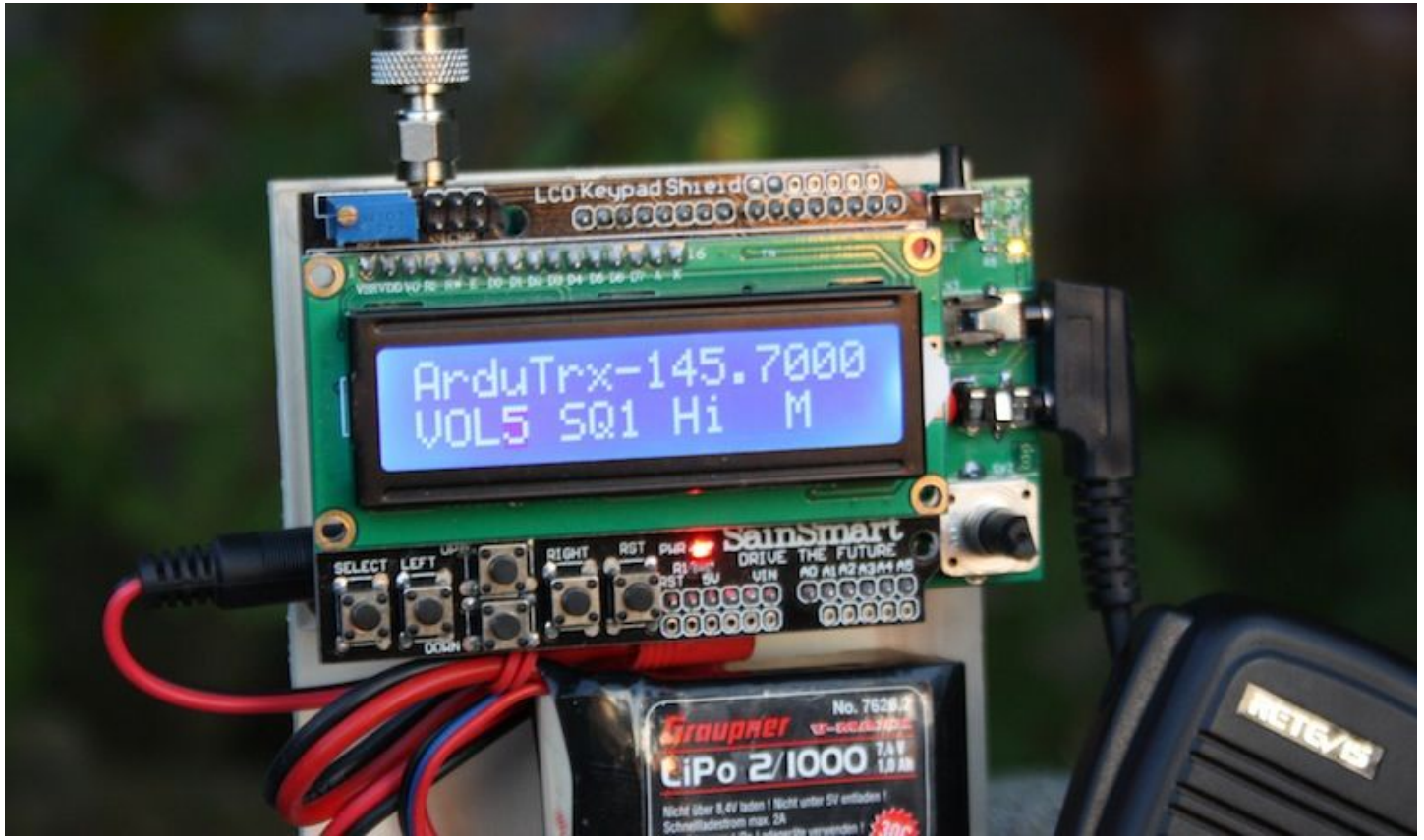
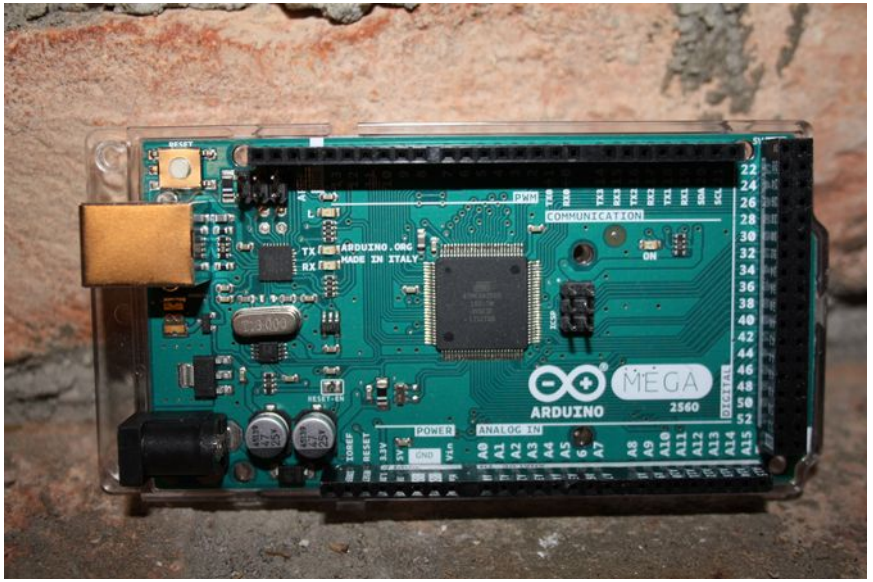
ArduTRX

