



Patrick Kaserer - The Fundamentals of IoT

Geringe Reichweite

Hoher Stromverbrauch

Teure Lizenzen und Abhängigkeiten

Several thin, white, diagonal lines of varying lengths are positioned in the bottom right corner of the slide, creating a sense of movement or a modern design element.



LoRa mit WA(H)N

LoRa

LoRaWAN

Wide Area Network

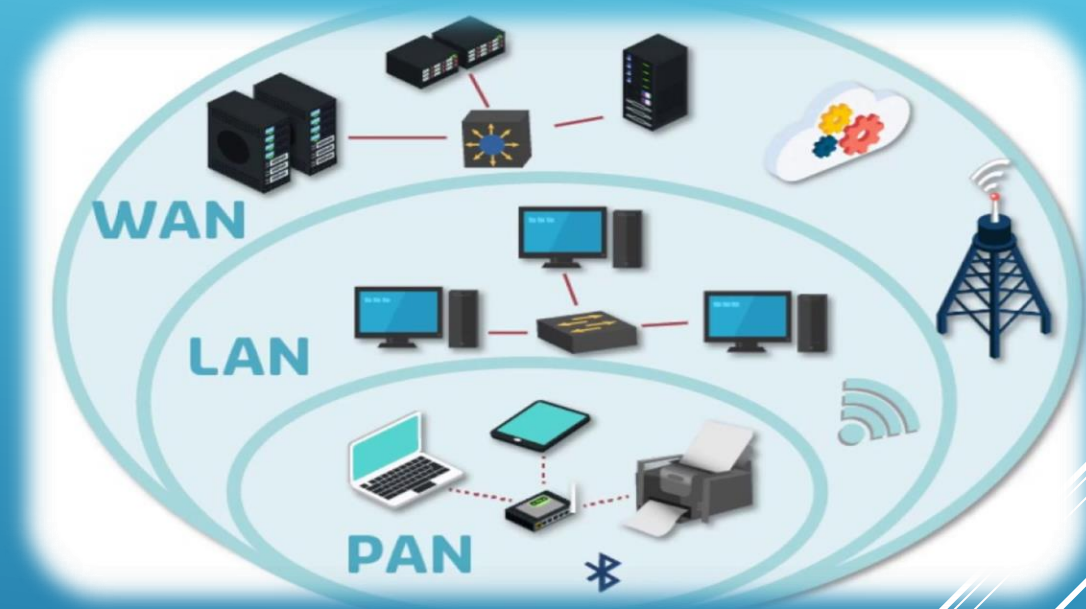


Abb1: Unterschied zwischen PAN, LAN und WAN

LoRa

Funktechnik

Sensor zu
Gateway

LoRaWAN

Netzwerkaufbau

Komplettes
Netzwerk

Long Range

5 Km -15 Km

Low Power

10 mA - 100 nA

Low Frequenz

868 MHz - EU



Abb2: Back



Abb3: Front

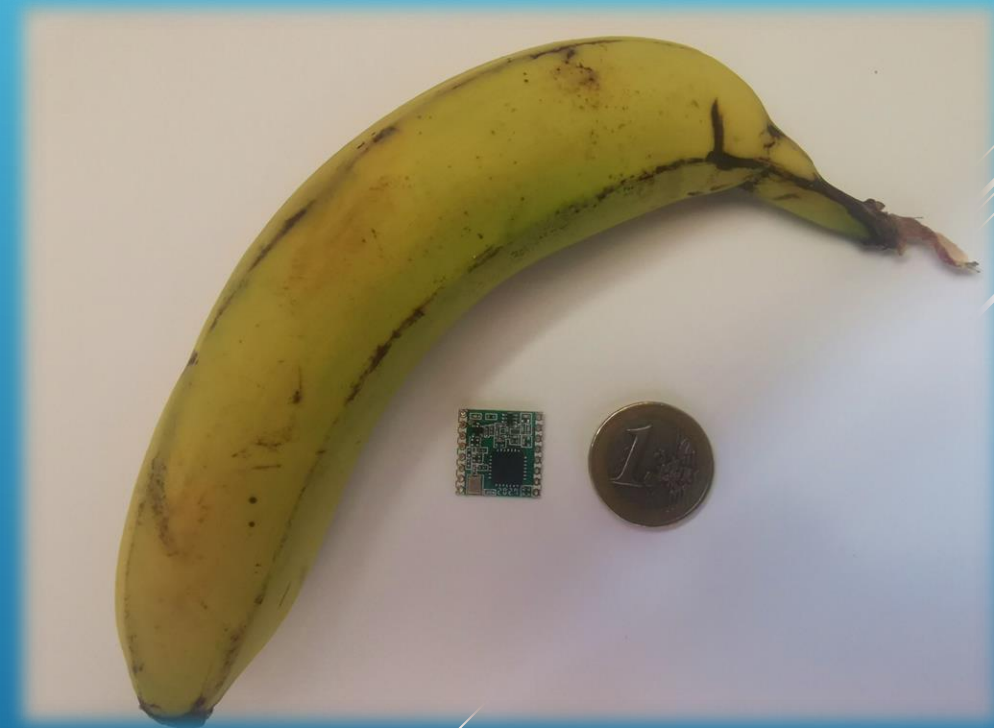
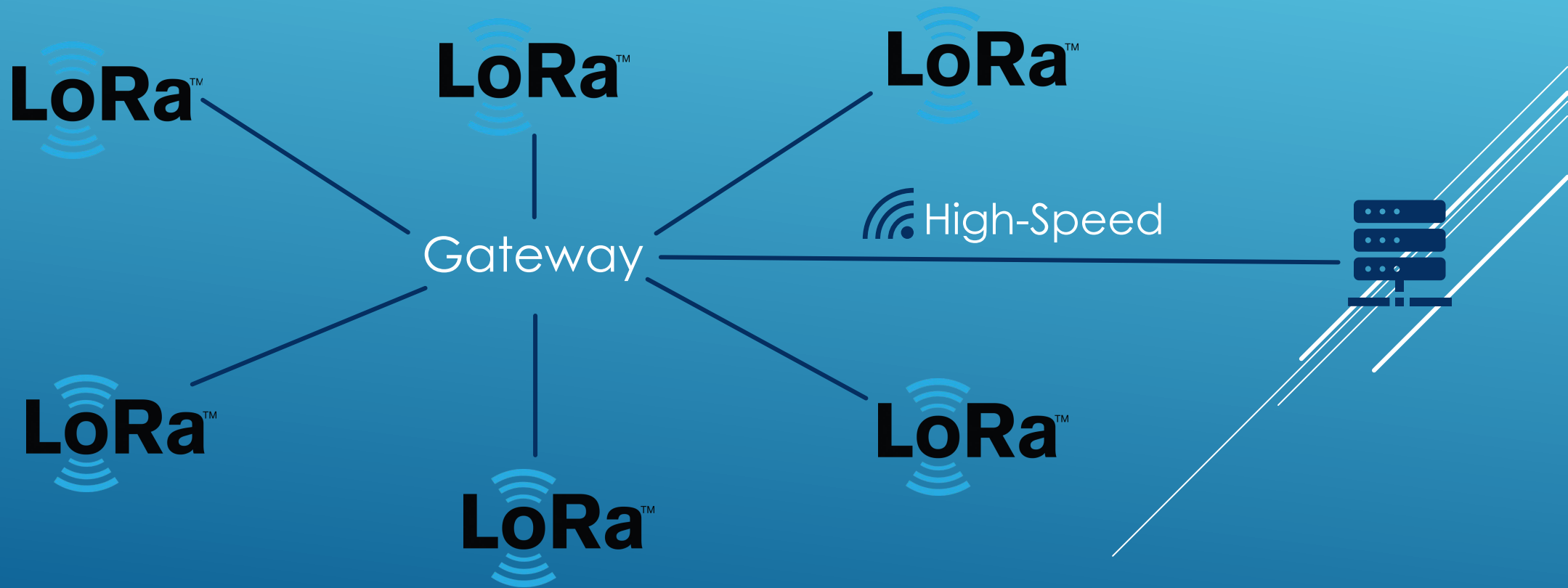


