STM WiFI + STM32F0 = Web Server

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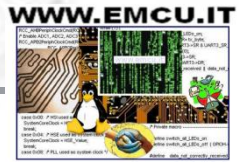
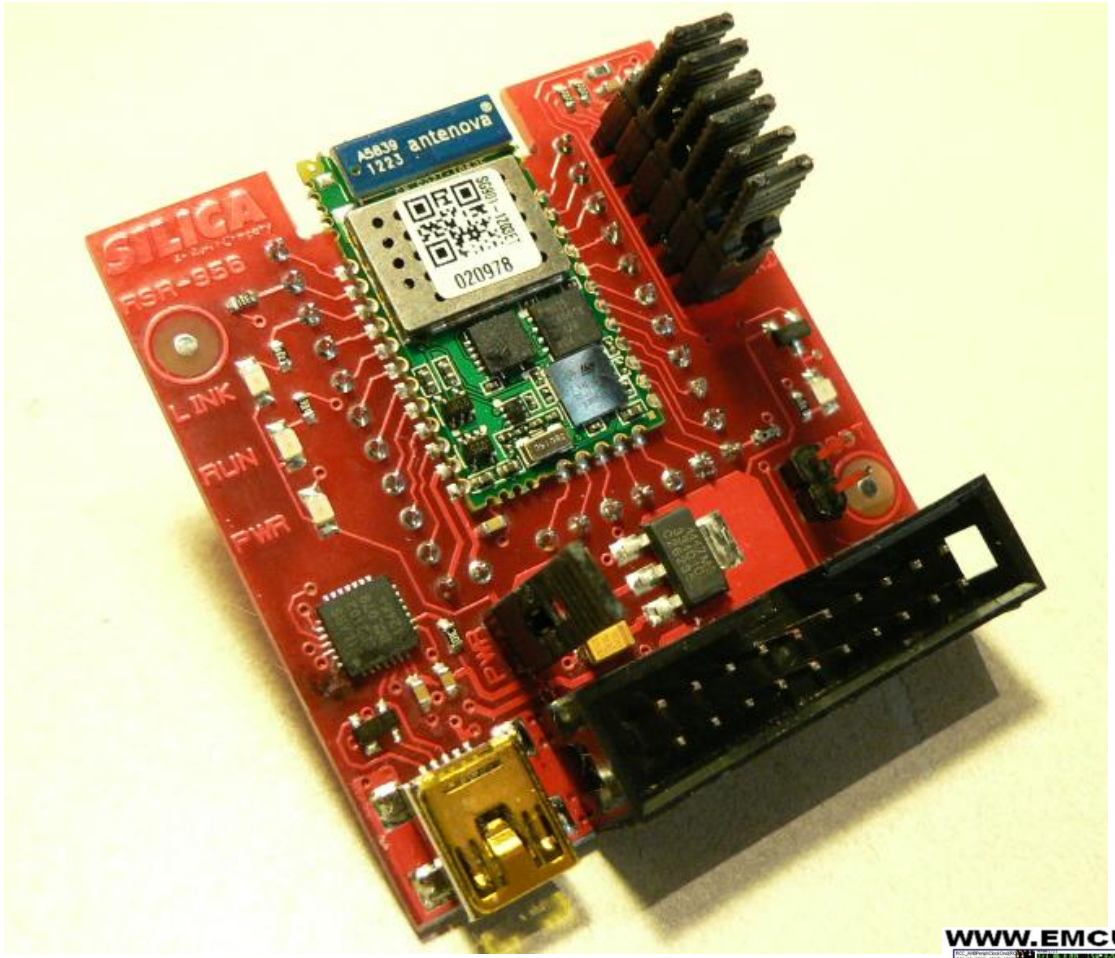
Ver.2.0



STM WiFi + STM32F0-Discovery = Web Server

STM WiFi

SILICA STM WiFi EvaBoard



STM WiFI (SPWF01Sx) Key Messages

- **Serial To WiFi** 802.11b/g/n OEM Module
- **Plug&Play** Solution
- **Very Small** Form Size Factor
- **FCC/IC/CE** certified
- **Multiple Antenna Options**
- **Low Power Use Modes** Available
- Industrial **Temperature Range**
- **Infrastructure Mode**
- **AhHoc/WiFi Direct Mode**
- **"Full TCP/IP Stack" SW Library with**
  - Built-in **Wi-Fi security**
  - Built-in **TCP/IP stack**
  - Built-in **DHCP, DNS**
  - Built-in **HTTP server/client**
- **Rich AT-like commands** for host usage
- **SDK for custom Application development (Q4/13)**

STM WiFI (SPWF01Sx) Features

- **Radio:** 2.4 GHz IEEE 802.11b/g/n
- **Micro:** STM32 ARM Cortex-M3
- **Memory.:** 64KB RAM, 1.5 MB Flash
- **Size (mm):** 26.92 x 15.24 x 2.35
- **Interfaces:**
  - Serial (UART, I2C, SPI)
  - GPIOs
  - JTAG
- **XTAL:** Integrated 32kHz XTAL to support low power modes
- Side pads **SMD**
- **Temperature:** Industrial temperature range
- **Antenna Options:** Integrated Antenna/U.fl. Connector
- **Certifications:**
  - FCC, IC and CE certified
  - ROHS Compliant
- **Software. Multiple Stacks Available**
  - Full Stack
    - AT
    - SDK (Q4/13)

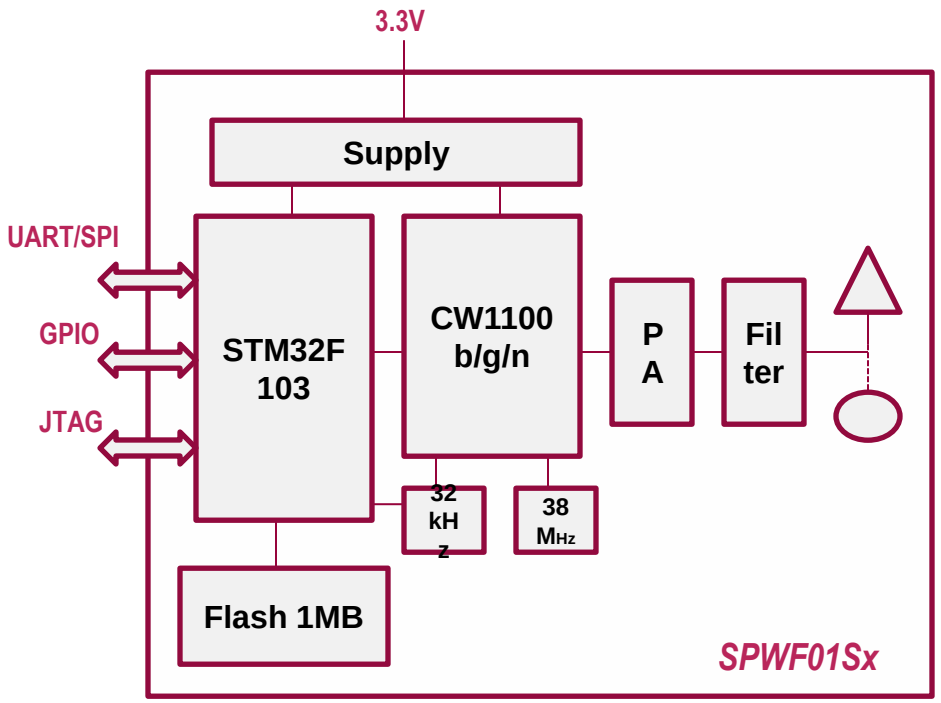
Serial To WiFi Module

Part Number	Antenna Option	SW Library
SPWF01SA.11	Chip Antenna	Full Stack
SPWF01SC.11	U.FL	Full Stack