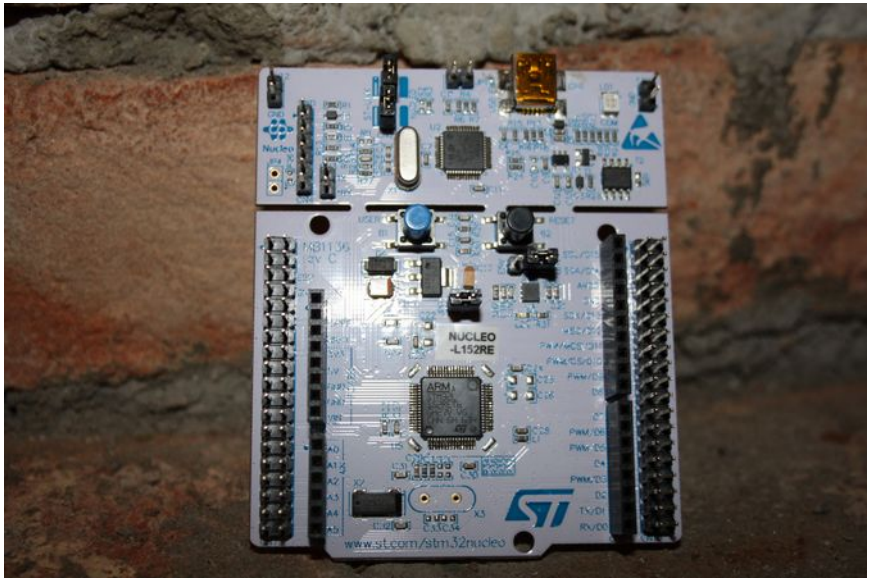


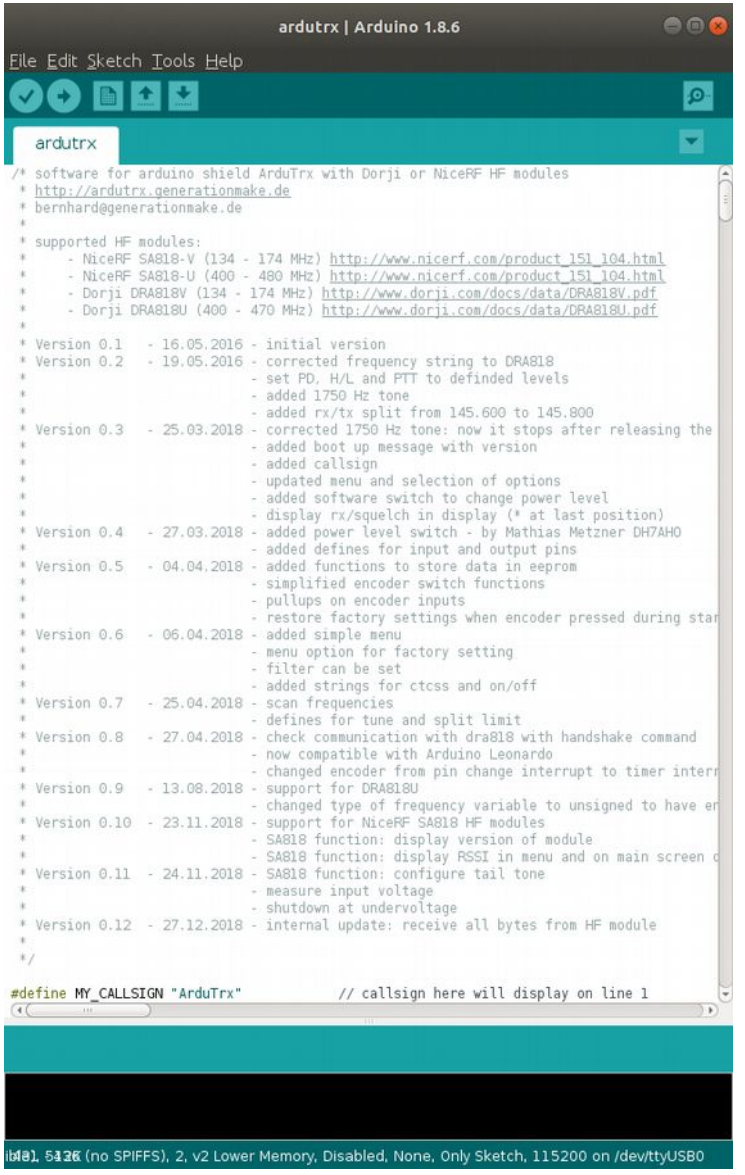
Open Source Transceiver

Bernhard Mayer, DL1MAB, bernhard@generationmake.de, Make Munich 2019

Arduino

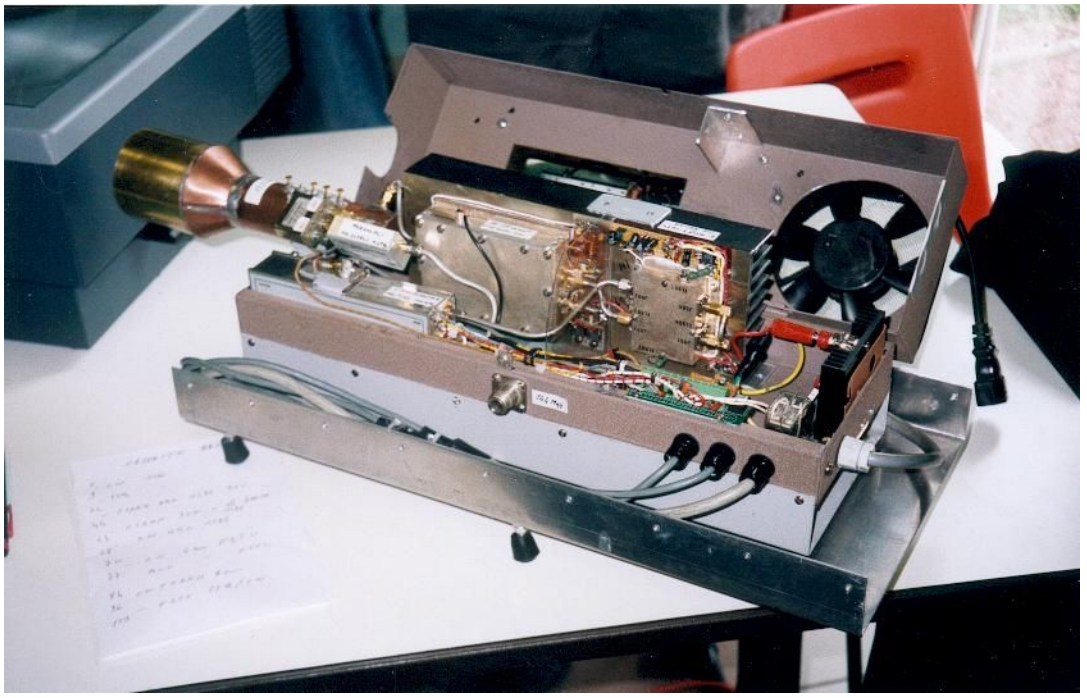

ARDUINO.ORG
MADE IN ITALY
COMMUNICATION
POWER
ANALOG IN
DIGITAL
MEGA
ARDUINO
2560


NUCLEO
-L152RE
www.st.com/stm32nucleo


ardutrx | Arduino 1.8.6
File Edit Sketch Tools Help
ardutrx
/* software for arduino shield ArduTrx with Dorji or NiceRF HF modules
* http://ardutrx.generationmake.de
* bernhard@generationmake.de
*
* supported HF modules:
*   - NiceRF SA818-V (134 - 174 MHz) http://www.nicerf.com/product_151_104.html
*   - NiceRF SA818-U (400 - 480 MHz) http://www.nicerf.com/product_151_104.html
*   - Dorji DRA818V (134 - 174 MHz) http://www.dorji.com/docs/data/DRA818V.pdf
*   - Dorji DRA818U (400 - 470 MHz) http://www.dorji.com/docs/data/DRA818U.pdf
*
* Version 0.1   - 16.05.2016 - initial version
* Version 0.2   - 19.05.2016 - corrected frequency string to DRA818
