Getting started with the Sparkfun ESP32 Thing

Let's make sure all the basic functionality is working on our ESP32 before we start communicating across the Internet or to different devices.

I've experienced occasional pins behaving unreliably. If at first you encounter issues, try a different pin! However if a large number of pins don't seem to be functioning properly, the USB cable is broken, you cannot get the wifi sketches to work, or any other serious issues, please let me know asap so we can get you a different board. Your certification below states that none of these are the case for the kit you were provided. Please upload a digital confirmation (or a scan of this completed and signed form) in Canvas.

Connecting to wifi

1. Test the **ESP32-WiFiScan** sample code. You should see a list of available wifi networks (2.4GHz band only).
2. Test the **ESP32-WifiConnect** code, updating the ssid and password to match an available network.

Working with inputs and outputs

First, review and test the **ESP32_GettingStarted** code. Looks like the Arduino we're used to, right?

You can try connecting one or more digital inputs/outputs and adapting the code. Consider also exploring the device's capacitive sensing abilities, the Touch examples, or any other example code provided in **File > Examples > ESP32**!

The biggest difference from "classic" Arduino is that AnalogWrite is not currently supported for the ESP32 Thing. Instead, we can use SigmaDeltaWrite. There is also a very specific case designed for PWM output for LEDs, called LEDC. Check out the **ESP32-RGB-LEDC** and **ESP32-RGB-SigmaDelta** example code for details.

Charging the LiPo battery

Remember to follow the LiPo safety precautions at all times and only use the ESP32 Thing board to charge your battery!

The ESP32 Thing contains a smart circuit. If we connect our device via USB to the computer with the battery plugged in via the JST connectors, then it will automatically charge our LiPo battery.

Certification

I hereby declare that I, _____, am in possession of the Inworks ESP32 kit number _____. The kit is complete and all parts are in good working order. I recognize that my grade for any Inworks class will not be released until I return this equipment or its equivalent restitution by Saturday, 11 May 2019 with all parts intact and in the same condition as attested here.
Signed:

ESP32 Thing Pinout diagram

SparkFun ESP32 Thing (DEV-13907)

Antenna

Reset button

Button: GPIO 0

Legend:

Name	ADC
Power	DAC
GND	SPI
Control	UART
Arduino	Touch
GPIO Port	Misc

*GPIO: Port Input Only
*ADC: Preamplifier ADC
GPIO 3.3V tolerant only

Left side pins:

Touch	ADC	GPIO	Control	Pin
	ADC1_0*	GPIO36*	SenseVP	36
	ADC1_1*	GPIO37*	CapVP	37
	ADC1_2*	GPIO38*	CapVN	38
	ADC1_3*	GPIO39*	SensVN	39
Touch9	ADC1_4	GPIO32	XTAL32	32
Touch8	ADC1_5	GPIO33	XTAL32	33
	VDET1	ADC1_6	GPIO34*	34
	VDET2	ADC1_7	GPIO35*	35
	DAC1	ADC2_8	GPIO25	25
	DAC2	ADC2_9	GPIO26	26
	Touch7	ADC2_7	GPIO27	27
Touch6	HSPI_CLK	ADC2_6	GPIO14	14
Touch5	HSPI_Q	ADC2_5	GPIO12	12
Touch4	HSP_ID	ADC2_4	GPIO13	13
	Reset			/RST
	3.3V			3V3
	GND			GND
	VBAT			VBAT
	VUSB			VUSB
	GND			GND

Jumpers

Right side pins:

Pin	Arduino	GPIO	SPI	UART	Misc
GND					
21	SDA	GPIO21	V_SPI_HD		
TX	CLK3	GPIO1		U0_TXD	
RX	CLK2	GPIO3		U0_RXD	
22	SCL	GPIO22	V_SPI_WP	U0_RTS	
19	MISO	GPIO19	V_SPI_Q	U0_CTS	
23	MOSI	GPIO23	V_SPI_D		
18	SCK	GPIO18	V_SPI_CLK		
5		GPIO5	V_SPI_CS0	LED	
15		GPIO15	ADC2_3	HSPI_CS0	Touch3
2	CS	GPIO21	ADC2_2	HSPI_WP	Touch2
0	CLK1	GPIO0	ADC2_1	Touch1	Button
4		GPIO4	ADC2_0	HSPI_HD	Touch0
17		GPIO17	U2_TXD		
16		GPIO16	U2_RXD		
3V3	3.3V				
GND	GND				
VBAT	VBAT				
VUSB	VUSB				
GND	GND				

microB Connector
JST Connector for single celled LiPO
Power LED

Power
ESP32 VCC range: 2.2V-3.6V
VBAT: direct to battery (and charger)
VUSB: direct to USB (5V)
VCC: Output of regulator 3.3V/600mA
Up to 250mA during RF transmissions

Wireless
Wifi: 802.11 b/g/n/e/i
WPA/WPA2/WPA2-Enterprise/SPS
Bluetooth:Bluetooth 4.2/BLE

ESP32
Dual-core Xtensa 32-bit LX6
Up to 240MHz
520kB internal SRAM
4MB external flash
Multiplexed I/Os allow up to
  18 ADC channels
  3 SPI interfaces
  3 UART interfaces
  2 I2C interfaces
  2 I2S interfaces
  16 LED PWM outputs
  2 DACs
  10 Capacitive Touch Inputs

ADC Preamp
When using preamp 270pF cap
connector from VP to CAPP

Other
Hall Sensor
Temp sensor (-40C to 125C)
SD/SDIO/MMC Host controller