

Dlouhodobá maturitní práce

Inteligentní tavná pistole

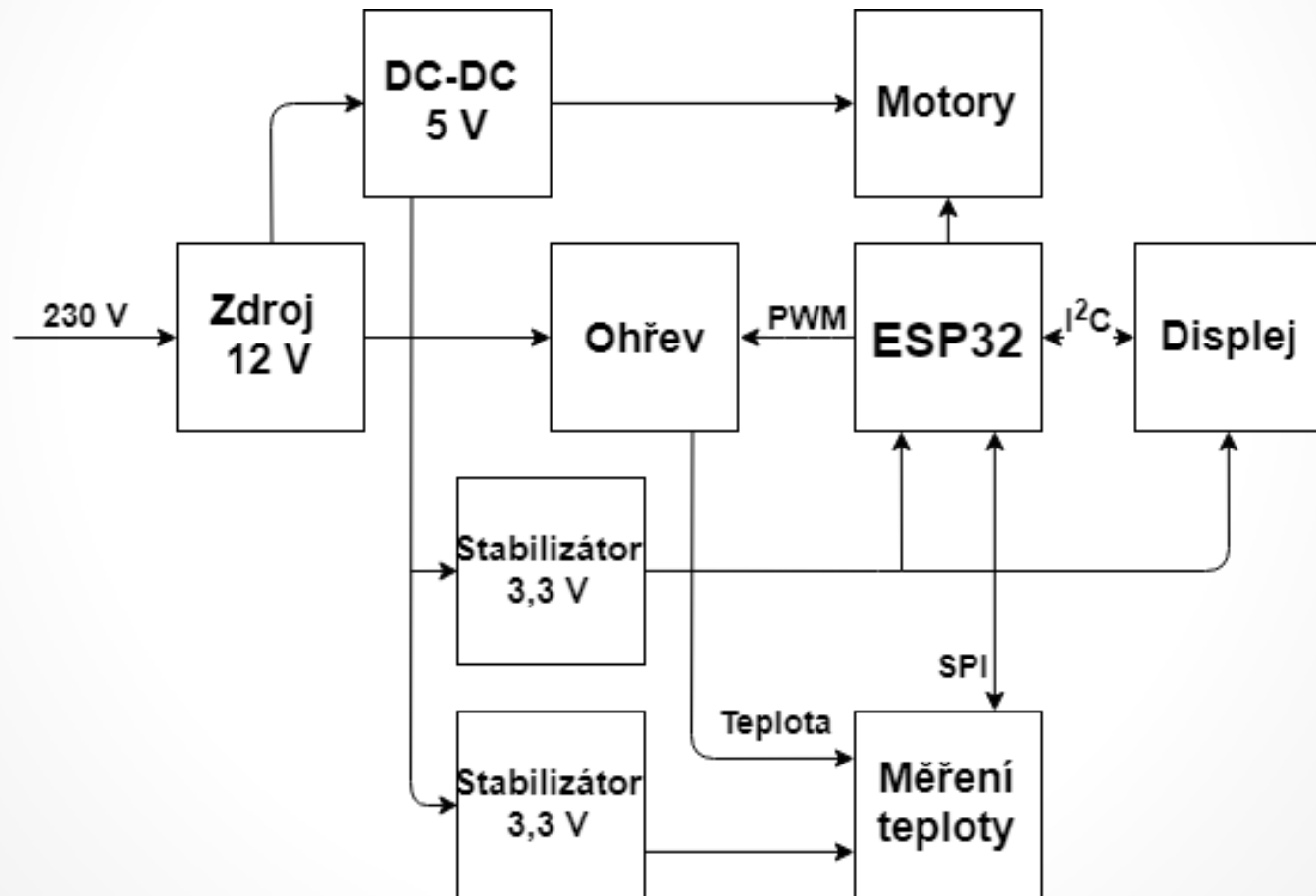
Martin Kousal, S4E

Střední průmyslová škola a Vyšší odborná škola Brno, Sokolská,
příspěvková organizace