*   - set PD, H/L and PTT to definded levels
*   - added 1750 Hz tone
*   - added rx/tx split from 145.600 to 145.800
* Version 0.3   - 25.03.2018 - corrected 1750 Hz tone: now it stops after releasing the
*   - added boot up message with version
*   - added callsign
*   - updated menu and selection of options
*   - added software switch to change power level
*   - display rx/squelch in display (* at last position)
* Version 0.4   - 27.03.2018 - added power level switch - by Mathias Metzner DH7AHO
*   - added defines for input and output pins
* Version 0.5   - 04.04.2018 - added functions to store data in eeprom
*   - simplified encoder switch functions
*   - pullups on encoder inputs
*   - restore factory settings when encoder pressed during star
* Version 0.6   - 06.04.2018 - added simple menu
*   - menu option for factory setting
*   - filter can be set
*   - added strings for ctcss and on/off
* Version 0.7   - 25.04.2018 - scan frequencies
*   - defines for tune and split limit
* Version 0.8   - 27.04.2018 - check communication with dra818 with handshake command
*   - now compatible with Arduino Leonardo
*   - changed encoder from pin change interrupt to timer interr
* Version 0.9   - 13.08.2018 - support for DRA818U
*   - changed type of frequency variable to unsigned to have er
* Version 0.10 - 23.11.2018 - support for NiceRF SA818 HF modules
*   - SA818 function: display version of module
*   - SA818 function: display RSSI in menu and on main screen c
* Version 0.11 - 24.11.2018 - SA818 function: configure tail tone
*   - measure input voltage
*   - shutdown at undervoltage
* Version 0.12 - 27.12.2018 - internal update: receive all bytes from HF module
*
*/
#define MY_CALLSIGN "ArduTrx"   // callsign here will display on line 1
(no SPIFFS), 2, v2 Lower Memory, Disabled, None, Only Sketch, 115200 on /dev/ttyUSB0

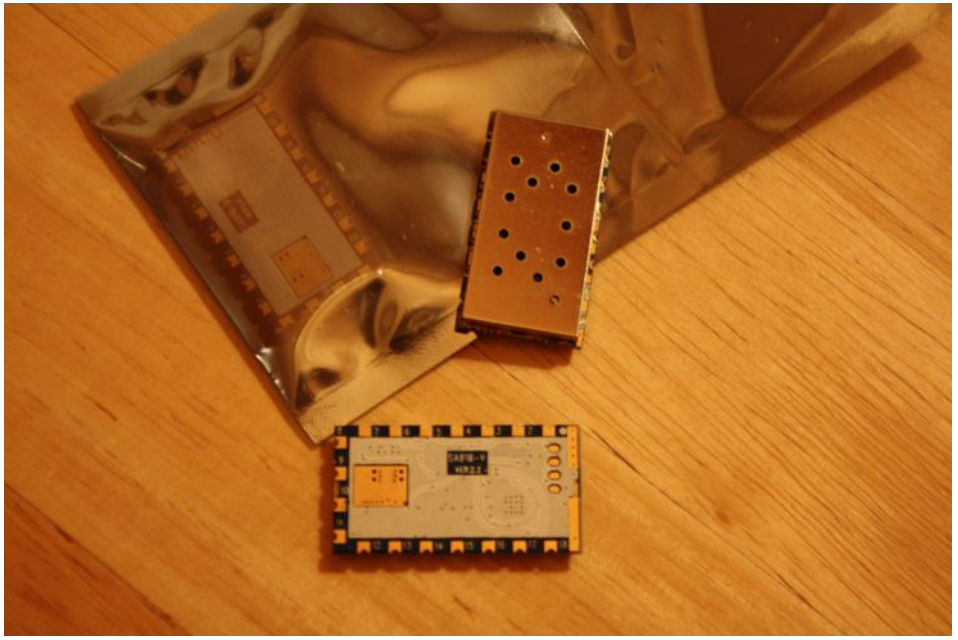
Amateurfunk-Selbstbau

- früher sehr schwierig
- wenig Funktionen
- komplex
- fehlerträchtig
- langwierig
- teuer