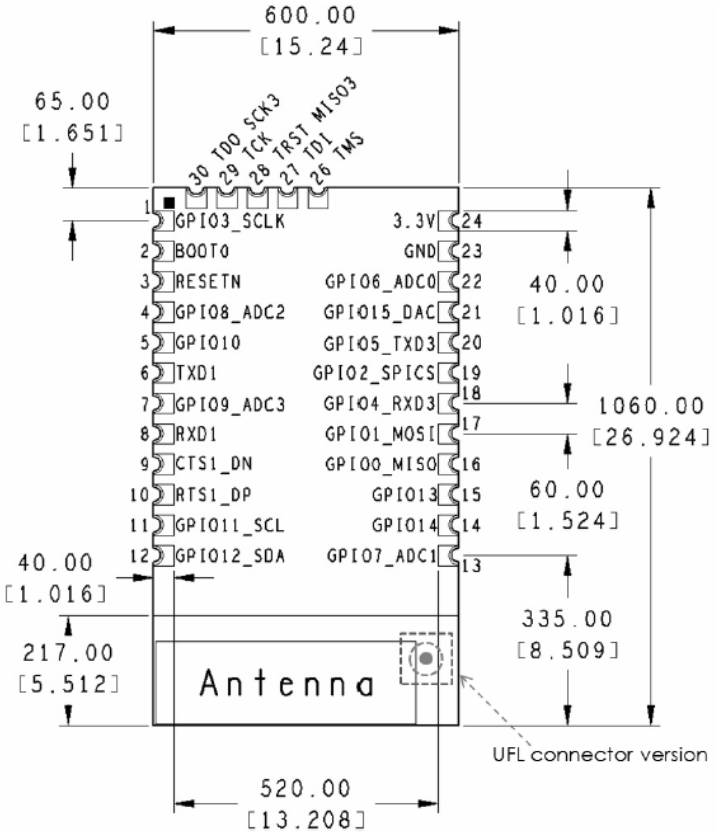
STM WiFI (SPWF01Sx) Characterization Figures

Parameter	Conditions	Min	Typ	Max	Unit
Supply Voltage, Vin	---	+3.1	+3.3	+3.6	V
Operating Temperature Range	---	-40	---	+85	°C
Radio Rec. Sensitivity Level	11g/9Mbs	---	-96	---	dBm
Radio Transmitter Output Power	50 load, 11g/9Mbps	--	+18.3	--	dBm

STM WiFI (SPWF01Sx) Architecture and Footprint



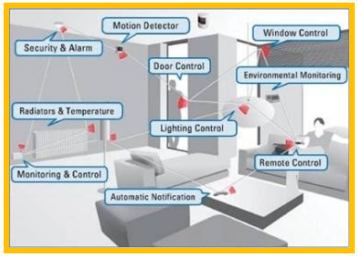
Dimensions: L: 26.92mm W: 15.24mm H: 2.35mm



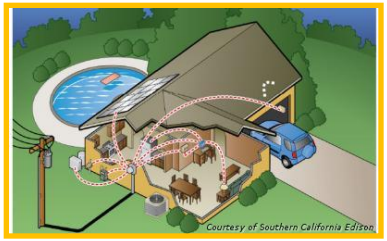
STM WiFI (SPWF01Sx) Target Applications

- Smart Appliances
- Industrial Control and Data Acquisition
- Home Automation & Home Energy
- Home Security Systems
- Wireless Sensors
- Cable Replacement
- Medical Equipments

