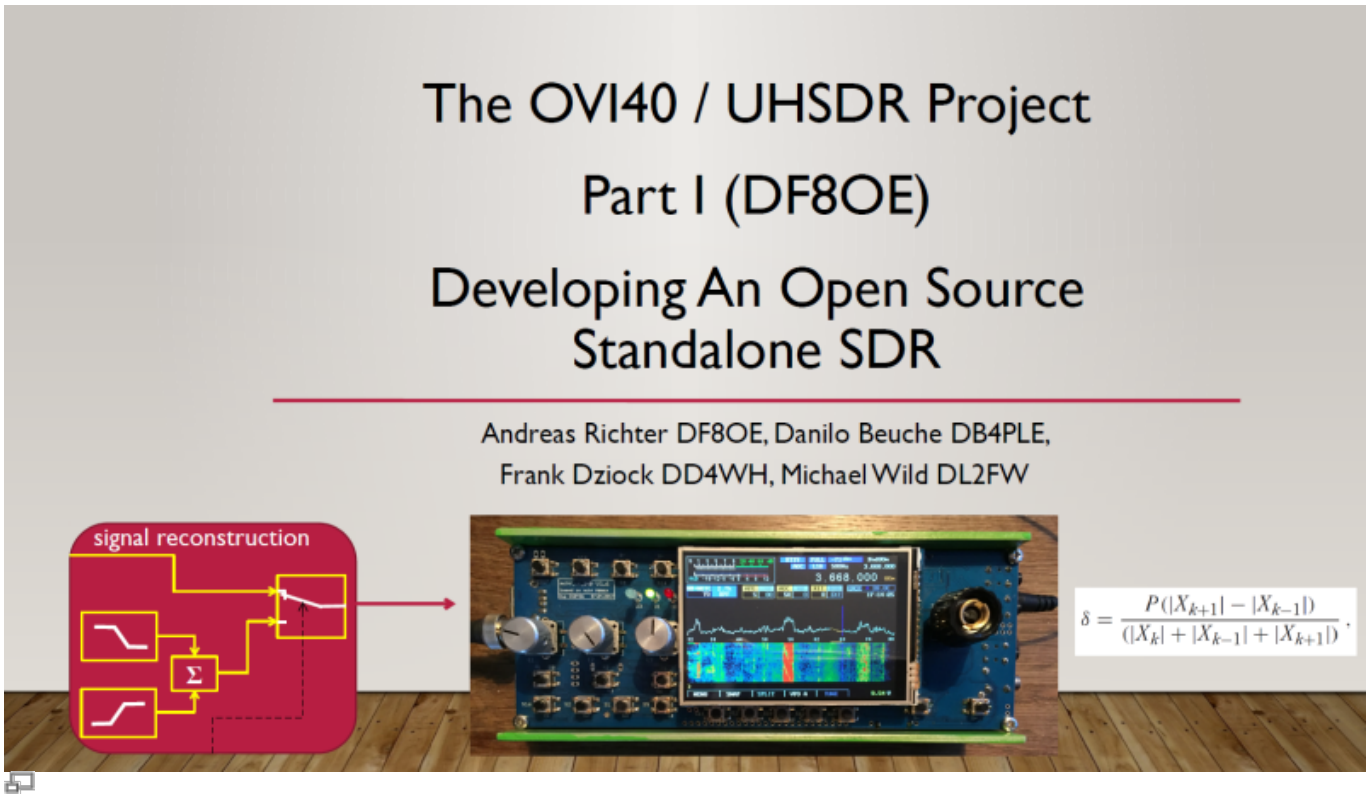
