

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 Ri, 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: Change to SST26WF flash memory – open

New: 100k pullup resistors for SlaveSelect pins SSB\_HV, FLASH\_CE\_HV – open

New Ferrite beads in voltage supply – open

New: 100k bypass resistor on DAC\_Ref – open

## Layout

Changed: Reworked LED footprint for handsoldering

Changed: Reworked solder jumper mask and copper for inductors, solder jumpers

Changed: Reworded ESD Suppressor footprint for handsoldering – open

Changed: Reworked Tuner IC footprint for better handsoldering

New: Use only smd size 2012 metric packages for handsoldering – open

Changed: Rework for all footprints to handsoldering – open

Changed: 22k Resistor Array Audio Amplifier – open

Changed: Check operating temperature rating industrial  $-40^{\circ}\text{C}$  –  $+85^{\circ}\text{C}$

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Sheet: /

File: Tuner Shield 0.7.0.sch

**Title: Tuner Shield DAB+**

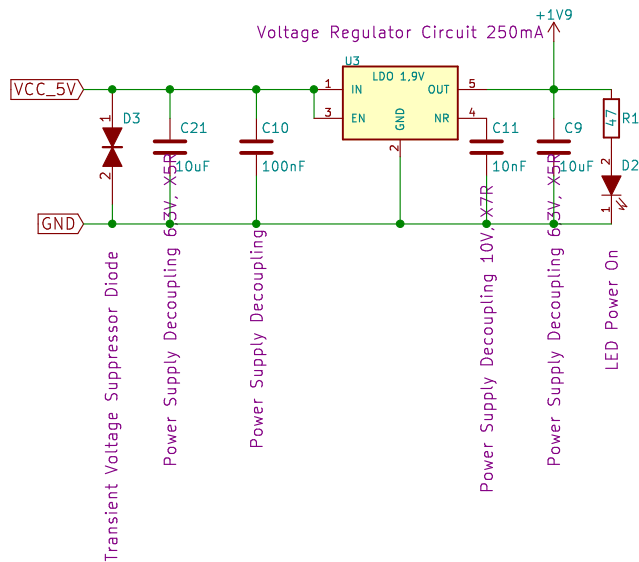
Size: A4	Date: 2018-08-10
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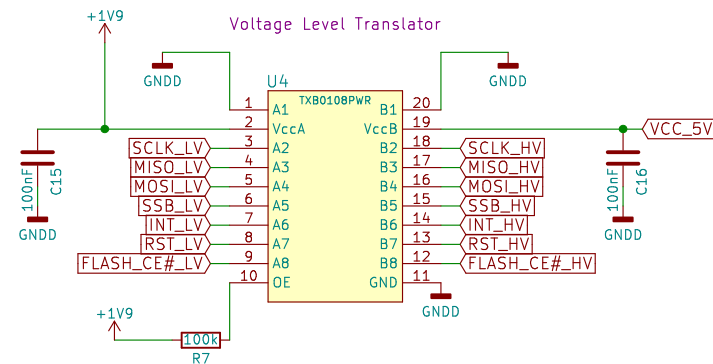
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### 1.9V LDO Voltage Regulator