Home/Building Automation

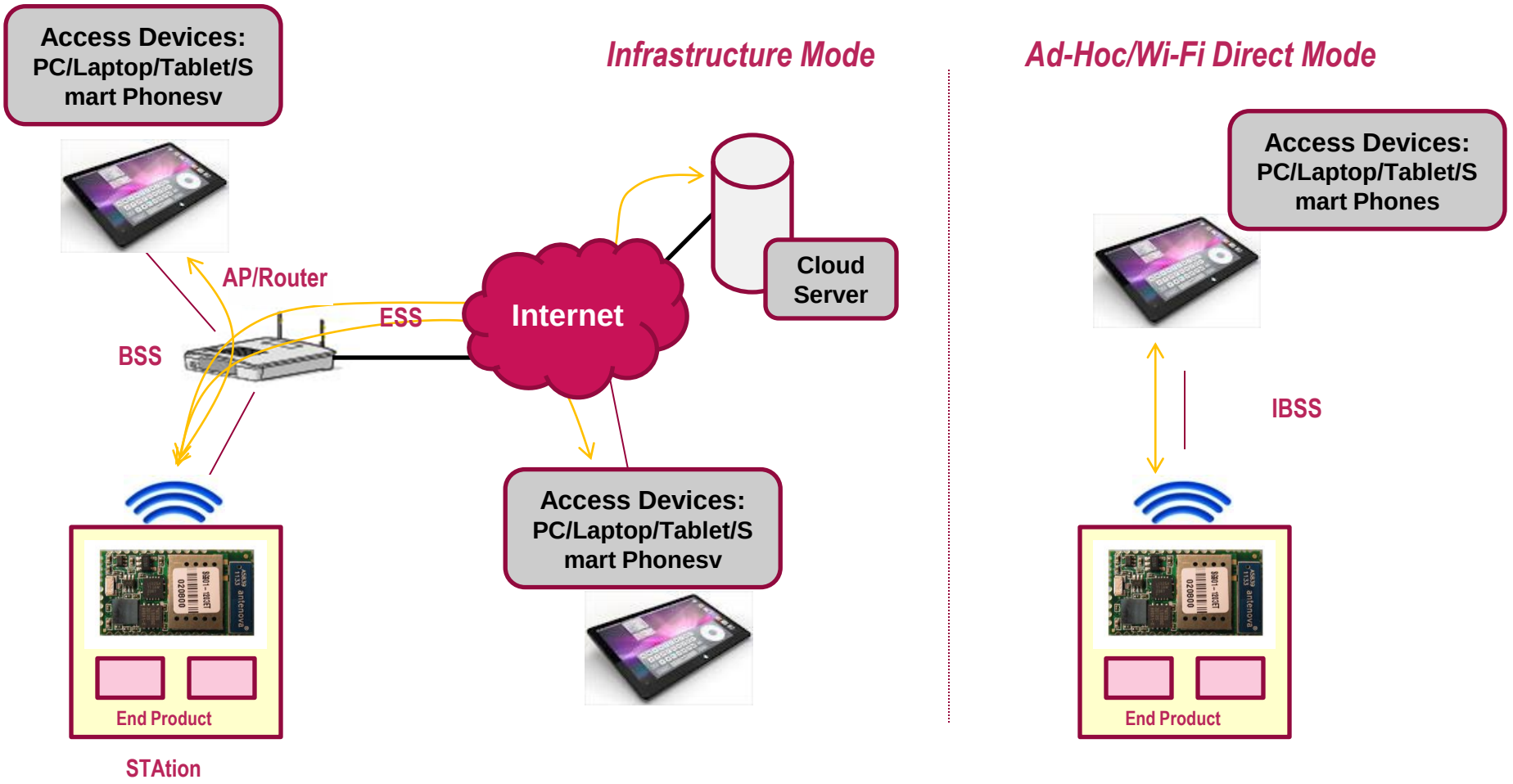


Smart Energy/ Smart Grid



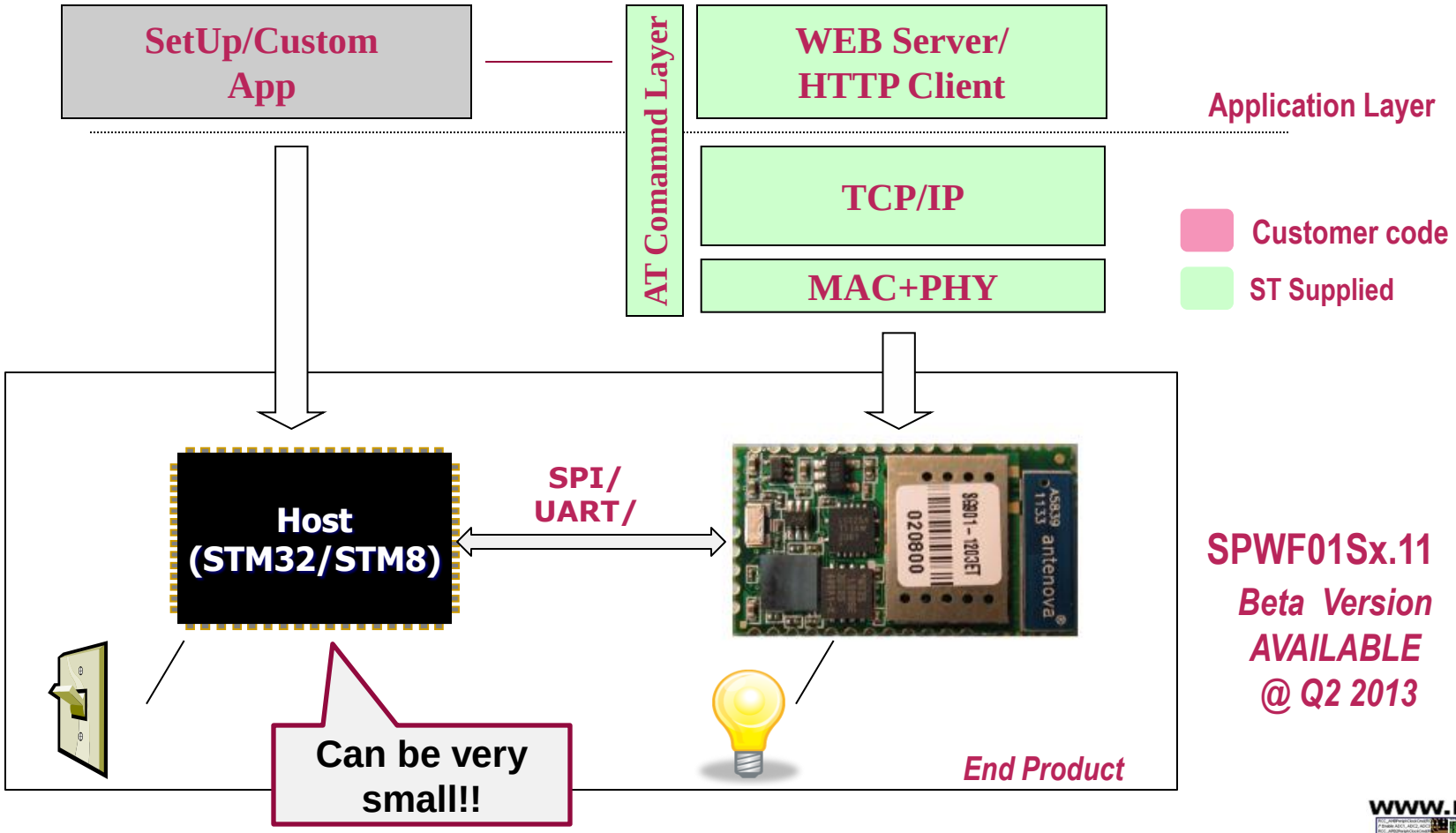
Industrial

STM WiFI (SPWF01Sx) Supported System Configurations



STM WiFI (SPWF01Sx) AT Full Stack

Enable the use of the module as a Network Coprocessor

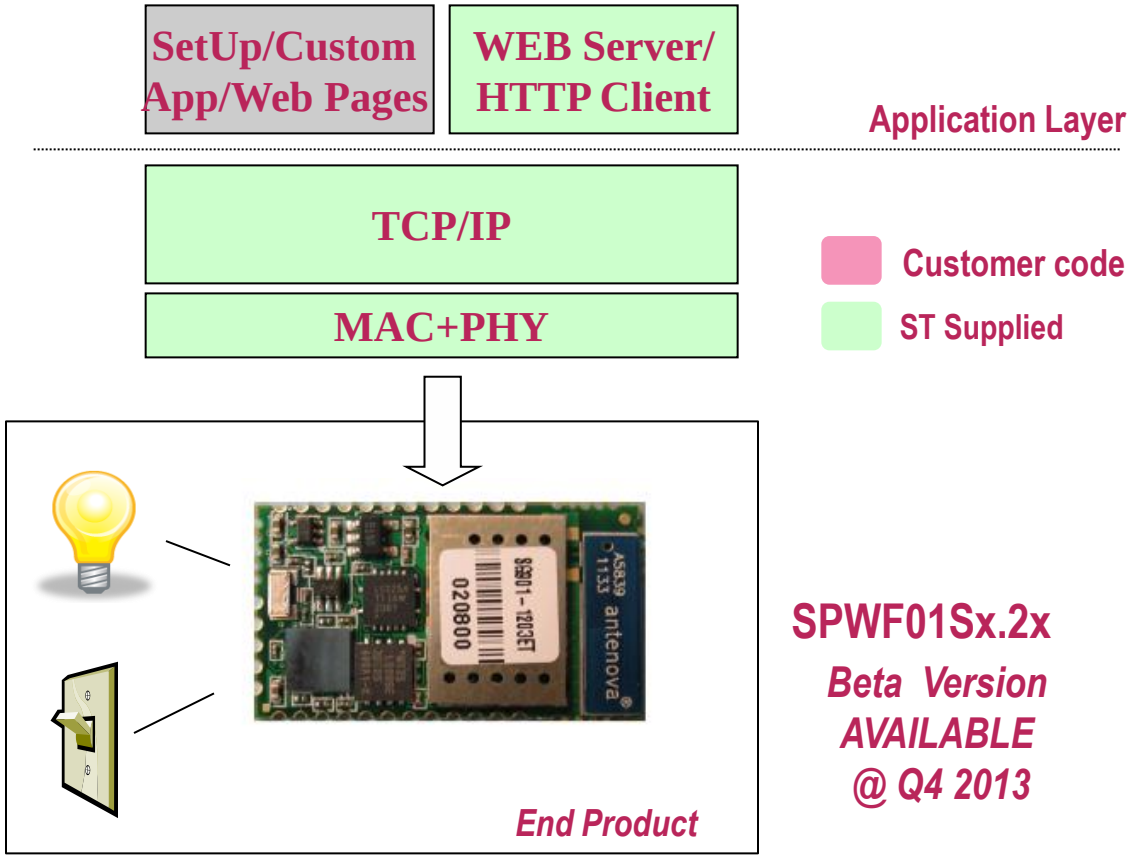


SPWF01Sx.11

Beta Version AVAILABLE @ Q2 2013

STM WiFI (SPWF01Sx) SDK Full Stack – Q4/13

Enable the module to host the whole target application



SPWF01Sx.2x

Beta Version AVAILABLE @ Q4 2013

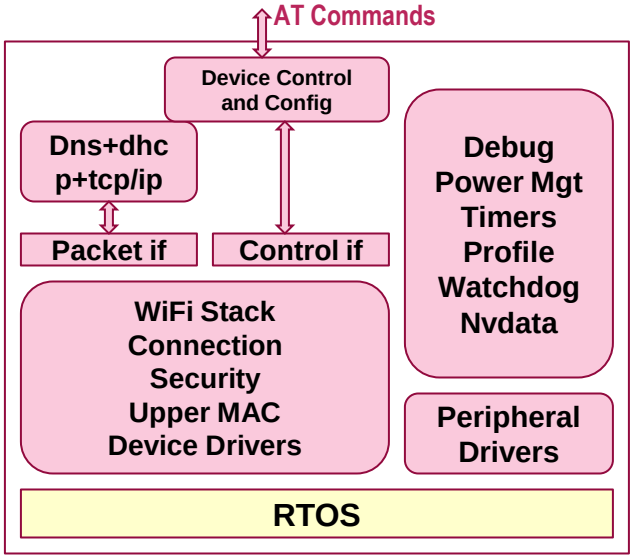
STM WiFI (SPWF01Sx) AT Full Stack Features

In the Available Beta Version