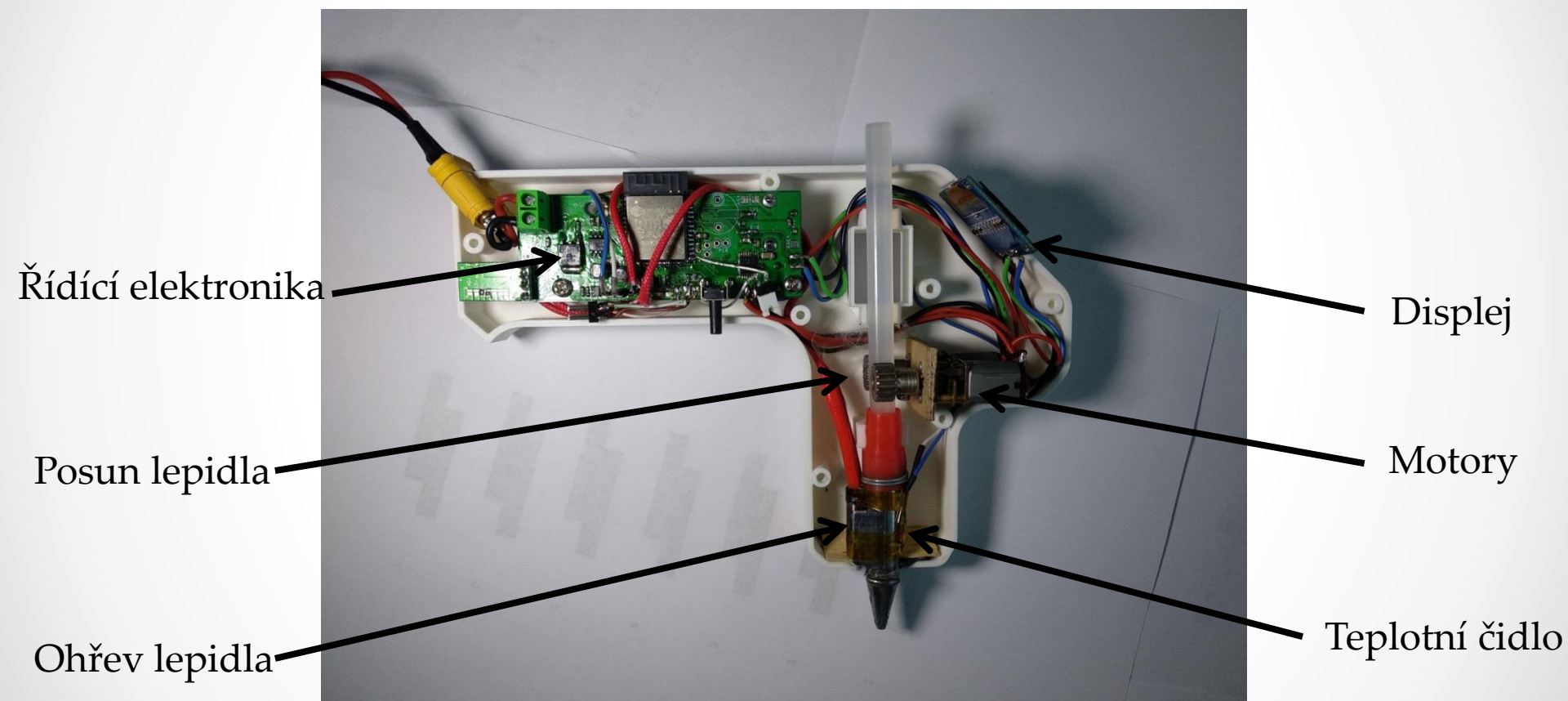
Cíl práce



Blokové schéma zapojení



Základní komponenty

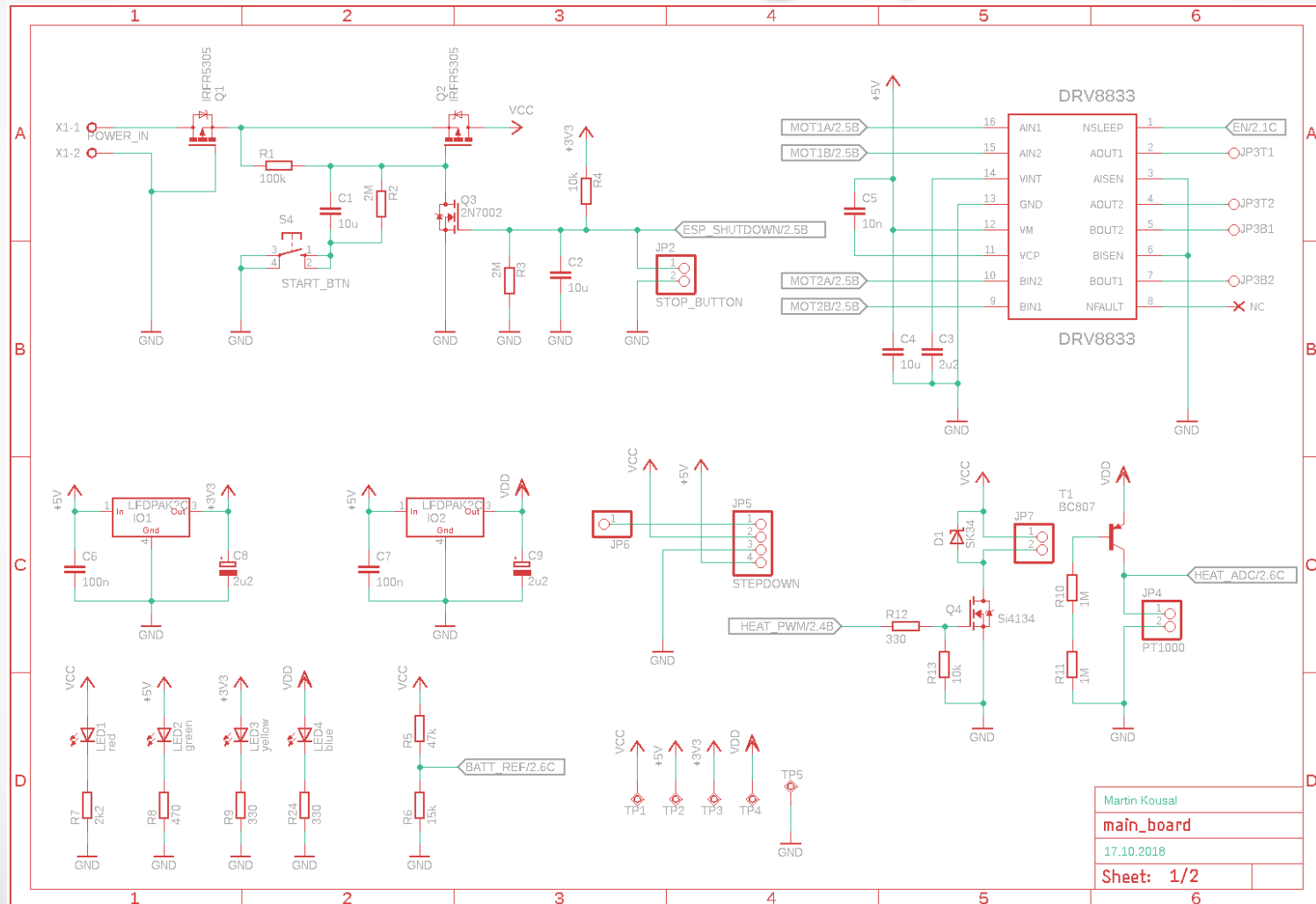


Řídící mikrokontrolér – ESP32

- Hlavní výhody:
- Wi-Fi + Bluetooth
- Vysoký výkon
- Podpora velkého množství sběrnic
- Nízká cena
- Malé rozměry (25 x 18 mm)



