SPWF Series of WiFi Modules

Subsystem Products Group

life.augmented

Benefits of Wireless OEM Modules

- Off-the-shelf RF **plug&play solutions**
  - Enable short **time-to-market** product development
  - **No RF specific knowledge** is required for the integration of the modules in the target application
- **Cost-effective** for design of multiple platforms or multiple versions of the same platform
  - Save 8-12 months in design cycle
  - Significantly reduce engineering and production costs
- **Pre-certified** RF modules
  - Reduce the effort and certification cost on the customer side

ST Wireless OEM Modules Portfolio

BlueTooth

SPBT Series

HW	SW Protocol
SPBT2532	BT 2.1
SPBT2632	BT3.0

802.15.4/ZigBee

SPZB32W Series

HW	SW Protocol
SPZB32W1	SimpleMAC
SPZB32W2	ZigBeeIP

WiFi

SPWF Series

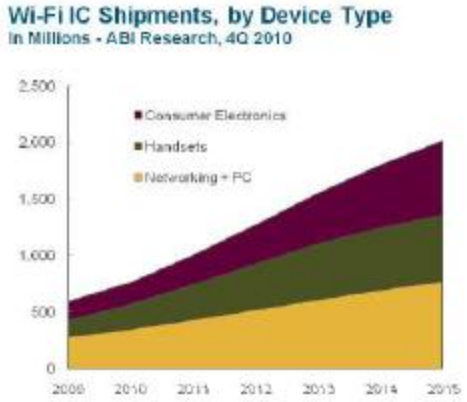
HW	SW Protocol
SPWF01S	TCP/IP

NEW Development

ST core leading industry technology inside

Drivers for an Explosive WiFi Growth

- **Momentum of Wi-Fi technology**
  - 10% of the world's population uses Wi-Fi
  - Double-digit growth year over year
  - Ubiquitous in home, enterprise, industry, education and government environments



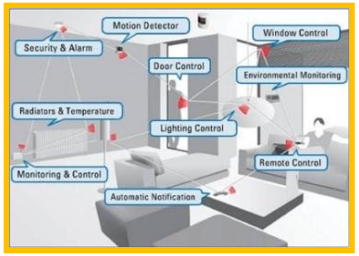
- **Prevalence of Wi-Fi based products**
  - Home market deployment, installed in 200M homes Worldwide
  - Consumer electronic deployment, 100% in Smart Phones, major growth
  - PC deployment, ~80% laptops, 100% tablets

- **Characteristics of the technology**
  - Easy path to the internet (TCP/IP based)
  - Secured for machine-to-machine
  - Flexible over multiple applications

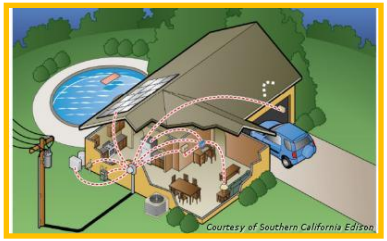
Target Applications

- 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

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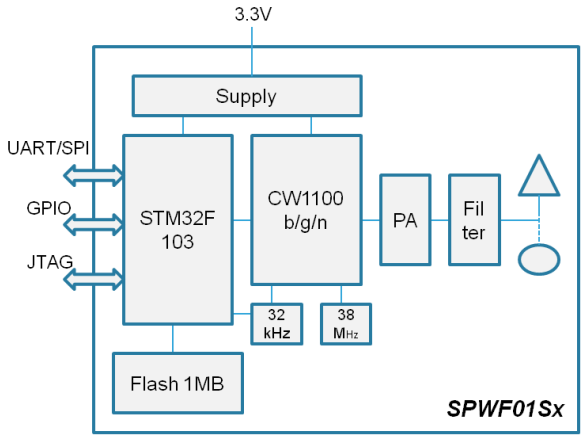
SPWF01Sx Modules

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)
  - 16 GPIOs
  - JTAG
- **XTAL**. Integrated 32kHz 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