- Rich AT command set for RS-232
- Standards-compliant 802.11b/g/n operation
- IBSS and BSS Station operation modes
- Advanced Power Saving Modes
- Wireless security (WEP, WPA/WPA2-PSK)
- Full IPv4 stack + TCP + UDP (including DHCP client and DNS Client)
- Field update via WiFi and RS-232
- Rich AT command set for RS-232 control
- Built-in application utilities:
  - web server
  - http client (http get) (pull data mode)
  - “http post via get” (push data mode)

In the Final Release Version

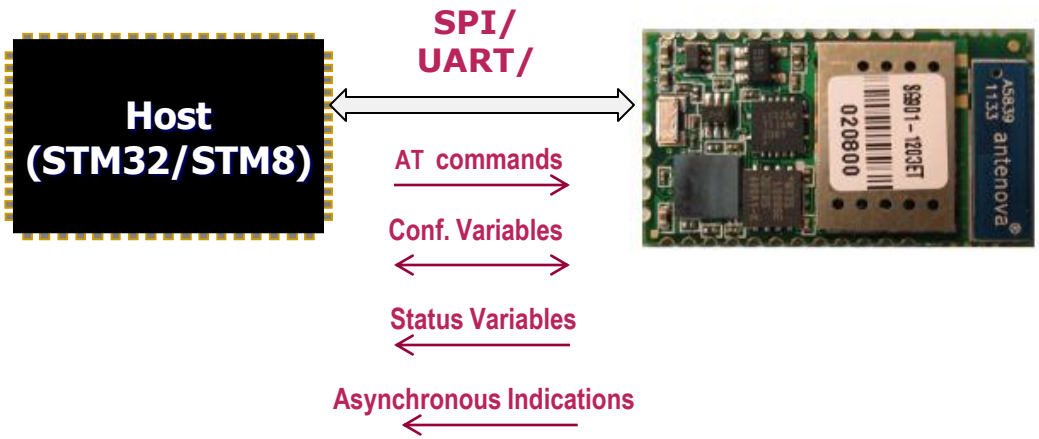
- WiFi Direct + WPS
- Mini AP WLAN Functions (2 Clients)
- WPA/WPA2 Enterprise
- SSL/TLSS
- http post
- TCP/UDP Sockets API
- Telnet Server