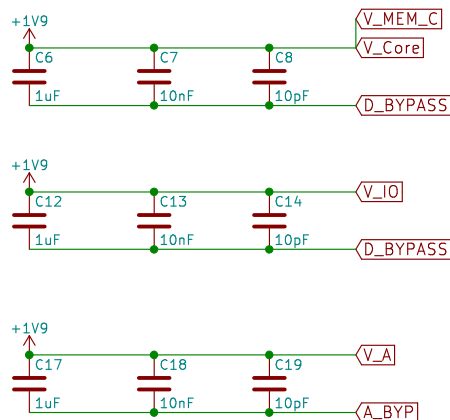


### Logik Level Shifter



Operation Enable Resistor (VccA) Thin Film 1/10W

### Power Supply Decoupling



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Sheet: /Power Supply/

File: Power Supply.sch

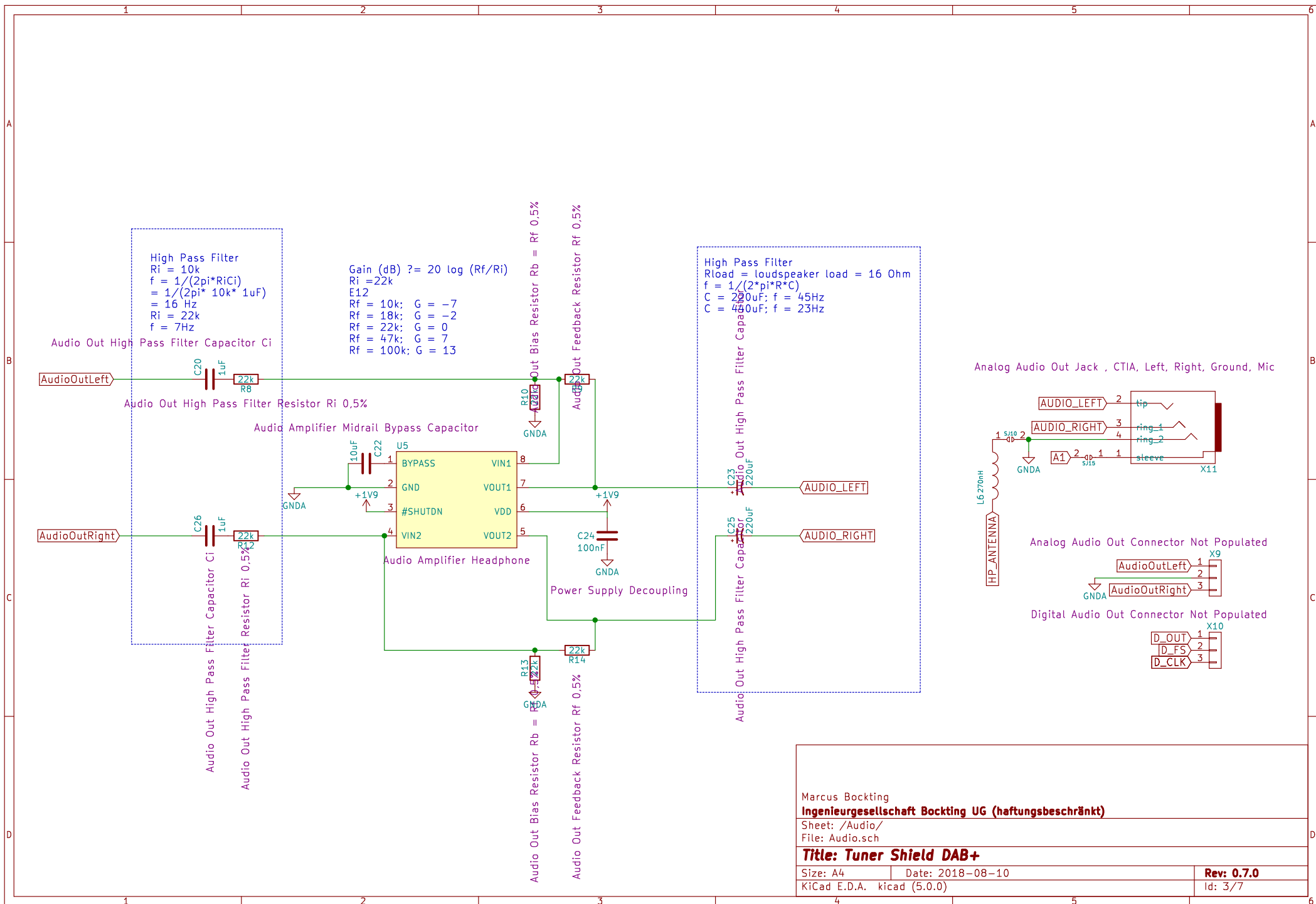
**Title: Tuner Shield DAB+**

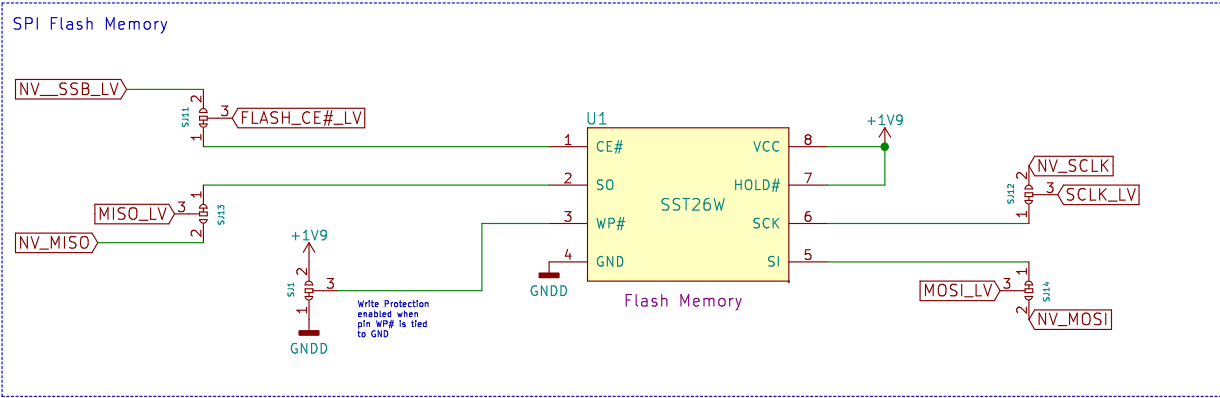