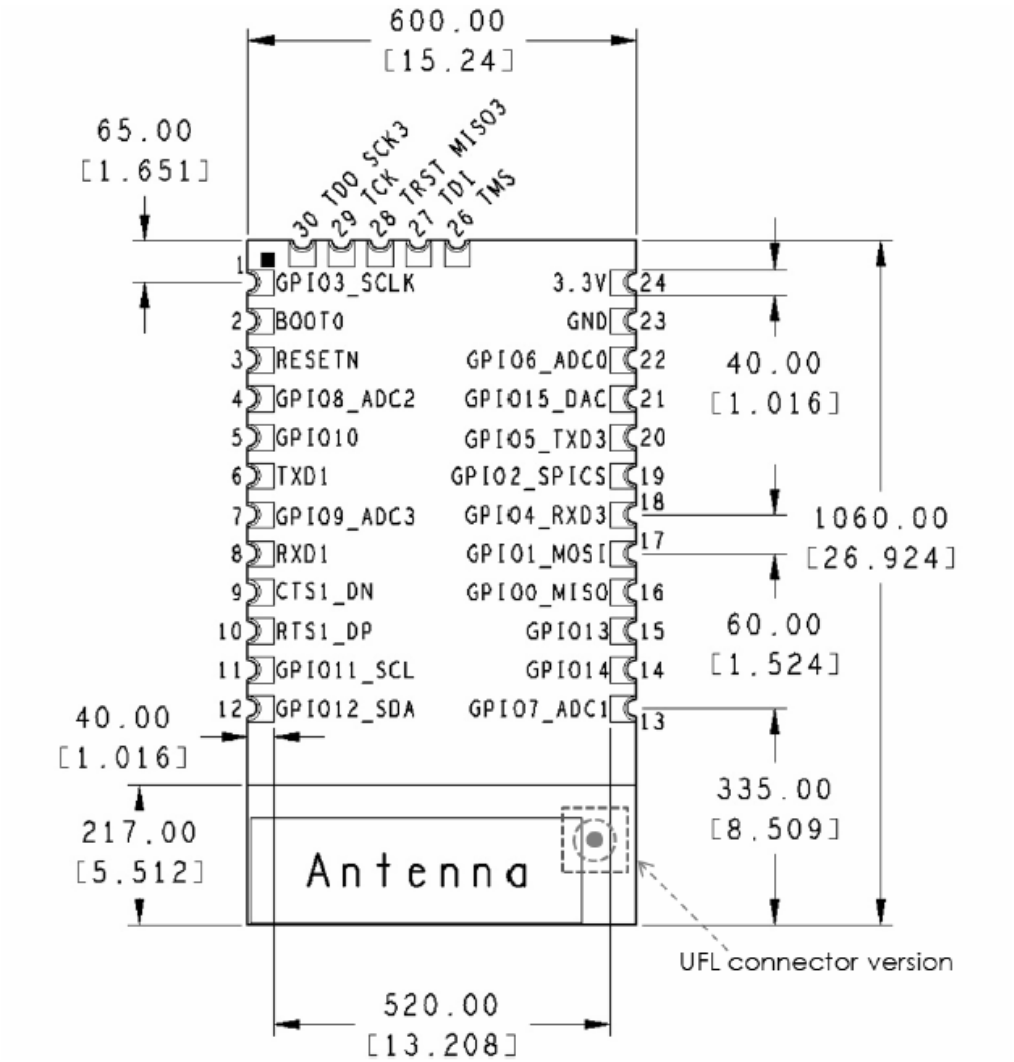
Serial To WiFi Module



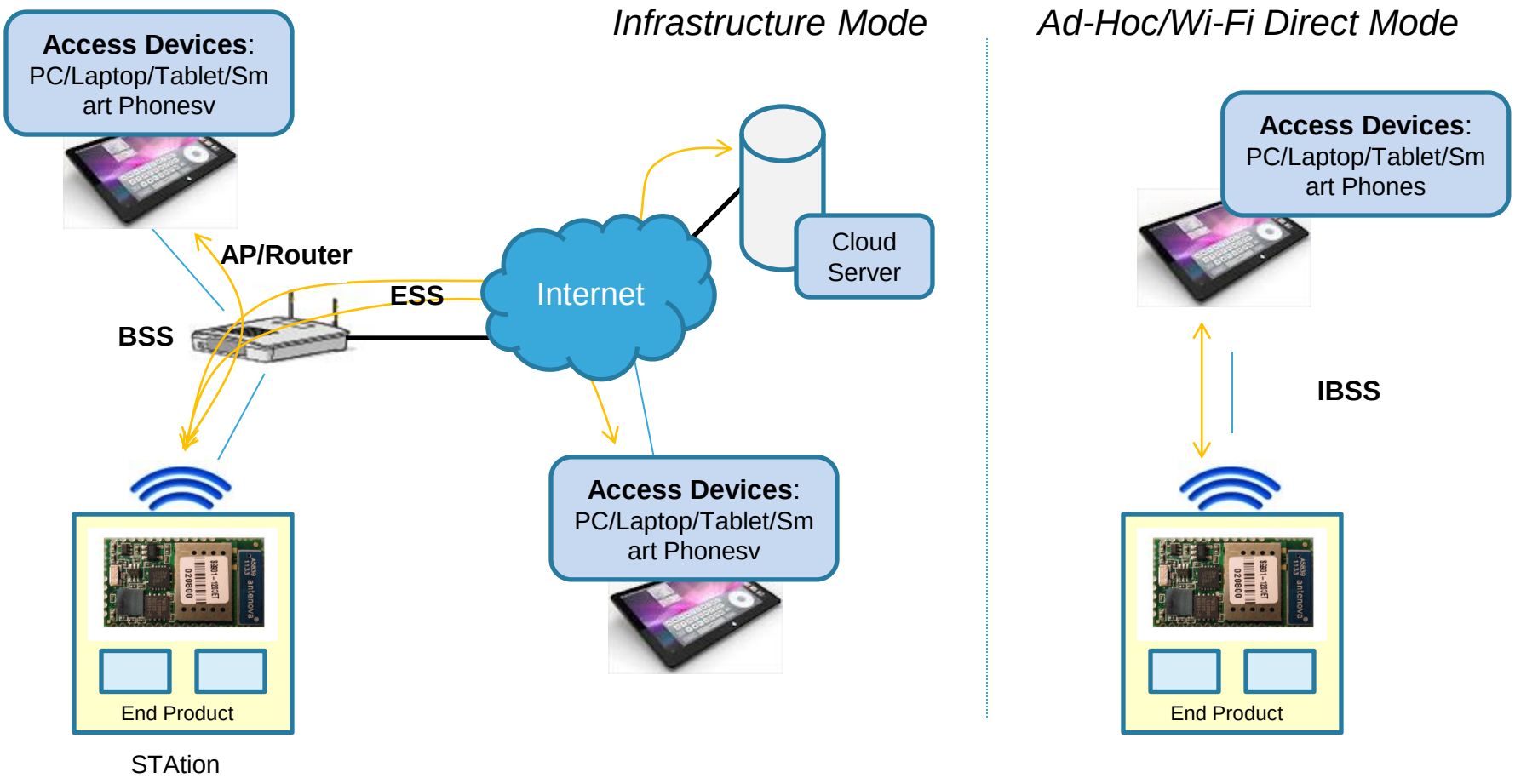
Part Number	Antenna Options	SW Library
SPWF01SA.11	Chip Antenna	Full Stack (AT)
SPWF01SC.11	U.FL	Full Stack (AT)