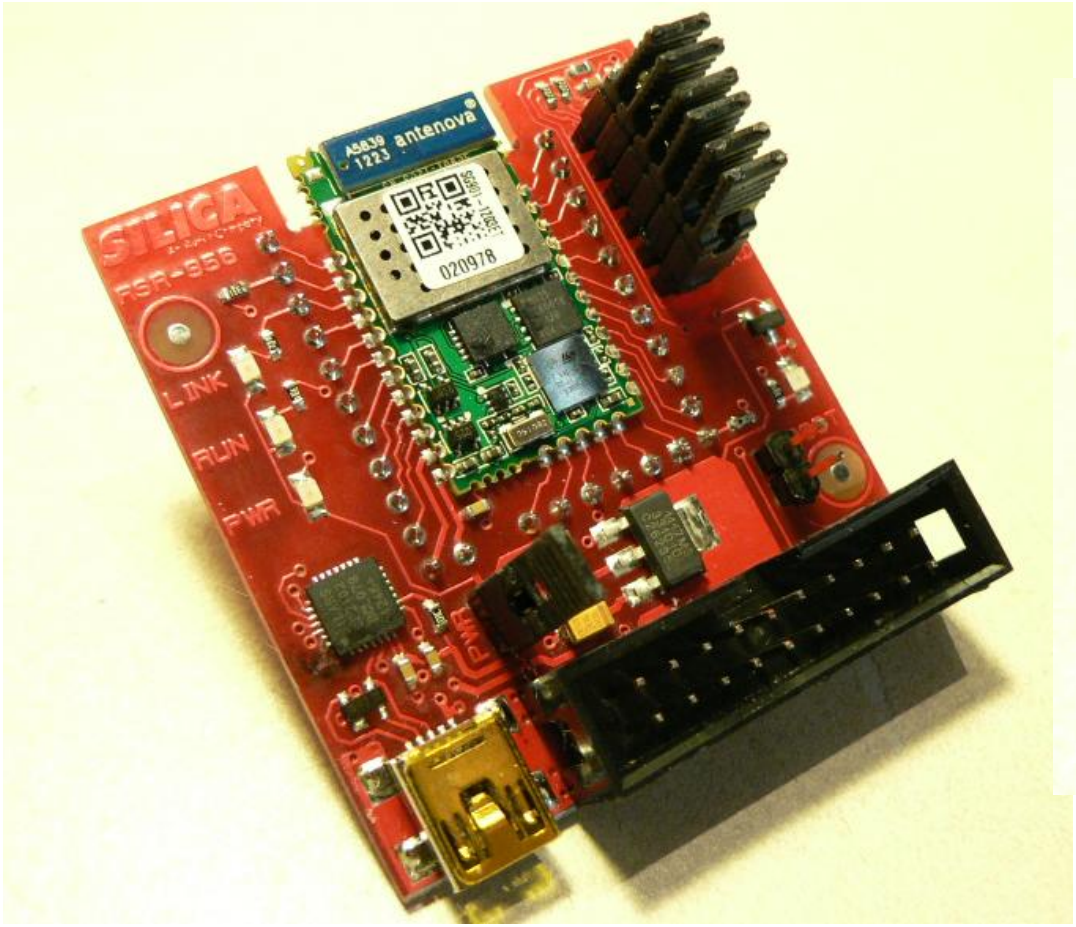
Sagrad WiFi Platform

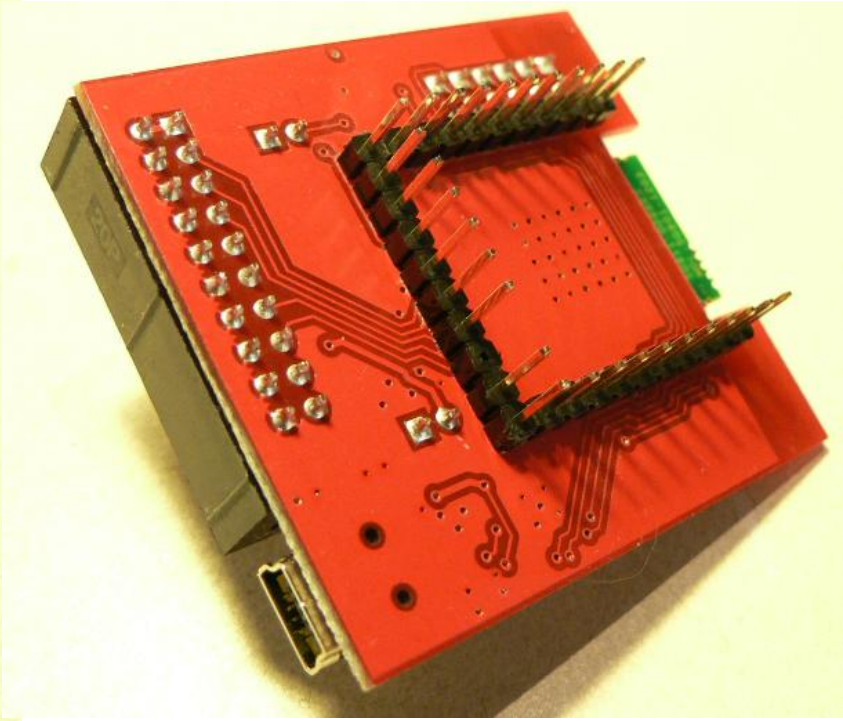
STM WiFI (SPWF01Sx) “Full Stack” Application Interface

Utilities	Notes
AT-style commands	Multiple Categories: i.e. Utilities, Configuration, Network, GPIO, Files Management
Configuration Variables	Multiple SetUp categories: i.e security, network, applications.
Status Variables	Radio, channels …
Asynchronous Indications	Radio/Protocol/Status Indication Run-Time Messages that are echoed on the serial port



SILICA STM WiFi EvaBoard





STM WiFI (SPWF01Sx) availability

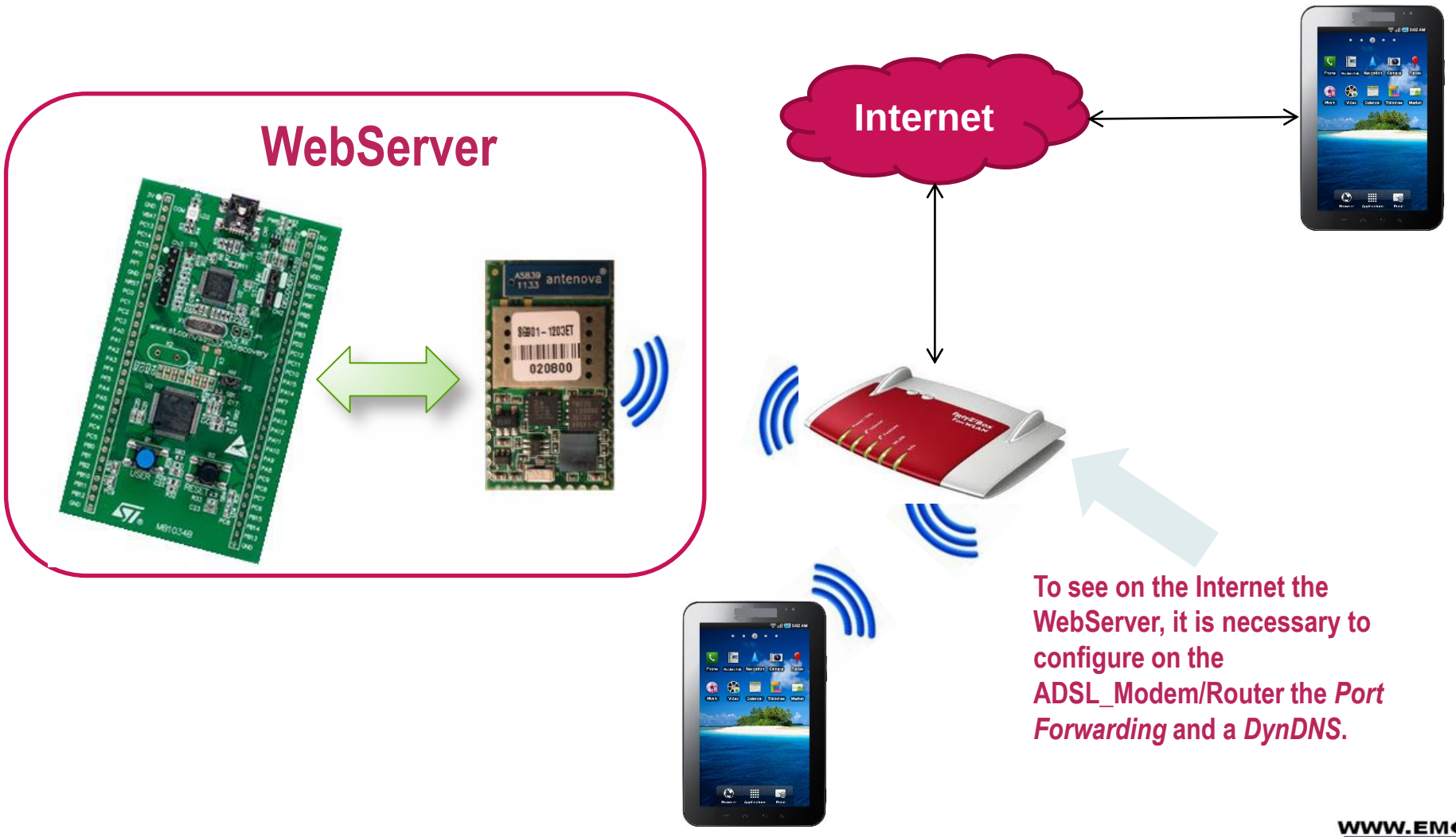
- Samples: early June 2013 (mat.21).
- Immediate availability of samples with selected customers (according with STM).