HF Module

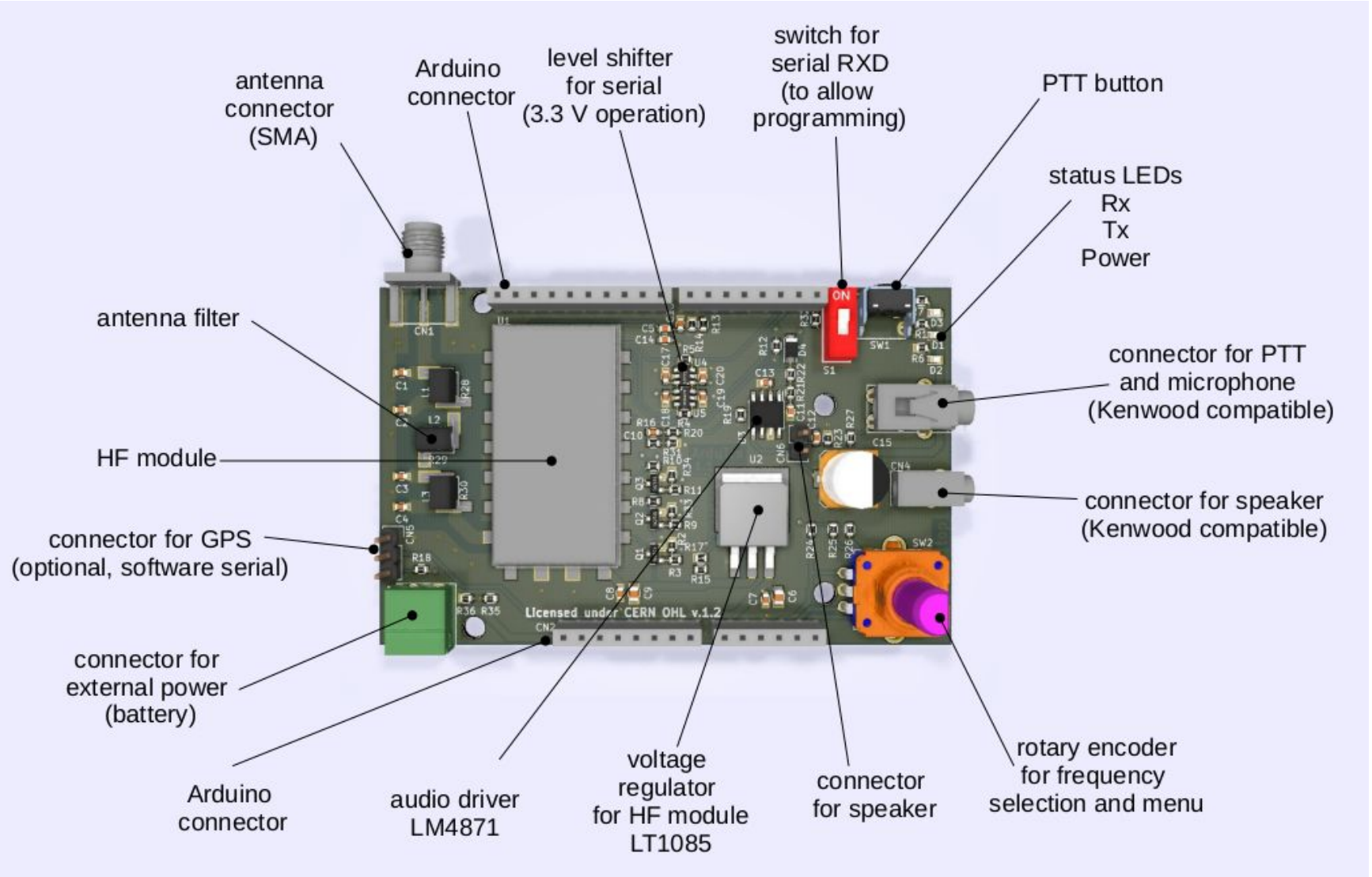
- seit einigen Jahren günstige HF-Module verfügbar
- Hersteller unter anderem Nice RF und Dorji
- komplettes Funkgerät in einem Modul