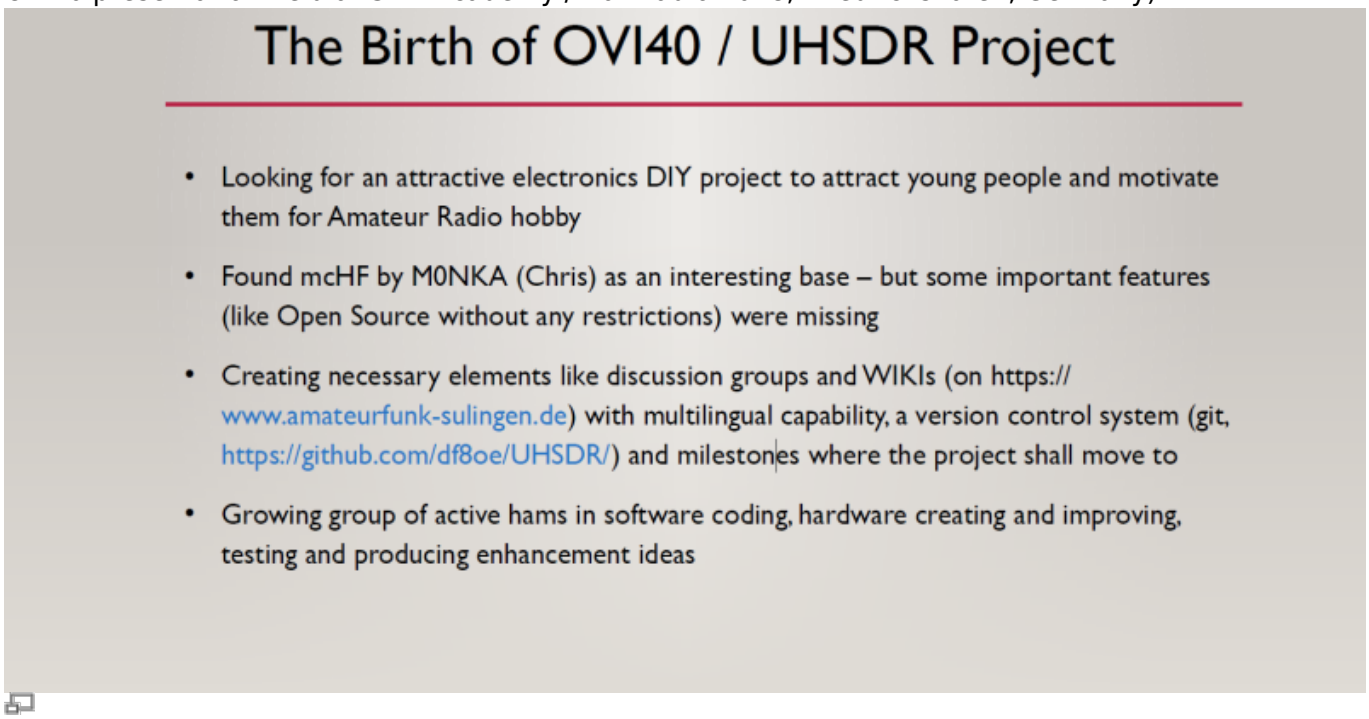
english
review

