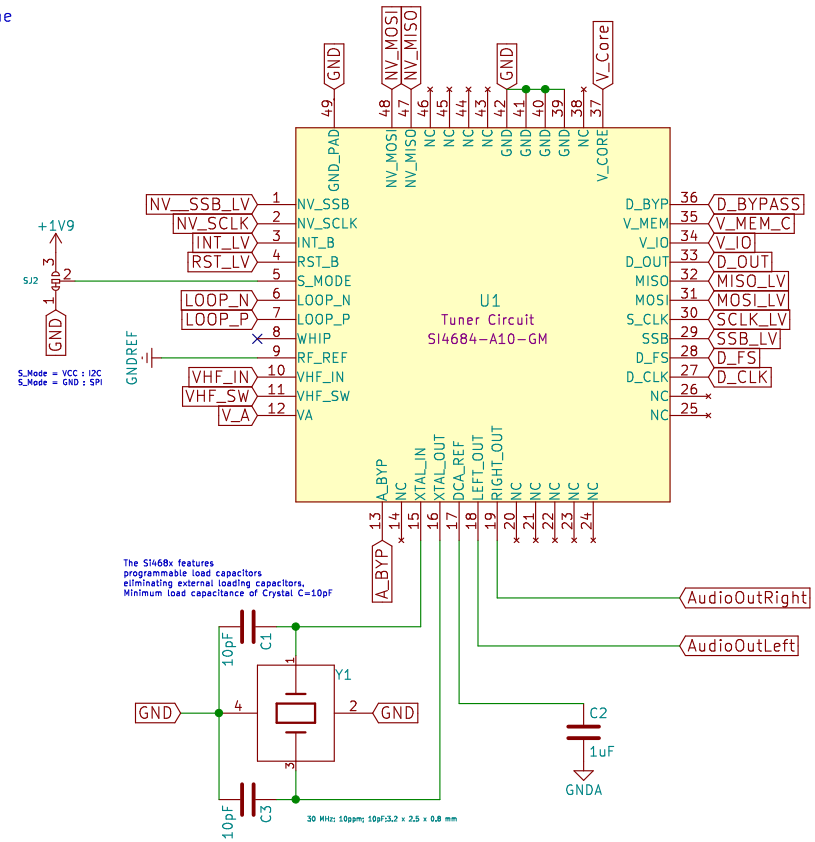
0.8.0

Changed: Bandpass filter in RF Front End for filtering the VCO spur – done
Changed: Reworked tactile switch pinning – done
Changed: Move Tactile Switch to A0 – done
Changed: Logic Level Shifter from TXB0108 to TXS0108E – done
Added: Headphone remote function circuit via pin A1 – done
Added: Headphone antenna circuit – done
Added: Voltage selector 5V and 3,3V – done
Changed: Changed to SST26WF flash memory – done
Changed: Disconnected 5V, RESET from ICSP connector – done




Oscillator Tuner Circuit Analog Part

Sheet: Version History
File: Version History.sch

Sheet: Power Supply
File: Power Supply.sch

Sheet: Connectors
File: Connectors.sch

Sheet: Audio
File: Audio.sch

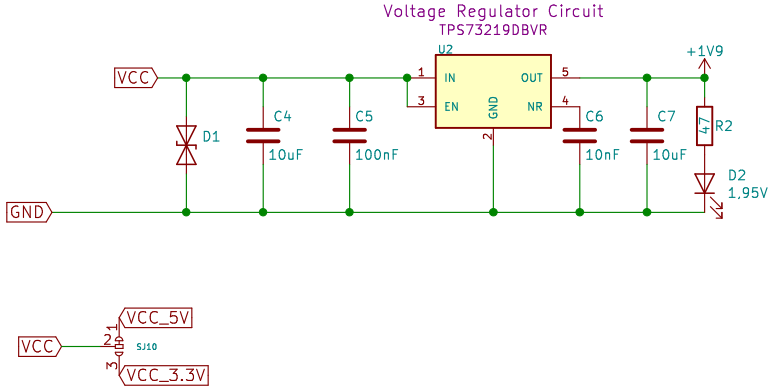
Sheet: Flash Memory
File: Flash Memory.sch