Abb1: Banana for scale

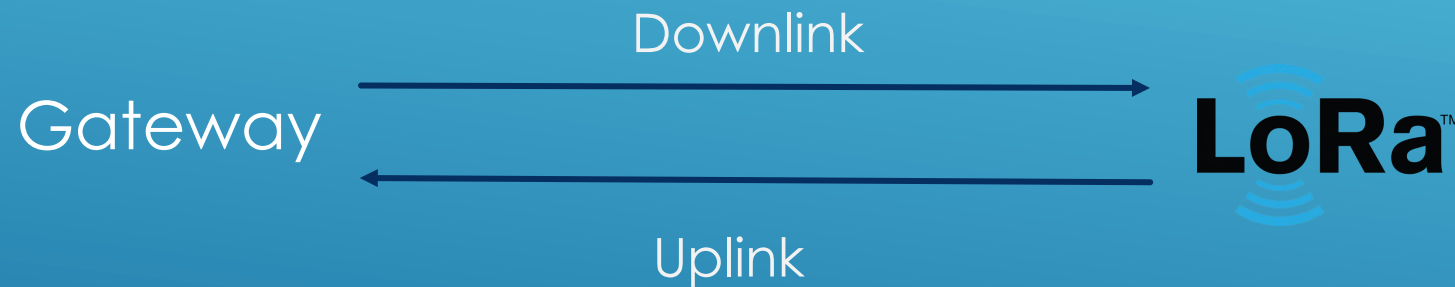
Long Range Low Power Wide Area Network

Sterntopologie



Verbindungen

Bidirektionaler Verbindung





A Kommunikation Nach Uplink



B Zusätzlich alle 128s eine Sync



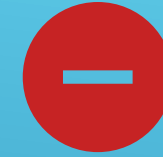
C Dauerhaft



Vor- und Nachteile