SDR Academy 2018: OVI40 Hardware presentation



OVI40 presentation held at SDR Academy / Hamradio 2018, Friedrichshafen, Germany)



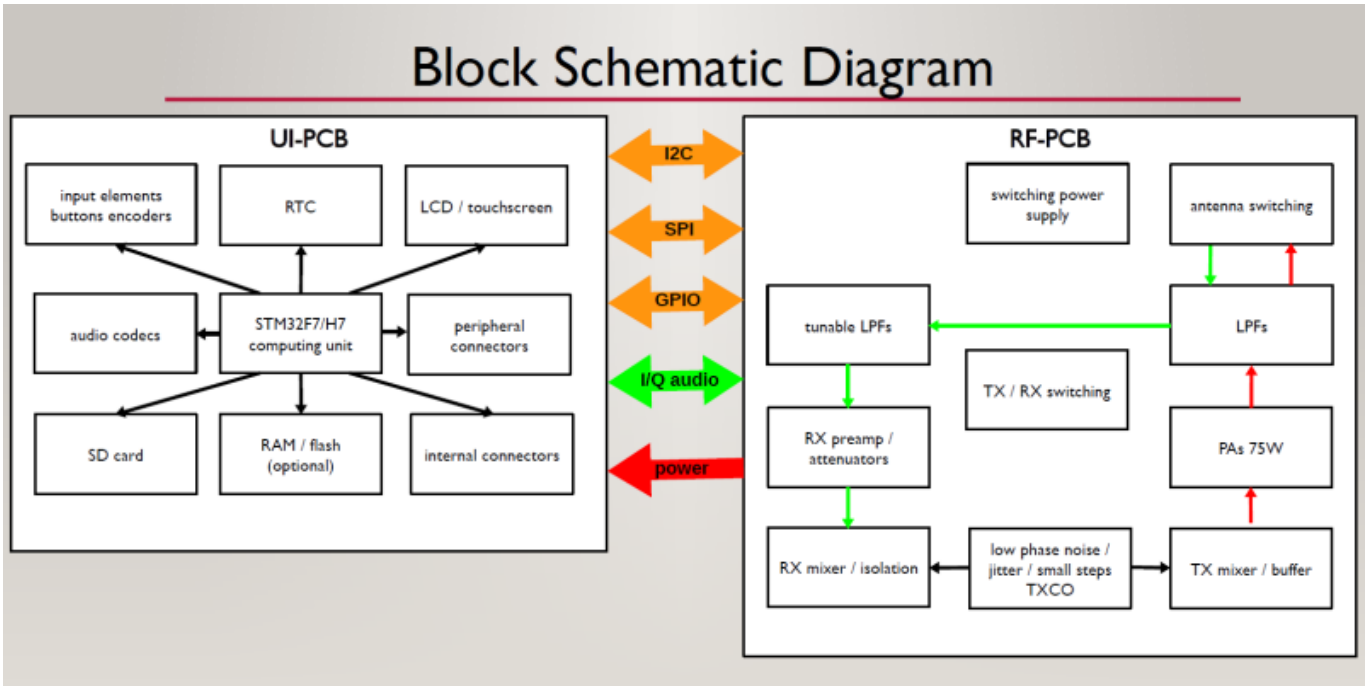
Creating OVI40 Project

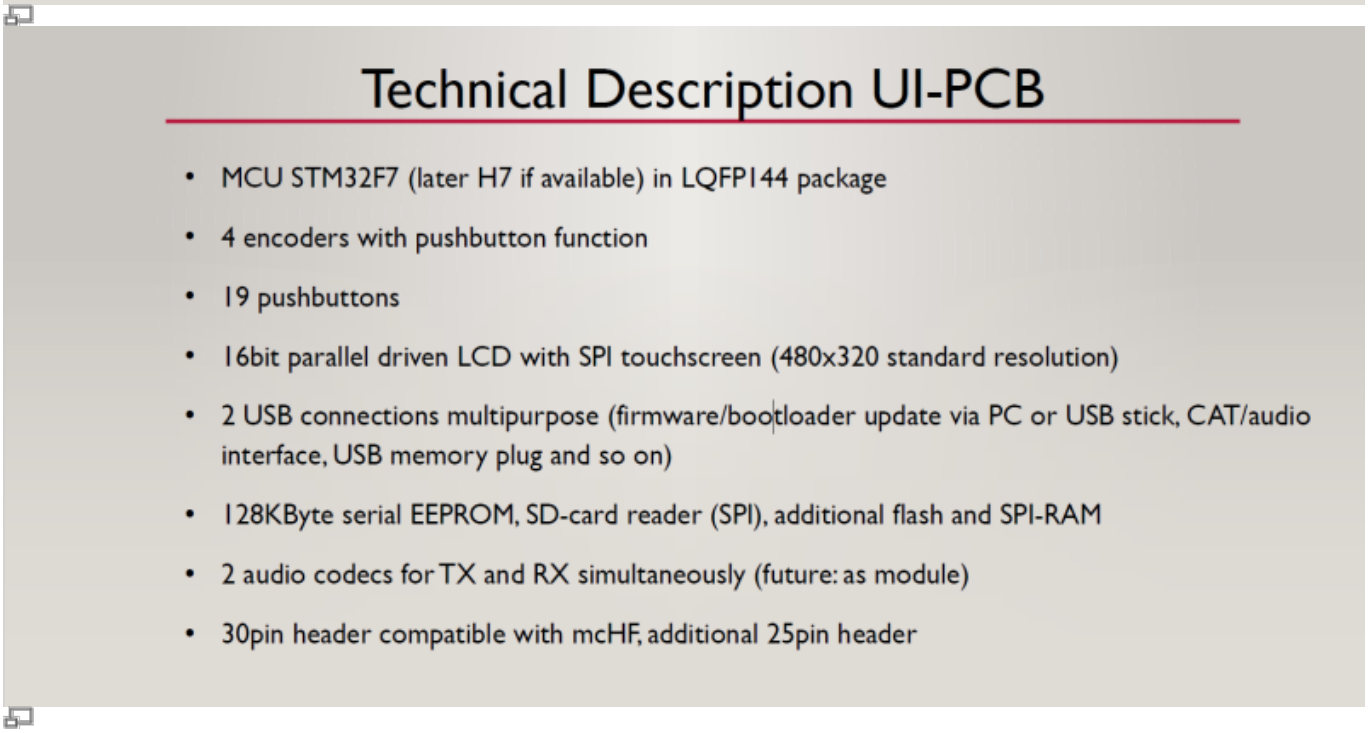
OVI40 is a project that is

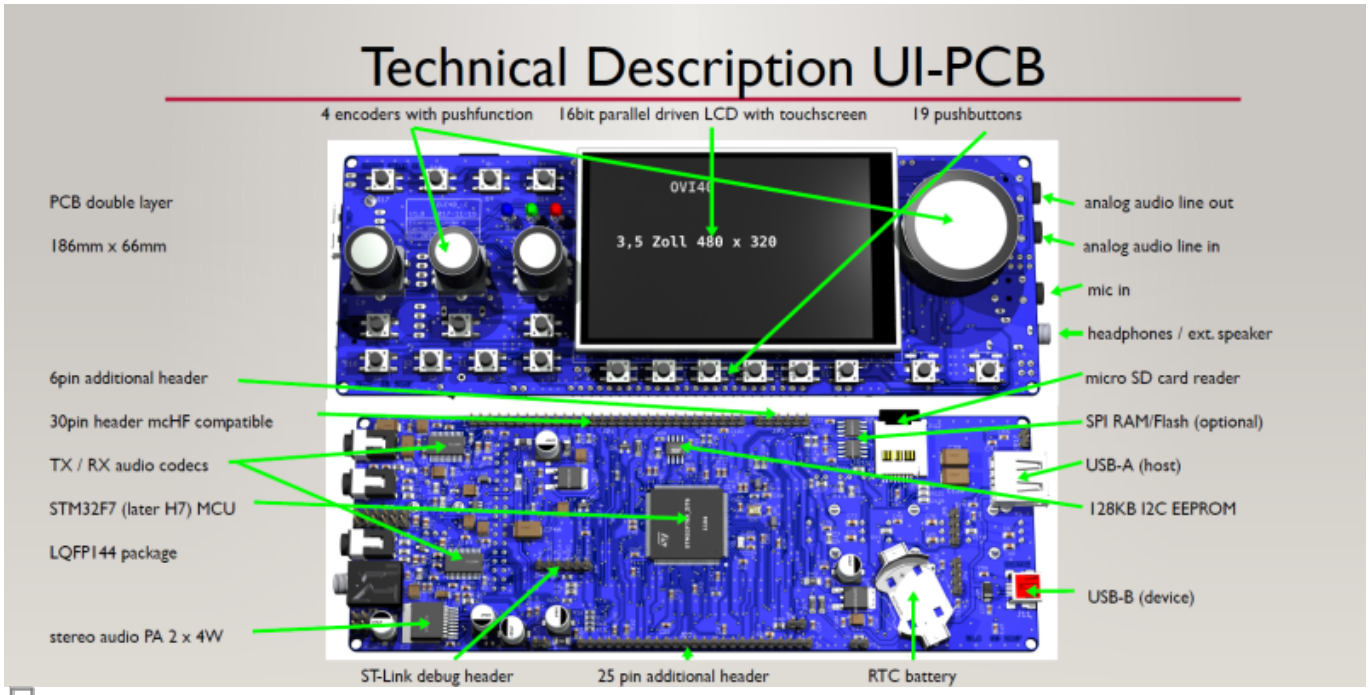
- Open Source in software and hardware
- I will provide hardware in different configurations (only PCBs, PCBs and complete set of components, partially assembled, fully assembled), additional cases will be available
- Modular system (UI-PCB, RF-PCB with ~8 pluggable small modules. OVI40 is meant to be a future-proof system which can grow and be changed individually. "A TRX / RX for many years"
- Connections and wiring is well documented and gives room for own creative work

