

Diagnose: Can we add WiFi to Non-WiFi Thermostat bac-002?

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Question: Is it possible to upgrade a Non-WiFi Version of Beca/Moes Thermostat BAC-002 to a WiFi-Version by adding an ESP8266 WiFi-Chip?

Image of Wifi-Version:

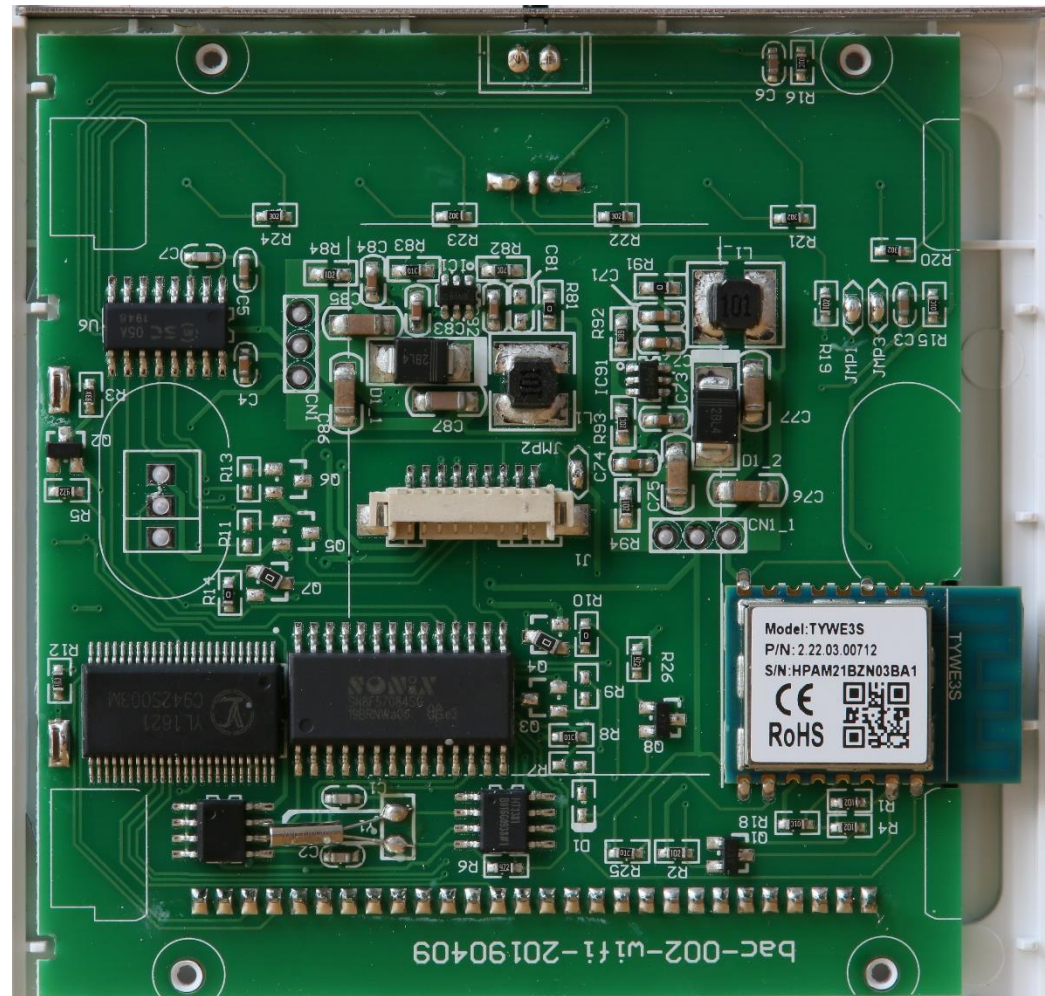
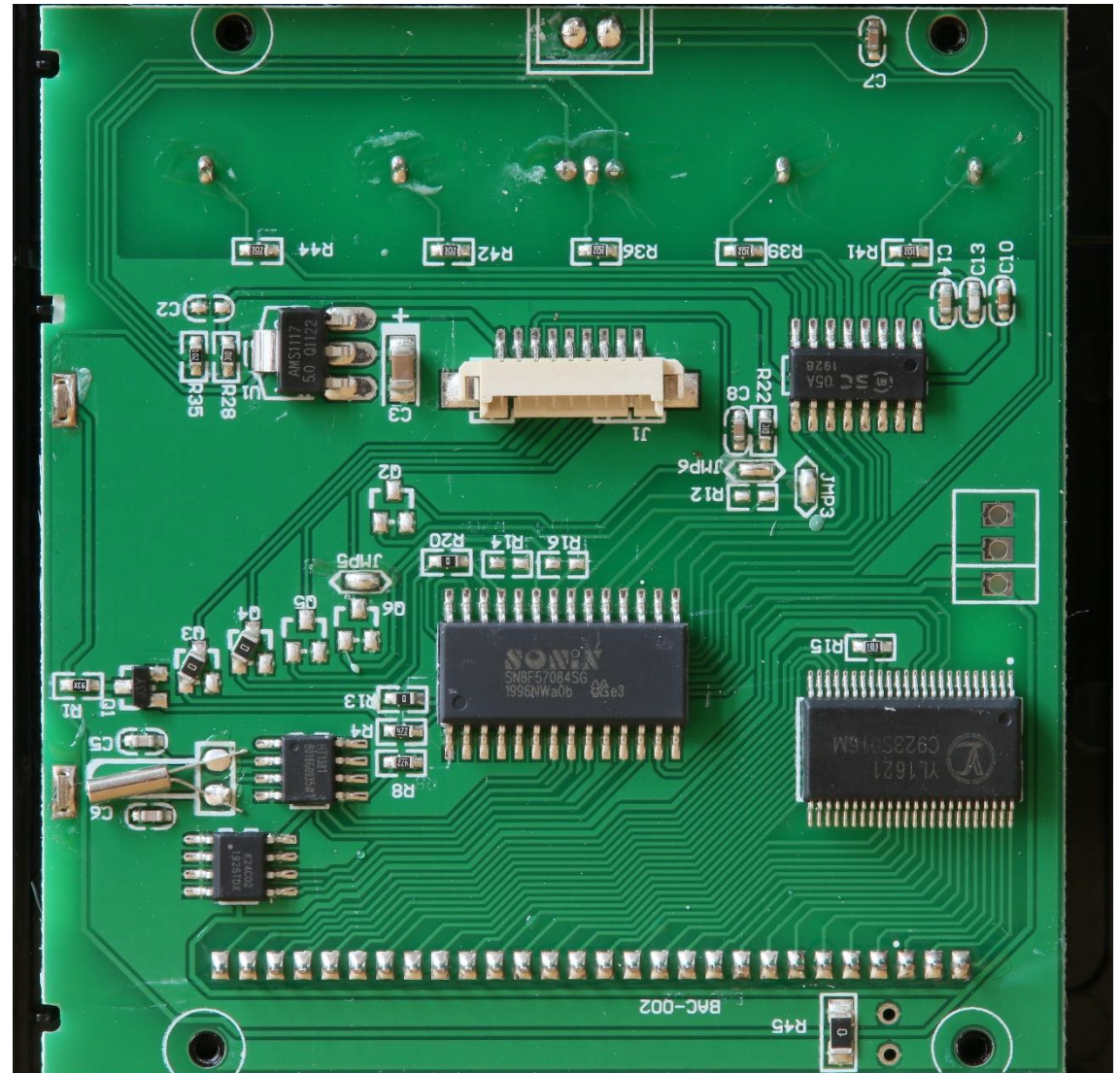