SPWF01Sx Footprint

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

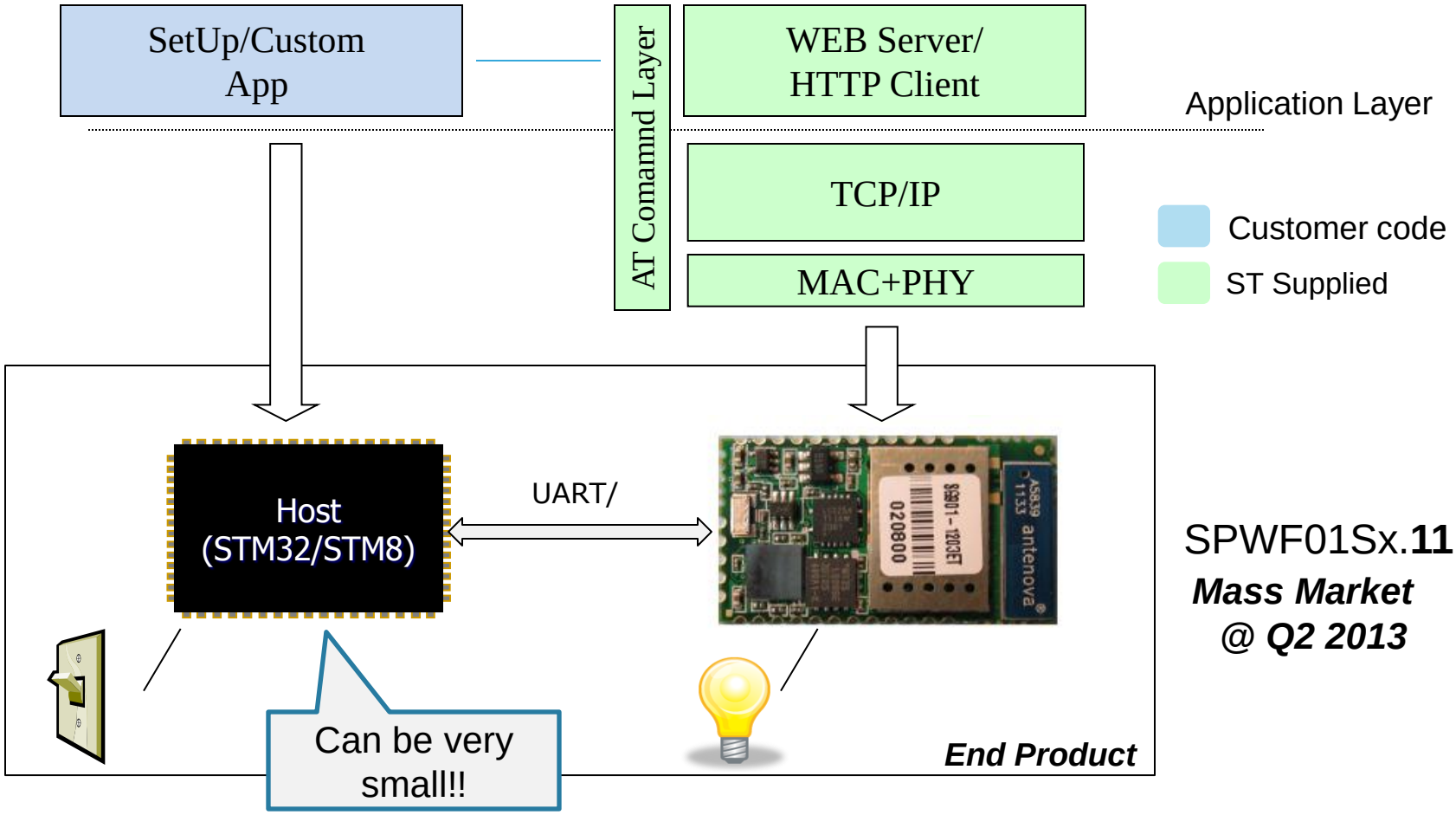


Supported System Configurations



AT Full Stack

Enable the use of the module as a Network Coprocessor



SPWF01Sx.**11**

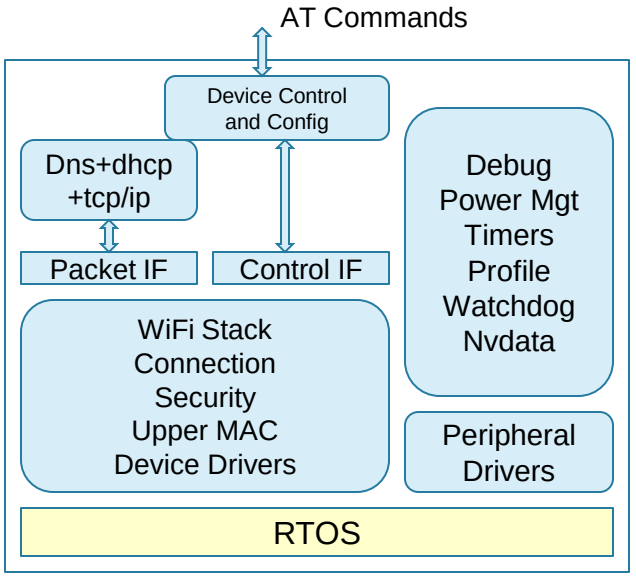
Mass Market

@ Q2 2013

AT Full Stack Features

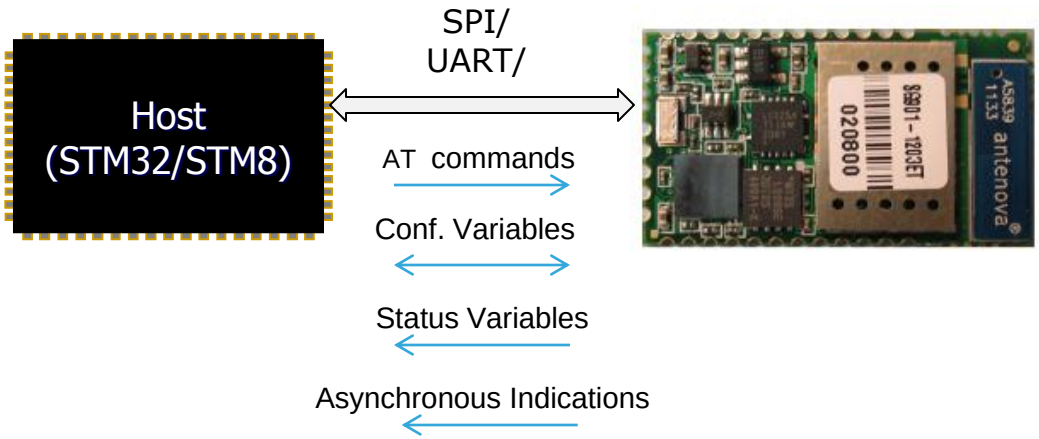
Available

- 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
- DHCP client and DNS Client
- Field update via WiFi and RS-232
- Rich AT command set for RS-232 control
- TCP/UDP Socket Client
- Built-in application utilities:
  - web server
  - http client (http get) (pull data mode)
  - “http post via get” (push data mode)



AT Full Stack Command 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



AT Full Stack Commands

Utilities	
AT	Attention
AT+S.HELP	Display Help Text
AT+S.FWUPDATE	Perform a firmware update
AT+S.WIFI	Enable/Disable WiFi device
AT+CFUN	Comm Function (Reset)
AT+S.MFGTEST	Perform manufacturing tests
AT+S.PEMDATA	Configure certificate store
AT+S.ECHO	Send data out serial port
AT+S.HTTPDFSUPDATE	Update static HTTPD Filesystem
Configuration	
AT+S.GCFG	Get configuration value
AT+S.SCFG	Set configuration value
AT+S.SSIDTXT	Set a textual SSID
AT+S.STS	Report current status/statistic
AT&V	Display all configuration values
AT&F	Restore factory default settings
AT&W	Save current settings
AT+S.NVW	Write production settings

