Using the ESP8266 to build the Internet of Things

Dr Alasdair Allan
http://alasdairallan.com
@aallan
The Internet of Things?
Meet Homo-Erectus Connectus

Credit: GigaOM
The Espressif ESP8266

“This is inexpensive enough to be very much in the territory of ‘thousands of sensors-launched-out-of-a-cannon’-cheap.” — Brian Jepson, Make: Magazine
Nine usable GPIO pins: #0, #2, #4, #5, #12, #13, #14, #15, #16
<table>
<thead>
<tr>
<th>Mode</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.11b, CCK 1Mbps, POUT=+19.5dBm</td>
<td>215 mA</td>
</tr>
<tr>
<td>802.11b, CCK 11Mbps, POUT=+18.5dBm</td>
<td>197 mA</td>
</tr>
<tr>
<td>802.11g, OFDM 54Mbps, POUT=+16dBm</td>
<td>145 mA</td>
</tr>
<tr>
<td>802.11n, MCS7, POUT =+14dBm</td>
<td>135 mA</td>
</tr>
<tr>
<td>802.11b, packet size of 1024 bytes, -80dBm</td>
<td>60 mA</td>
</tr>
<tr>
<td>802.11b, packet size of 1024 bytes, -70dBm</td>
<td>60 mA</td>
</tr>
<tr>
<td>802.11b, packet size of 1024 bytes, -65dBm</td>
<td>62 mA</td>
</tr>
<tr>
<td>Standby</td>
<td>0.9 μA</td>
</tr>
<tr>
<td>Deep sleep</td>
<td>10 mA</td>
</tr>
<tr>
<td>Saving mode DTIM 1</td>
<td>1.2 mA</td>
</tr>
<tr>
<td>Saving mode DTIM 3</td>
<td>0.86 mA</td>
</tr>
<tr>
<td>Shutdown</td>
<td>0.5 μA</td>
</tr>
</tbody>
</table>
http://lazyzero.de/en/elektronik/esp8266/diy_weather/start
Channel 3 Broadcasting.
Frame: 166
rss: 31
adc: 44

https://github.com/cnlohr/channel3
Getting Started
GPIO0 pulled LOW for firmware upload
GPIO2 pulled HIGH for firmware upload
$ python esptool.py -p /dev/tty.usbserial-A9048LJJ write_flash 0x00 ESP_8266_BIN0.92.bin
Other firmware

- Lua (NodeMCU)
- Python (MicroPython)
- Javascript (Espruino)
- Lisp
- Arduino
- Lots of others, including BASIC
https://github.com/esp8266/Arduino
Building a Button
Demo
More Information

- http://www.esp8266.com/
- https://nurdspace.nl/ESP8266
- https://github.com/nodemcu/nodemcu-firmware
- https://github.com/esp8266/Arduino
- https://github.com/themadinventor/esptool
- https://github.com/espressif
- http://bbs.espressif.com/
Thanks!

http://alasdairallan.com
@aallan