Size: A4 Date: 2018-08-10

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**Rev: 0.7.0**

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Sheet: /Flash Memory/  
File: Flash Memory.sch

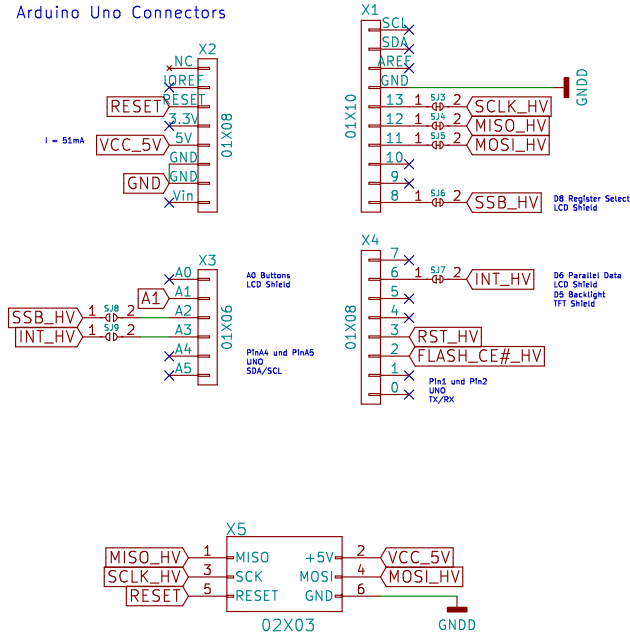
**Title: Tuner Shield DAB+**

Size: A4  
Date: 2018-08-10  
KiCad E.D.A. kicad (5.0.0)