Image of NON-WiFi-Version:

There is no ESP8266 Chip. The PCB Layout is completely different.

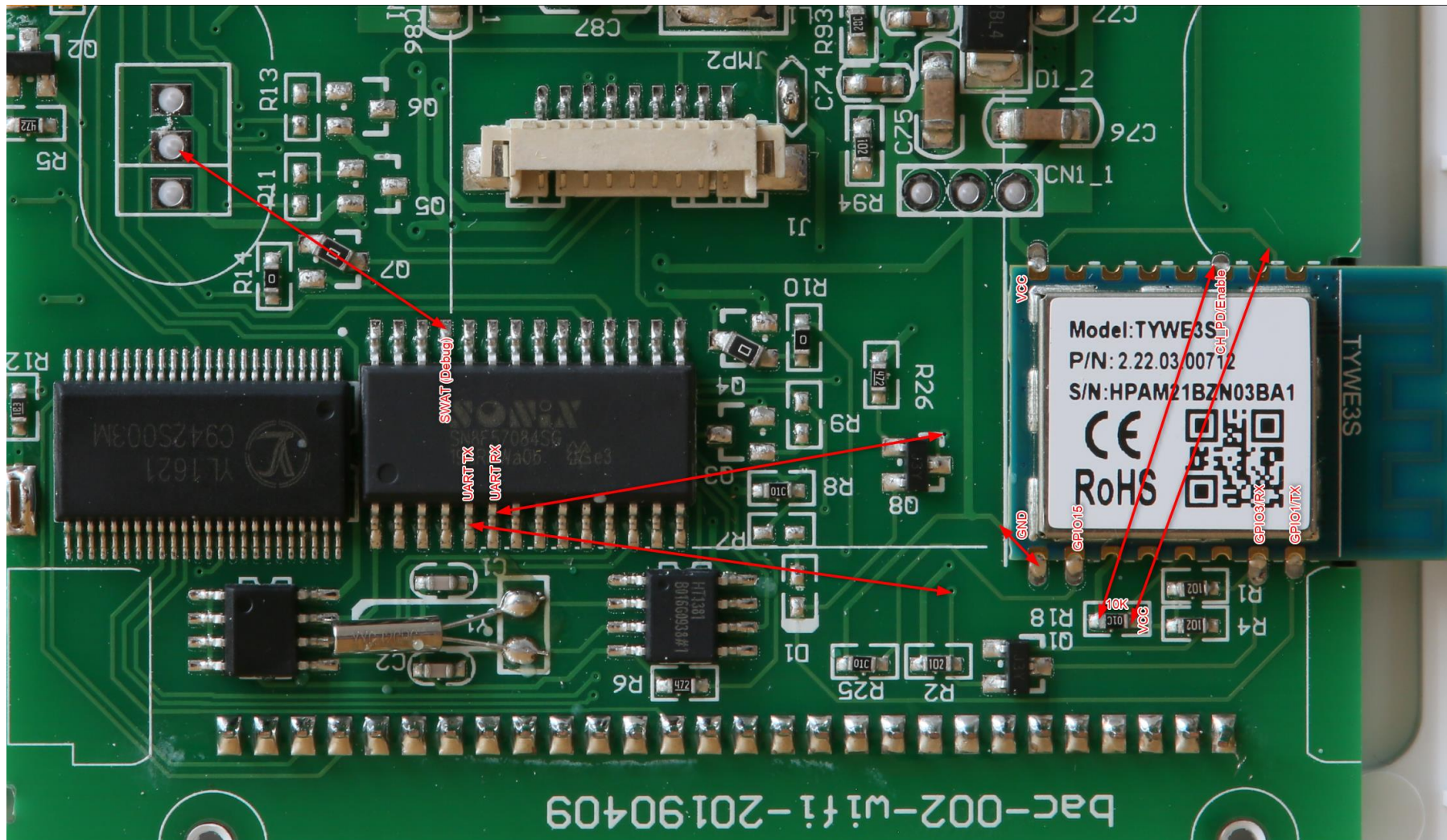
But many chips are the same, especially SONIX SN8F57084 8051-based CPU (<http://www.sonix.com.tw/article-en-3562-21372>) (MCS-51, yeah, from 1980).