Low Power
High Range
Günstig
Auch privat Nutzbar
Sicherheit



Geringe
Datenübertragung

Keine einheitlichen
Frequenzbänder



Verbindung

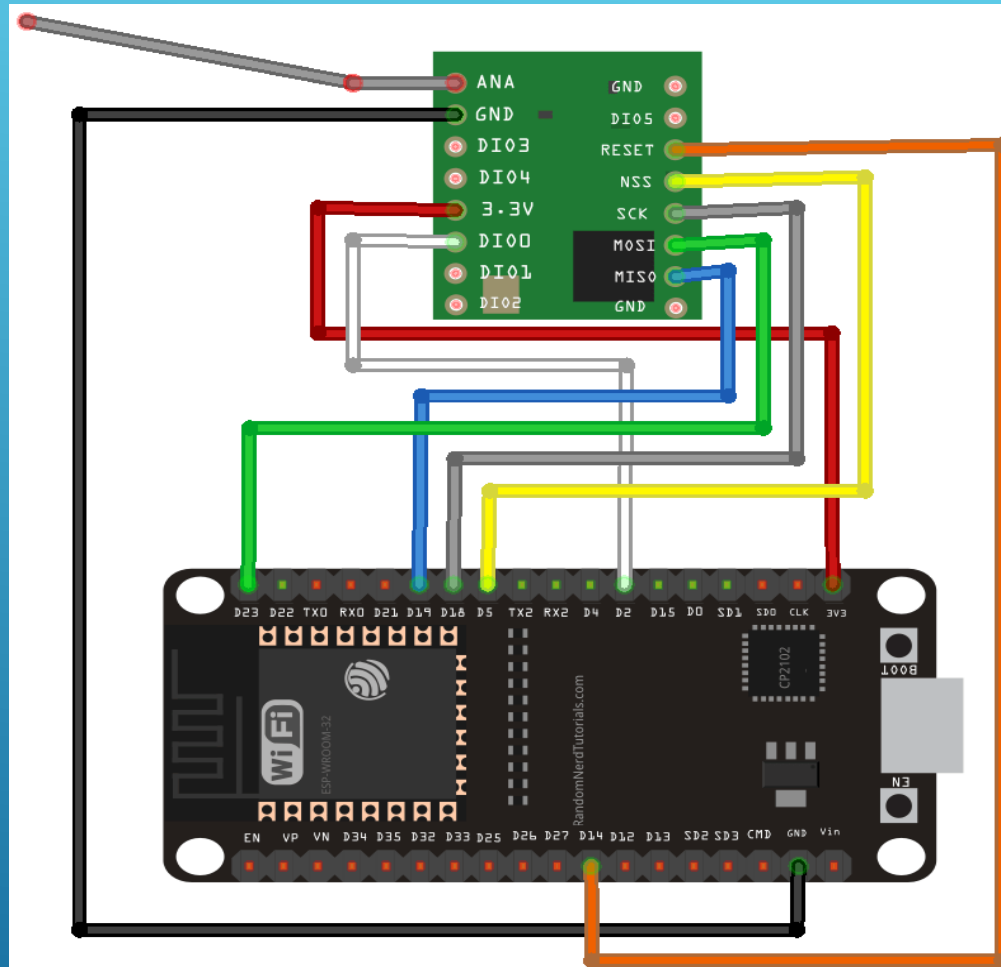
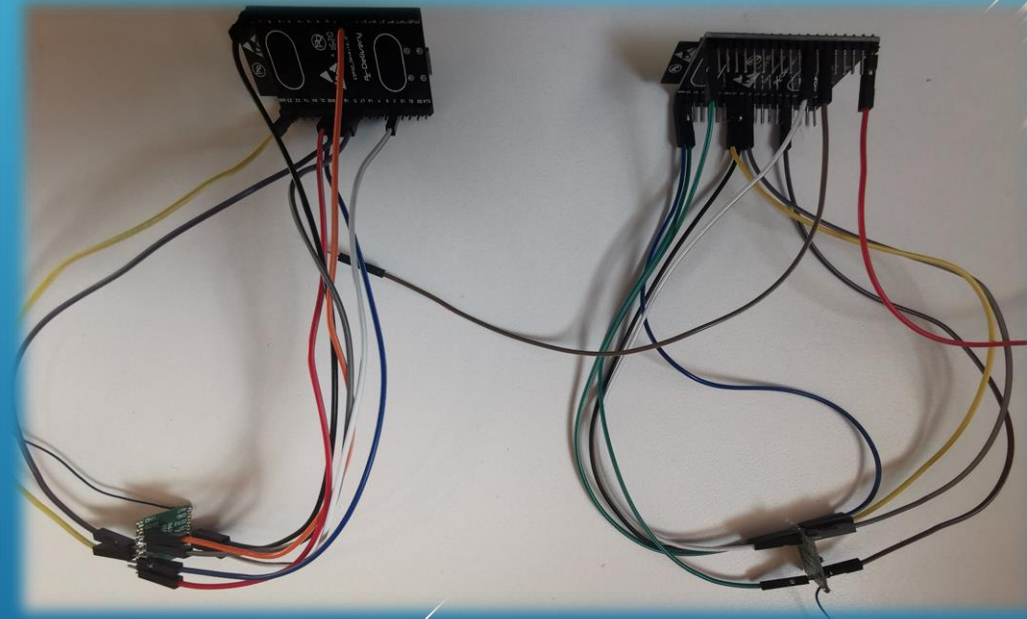
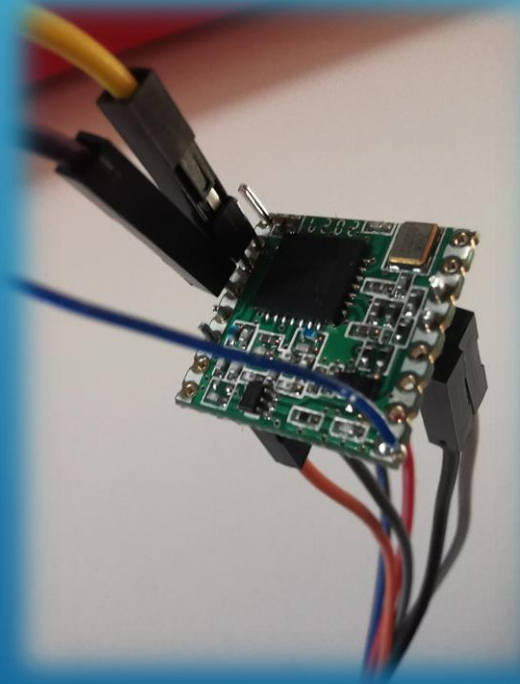
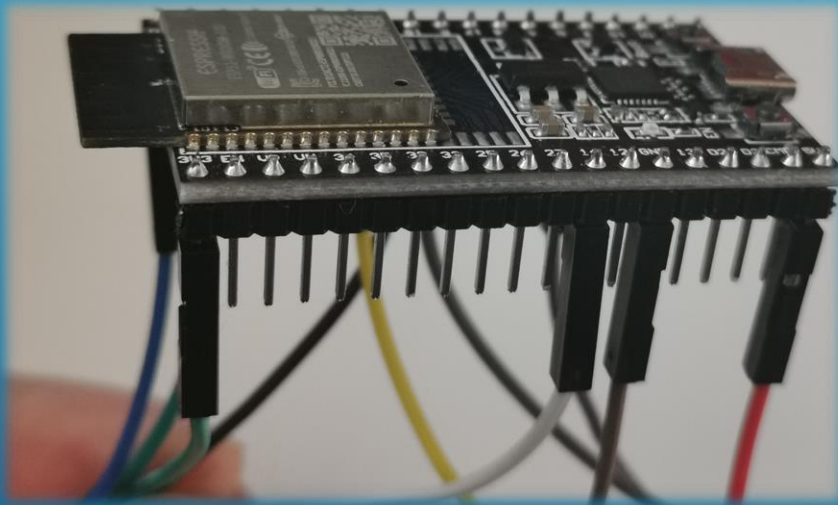


