4 blinking), the Quick-Jack board can be controlled from the app:

- By adjusting the slider, the blink rate of LD4 can be changed (faster/slower).
- By clicking the *LED1/LED2/LED3* buttons, on-board LEDs LD1 to LD3 can be toggled on and off (Fig 5).
- The state of the on-board joystick is reflected on the circle in the app.

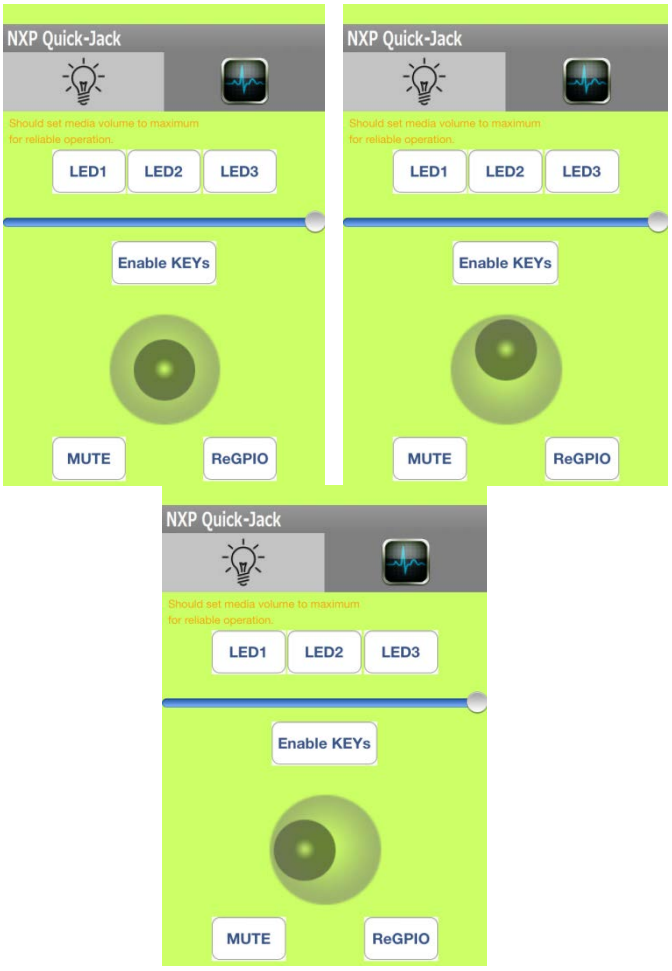


Fig 5. State of the on-board joystick is reflected in the app

- If the *Enable KEYs* button is pressed, the joystick image will no longer be displayed (Fig 6). It can be re-enabled by pressing *Disable KEYs*.

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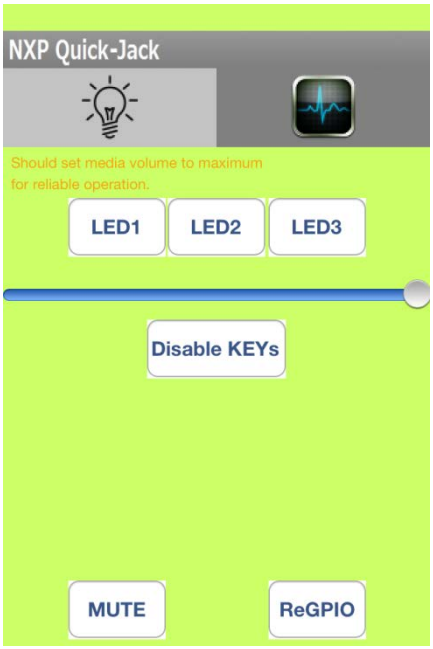


Fig 6. If *Disable KEYs* is displayed the joystick position is no longer visible

- Clicking on the sensor tab (top right in the app) shows the temperature sensor interface. After clicking the Begin button, the current temperature as measured by the on-board SE98 sensor will be displayed and a temperature vs. time graph will be plotted (Fig 7). Note that when the sensor tab is opened, LD4 stops blinking; when returning to the LEDs tab LD4 resumes blinking.

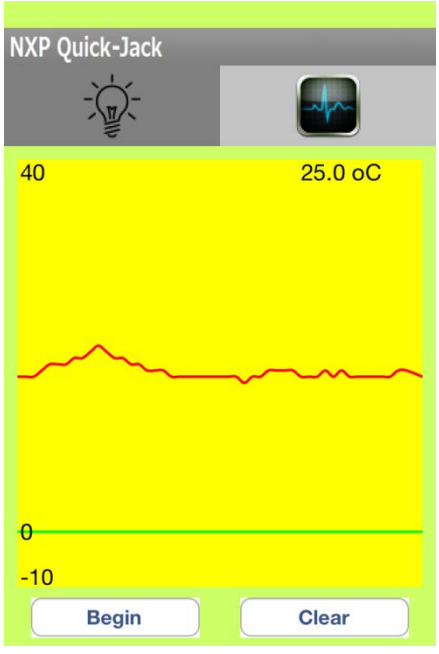


Fig 7. Environment temperature measured by the SE98 temperature sensor

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- Press the phone's Return button (Android) or the phone's Home button (iOS) to exit the app.

2.4 Jumper settings

Two jumper headers are available on the Quick-Jack board, jumpers JP2 and JP3 (Fig 8):

- **JP2** (Power) - **Power supply select**. Four-pin header JP2 allows placing two jumpers. The left (outer) jumper connects the energy-harvester to the input of the LDO, the right (inner) jumper connects the coin cell battery to the input of the LDO. Diodes prevent current flowing from one source into the other, allowing Quick-Jack to be powered by both the battery and the energy-harvester at the same time. This operation is advised when using Quick-Jack and is the default setting.
- **JP3** (Communication) – **Left-channel audio signal path select**. This jumper can be positioned in either the left- or right position. When placed on the right two pins, the phone's left-channel audio signal – the signal with the Manchester encoded data – is routed through the on-board comparator (default mode).
- When placed on the left two pins, the on-board comparator is bypassed and the analog signal is fed straight into the LPC812. In this case, the LPC812's internal comparator must be enabled and configured in order to convert the phone's analog data to digital data. Note that this mode is not supported in the default firmware.

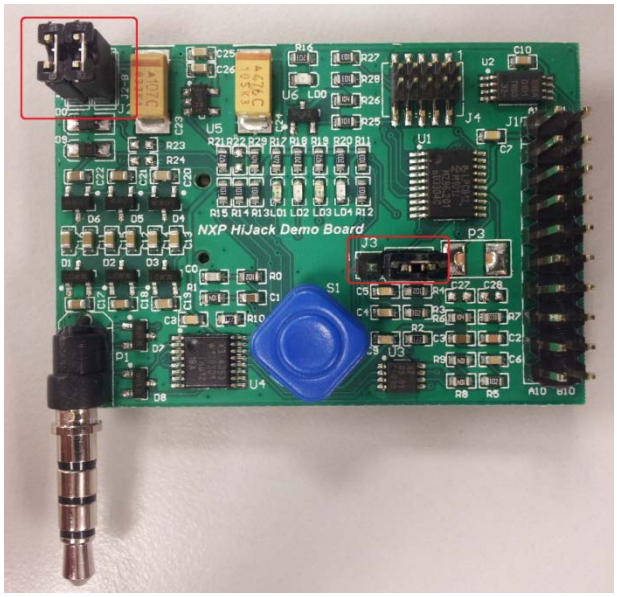


Fig 8. Jumper JP2 and JP3 and their default position

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