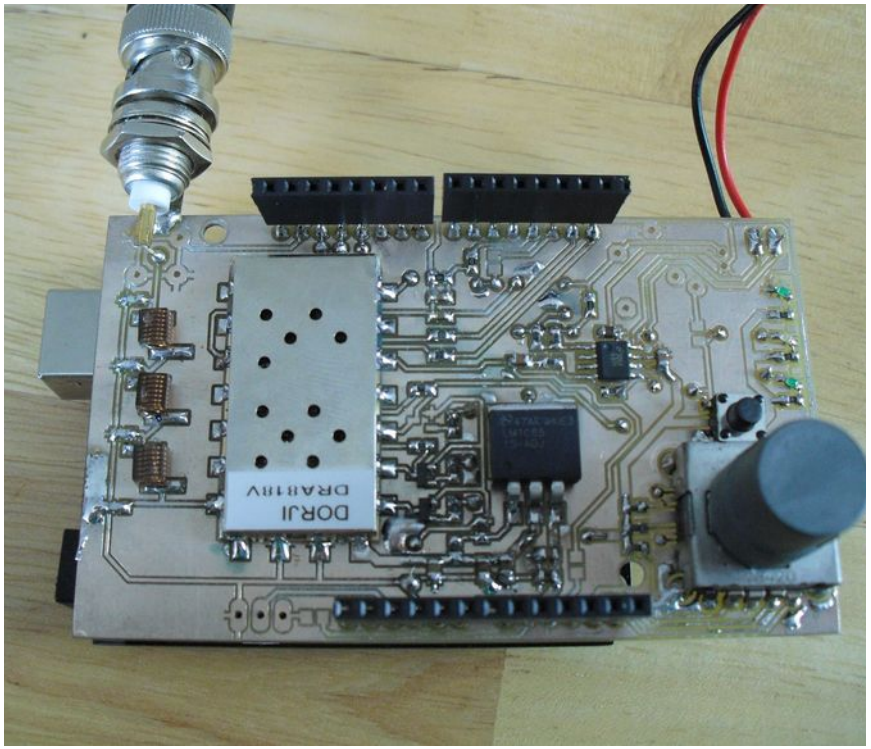
Leistungsdaten HF Modul

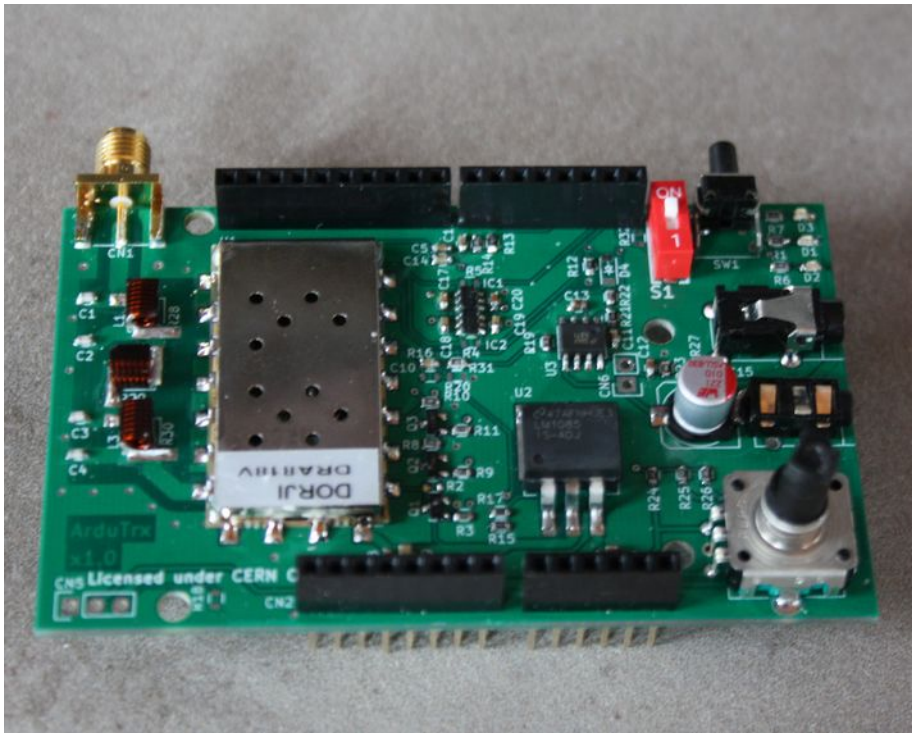
- 2m (144 MHz) oder 70cm (430 MHz)
- 1W oder 2W Sendeleistung
- NBFM-Modulator und -Demodulator
- Audio-Teil, direkter Anschluss von Mikrofon und Kopfhörer bzw. Lautsprecherverstärker
- bereits diverse Projekte damit im Internet und Zeitschriften
- leider zu hohe Nebenaussendungen und deshalb Einsatz eines Filters nötig

ArduTrx


antenna connector (SMA)
Arduino connector
level shifter for serial (3.3 V operation)
switch for serial RXD (to allow programming)
PTT button
status LEDs
Rx
Tx
Power
antenna filter
HF module
connector for PTT and microphone (Kenwood compatible)
connector for speaker (Kenwood compatible)
connector for GPS (optional, software serial)
connector for external power (battery)
Arduino connector
audio driver LM4871
voltage regulator for HF module LT1085
connector for speaker
rotary encoder for frequency selection and menu
ON
Licensed under CERN OHL v.1.2