Network	
AT+S.PING	Send a ping to a specified host
AT+S.SCAN	Channels Scan
AT+S.HTTPGET	Issue an HTTP GET
AT+S.ROAM	Trigger WiFi reassociation sequence
File Management	
AT+S.FSC	Create a file
AT+S.FSA	Append to an existing file
AT+S.FSD	Delete an existing file
AT+S.FSL	List existing filename(s)
AT+S.FSP	Print the contents of an existing file
Socket	
AT+S.SOCKON	Open a network socket
AT+S.SOCKOS	Open Serial Port
AT+S.SOCKW	Write len bytes of data to socket
AT+S.SOCKR	Return len bytes of Data from socket
AT+S.SOCKQ	Query pending data
AT+S.SOCKC	Close socket
GPIO	
AT+S.GPIOC	Configure General Purpose I/O
AT+S.GPIOR	Query General Purpose Input
AT+S.GPIOW	Set General Purpose Output

AT Full Stack Variables

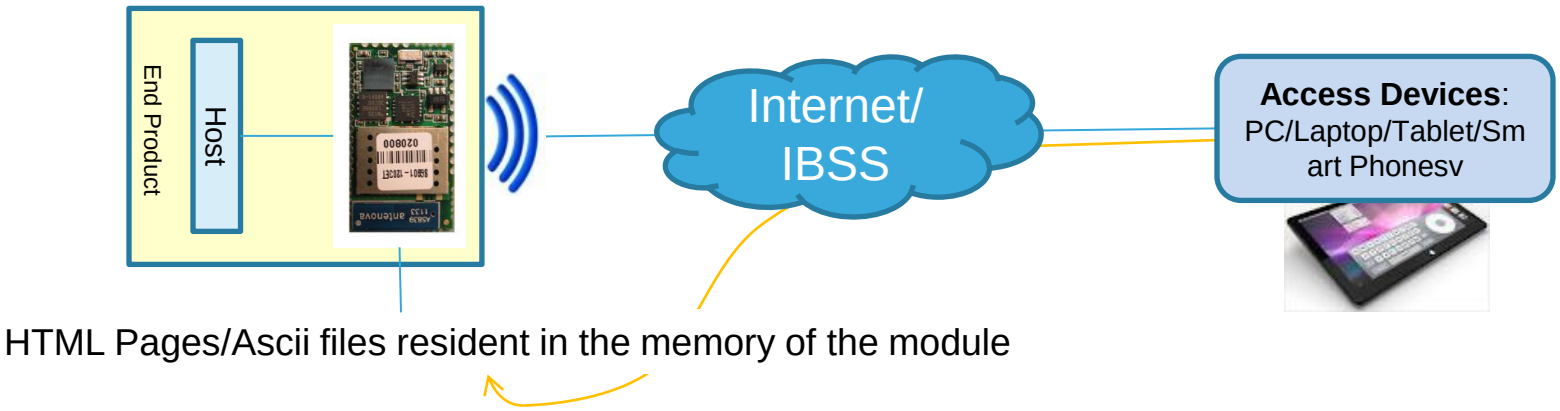
Configuration Variables
Production Data
UART Configuration
Power save configuration
Security Configuration
Radio Setup
Protocol Setup
Mode Setup

Remotely accessible
In the “config.shtml” page

Status Variables
Protocol Statistics
Radio Statistics
Module Status
Security Setup
Modules Configuration

