Carrera 2.0

Neu mit Spurwechsel!

Julian Egbert und Finn Schöllkopf

Recap - Zwischenstandsvortrag

Projektidee

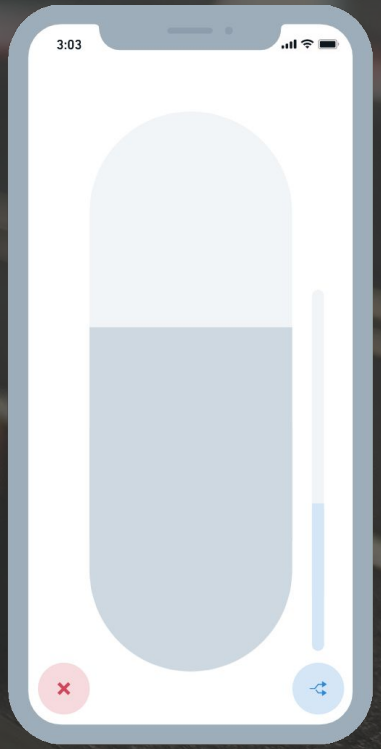
Alternative Steuerung von Carrera-Autos per Handy/Computer

Software

- ESP öffnet WiFi Access Point
- Steuerungs-Webseite im Browser erreichbar
  - Geschwindigkeitsregler zur Bedienung
  - Aktivierung der IR-Led