**Rev: 0.7.0**  
Id: 4/7

	1	2	3	4	5															
A	<p>0.6.0</p> <p>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 -&gt;1,9V – done Changed: NV_SPI connections separated – done</p> <p>New: Solder Jumper between audio jack ring and analog in – done New: TVS Diode added – done</p>																			
B	<p>0.5.2</p> <p>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 changedn 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</p> <p>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</p>																			
C	<p>0.5.1</p> <p>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</p> <p>New: tactile switch analog pin 1 New: Logic Level Translator TXB0108, changed footprint New: footprint solder jumper to smaller New: I2C/SPI solder switch</p> <p>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</p>																			
D	<p>Roadmap:</p> <p>1) Optimizing: Ferrite in power supply – open Transmission Line VHF In 50 Ohm – open EMI Shielding – open (A) Low Noise Amplifier (LNA) in Frontend – open SPI slave select pull ups – open</p> <p>2) New Functions: I2S DAC amplifier – open Fractal Antenna on Backside – open Mobile App with Juce –open Bluetooth Shield integration – open Amplifier: shutdown pin, additional pin necessary – open Amplifier: Programmable resistor/poti for variable Gain, additional pin necessary – open LED array WS2812 for status bootloader, application, RSSI, SNR, FIC quality – open RSSI/SNR LED – open</p> <p>3) Other:</p> <p>Known Issues:</p> <p>1,8V Flash cmd by Tuner Chip not working – NVSPI only if not connected to other spi 100Hz noise in audio signal is from pc usb connector – reduction with big bulk capacitor Noise when flash is loading firmware</p> <table><tr><td colspan="3">Marcus Bockting <b>Ingenieurgesellschaft Bockting UG (haftungsbeschränkt)</b></td></tr><tr><td colspan="3">Sheet: /Version History/ File: Version History.sch</td></tr><tr><td colspan="3"><b>Title: Tuner Shield DAB+</b></td></tr><tr><td>Size: A4</td><td>Date: 2018-08-10</td><td><b>Rev: 0.7.0</b></td></tr><tr><td>KiCad E.D.A. kicad (5.0.0)</td><td></td><td>Id: 5/7</td></tr></table>					Marcus Bockting <b>Ingenieurgesellschaft Bockting UG (haftungsbeschränkt)</b>			Sheet: /Version History/ File: Version History.sch			<b>Title: Tuner Shield DAB+</b>			Size: A4	Date: 2018-08-10	<b>Rev: 0.7.0</b>	KiCad E.D.A. kicad (5.0.0)		Id: 5/7
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	1	2	3	4	5															

Arduino Uno Connectors



Adafruit 2.8" TFT touch shield v2 Capacitive Touch		SalvSmart LCD keypad	Bluetooth LE Shield Adafruit
PIN	Description	A0 Buttons	PIN Description
A4	SDA Capacitive Touch Controller FT6206	D4 LCD Parallel Data	D4 Reset BLE Shield
A5	SCL Capacitive Touch Controller FT6206	D5 LCD Parallel Data	D7 IRQ BLE Shield
D4	SD_CS Micro SD card chip select	D6 LCD Parallel Data	D8 Chip select BLE Shield
D5	LCD_BL Backlight Capacitive Version	D7 LCD Parallel Data	D11 MOSI 7SPI data Input BLE Shield
D7	LCD_IRQ LCD Interrupt	D8 Register Select	D12 MISO 7SPI data output BLE Shield
D9	LCD_DC LCD data/command selection	D9 Enable	D13 SCLK 7SPI clock BLE Shield
D10	LCD_CS LCD chip select	D10 Backlight	
D11	MOSI 7 SPI data Input		
D12	MISO 7 SPI data output		
D13	SCLK 7 SPI clock		
optional			
D3	LCD_BL Backlight Resistive Version		
D8	RTC_CS Resistive Touch Controller chip select		

Not Pin compatible:  
2.8inch TFT Touch Shield Waveshare  
<http://www.waveshare.com/2.8inch-tft-touch-shield.htm>  
HX8347D

Arduino PIN2Symbol?Description  
D3 TTP\_IRQ 7Touch panel Interrupt  
D4 TTP\_CS 7Touch panel chip select  
D5 7SD\_CS 7Micro SD card chip select  
D7 7LCD\_DC 7LCD data/command selection  
D9 7LCD\_BL 7LCD backlight control  
D10 7LCD\_CS 7LCD chip select  
D11 7MOSI 7SPI data Input  
D12 7MISO 7SPI data output  
D13 7SCLK 7SPI clock

Sheet: /Antenna/		
File: Antenna.sch		
<b>Title: Tuner Shield DAB+</b>		
Size: A4	Date: 2018-08-10	Rev: 0.7.0
KiCad E.D.A. kicad (5.0.0)		Id: 7/7

**Title: Tuner Shield DAB+**

Size: A4	Date: 2018-08-10	Rev: 0.7.0
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KiCad E.D.A. kicad (5.0.0)	Id: 7/7
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