Návrh zapojení



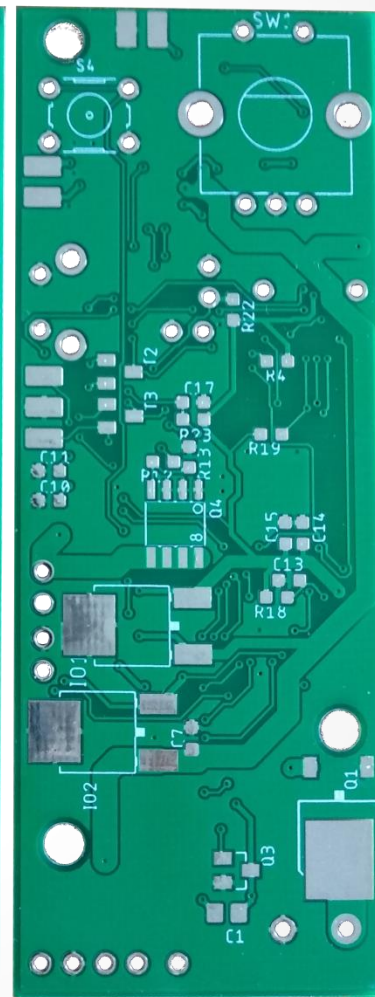
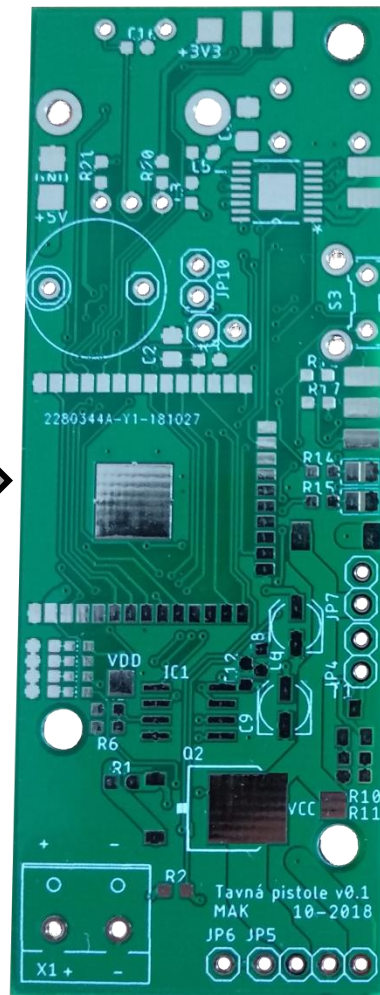
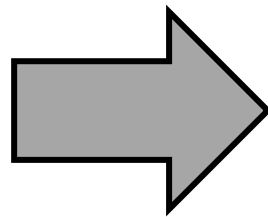
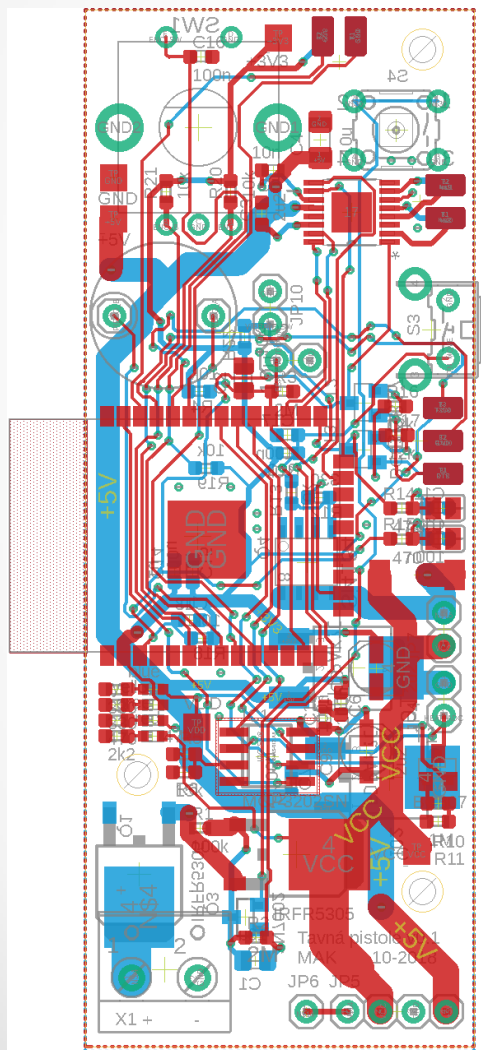
Martin Kousal