- OTA Updates

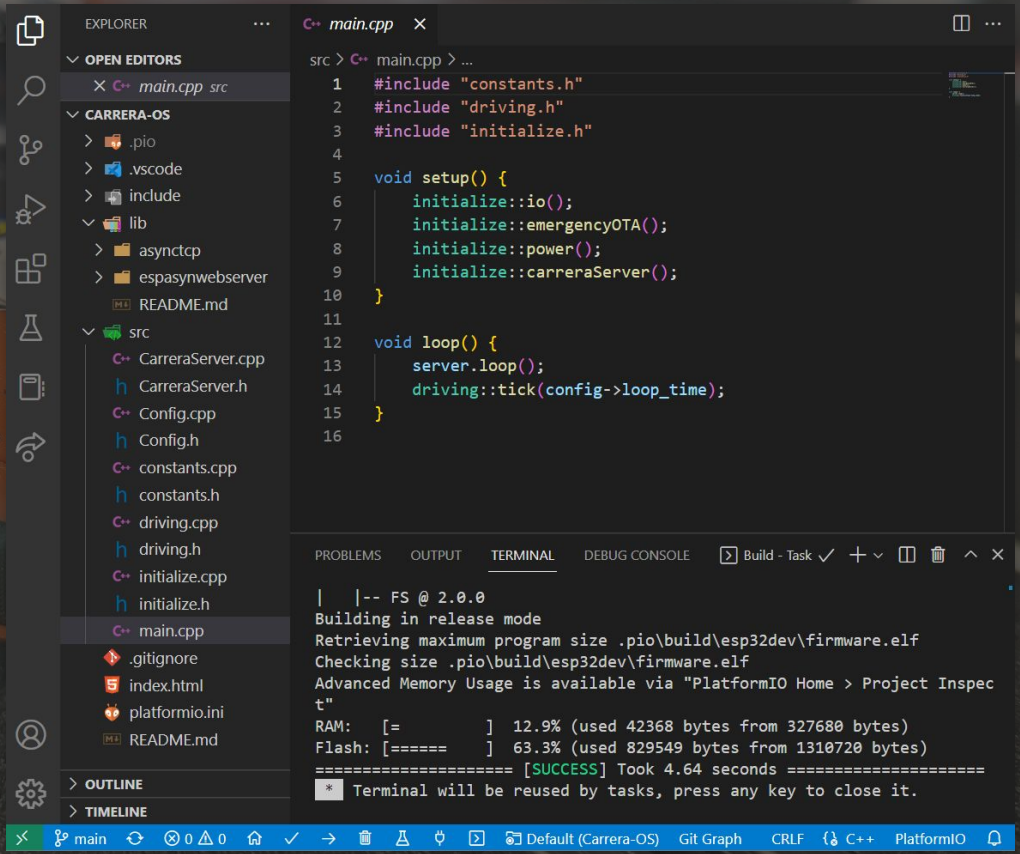
Aktuelles UI



Mock-Entwurf des UI

Platform IO & VS-Code

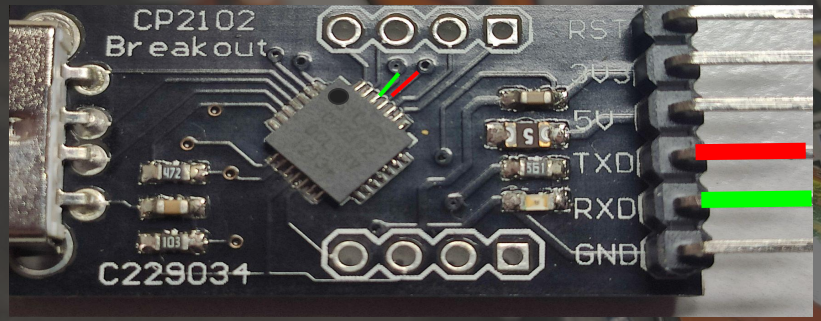
- Kompilieren und flashen
- Übersichtliche IDE
- Easy to use
- Git-Integration

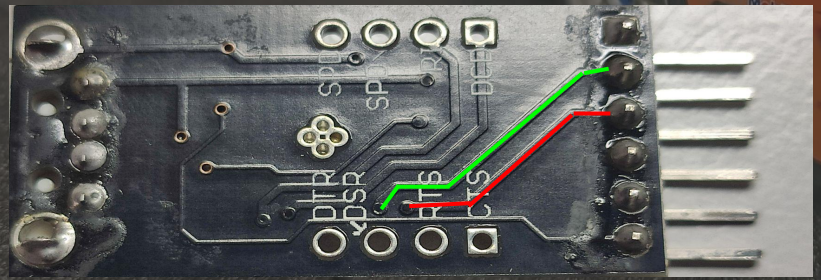


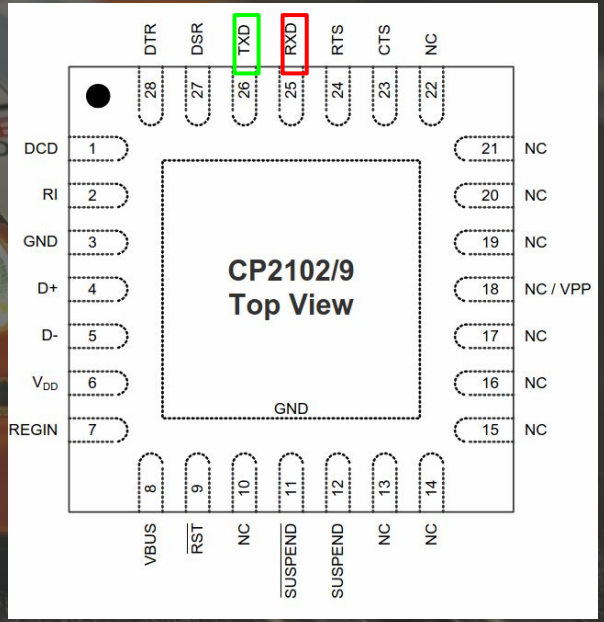
UART-Bridge

ESP32 programming

Initial programming of the ESP32 must be done via UART with an external USB to UART bridge. For this connect the RX and TX pins to the UART bridge. Remember to reverse it, TX of the UART bridge must be RX on the ESP and vice versa. Also remember to use a 3.3V UART bridge, NOT a 5V one!