STM32F0-Discovery + STM WiFi = Web Server

STM32F0-Discovery

STM WiFi

STM32F0-Discovery + STM WiFi = Web Server

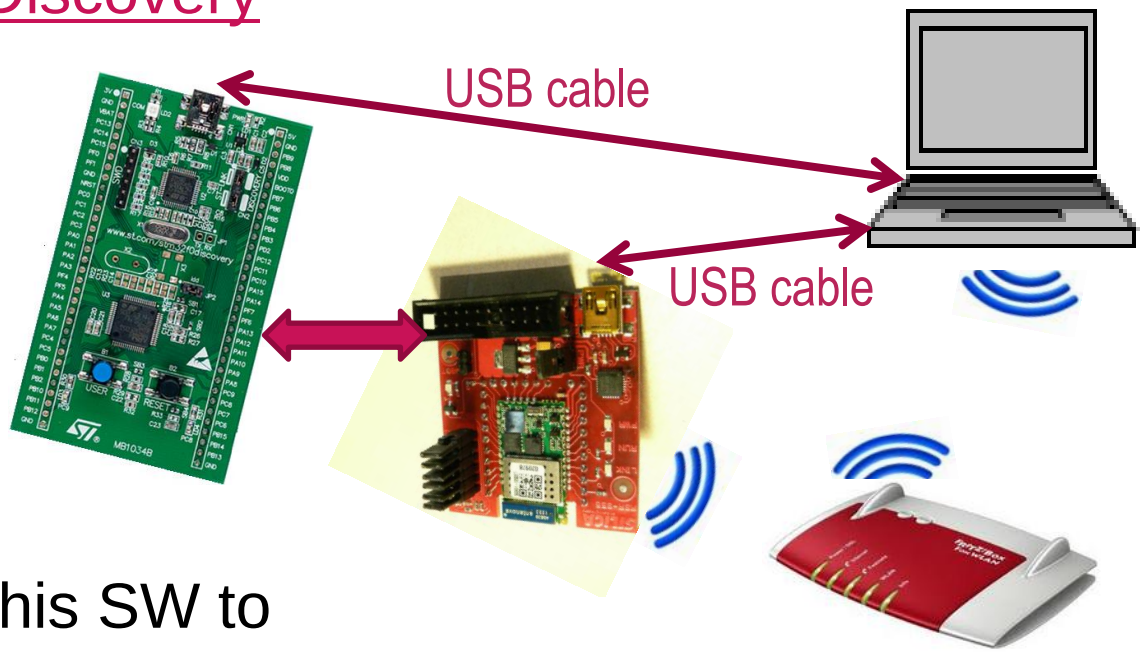


STM32F0-Discovery to control the STM WiFi module

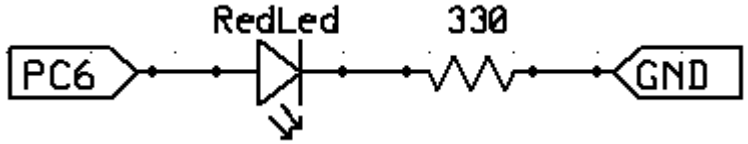
- We used the STM32F0-Discovery for control the SILICA STM WiFi EvaBoard.

- The SW was developed using KEIL C Compiler (32K free version).

- It is very easy transport this SW to the other STM32 family.

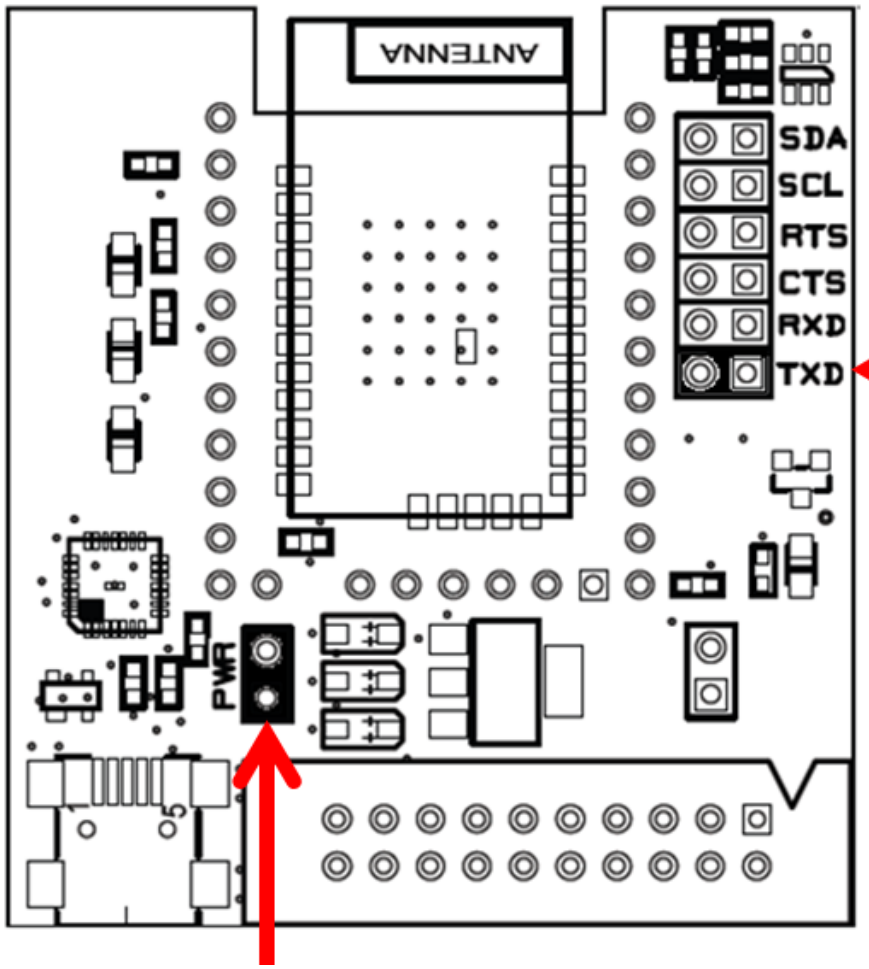


- Optionally: if you connect a led from **PC6** and **GND**, you have the possibility to monitor the waiting from the answer from STM WiFi module.



Connect STM WiFi module to STM32F0-Discovery

TOP MOUNT

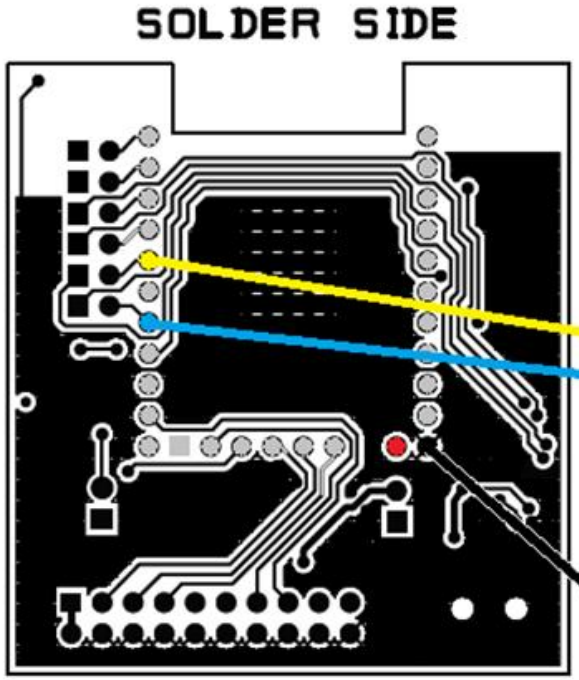


ATTENTION:
Only the jumpers: **PWR** and **TXD** must be present on SILICA STM WiFi EvaBoard