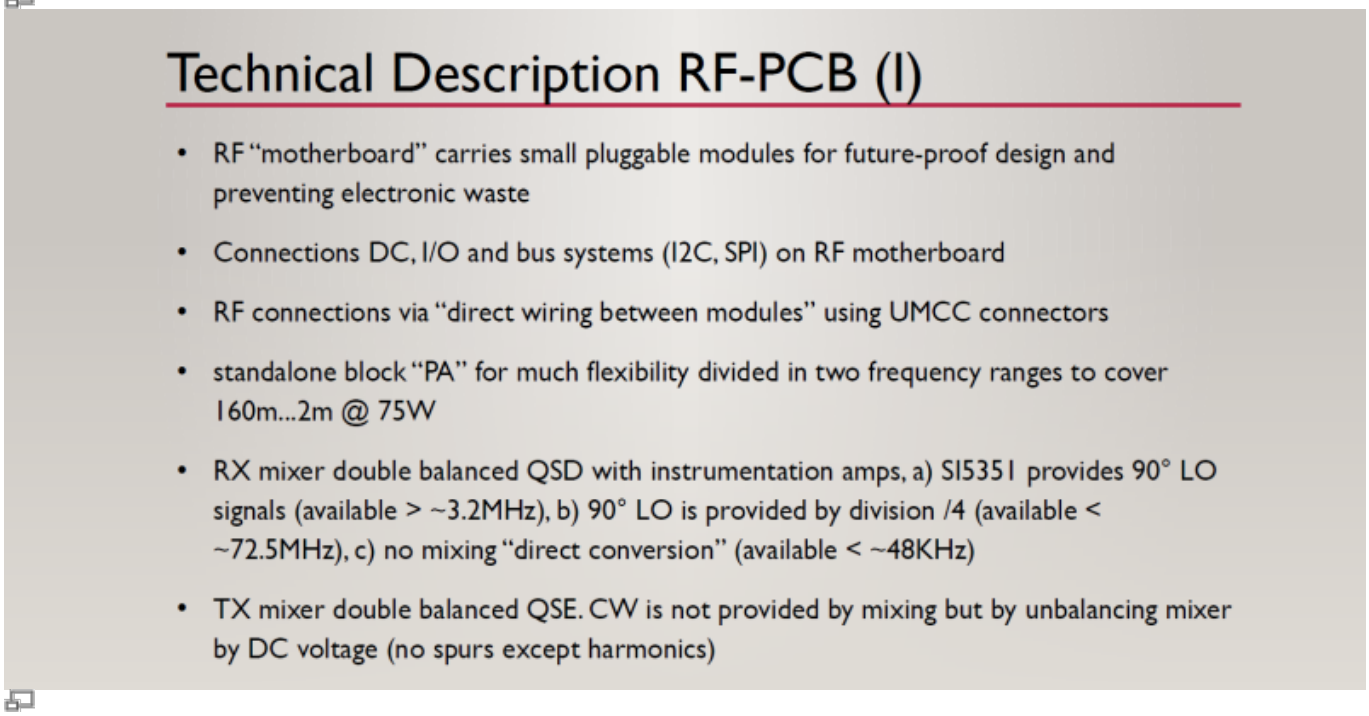
Technical Specifications OVI40

- Most parts available from different sources and only described by technical specification not by part-no.
- RX: few KHz … 250MHz
- TX: same range. 160m...2m ~75W, outside 50mW out of SMA plugs
- Low power consumption, standalone SDR with as many digital modes implemented as possible, pushing functions to firmware
- Signals as clean as possible. Compromise not always on "cheapest solution"
- I2C identification of different module types and versions
- Future planned TX predistortion


Block Schematic Diagram
UI-PCB
input elements buttons encoders
RTC
LCD / touchscreen
audio codecs
STM32F7/H7 computing unit
peripheral connectors
SD card
RAM / flash (optional)
internal connectors
I2C
SPI
GPIO
I/Q audio
power
RF-PCB
switching power supply
antenna switching
tunable LPFs
LPFs
TX / RX switching
RX preamp / attenuators
PAs 75W
RX mixer / isolation
low phase noise / jitter / small steps TXCO
TX mixer / buffer