main_board

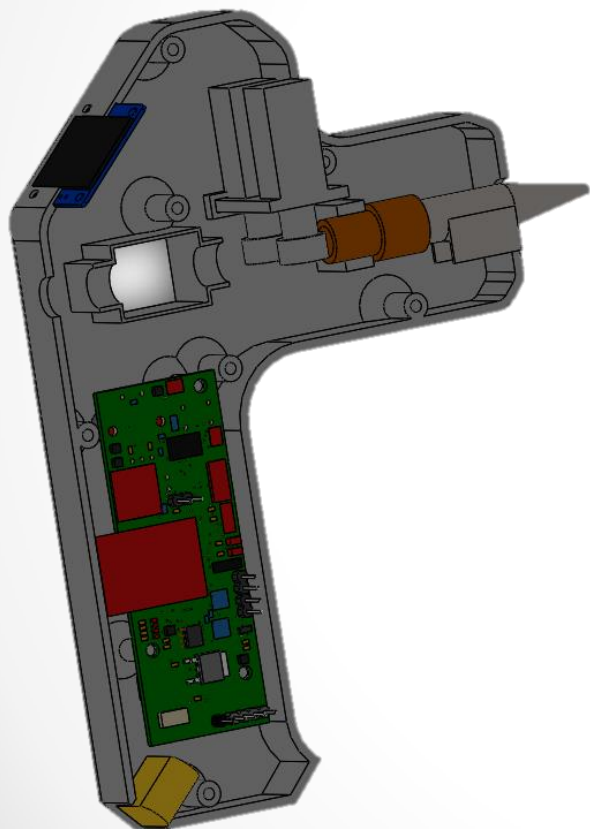
17.10.2018

Sheet: 1/2

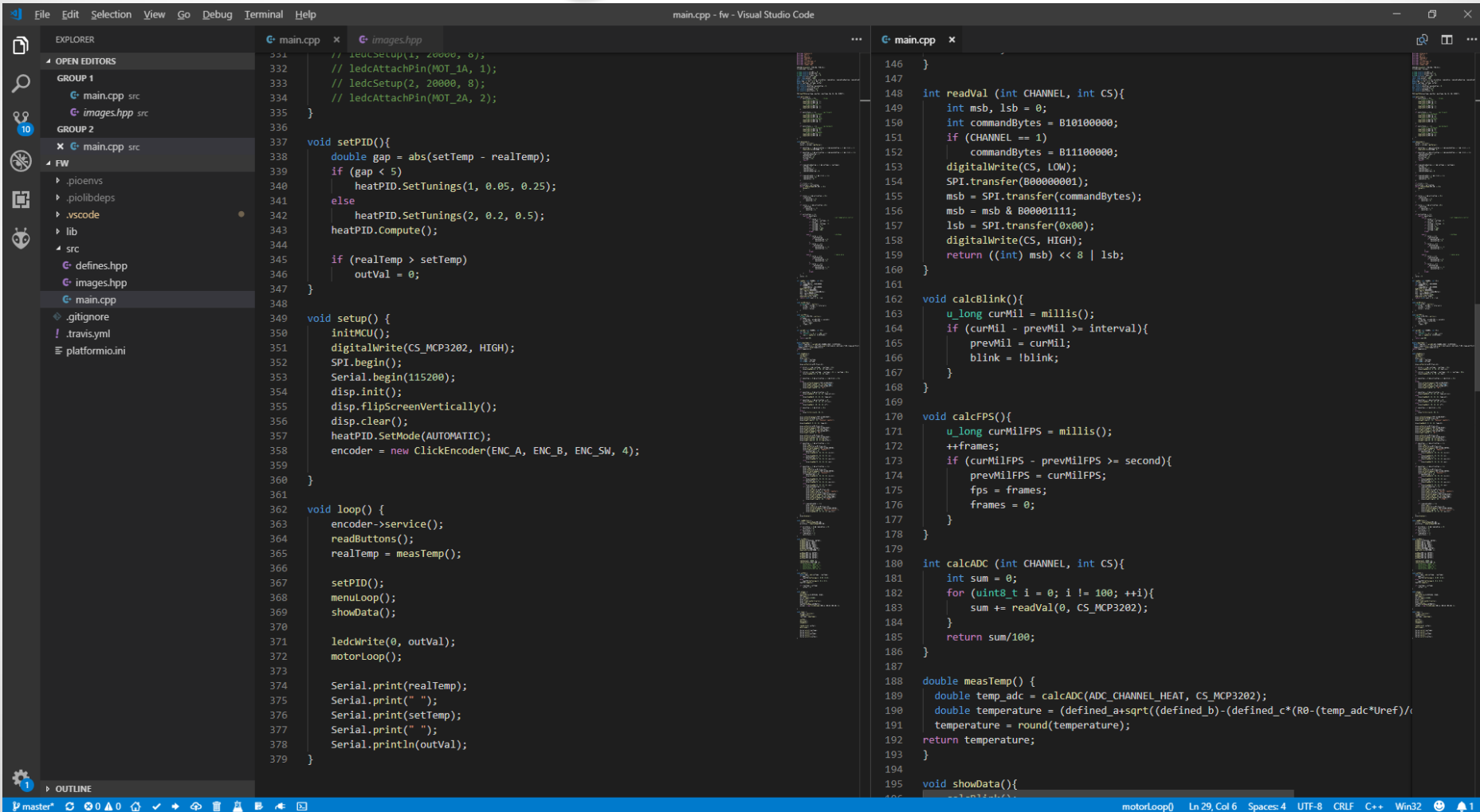
Výroba DPS



Návrh a výroba obalu



Programování

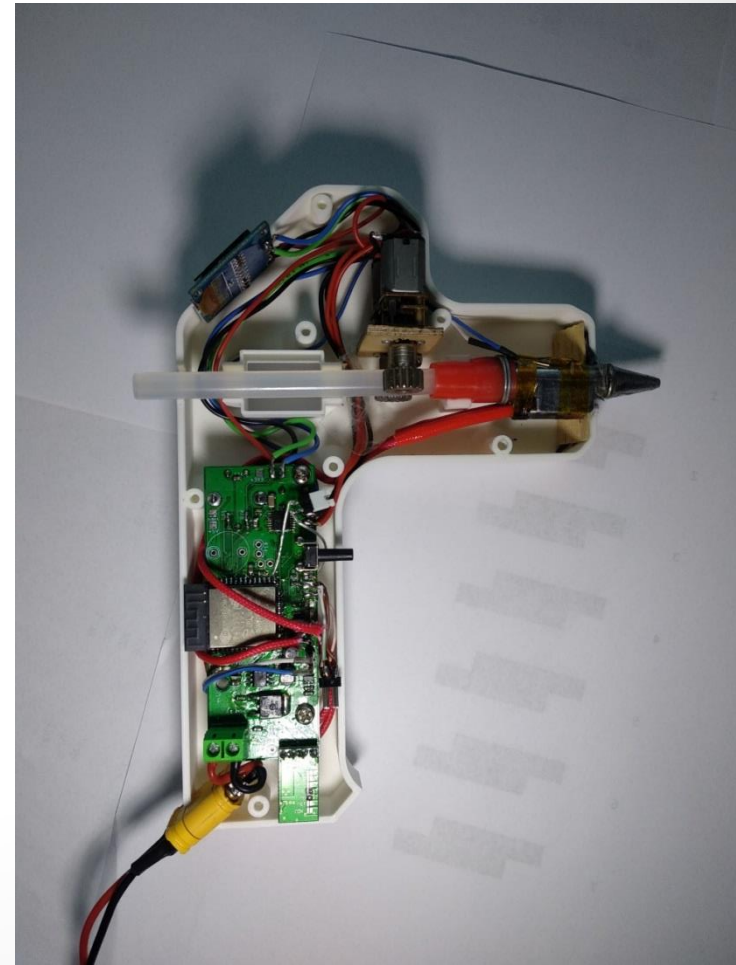


The image shows a Visual Studio Code editor window with a dark theme. The Explorer sidebar on the left shows a project structure with folders for .pioenvs, .pio/libdeps, .vscode, lib, and src. The src folder is expanded, showing files like defines.hpp, images.hpp, and main.cpp. The main.cpp file is open in the editor, showing C++ code for a motor control system. The code includes headers for SPI, Serial, and a custom ClickEncoder. It defines a PID controller and a menu system. The main loop calls setup(), reads buttons, and updates the motor speed based on a PID controller. The code is written in C++ and uses the Arduino IDE's digitalWrite and digitalWriteFast functions. The status bar at the bottom shows the current file is motorLoop0, line 29, column 6, with 6 spaces, UTF-8 encoding, CRLF line endings, and C++ language. The window title is 'motorLoop0 Ln 29, Col 6 Spaces: 4 UTF-8 CRLF C++ Win32'.

```
main.cpp
331 // ledcSetup(2, 20000, 8);
332 // ledcAttachPin(MOT_1A, 1);
333 // ledcSetup(2, 20000, 8);