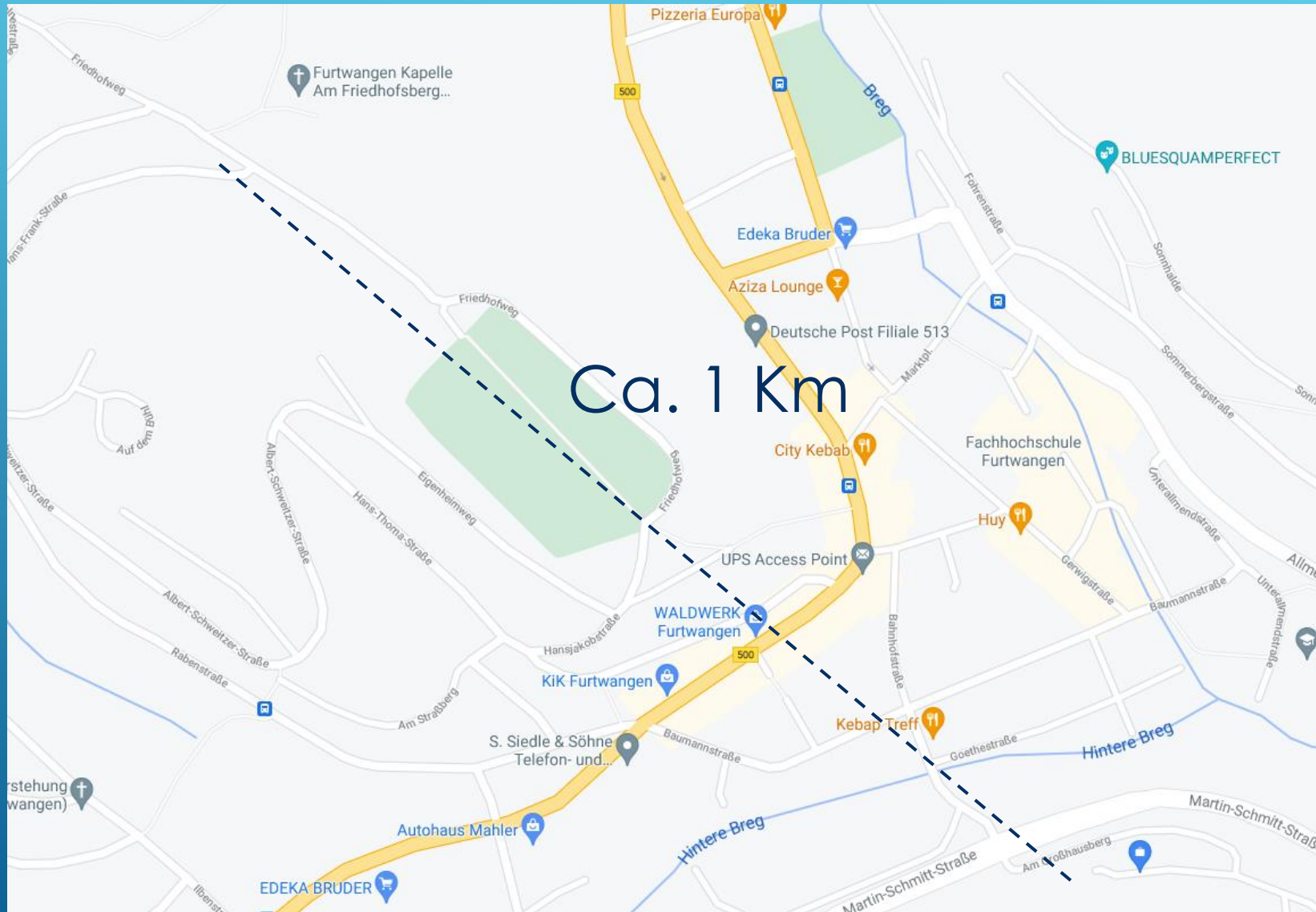
Abb1: Aufbau: Praktischer Teil