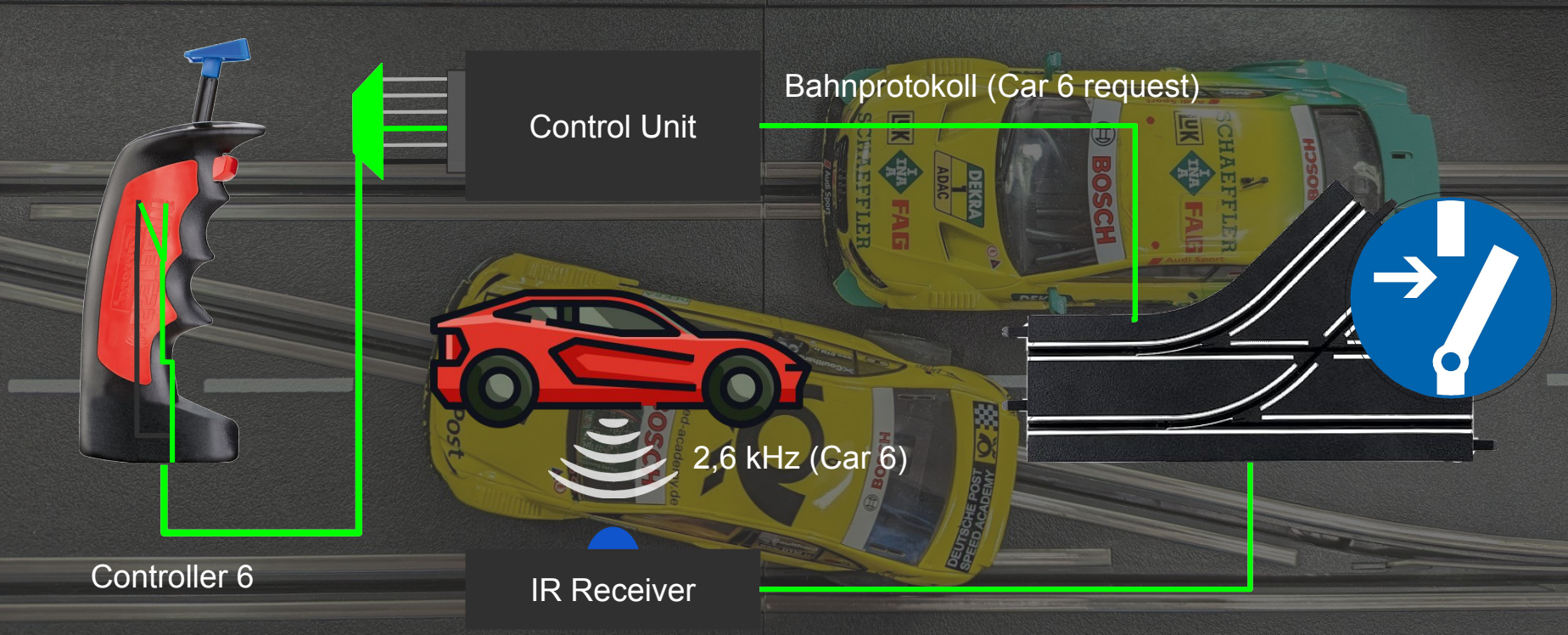


Neue Features

und ihre Probleme

Spurwechsel

IR-LED - Weichenstellung

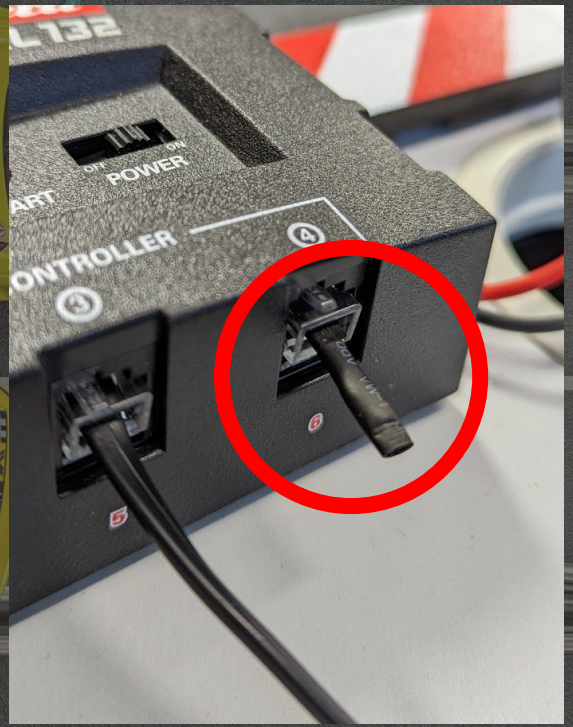


http://redlichelectronics.de/ir-diode.html

Wie werden wir den Controller los?