4.6 SN8F57084K/S/T (SKDIP28/SOP28/TSSOP28)

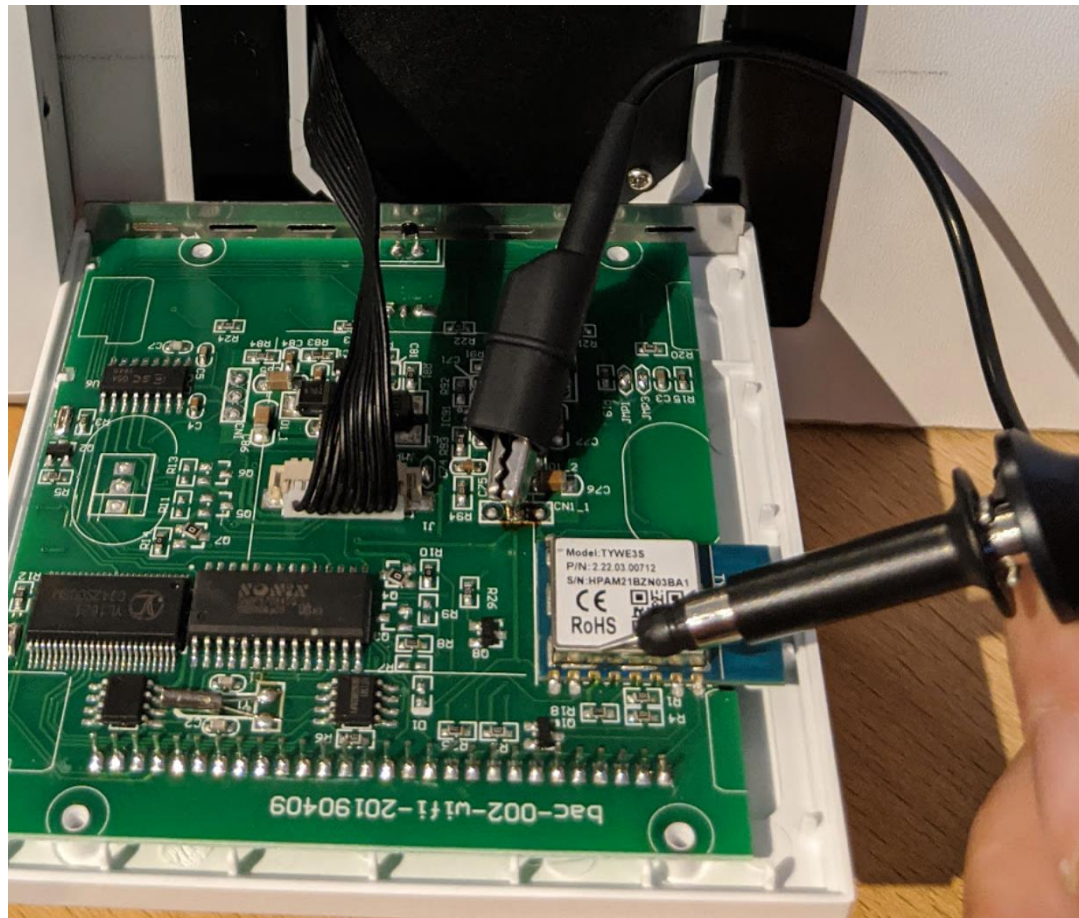
VSS	1	U	28	VDD
XIN/P0.0	2		27	P5.4/AVREFH
XOUT/P0.1	3		26	P5.5/AVREFL
RST/P0.2	4		25	P4.0/AIN0/SWAT
UTX/P0.5	5		24	P4.6/AIN6/PWM10
URX/P0.6	6		23	P4.7/AIN7/PWM11
SSN/P0.7	7		22	P5.0/AIN8/PWM20
MOSI/T2COM1/P1.1	8		21	P5.1/AIN9/PWM21
MISO/T2COM2/P1.2	9		20	P5.2/AIN10/PWM30
SCK/T2COM3/P1.3	10		19	P5.3/AIN11/PWM31
SCL/P1.4	11		18	P3.3/OP1N
SDA/P1.5	12		17	P3.4/OP1P/T2CC0
T2RL/INT1/P2.2	13		16	P3.5/OP1O/T2CC1
T2/INT2/P2.3	14		15	P2.6/CM1N

The specs of MCU are showing that UART TX and UART RX are PIN 5 and 6.