Technical Description UI-PCB
MCU STM32F7 (later H7 if available) in LQFP144 package
4 encoders with pushbutton function
19 pushbuttons
16bit parallel driven LCD with SPI touchscreen (480x320 standard resolution)
2 USB connections multipurpose (firmware/bootloader update via PC or USB stick, CAT/audio interface, USB memory plug and so on)
128KByte serial EEPROM, SD-card reader (SPI), additional flash and SPI-RAM
2 audio codecs for TX and RX simultaneously (future: as module)
30pin header compatible with mcHF, additional 25pin header

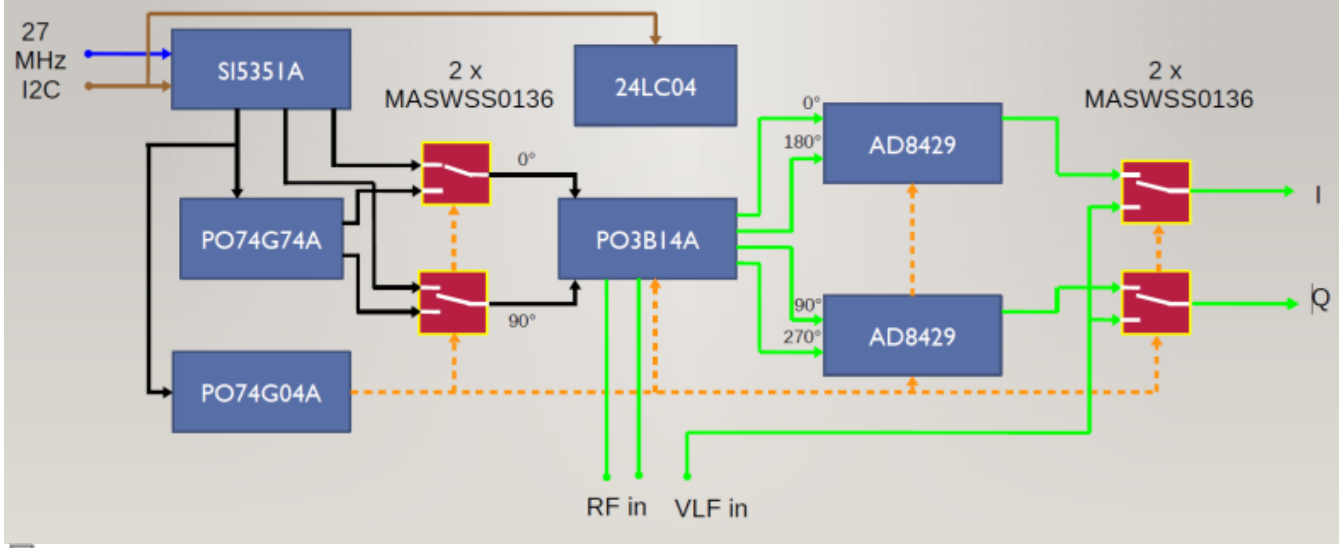

Technical Description UI-PCB
4 encoders with pushfunction
16bit parallel driven LCD with touchscreen
19 pushbuttons
PCB double layer
186mm x 66mm
3,5 Zoll 480 x 320
analog audio line out
analog audio line in
mic in
headphones / ext. speaker
6pin additional header
30pin header mcHF compatible
TX / RX audio codecs
STM32F7 (later H7) MCU
LQFP144 package
micro SD card reader
SPI RAM/Flash (optional)
USB-A (host)
128KB I2C EEPROM
USB-B (device)
stereo audio PA 2 x 4W
ST-Link debug header
25 pin additional header
RTC battery