IR-Lead - Lösung

Dummy Controller



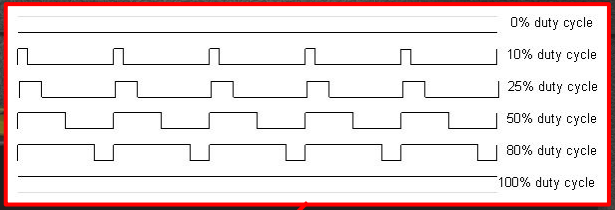
IR-LED - Code Example

Initialization

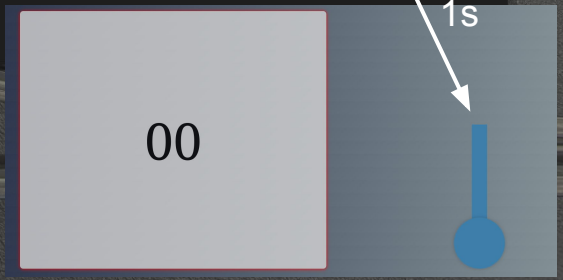
```
config->frequency = preferences
    .getInt("frequency", config->frequency);
initialize::init_irled(config->frequency);
```

```
void initialize::init_irled(int frequency) {
    ledcSetup(IRLED_PWM_CHANNEL, frequency, 8);
    ledcAttachPin(IRLED_PIN, IRLED_PWM_CHANNEL);
    ledcWrite(IRLED_PWM_CHANNEL, 0);
}
```

Activation




```
void CarreraServer::enableIRLed() {
    ledcWrite(IRLED_PWM_CHANNEL, 128);
    irl_toggle_time = millis();
    irl_enabled = true;
}

void CarreraServer::updateIRLed() {
    if (millis() - irl_toggle_time >= config->irl_time) {
        ledcWrite(IRLED_PWM_CHANNEL, 0);
        irl_enabled = false;
    }
}
```



Controllerunterstützung

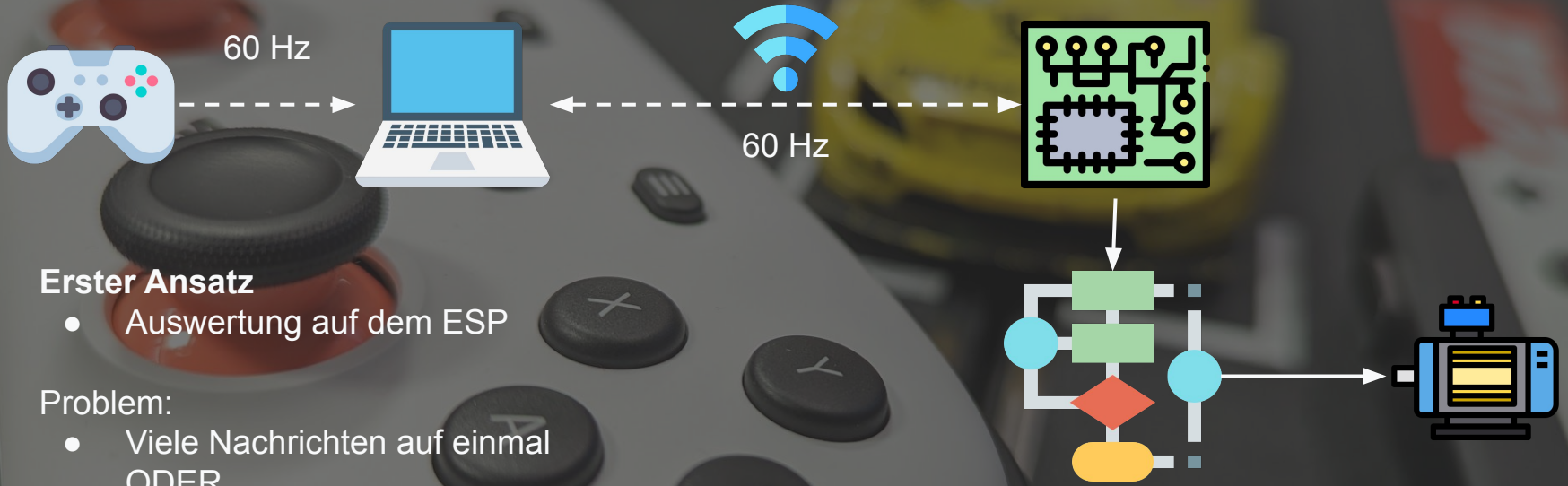
Controllerunterstützung

- Erweiterung der Steuerungsmöglichkeiten
- Unterschiedlich nach Controllertyp

https://stadt-bremerhaven.de/wp-content/uploads/2019/06/Google-Stadia-Controller.jpg

Joycon: https://gzhls.at/i/73/65/2387365-n0.jpg

Controllerunterstützung - Umsetzung



Erster Ansatz

- Auswertung auf dem ESP

Problem:

- Viele Nachrichten auf einmal
  ODER
- Keine Nachrichten

Controllerunterstützung - Umsetzung

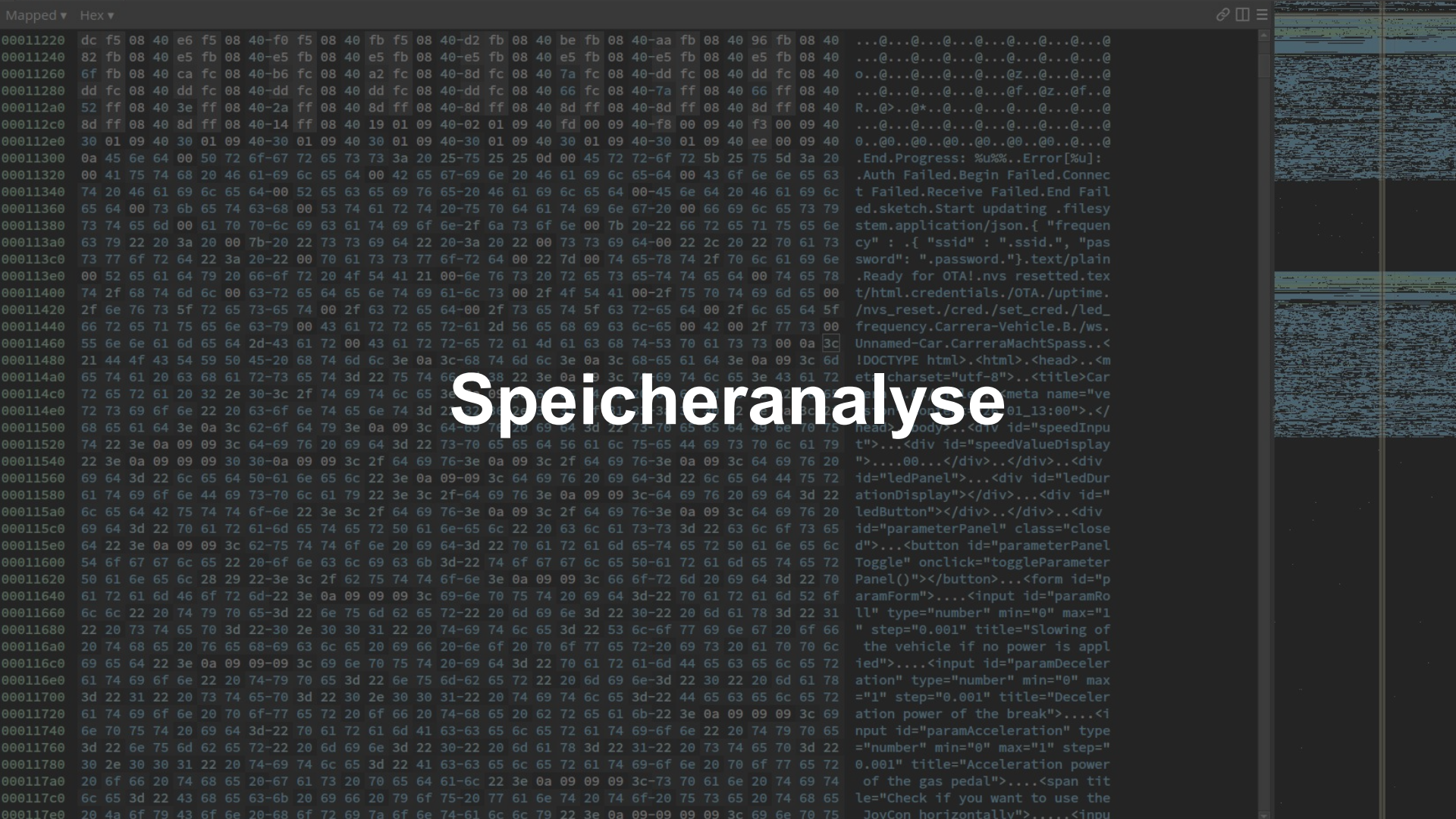
Aktueller Ansatz

- Auswertung im Frontend

Vorteil:

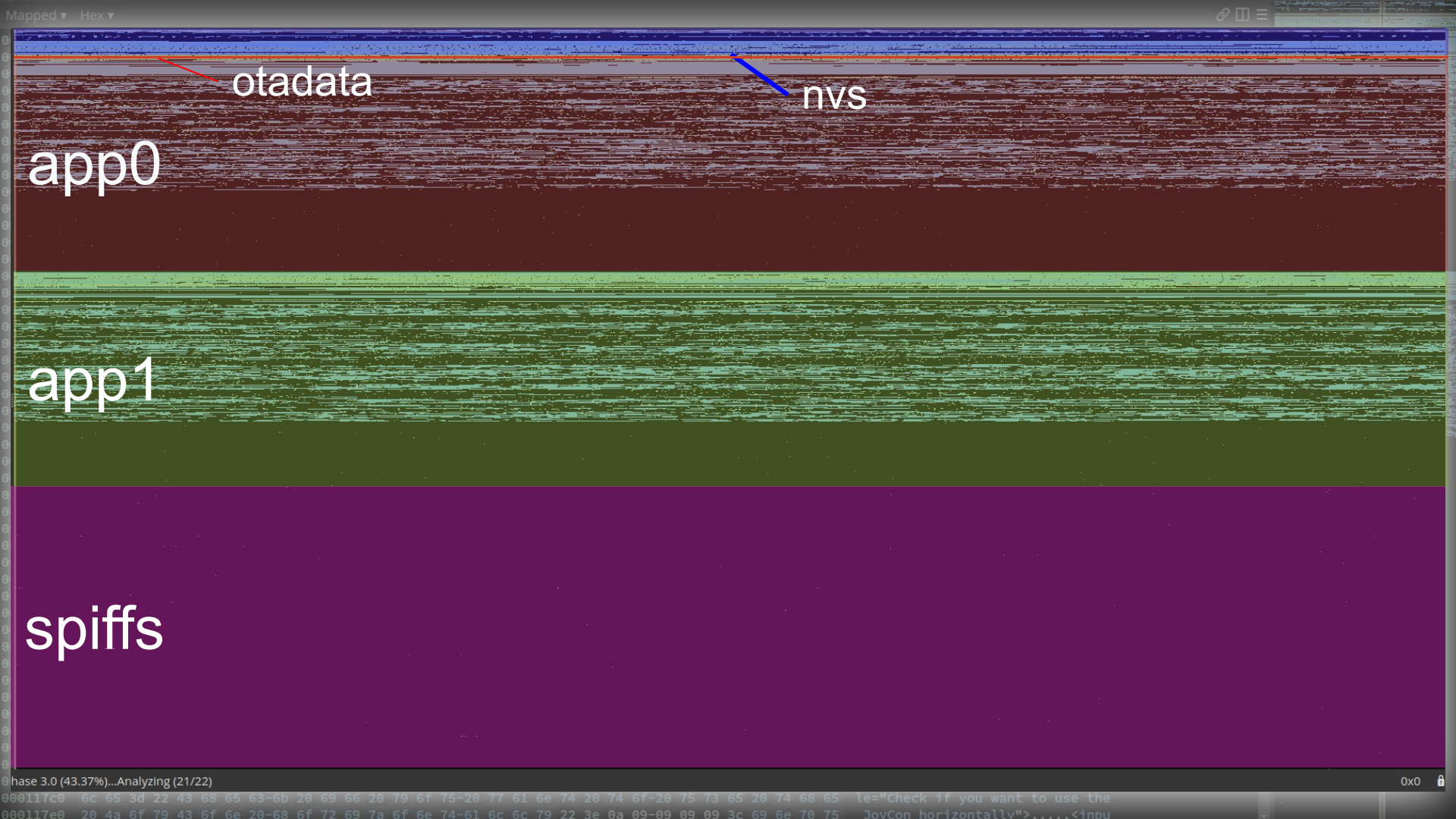
- Kontinuierlicher Nachrichtenfluss
- Konfigurationsparameter

Speicheranalyse



Flash-Partitionen

Name	Type	SubType	Offset	Size
nvs	data	nvs	0x9000	20K
otadata	data	ota	0xe000	8K
app0	app	ota_0	0x10000	1280K
app1	app	ota_1	0x150000	1280K
spiffs	data	spiffs	0x290000	1472K


Mapped ▾ Hex ▾
otadata
nvs
app0
app1
spiffs
hase 3.0 (43.37%)...Analyzing (21/22)
0x0
000117c0 6c 65 3d 22 43 68 65 63-6b 20 69 66 20 79 6f 75-20 77 61 6e 74 20 74 6f-20 75 73 65 20 74 68 65 le="Check if you want to use the
000117e0 20 4a 6f 79 43 6f 6e 20-68 6f 72 69 7a 6f 6e 74-61 6c 6c 79 22 3e 0a 09-09 09 09 3c 69 6e 70 75 JoyCon horizontally">.....<inpu