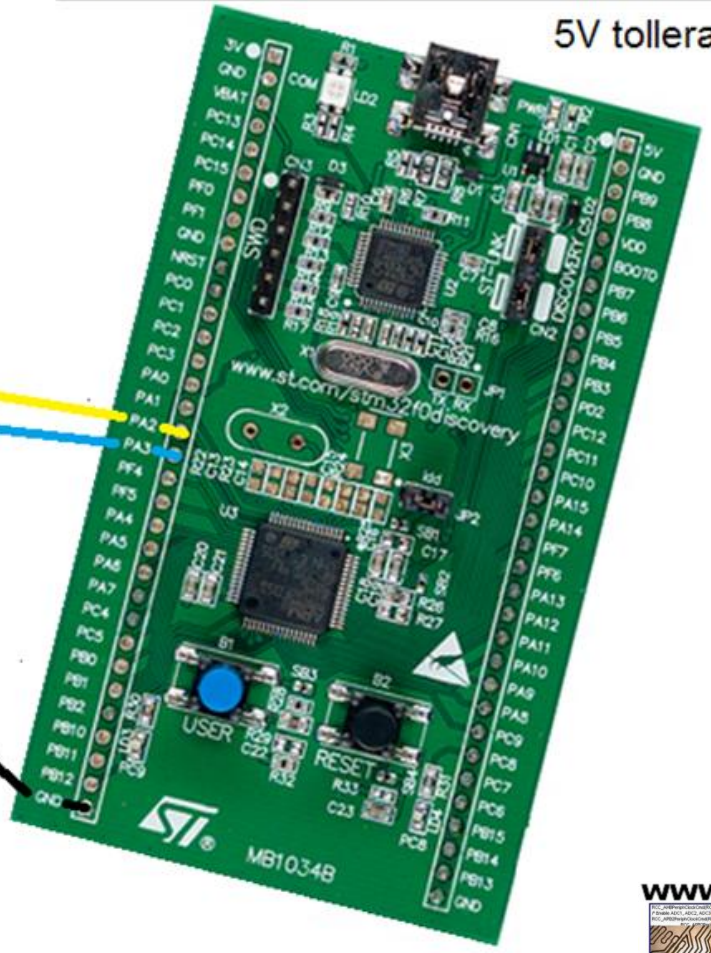
Connect STM WiFi module to STM32F0-Discovery

TX	UART Transmit line	PA2	USART2_TX
RX	UART Receive line	PA3	USART2_RX

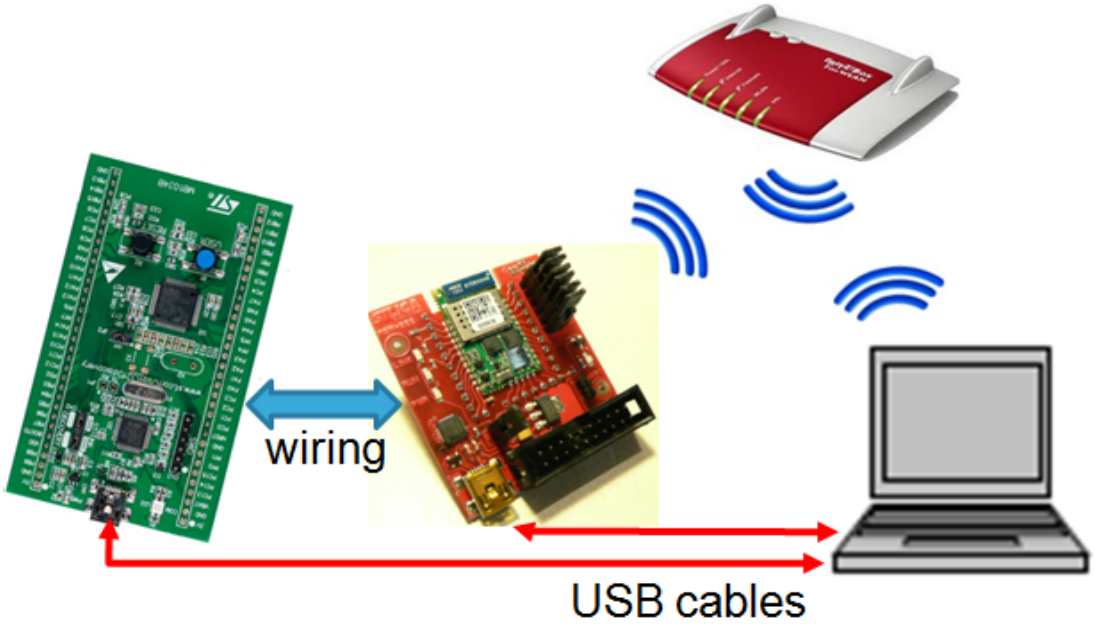
5V tollerant



RXD1	8	UART1 Receive data input	5V tolerant
TXD1	6	UART1 Transmit data output	5V Tolerant



STM32F0 + STM_WiFi = Web Server



Remember:

- **Connect your PC WiFi to the classroom A.P./Router**
- **Connect Silica STM WiFi EvaBoard to your PC**
- **Connect the STM32F0-Discovery to your PC**

On STM32F0-Discovery you must upload the file of the WebServer that is *here*.

I suggest to use *ST-LINK Utility*.

- Close the ST-LINK Utility
- Disconnect the USB cable from STM32F0-Discovery
- Wait a second
- Reconnect the USB cable to STM32F0-Discovery.

STM32F0-Discovery to control the STM WiFi module

- **Now run Tera Term or Hyper Terminal and press and release the black button on the STM32F0-Discovery.**
  This is for reset the STM32F0-Discovery.
- **For doing the connection just press and release the blue button on the STM32F0-Discovery.**