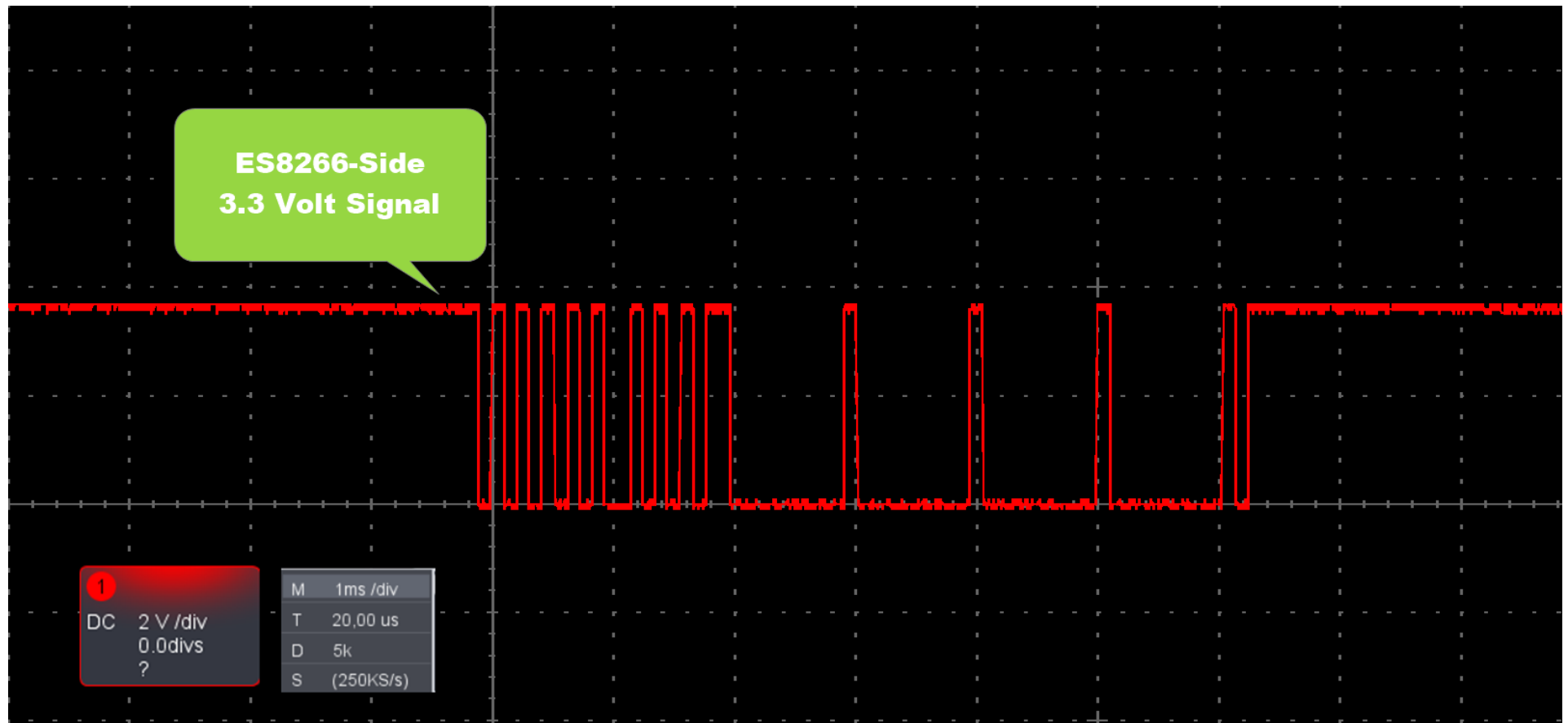


Diagnose of serial connection between MCU and WiFi-Chip.