Mapped ▾ Hex ▾

```
00011220  dc f5 08 40 e6 f5 08 40-f0 f5 08 40 fb f5 08 40-d2 fb 08 40 be fb 08 40-aa fb 08 40 96 fb 08 40  ...@...@...@...@...@...@...@...@
00011240  82 fb 08 40 e5 fb 08 40-e5 fb 08 40 e5 fb 08 40-e5 fb 08 40 e5 fb 08 40-e5 fb 08 40 e5 fb 08 40  ...@...@...@...@...@...@...@...@
00011260  6f fb 08 40 ca fc 08 40-b6 fc 08 40 a2 fc 08 40-8d fc 08 40 7a fc 08 40-dd fc 08 40 dd fc 08 40  o..@...@...@...@...@z..@...@...@
00011280                                                                                                  ...@...@...@...@...@f..@z..@f..@
000112a0                                                                                                  R..@>..@*..@...@...@...@...@...@
000112c0                                                                                                  ...@...@...@...@...@...@...@...@
000112e0                                                                                                  0..@0..@0..@0..@0..@0..@...@...@
00011300                                                                                                  .End.Progress: %u%%..Error[%u]:
00011320                                                                                                  .Auth Failed.Begin Failed.Connec
00011340                                                                                                  t Failed.Receive Failed.End Fail
00011360                                                                                                  ed.sketch.Start updating .filesy
00011380                                                                                                  stem.application/json.{ "frequen
000113a0                                                                                                  cy" : .{ "ssid" : ".ssid.", "pas
000113c0                                                                                                  sword": ".password."}.text/plain
000113e0                                                                                                  .Ready for OTA!.nvs resetted.tex
00011400                                                                                                  t/html.credentials./OTA./uptime.
00011420                                                                                                  /nvs_reset./cred./set_cred./led_
00011440                                                                                                  frequency.Carrera-Vehicle.B./ws.
00011460                                                                                                  Unnamed-Car.CarreraMachtSpass..<
00011480                                                                                                  !DOCTYPE html>.<html>.<head>..<m
000114a0                                                                                                  eta charset="utf-8">..<title>Car
000114c0                                                                                                  rera 2.0</title>..<meta name="ve
000114e0                                                                                                  rsion" content="26.01_13:00">.</
00011500                                                                                                  head>.<body>..<div id="speedInpu
00011520                                                                                                  t">...<div id="speedValueDisplay
00011540                                                                                                  ">....00...</div>..</div>..<div
00011560                                                                                                  id="ledPanel">...<div id="ledDur
00011580                                                                                                  ationDisplay"></div>...<div id="
000115a0                                                                                                  ledButton"></div>..</div>..<div
000115c0                                                                                                  id="parameterPanel" class="close
000115e0                                                                                                  d">...<button id="parameterPanel
00011600                                                                                                  Toggle" onclick="toggleParameter
00011620                                                                                                  Panel()"></button>...<form id="p
00011640                                                                                                  aramForm">....<input id="paramRo
00011660                                                                                                  ll" type="number" min="0" max="1
00011680                                                                                                  " step="0.001" title="Slowing of
000116a0                                                                                                  the vehicle if no power is appl
000116c0                                                                                                  ied">....<input id="paramDeceler
000116e0                                                                                                  ation" type="number" min="0" max
00011700                                                                                                  ="1" step="0.001" title="Deceler
00011720                                                                                                  ation power of the break">....<i
00011740                                                                                                  nput id="paramAcceleration" type
00011760  3d 22 6e 75 6d 62 65 72-22 20 6d 69 6e 3d 22 30-22 20 6d 61 78 3d 22 31-22 20 73 74 65 70 3d 22  ="number" min="0" max="1" step="
00011780  30 2e 30 30 31 22 20 74-69 74 6c 65 3d 22 41 63-63 65 6c 65 72 61 74 69-6f 6e 20 70 6f 77 65 72  0.001" title="Acceleration power
000117a0  20 6f 66 20 74 68 65 20-67 61 73 20 70 65 64 61-6c 22 3e 0a 09 09 09 3c-73 70 61 6e 20 74 69 74  of the gas pedal">....<span tit
000117c0  6c 65 3d 22 43 68 65 63-6b 20 69 66 20 79 6f 75-20 77 61 6e 74 20 74 6f-20 75 73 65 20 74 68 65  le="Check if you want to use the
000117e0  20 4a 6f 79 43 6f 6e 20-68 6f 72 69 7a 6f 6e 74-61 6c 6c 79 22 3e 0a 09-09 09 09 3c 69 6e 70 75  JoyCon horizontally">.....<inpu
```

```
1  const char index_html[] PROGMEM = R"rawliteral(
2  <!DOCTYPE html>
3  <html>
4  <head>
5      <meta charset="utf-8">
6      <title>Carrera 2.0</title>
7      <meta name="version" content="26.01_13:00">
8  </head>
9  <body>
10     <div id="speedInput">
11         <div id="speedValueDisplay">
12             00
13         </div>
14     </div>
15     <div id="ledPanel">
16         <div id="ledDurationDisplay"></div>
17         <div id="ledButton"></div>
18     </div>
```

```
1  void CarreraServer::setCredentials(String ssid, String password) {
2      preferences.putString("ssid", ssid);
3      preferences.putString("password", password);
4  }
5
6  void CarreraServer::updateFrequency(int frequency) {
7      preferences.putInt("frequency", frequency);
8      initialize::init_irled(frequency);
9  }
10
11 void CarreraServer::setup() {
12     preferences.begin("credentials", false);
13     ssid = preferences.getString("ssid", ssid);
14     password = preferences.getString("password", password);
15
16     initialize::init_irled(preferences.getInt("frequency", config->frequency));
17     ...
```