Sheet: RF Front End
File: RF Front End.sch

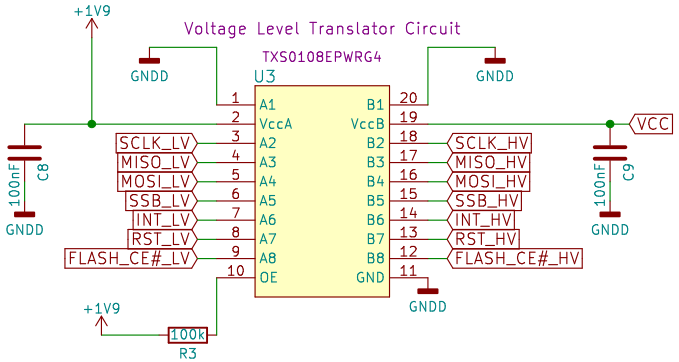
IGB
Sheet: /
File: Tuner Shield 0.8.0.sch
**Title: Tuner Shield DAB+**
Size: A4 | Date: 2019-02-17 | **Rev: 0.8.0**
KiCad E.D.A. kicad (5.0.0) | Id: 1/7

## 1.9V LDO Voltage Regulator

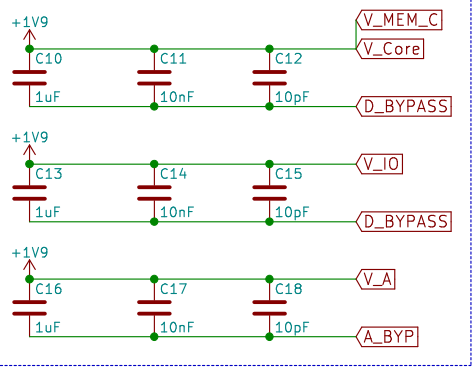
After Power Off is a RESET necessary to load firmware