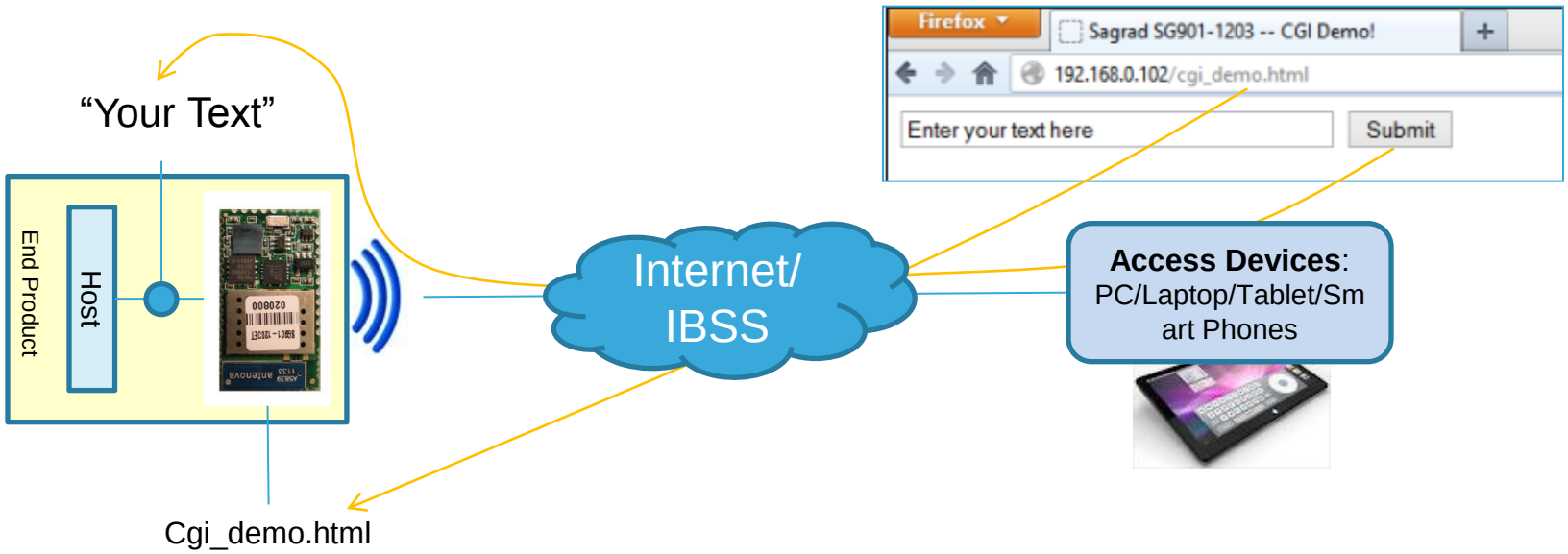
Remotely accessible
In the “status.shtml” page

«Web Server» Use Mode



Built-in HTML files (Resident in the Flash)	status.shtml	Remote Access to Status parameters (i.e. radio, channels)
	index.html	Home page
	config.shtml	Remote Access to the config variables values
	404.html	Error page
Custom html/ascii files (resident in the RAM)	Any name	Can be loaded via the serial port
Custom files (resident in the Flash)	Any name	Can be loaded remotely