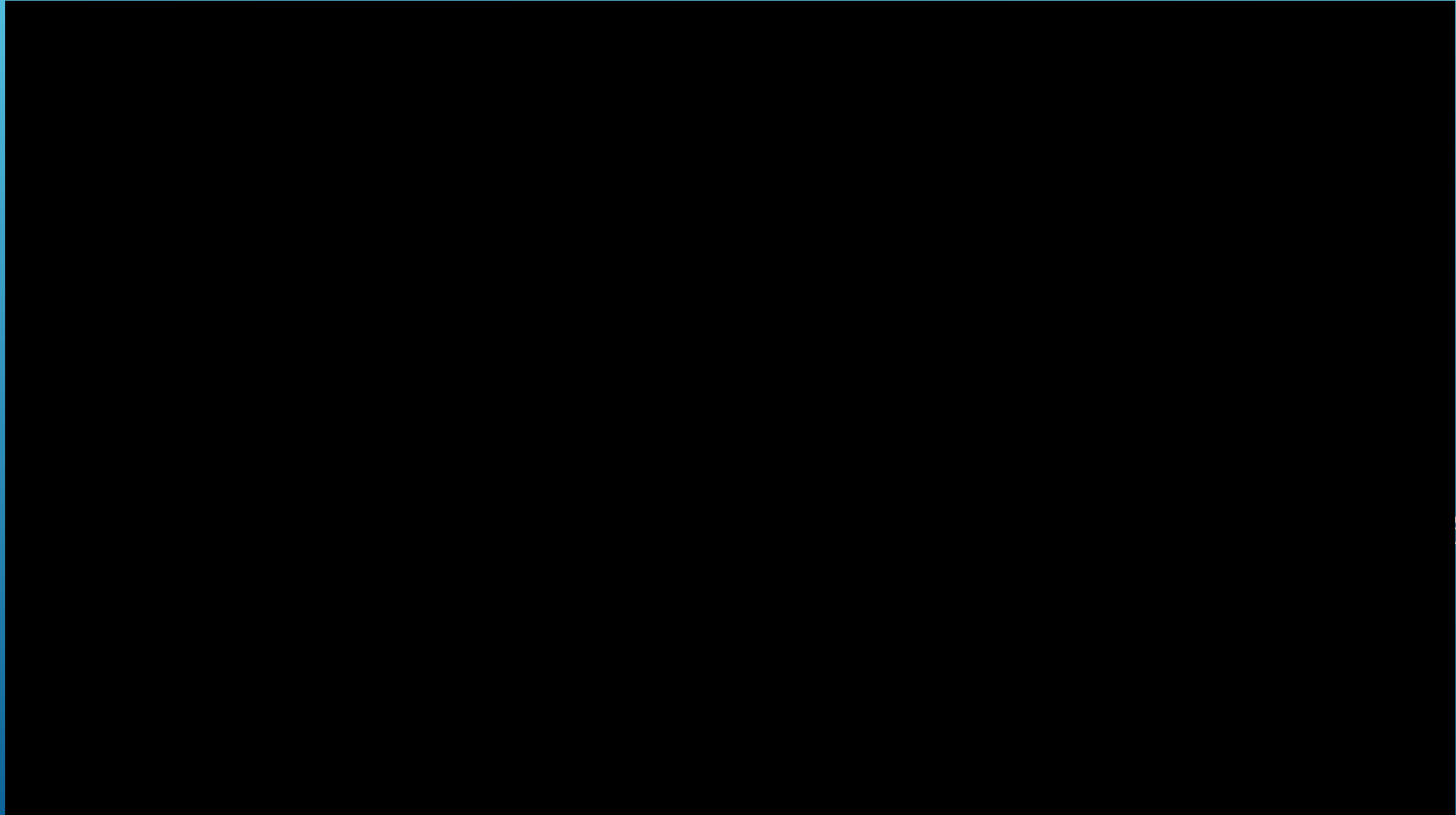
SPI
(Serial Peripheral Interface)

