MAX32600 Low Power Modes Using GPIO

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1 Abstract

This document describes the “GPIOPowerDemo” sample application provided for the MAX32600. The code provided demonstrates how to sleep from LP3 and wake up from both LP1 and LP0 by using GPIO with the provided firmware APIs.

2 Requirements

- MAX32600B EvKit
- Sample code for this application located in `Firmware/Applications/GPIOPowerDemo`
- Olimex JTAG ARM-USB-TINY-H
- GNU ARM toolchain with newlib libc
- External power source; Bench style 3.0v or AAA batteries
- Optional: Multimeter capable of reading μ Amps

3 Setup

- Load the compiled max32600.elf file onto the MAX32600 EvKit. Remove the JTAG connector and power cycle the device. Do not power with USB. The green LED should be on.
- Remove the jumper on J10 (VDD-BRK); connect meter probes across J10 for measuring the core current.
- If using an external 3.0v supply on pins J1+ and J2-, connect a jumper on J4 (EXT V IN).
- If using batteries, connect a jumper on J5; pins 2-3
- Set jumper J75-1 to J76-2 to power the peripherals directly with supply power, therefore power measurements do not include peripherals (LEDs and others).
- The RTC domain will shift power to/from the super-cap on the EvKit. To eliminate the super-cap from power measurements, remove jumper J16 (VRTC-BRK).

4 Observation

- Push “SW1 Test” button and the device will go to LP1 sleep mode, no LEDs on will indicate sleep mode. The current consumption should be around 1.4 μA.
- In sleep mode, press “SW1 TEST” button, the device will resume. The yellow LED should be on.
- With the yellow LED on, press “SW1 TEST” button, the device will sleep into LP0, no LEDs. The current consumption should be around 0.9 μA.
- In LP0 sleep mode, press “SW1 TEST” button, the device will wake from LP0 with a reboot and turn on the green LED.

5 Source Code Overview

5.1 Drivers In Use

- Instruction cache
- Clock Manager
- Power Manager
- GPIO

5.2 Interrupts Enabled

- GPIO
- Wake Up Detect

5.3 Code Operation

- Enable instruction cache
- Setup clocks
- Setup power for peripherals during sleep mode and/or run mode
- Turn on trickle charger (needed to stabilize and charge the super-cap on EvKit)
- Enable GPIO wake-up detect only
- Disable real-time clock
- Initialize power to a known state
- Setup the “SW1 TEST” push-button to trigger an interrupt when the button is released
- Setup the LEDs
- Wait for interrupt from SW1 TEST GPIO