«Post Data» Use Mode

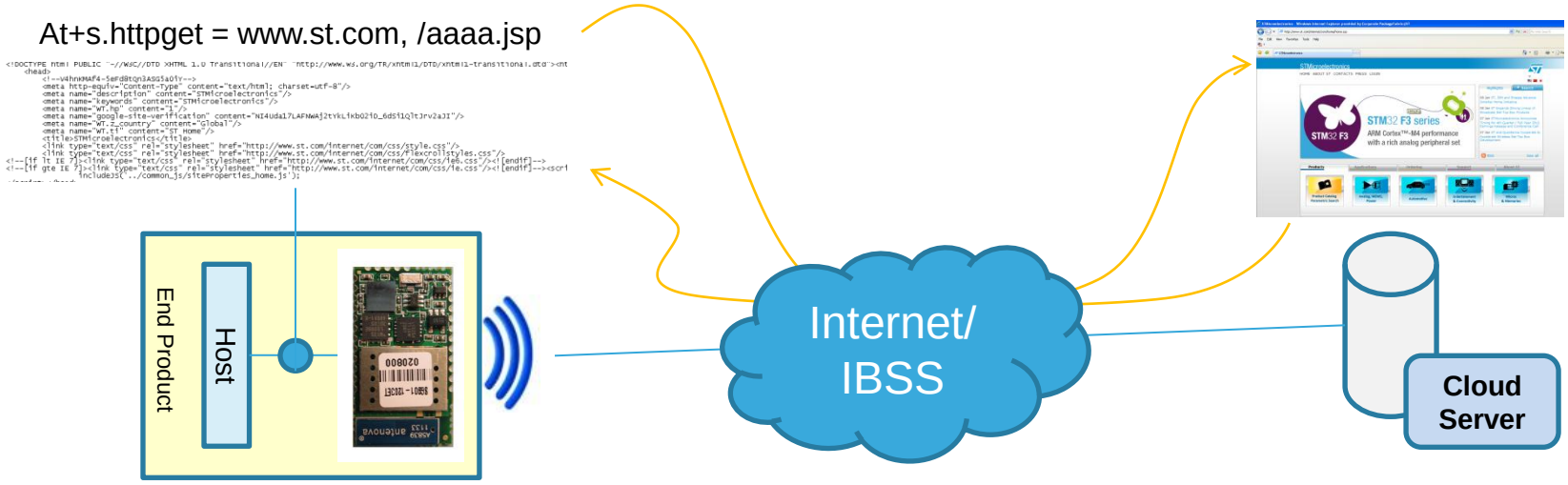


A built-in html page "cgi_demo.html" allows to remotely push characters on the serial port from a remote browser

«HTTP Client» Use Mode

- The module implements the **HTTP get** method by means of an AT command

- The HTTP GET feature performs a single HTTP request to the specified host and path. The server response is printed on the UART enabled.



«Socket» Use Mode

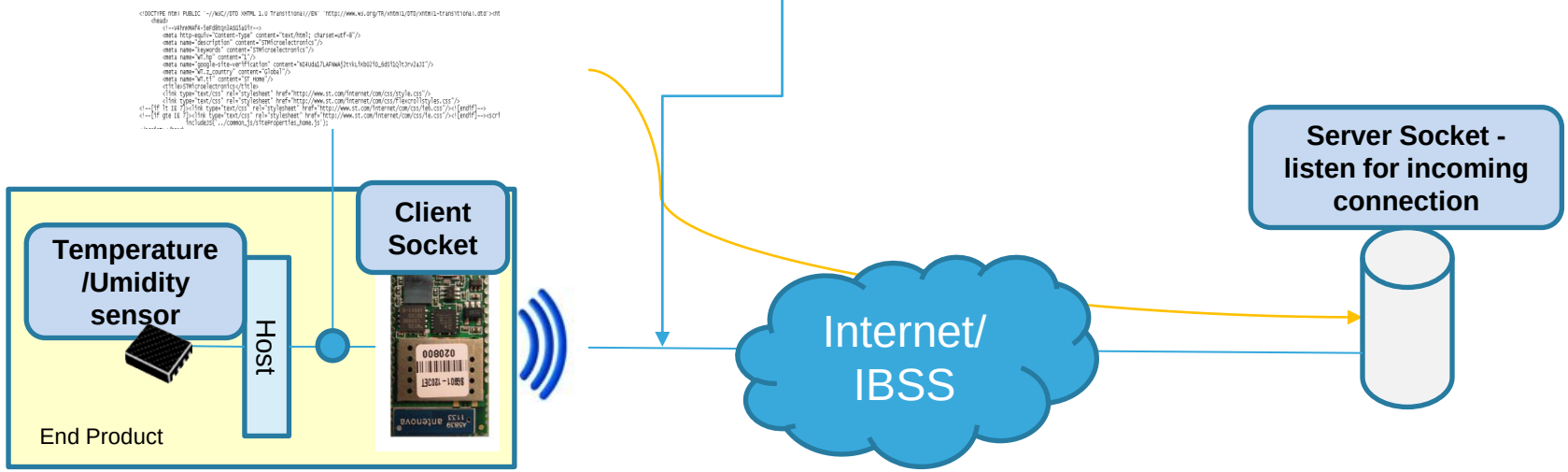
- The Socket interface allows communication via TCP, UDP and UART by means of AT commands.
- The module is a client socket only and it can open up to 8 TCP/UDP/UART connections.

1) Open a Socket (returns a SocketID)

AT+S.SockOn (Port, IPserver, TCP/UDP)

2) Read/Write on the Socket

AT+S.SockW (SocketID, SensorData)



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** Operating 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