334 // ledcAttachPin(MOT_2A, 2);
335 }
336
337 void setPID(){
338     double gap = abs(setTemp - realTemp);
339     if (gap < 5)
340         heatPID.SetTunings(1, 0.05, 0.25);
341     else
342         heatPID.SetTunings(2, 0.2, 0.5);
343     heatPID.Compute();
344
345     if (realTemp > setTemp)
346         outVal = 0;
347 }
348
349 void setup() {
350     initMCU();
351     digitalWrite(CS_MCP3202, HIGH);
352     SPI.begin();
353     Serial.begin(115200);
354     disp.init();
355     disp.flipScreenVertically();
356     disp.clear();
357     heatPID.SetMode(AUTOMATIC);
358     encoder = new ClickEncoder(ENC_A, ENC_B, ENC_SW, 4);
359
360 }
361
362 void loop() {
363     encoder->service();
364     readButtons();
365     realTemp = measTemp();
366
367     setPID();
368     menuLoop();
369     showData();
370
371     ledcWrite(0, outVal);
372     motorLoop();
373
374     Serial.print(realTemp);
375     Serial.print(" ");
376     Serial.print(setTemp);
377     Serial.print(" ");
378     Serial.println(outVal);
379 }
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Splnění cíle

- Možnost nastavení teploty a její automatické udržování
- Větší uživatelský komfort
- Výrazné zjednodušení práce
- Úspora času a energie



Děkuji za pozornost