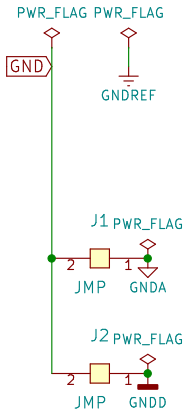



## Logic Level Shifter

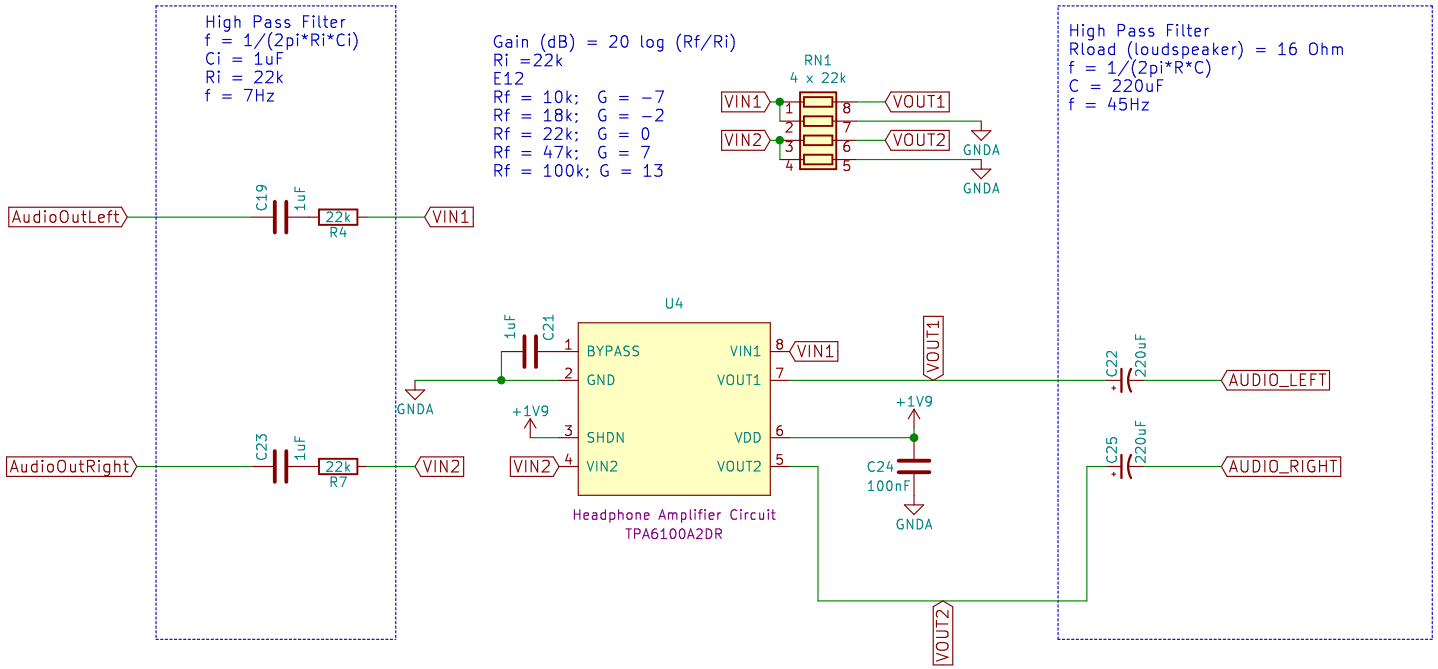


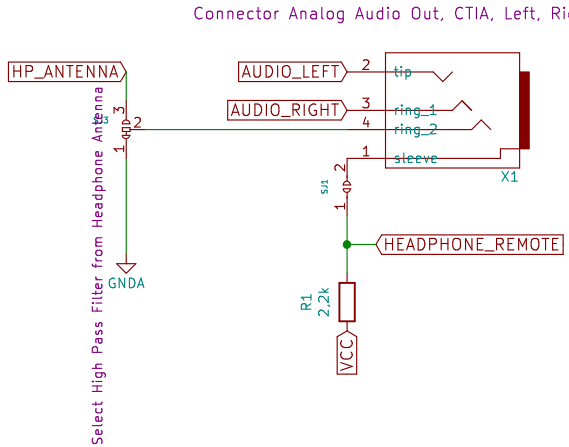

## Power Supply Decoupling

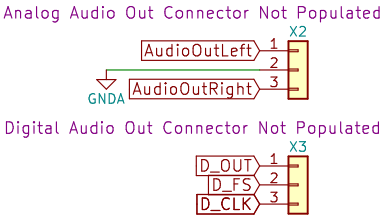


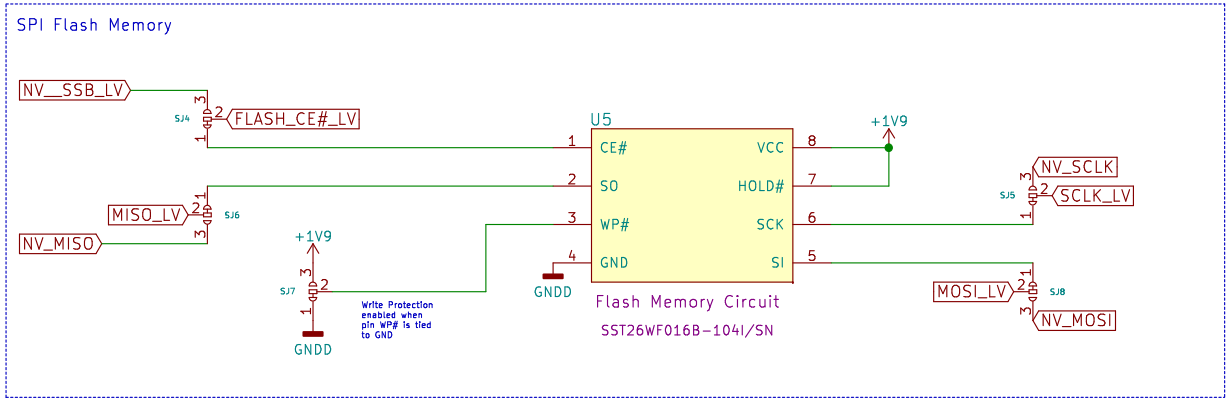

| | | |
|---|---|---|
| **IGB** | | |
| Sheet: /Power Supply/ | | |
| File: Power Supply.sch | | |
| ***Title: Tuner Shield DAB+*** | | |
| Size: A4 | Date: 2019-02-17 | **Rev: 0.8.0** |
| KiCad E.D.A. kicad (5.0.0) | | Id: 2/7 |




| | | |
|---|---|---|
| **IGB** | | |
| Sheet: /Audio/ | | |
| File: Audio.sch | | |
| ***Title: Tuner Shield DAB+*** | | |
| Size: A4 | Date: 2019-02-17 | **Rev: 0.8.0** |
| KiCad E.D.A. kicad (5.0.0) | | Id: 3/7 |




| | | |
|---|---|---|
| **IGB** | | |
| Sheet: /Flash Memory/ | | |
| File: Flash Memory.sch | | |
| ***Title: Tuner Shield DAB+*** | | |
| Size: A4 | Date: 2019-02-17 | **Rev: 0.8.0** |
| KiCad E.D.A. kicad (5.0.0) | | Id: 4/7 |

