RF power meter using HP477 probeB
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This digital power meter uses a Hewlett Packard HP477 probeB.
The advantage of this probe is that it is almost independent of the input frequency up to 10 GHz, which is not the case with commercial integrated circuits.
This probe is available from Marcel F1GE f1ge.mg@gmail.com

The power measurement is carried out by measuring, without an RF signal then with an RF signal, the voltage at the terminals of the probe.

The assembly includes an HP477A probe, an M5stack Core and an electronic measurement circuit. The voltage measurement is performed by aA/D converterADS1115.

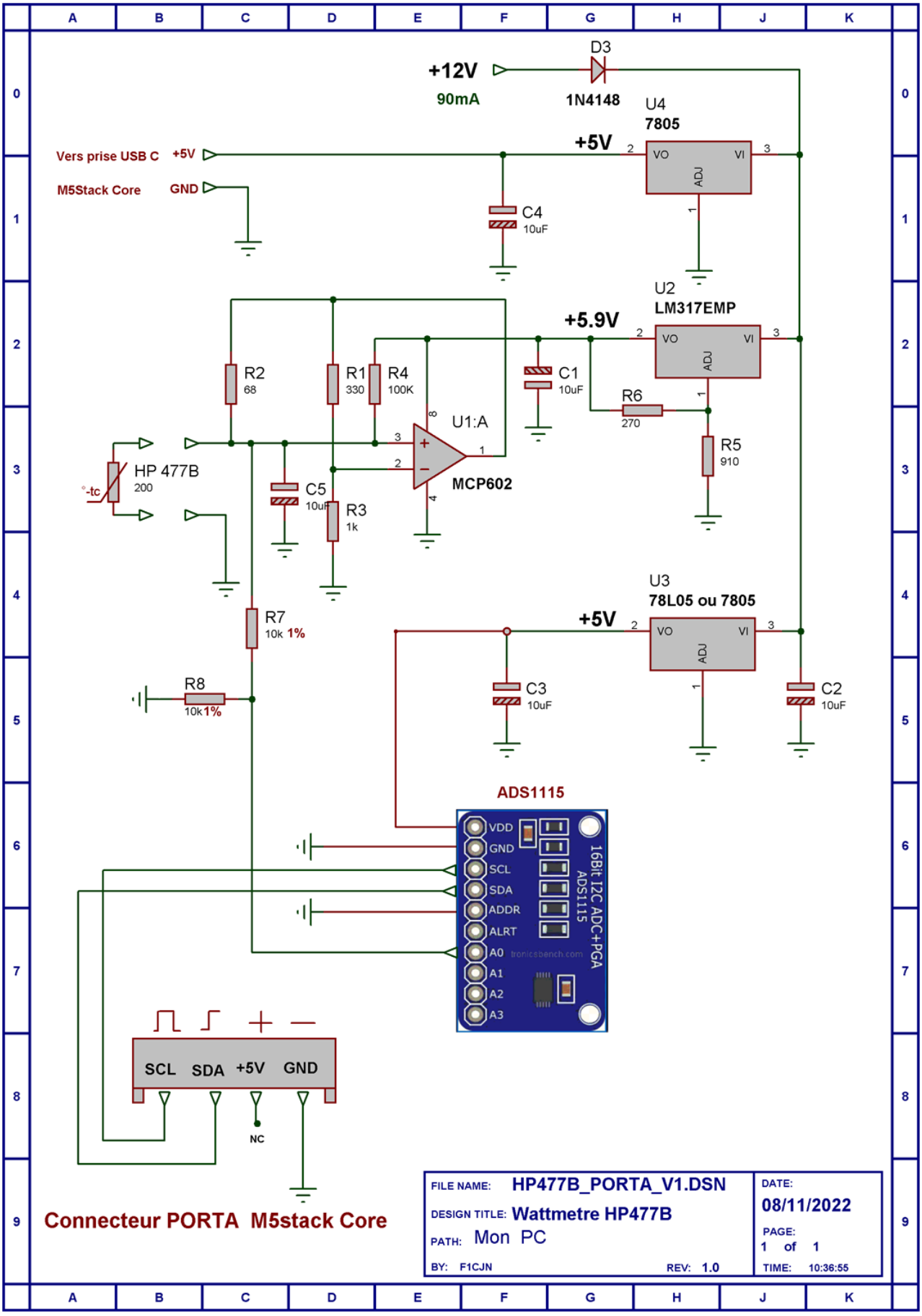
Functioning
When powering up, if the electronic assembly is not powered or present, the M5Stack displays “ADS1115 “not connected”.

Left button: it compensates the reading when an attenuator is mounted upstream of the probe (from 0 to 40 dB) which allows maximum reading10 mW with 0 dB attenuation and100Wwith 40dB of attenuation.
Attenuation is displayed behind the needle

Central button: it is used to zero the device without RF signal input. It is necessary to wait approximately 30 seconds for the probe to stabilize in temperature before carrying out the zero

Right button: It is used to read the voltage measured at the terminals of the probe, ie approximately 2.5 to 2.6V without signal at the input and approximately 1.7 to 1.8V at full scale.

A second press on the key allows you to return to dBm/mW.


+12V
90mA
D3
1N4148
U4
7805
+5V
Vers prise USB C
+5V
M5Stack Core
GND
C4
10uF
U2
LM317EMP
+5.9V
R2
68
R1
330
R4
100K
C1
10uF
R6
270
R5
910
U1:A
MCP602
HP 477B
200
°tc
C5
10uF
R3
1k
U3
78L05 ou 7805
+5V
R7
10k 1%
R8
10k1%
C3
10uF
C2
10uF
ADS1115
VDD
GND
SCL
SDA
ADDR
ALRT
A0
A1
A2
A3
16Bit I2C ADC+PGA
ADS1115
SCL
SDA
+5V
GND
NC
Connecteur PORTA M5stack Core
FILE NAME: HP477B_PORTA_V1.DSN
DESIGN TITLE: Wattmetre HP477B
PATH: Mon PC
BY: F1CJN
REV: 1.0
DATE:
08/11/2022
PAGE:
1 of 1
TIME: 10:36:55

Software: the program compiles with the Arduino V1 or V2 IDE. Check during use that you have loaded the librariess, especially M5stack and ADS1115_WE.

PFor Arduino novices follow the procedure described here

http://docs.m5stack.com/en/quick_start/m5core/arduino

Make sure everything is in place.
Dwithout tools, you have to take the M5Stack-Core-ESP32 card
load the libraries if you had never loaded them
- ADS1115_WE
- M5Stack
- EEProm
-Wire

Note: for those who wish, the absolute reading of the probe can be adjusted by modifying thehas the value of“float correction” parameteraround line 47.