

## Power Consumption Demo on EK-STM32F EVAL Board

This demo provide an application helping to measure the power consumption on the EK-STM32F EVAL Board

The application is made of 2 part :

- The first part allows the user to select a power configuration in the hyperterminal
- A second part will enter the power configuration previously selected

You will have to load the demo into the flash using the embedded JTAG emulator and then use the board in standalone mode

- Check the power supply setting (just below the UART0). It must be USB
- Check that you disconnect the JTAG jumpers (the yellow ones on the left)
- Check that is BOOT0 = BOOT1 = 0 (the yellow jumpers on the right)
- You can remove all the other jumpers except :
  - the UART0 Rx and Tx jumpers (the blue jumpers on the left)
  - the jumper JP16 and JP17 used for the LEDs and the Keys

The first time starts the application the LED2 will blink, this means that no power mode was selected. You need to enter into the configuration mode :

- - Press simultaneously Key2 and Reset button, then release the reset button
- - The LED2 is ON indicating that you are in the configuration mode
- - Connect one RS232 cable to the UART0 and open the hyperterminal on your Windows system
- - Config the hyperterminal as 9600bauds / 8bits / no parity bit / no hardware flow control / 1 stop bit
- - Press any key on hyperterminal , and the menu will be displayed

To mesure the power consumption, you need to measure VDD, Vref+ and VDDA (the red jumpers on the board)

## The configuration menu shown on Hyperterminal

Main Menu :

- 0 -- Select Configuration
  - 0 -- Run Mode
    - 0 -- Run HSE PLL 72Mhz
      - The application run at 72Mhz on the external clock ( AHB = 72Mhz / APB2 = 36Mhz / APB1 = 18Mhz).
      - The LED3 is blinking
    - 1 -- Run HSI 8Mhz
      - The application run at 8Mhz on the internal clock ( AHB = 8Mhz / APB2 = 4Mhz / APB1 = 2Mhz).
      - The LED3 is blinking
  - 1 -- Sleep Mode
    - 0 -- Sleep with Peripherals
      - The clock is the internal 8Mhz clock, all the peripheral clocks are on, the MCU enters sleep mode
    - 1 -- Sleep Without Peripherals
      - The clock is the internal 8Mhz clock, all the peripheral clocks are off, the MCU enters sleep mode
  - 2 -- Stop Mode
    - 0 -- Stop Power Regulator in normal mode
      - The MCU enters stop mode, the voltage regulator is in normal mode
    - 1 -- Stop Power Regulator in low power mode
      - The MCU enters stop mode, the voltage regulator is in low power mode
  - 3 -- Standby Mode
    - 0 -- Standby Mode with RTC
      - The MCU enters standby mode with the RTC running
    - 1 -- Standby Mode without RTC
      - The MCU enters standby mode with the RTC running
- 1 -- Read Configuration
  - The MCU will display in the Hyper terminal the mode that is currently selected.

## How does the application work

When reset the application check if the key2 button is pressed or not. If pressed the application will enter configuration mode

### The configuration mode

- In configuration mode the UART is enabled and used to display the menu
- The LED2 is ON to indicate that the configuration mode is selected
- When a configuration is selected, one byte is written in the backup registers (the value depends on the configuration) then the application will generate a software reset. This reset will put the board in Power Measure mode (unless you are still pressing Key2)

### The Power Measure mode

- the application will read back the value stored in the Backup Register (if the value is 0, the LED2 is blinking to indicate an error)
- then the configuration of the STM32 is set back to default (the LEDs, Keys are deconfigured)
- finally the application enters the configuration choosen.

### The files

main.c / main.h	the main part of the application what switches between the configuration and measurement modes
common.c / common.h	the files that contain the functions to display the strings or get the inputs from the UART
menu.c / menu.h	the part that manage the menu
power.c / power.h	the functions entering the different mode
STM32 Software library	

### For More details

There is an Application Note (AN 2629) on the STs website (<http://www.st.com/stm32>).

It provides more details and more examples on how to configure and optimize the low power modes