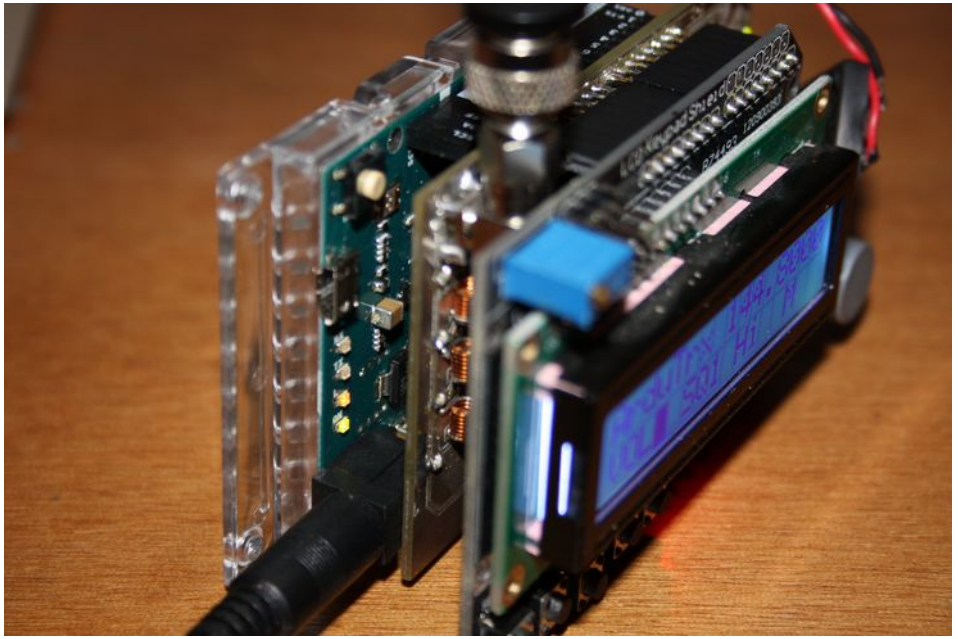
ArduTrx





Arduino-Kompatibilität

- 5V-Arduinos:
  - Arduino Uno
  - Arduino Mega
  - Arduino Leonardo
- 3,3V-Arduinos:
  - Arduino Due
  - ST Nucleo
  - ESP32
- und weitere



komplettes Funkgerät

- mit Arduino Leonardo und HMI-Keypad-Shield

Funktionen

- Frequenzwahl mit Drehencoder
- Display mit Menu
- CTCSS
- 1750 Hz-Ton
- Sendersuchlauf
- Speichern der Einstellungen

alternative Konfiguration

- ESP32 und Grafik-LCD

weitere Möglichkeiten

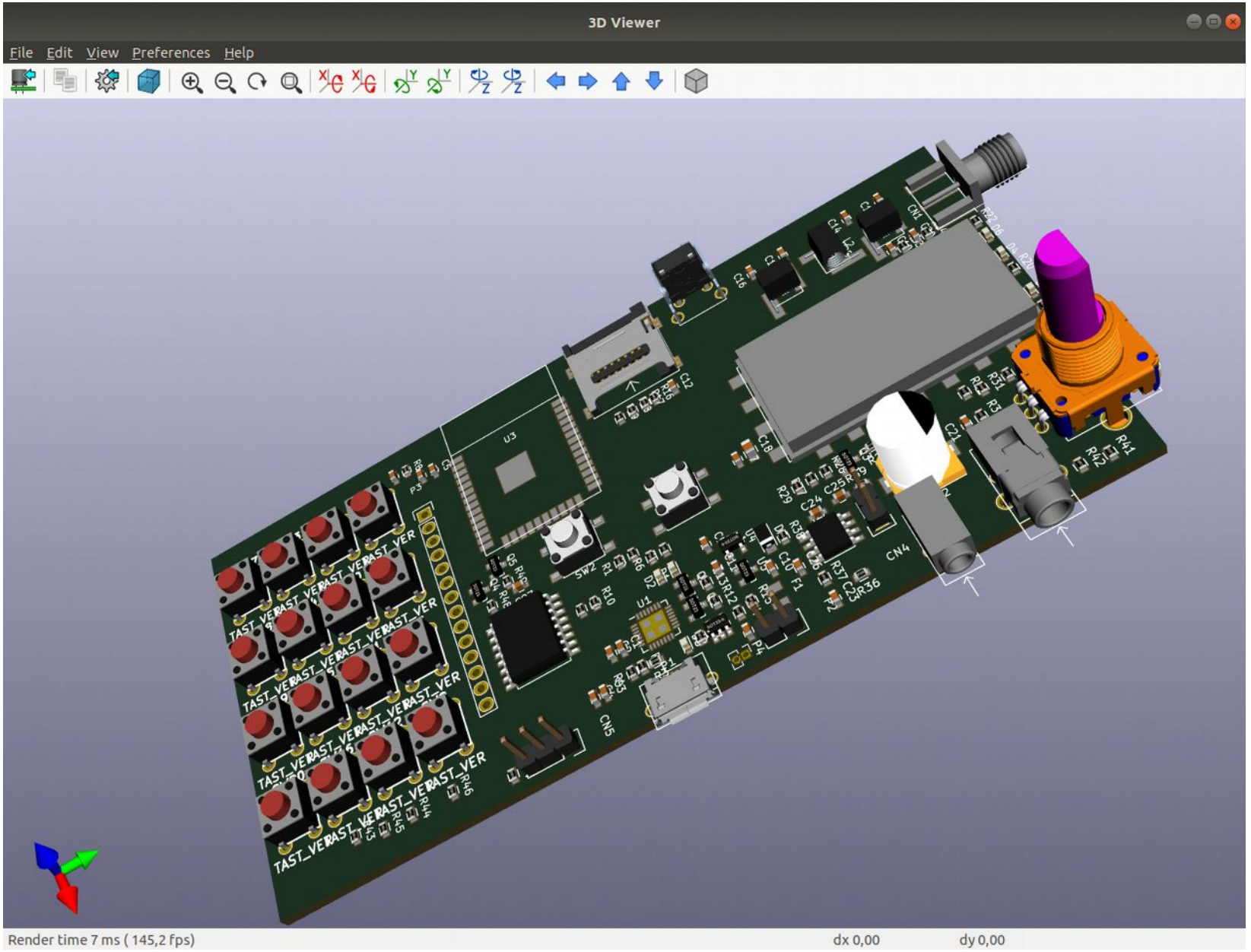
- Frequenzüberwachung
- Bakensender
- Fuchsjagdsender
- POCSAG-Receiver (Pager, DAPNET)
- APRS-Tracker
- TNC für Packet Radio