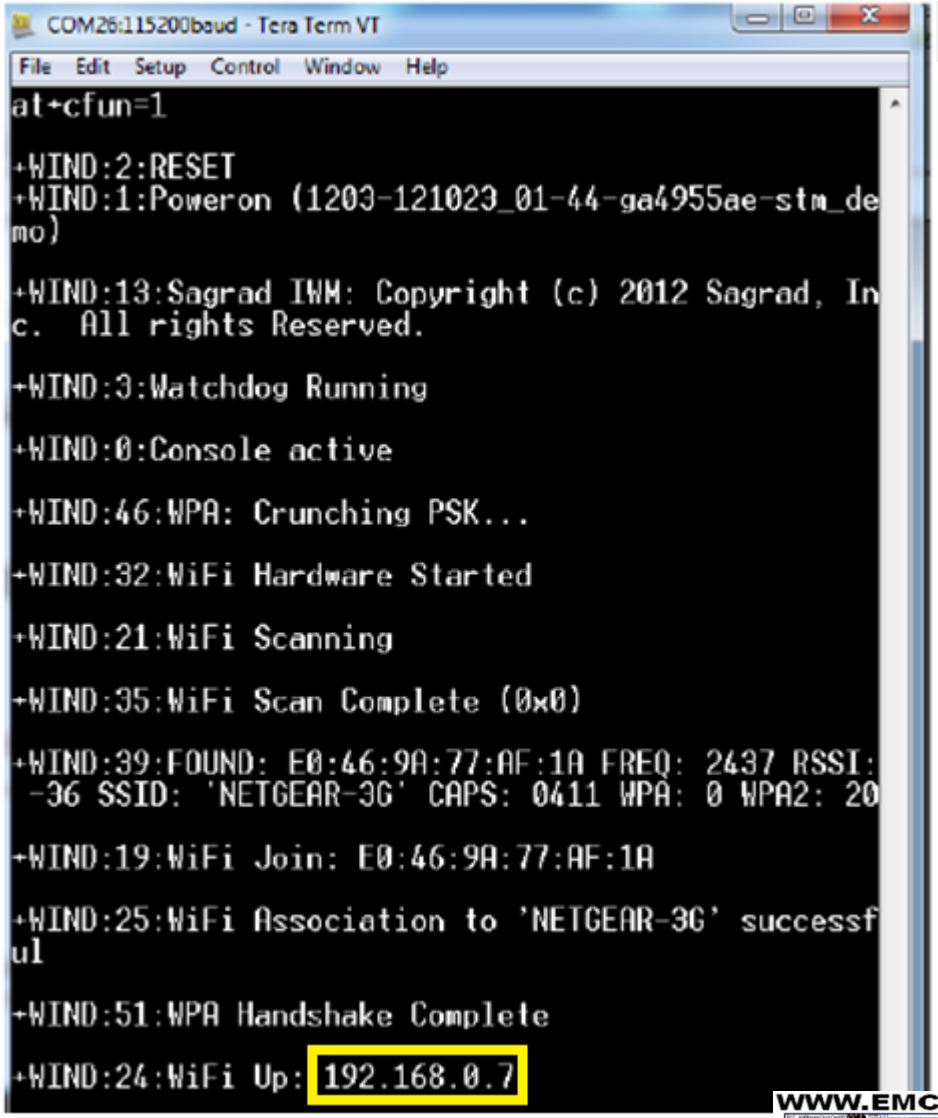
  At this point you see the **Blue led that flashing** and the **Red led that changes from OFF to ON**.

  After some seconds, Blue and Green leds are flashing and **this means that the STM WiFi module is trying to connect to the WiFi Router**.

  After 20/60 sec, Blue and Green leds go **OFF** and **this means that the connection is done**.
- Also, the **led LED2 must be ON. LED2** (LINK) is on the SILICA STM WiFi **EvaBoard**, this means that the WiFi connection is active.
- At this point, it is also loaded on the STM WiFi module, the html page named:
  led.hmtl
  This page shows the status of the LEDs mounted on the STM32F0-Discovery.

WiFi Sniffing

In the terminal Tera Term or Hyper Terminal you will see something similar to the image showed here.
In the yellow box there is the address that the access point and/or router have assigned to our WiFi card.



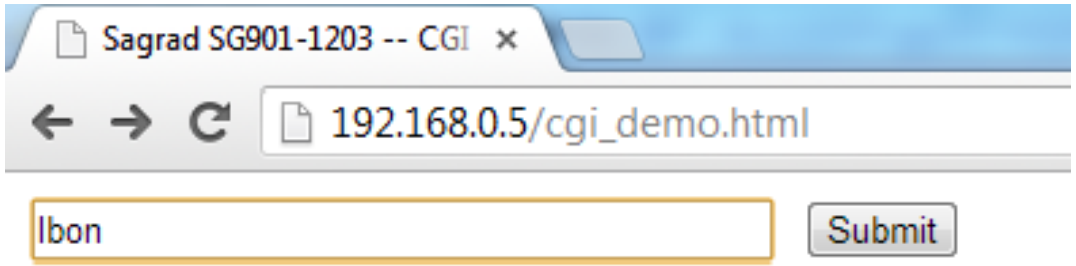
Now open the html page (use Windows Internet Explorer):

cgi_demo.html

this page is used to send commands to STM WiFi Module.

- Suppose that the STM WiFI IP is: 168.169.0.5
- Open your browser and type:

  192.168.0.5/cgi_demo.html



STM32F0-Discovery to control the STM WiFi module

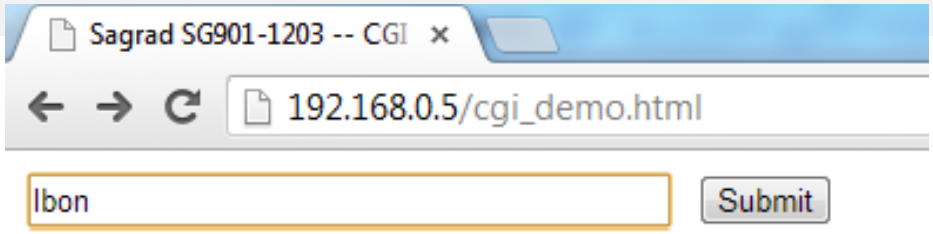
The custom commands (implemented on STM32F0-Discovery) to control the STM WiFi module are:

- **lgon** – TurnON the green LED
- **lgoff** – TurnOFF the green LED
- **lbon** – TurnON the blue LED
- **lboff** – TurnOFF the blue LED
- **X** – Clear RxBuffer
- **reset** – reset the STM WiFi module, it reloads the WiFi configuration received from STM32F0-Discovery.
  During the reset the Blue and Green Leds are flashing.

You have the possibility to see the LEDs status in the page:
192.168.0.5/led.html

Remember: **you must reload the led.html page after every command sent by using the cgidemo.html page.**

STM32F0-Discovery to control the STM WiFi module



Try the commands:

- **lgon** – TurnON the green LED
- **lgoff** – TurnOFF the green LED
- **lbon** – TurnON the blue LED
- **lboff** – TurnOFF the blue LED

and see the results, remember to reload the page after any command.

What we offer

- **A complete source code for STM32F0xx** family that is very easy to transfer on other STM32 families (Cortex Mx).
- **A complete manual that covers the topics below.**
  - **Resource available via STM WiFi pins**
  - Firmware update
  - **HTML pages**
  - **How to use the SILICA STM WiFi EvaBoard**
  - **AT Commands**
  - **AT SetUp commands (to connect STM WiFi module to WiFi network)**
  - **AT GPIO commands**
  - **AT General Commands**
  - **Create a filename.html** (a complete HTML example)
  - **NotePad++**
  - How to use **Tera Term**
  - **How to connect STM WiFi module to STM32F0-Discovery (Web Server), C source code**
  - **How to scan your local network**
  - How to use **PYTHON on LINUX** to drive STM WiFi module
  - How to use **PYTHON on Windows 7** to drive STM WiFi module

What we offer

- Comprehensive manual that explain the SW implementation and that covering the topics below

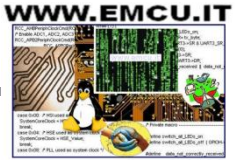
  - **How to connect STM WiFi module to STM32F0-Discovery**
  - **The Web pages**
  - **The definitions**
  - **The variables**
  - **The principal functions**

Code Size

The code size of the Web Server is:

- Flash < 8K
- Ram < 3K

It is possible reduce the code size using the C Compiler optimizations.



Thank You

ATTENTION:

this SW is available only for: SILICA Customers

enrico.marinoni@silica.com (FAE SILICA Italy)