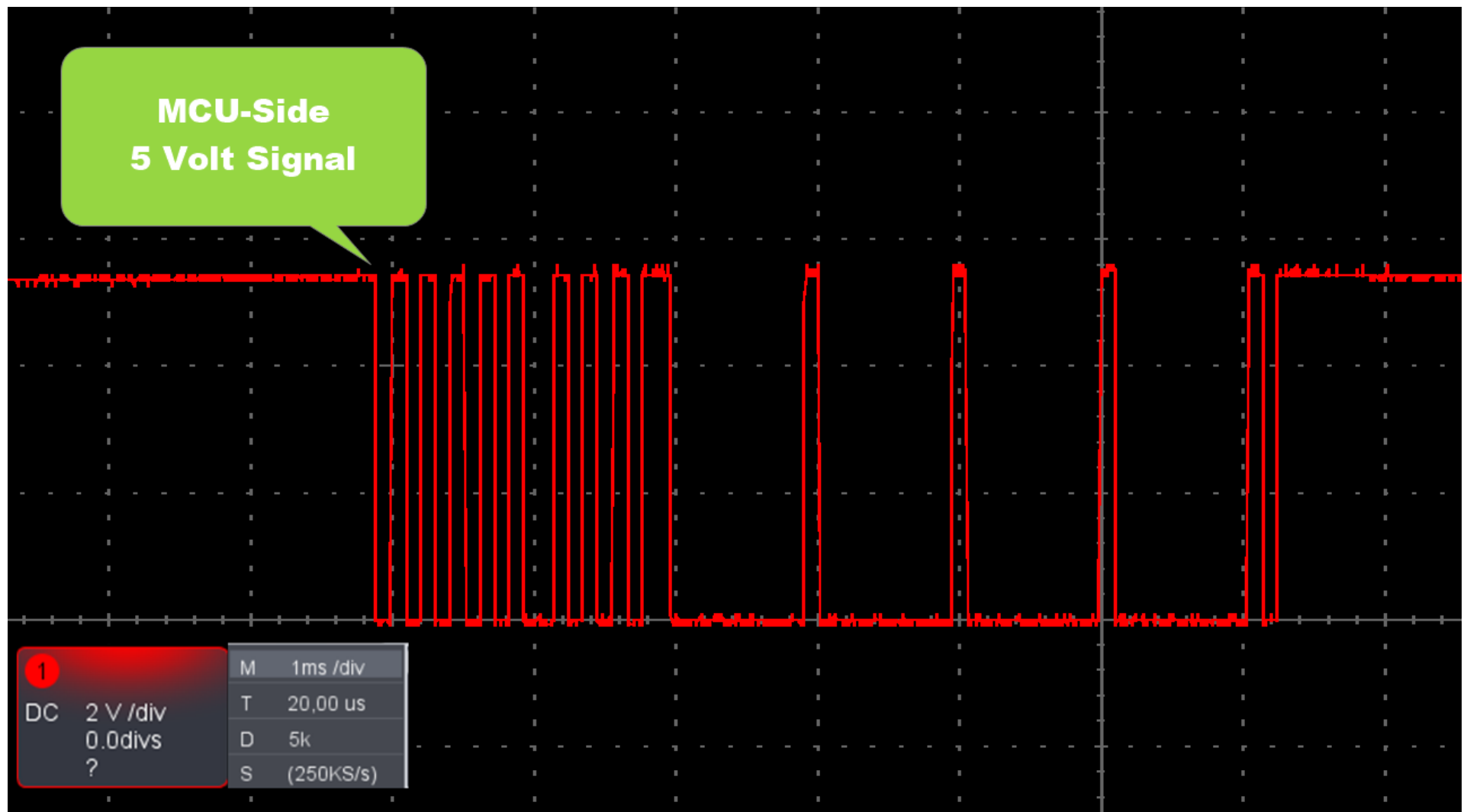
There are transistors in-between the serial connection. Let's check the signal with an Oscilloscope.