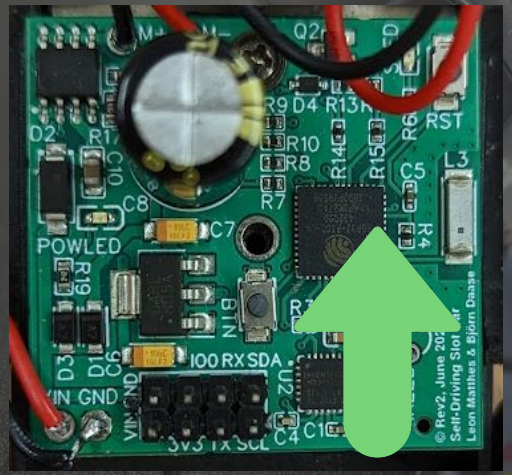
```
4a 55 d7  .............JU.
ff ff ff  Finn...........
ff ff ff  ................
6f 72 64  .!...,P.password
34 ec 64  .............4.d
ff ff ff  123............
ff ff ff

37 c6 5b  .!......ssid
                     .7.[
6e 00 ff  CarreraCarFinn..
ff ff ff  ................
6f 72 64  .!.....Ipassword
78 9c d7  .............x..
73 77 6f  DasIstMeinPasswo
ff ff ff  rt.............
69 64 00  .B..&}.nap.ssid.
5e 09 30  ........$....^.0
72 46 69  ....CarreraCarFi
00 00 00  nn...... .......
ff ff ff  ................
ff ff ff  ................
69 64 00  .H...g..ap.ssid.
80 ff ff  ........$.......
73 73 77  .B..2..dap.passw
83 6d 88  d.......A.....m.
73 77 6f  DasIstMeinPasswo
00 00 00  rt.............
00 00 00  ................
```

Ausblick

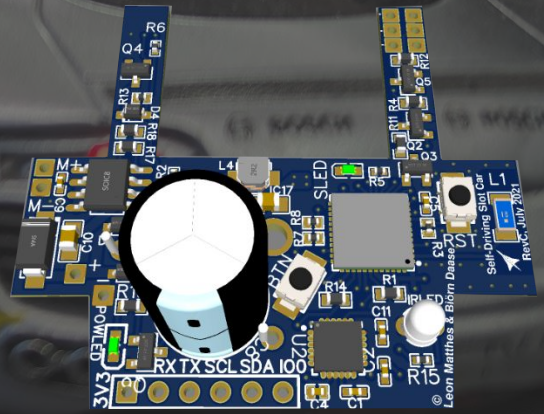
aka. Was wir nicht geschafft haben

Mögliche Nachfolger-Projekte

Kamera am Auto befestigen



Revision 2 ausbessern



Revision 3 fertigstellen


Viel Spaß auf der Rennstrecke
Deutsche Post
DEKRA
Carrera
DIGITAL 124