0.7.0
Schematic:
Changed: Added sub schematic for version history, connectors, antenna – done
Changed: Power Symbol 1.8V to 1.9V – done
Changed: Amplifier Midrail Bypass Capacitor = 10uF to reduce noise – done
Changed: Amplifier Rf, Rf, Rb = 22k to have proper amplification for headphones – done
Changed: Amplifier VCC = 1.9V to have right voltage – done
Changed: Audio Jack compatibel to CTIA with ring2 to GND – done
Changed: Antenna filter to pi bandpass – done
Changed: Tuner IC pin 8 disconnected (whip antenna) – done
New: Added 10uF Bulk Capacitor at LDO ingress to reduce noise – done
New: LED resistor to dim light – done

Changed: Check operating temerature rating industrial –40°C – +85°C

0.6.0

Changed: SJ1, SJ2 land pattern like schematic – done
Changed: Removed solder mask from all solder jumpers to be able to close by soldering – done
Changed: Reworked Audio out jack land pattern and schematic – done
Changed: Added 100k pullups/down resistors flash memory – done
Changed: Moved land patterns of all connectors in raster 1" – done
Changed: Audio Jack sleeve direct to GNDA – done
Changed: Audio gain from 20 (Rf = 100k) to 1.6 (Rf = 12k) – done
Changed: Supply Voltage from 1.8V –>1.9V – done
Changed: NV_SPI connections separated – done

New: Solder Jumper between audio jack ring and analog in – done
New: TVS Diode added – done

0.5.2

Changed: ICxx changed to Uxx –done
Changed: Tactile switch changed from 5V to GND – done
Changed: Move digital pin option 6,8 to analog pin 2,3 for compatibility with lcd shield – done
Changed: Naming of connectors acc EN 81346–2 changed from Pxx to Xxx – done
Changed: Audio Jack with Aux ring to A1– done
Changed: Turn silk screen LED cathode is wrong – done
Changed: Resize land pattern from 0603 to 0805 – done
Changed: Resize land pattern, orientation oszillator– done

New: Audio Out Schematic – done
New: Solder jumpers at digital pin 6,8 and analog pin 2,3 for compatibility with lcd shield – done
New: Head phone antenna option – done
New: ISP connector for MEGA spi combatibility – done
New: Head Phone Amplifier – done
New: footprint phone jack sj–4351x–sm – done
New: Floating pin A1, B1 from Voltage Level Translator to GND – done
New: Vias and GND plane below IC – done
New: Gndref on bottom side of pcb for controlled impedance – done
New: Separate gnd for oscillator

0.5.1

Changed: Tuner chip PIN5 from GNDD net to GND net
changed: Tuner chip PIN 39–42 from GNDD to GND
Changed: Power and GND lines from 0,25mm to 0,5mm
Changed: Orientation of PCB audio out left, antenna in right for housing, new crystal, changed footprints
Changed: Compatibility with adafruit tft cap touch screen pinning
Changed: Compatibility with Arduino Project Enclosure Sparkfun PRT–10088
Changed: Compatibility with Arduino Project Enclosure Adafruit ID: 337

New: tactile switch analog pin 1
New: Logic Level Translator TXB0108, changed footprint
New: footprint solder jumper to smaller
New: I2C/SPI solder switch

Initial
New: Solder Pads for selectors (Bus Mode, WP) – done
New: Audio Out Connector Jack 3,5mm – done
New: Flash 1.8V – done
New: GND pavillions – done
New: SMA A1A U.FL Jack Solder Pad for Antenna – done
New: Arduino Uno connector – done
New: Arduino Uno mechanical check – done
New: ERC: All GND as Power input –done

Roadmap:

1) Optimizing:

New: 100k pullup resistors for SlaveSelect pins SSB_HV, FLASH_CE_HV – open
Changed: Transmission Line VHF In 50 Ohm – open
New: EMI Shielding – open
Changed: 22k Resistor Array for Audio Amplifier – open
New: Add ferrite bead L in voltage supply line for providing high impedance to any VCO leakage – open
Changed: Add operating temperature rating industrial –40°C – +85°C – open

2) New Functions:

New: On/off switch – open
New: Selector 3,3V to 5V in Voltage Supply – open
New: Low Noise Amplifier (LNA) in Frontend – open
New: I2S DAC amplifier – open
New: Fractal Antenna on Backside – open
New: Mobile App with Juce –open
New: Bluetooth Shield integration – open
New: Amplifier: shutdown pin, additional pin necessary – open
New: Amplifier: Programmable resistor/poti for variable Gain, additional pin necessary – open
New: LED array WS2812 for status bootloader, application, RSSI, SNR, FIC quality – open

3) Cancelled:
100k bypass resistor on DAC_Ref Tuner Circuit – No improvement – done

Known Issues:

Acceptable: NVSPI Flash only working if not connected to other SPI
– NVSPI Flash function disabled

Critical: 100Hz noise in audio signal is from pc usb connector
– Reduction with large bulk cpacitor

Critical: Noise when loading firmware
– Audio lines routing away from SPI bus

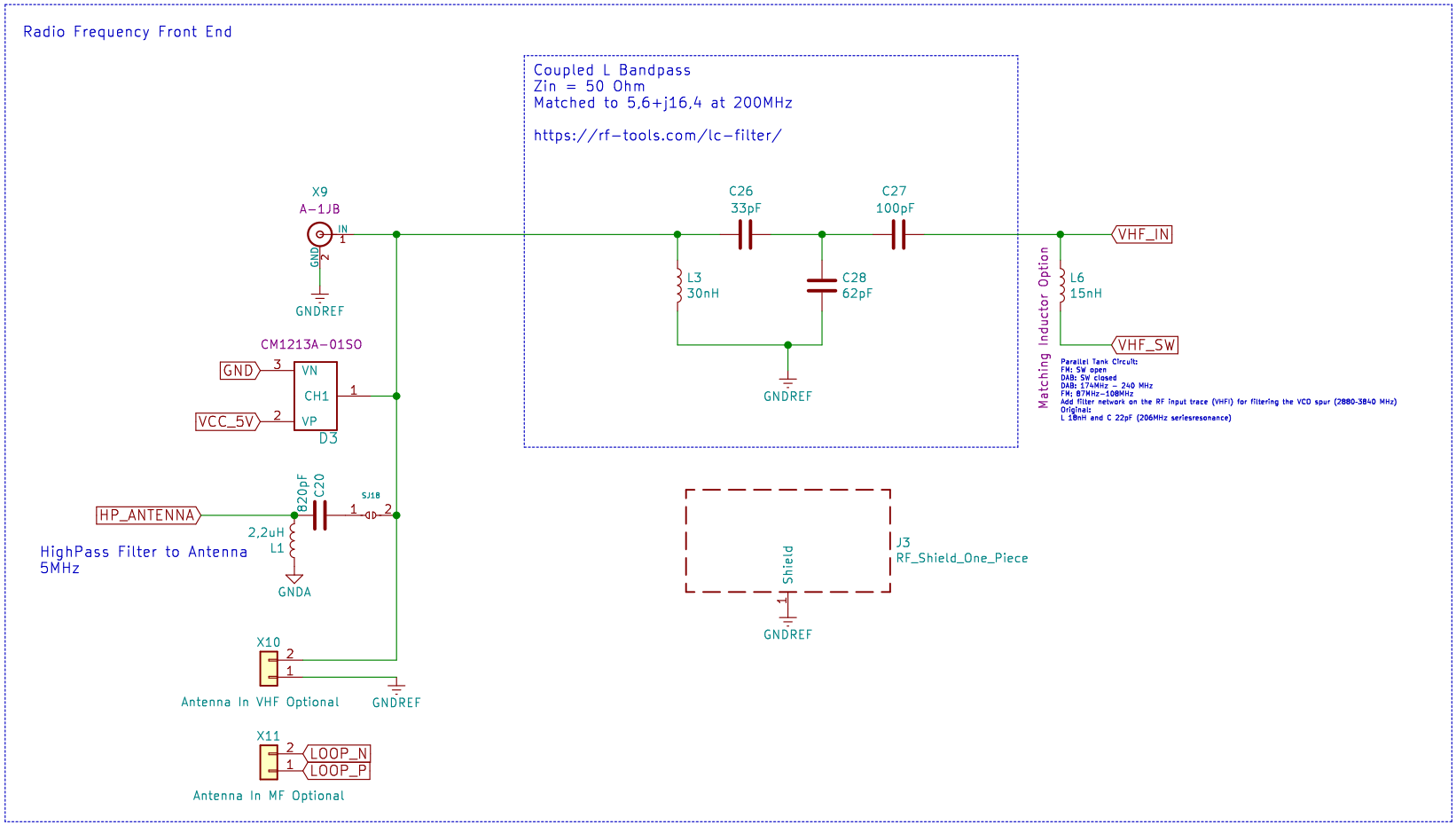
Critical: When audio jack with remote functionis plugged in tactile switch signal is generated leading to start a function
– Actually not solved and feature disabled