Open-Source

- Hardware
  - mit KiCAD erzeugt
  - unter Cern OHL v1.2 lizenziert
  - http://ardutrx.generationmake.de/

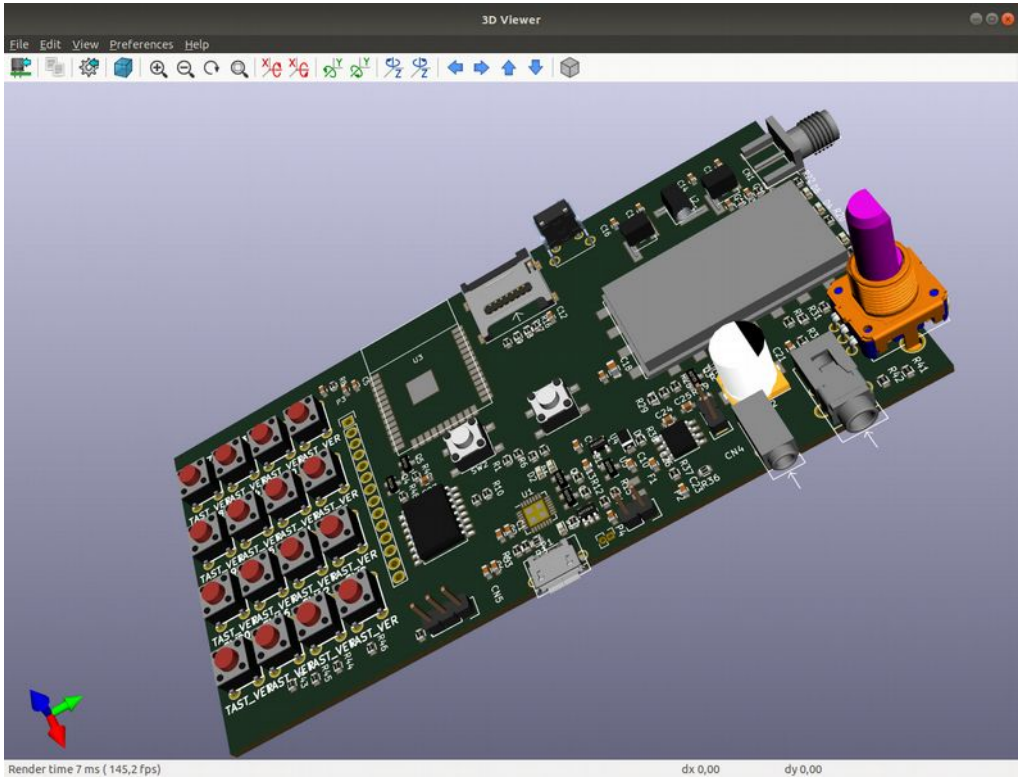
- Software
  - mit Arduino erzeugt
  - Lizenz GPL
  - https://github.com/generationmake/ArduTrx

Weiterentwicklung - Hack A Radio



Hack A Radio

- alles auf einer Platine
- Grafikdisplay
- Tastatur
- SD-Card
- ESP32
- GPS-Empfänger
- Laden über USB
- Bausatz
- voraussichtlich 2019 auf Kickstarter



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https://twitter.com/generation_make
https://www.facebook.com/Generationmake-213849749494723/