Kein Breadboard

Kein Löten







```
C++ main.cpp M X
1
2 #include <SPI.h>
3 #include <LoRa.h>
4
5 //define the pins used by the transceiver module
6 #define ss 5
7 #define rst 14
8 #define dio0 2
9
10 void setup() {
11     //initialize Serial Monitor
12     Serial.begin(115200);
13     while (!Serial);
14     Serial.println("LoRa Receiver");
15
16     //setup LoRa transceiver module
17     LoRa.setPins(ss, rst, dio0);
18
19     //replace the LoRa.begin(---E-) argument with your location's frequency
20     //433E6 for Asia
21     //866E6 for Europe
22     //915E6 for North America
23     while (!LoRa.begin(866E6)) {
24         Serial.println(".");
25         delay(200);
26     }
27     // Change sync word (0xF3) to match the receiver
28     // The sync word assures you don't get LoRa messages from other LoRa transceivers
29     // ranges from 0-0xFF
30     LoRa.setSyncWord(0xF3);
31     Serial.println("LoRa Initializing OK!");
32 }
33
34 void loop() {
35     // try to parse packet
36     int packetSize = LoRa.parsePacket();
37
38     if (packetSize) {
39         // received a packet
40         Serial.print("Received packet: ");
41
42         // read packet
43         while (LoRa.available()) {
44             String LoRaData = LoRa.readString();
45             Serial.print(LoRaData);
46         }
47
48         // print RSSI of packet
49         Serial.print(" with RSSI ");
50
51         // print SNR of packet
52         Serial.print(" with SNR ");
53
54         // print RSSI of packet
55         Serial.print(" with RSSI ");
56
57         // print SNR of packet
58         Serial.print(" with SNR ");
59
60         // print RSSI of packet
61         Serial.print(" with RSSI ");
62
63         // print SNR of packet
64         Serial.print(" with SNR ");
65
66         // print RSSI of packet
67         Serial.print(" with RSSI ");
68
69         // print SNR of packet
70         Serial.print(" with SNR ");
71
72         // print RSSI of packet
73         Serial.print(" with RSSI ");
74
75         // print SNR of packet
76         Serial.print(" with SNR ");
77
78         // print RSSI of packet
79         Serial.print(" with RSSI ");
80
81         // print SNR of packet
82         Serial.print(" with SNR ");
83
84         // print RSSI of packet
85         Serial.print(" with RSSI ");
86
87         // print SNR of packet
88         Serial.print(" with SNR ");
89
90         // print RSSI of packet
91         Serial.print(" with RSSI ");
92
93         // print SNR of packet
94         Serial.print(" with SNR ");
95
96         // print RSSI of packet
97         Serial.print(" with RSSI ");
98
99         // print SNR of packet
100        Serial.print(" with SNR ");
101    }
102    delay(2000);
103}
```

Danke fürs Zuhören

Bei Fragen steht euch Google
jederzeit zur Verfügung



HOCHSCHULE
FURTWANGEN
UNIVERSITY

HFU