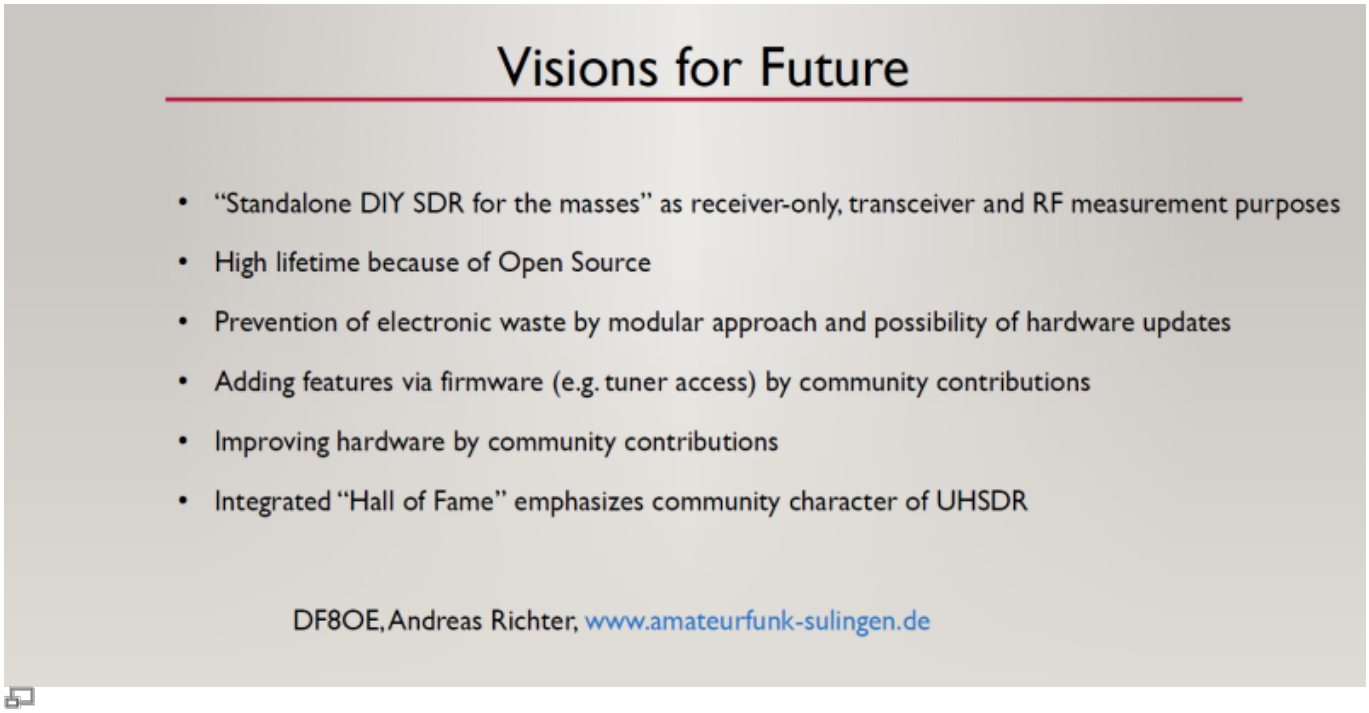

Technical Description RF-PCB (I)
• RF "motherboard" carries small pluggable modules for future-proof design and preventing electronic waste
• Connections DC, I/O and bus systems (I2C, SPI) on RF motherboard
• RF connections via "direct wiring between modules" using UMCC connectors
• standalone block "PA" for much flexibility divided in two frequency ranges to cover 160m...2m @ 75W
• RX mixer double balanced QSD with instrumentation amps, a) SI5351 provides 90° LO signals (available > ~3.2MHz), b) 90° LO is provided by division /4 (available < ~72.5MHz), c) no mixing "direct conversion" (available < ~48KHz)
• TX mixer double balanced QSE. CW is not provided by mixing but by unbalancing mixer by DC voltage (no spurs except harmonics)

Technical Description RF-PCB (II)

- RX filtering by tunable LPFs using varactors, individually and automatically created frequency / voltage tables, individually configurable switching frequencies between LPFs
- Switchable RX preamplifier and attenuators
- Switching voltage regulators for reducing power loss and heating
- All adjustments digitally by firmware
- Providing signal outputs / inputs to SMA connectors (programmable via firmware), 4 antenna connectors (programmable via firmware)

Picking Out One Module – RX Mixer





From:
https://www.amateurfunk-sulingen.de/wiki/ - **Afu - Wiki des DARC OV Sulingen I40**

Permanent link:
https://www.amateurfunk-sulingen.de/wiki/doku.php?id=en:sdra2018:ovi40_hw&rev=1528313631

Last update: **06.06.2018 19:33**