**IGB**

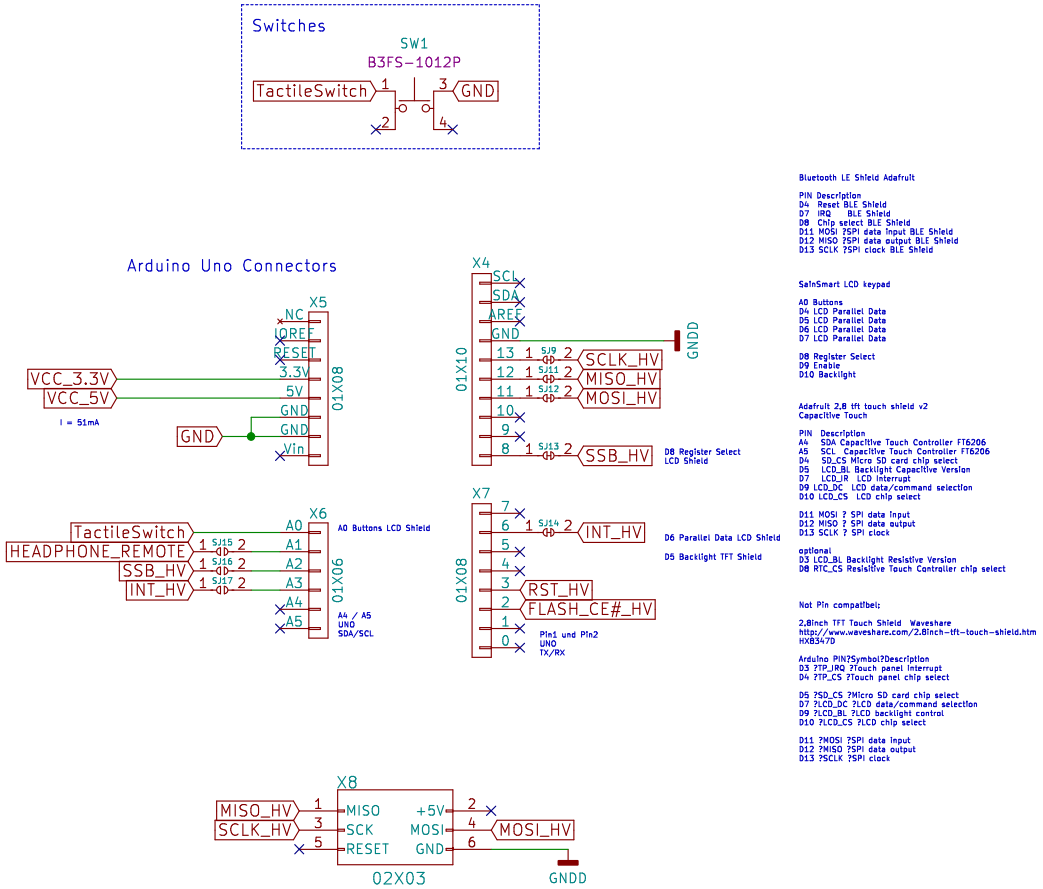
Sheet: /Version History/
File: Version History.sch

**Title: Tuner Shield DAB+**

| Size: A4 | Date: 2019–02–17 | **Rev: 0.8.0** |
|---|---|---|
| KiCad E.D.A. kicad (5.0.0) | | Id: 5/7 |




| | | |
|---|---|---|
| **IGB** | | |
| Sheet: /RF Front End/ | | |
| File: RF Front End.sch | | |
| ***Title: Tuner Shield DAB+*** | | |
| Size: A4 | Date: 2019-02-17 | **Rev: 0.8.0** |
| KiCad E.D.A. kicad (5.0.0) | | Id: 6/7 |




**IGB**

Sheet: /Connectors/
File: Connectors.sch

**Title: Tuner Shield DAB+**

| Size: A4 | Date: 2019-02-17 | **Rev: 0.8.0** |
|---|---|---|
| KiCad E.D.A. kicad (5.0.0) | | Id: 7/7 |