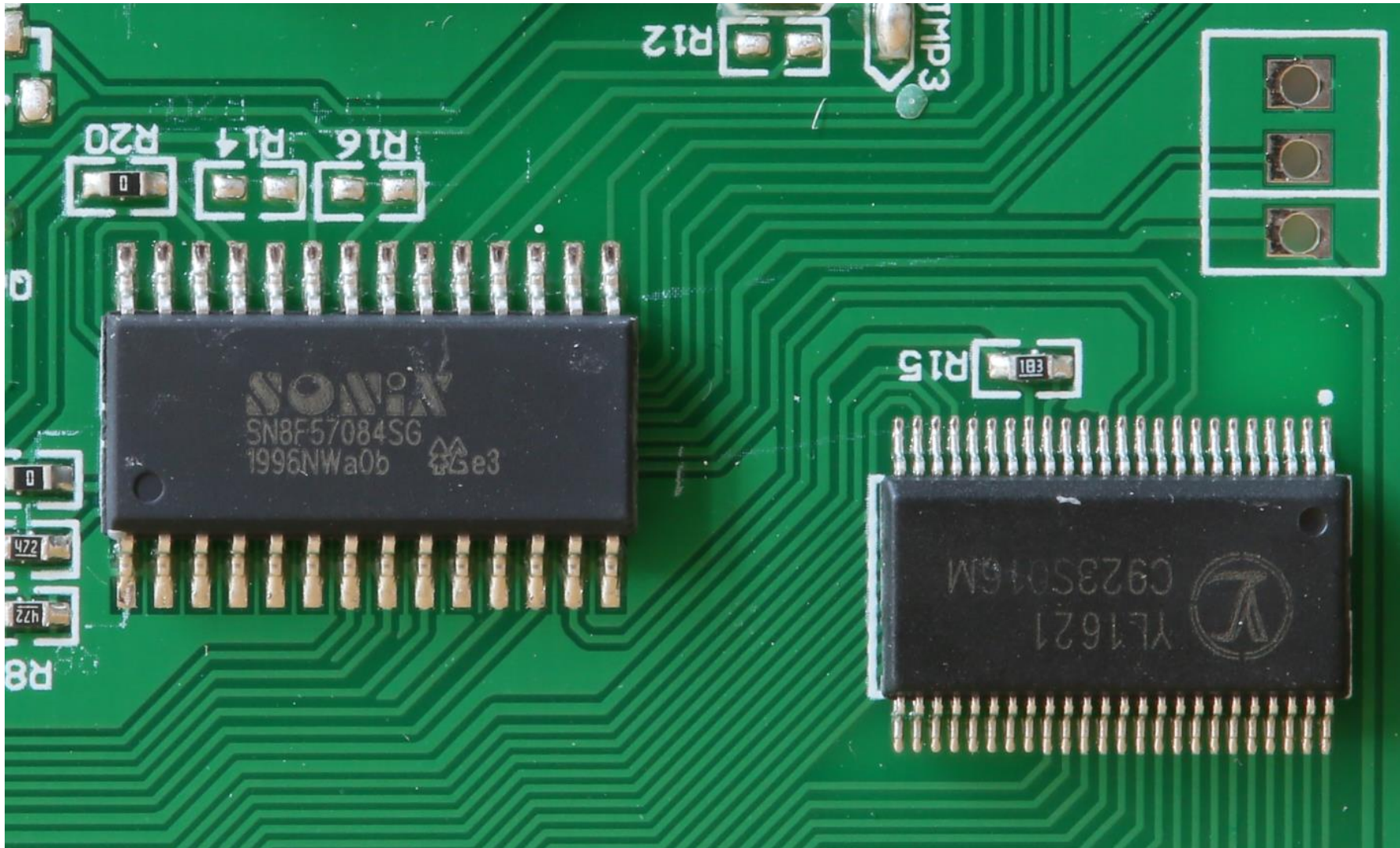
At ESP Serial in/out (GPIO 3/1) there is a 3,3 Volt signal.



At UART-TX/UART-RX (PIN 5/6) of MCU-CPU there is a 5 Volt signal.



Checking the UART-TX/UART-RX Pins of SONIX-MCU-Chip at **non**-Wifi Version there is just a constant 5 Volt level, but no data.
-> So there seems to be another software on MCU and UART is disabled.



Conclusion:

An Upgrade to WiFi Version seems to impossible.

Next to ESP8266 Chip you would need a TTL-Level-Shifter.

And you need 3.3 Volt for ESP Chip (WiFi Version has 5 Volt and 3.3 Volt regulator).

Also the software on the MCU-Chips seems to be different. No Signal Output on UART at Non-WiFi-Version.

So buy an WiFi Version if you want WiFi.