RPi-DAC SPS

How to solder

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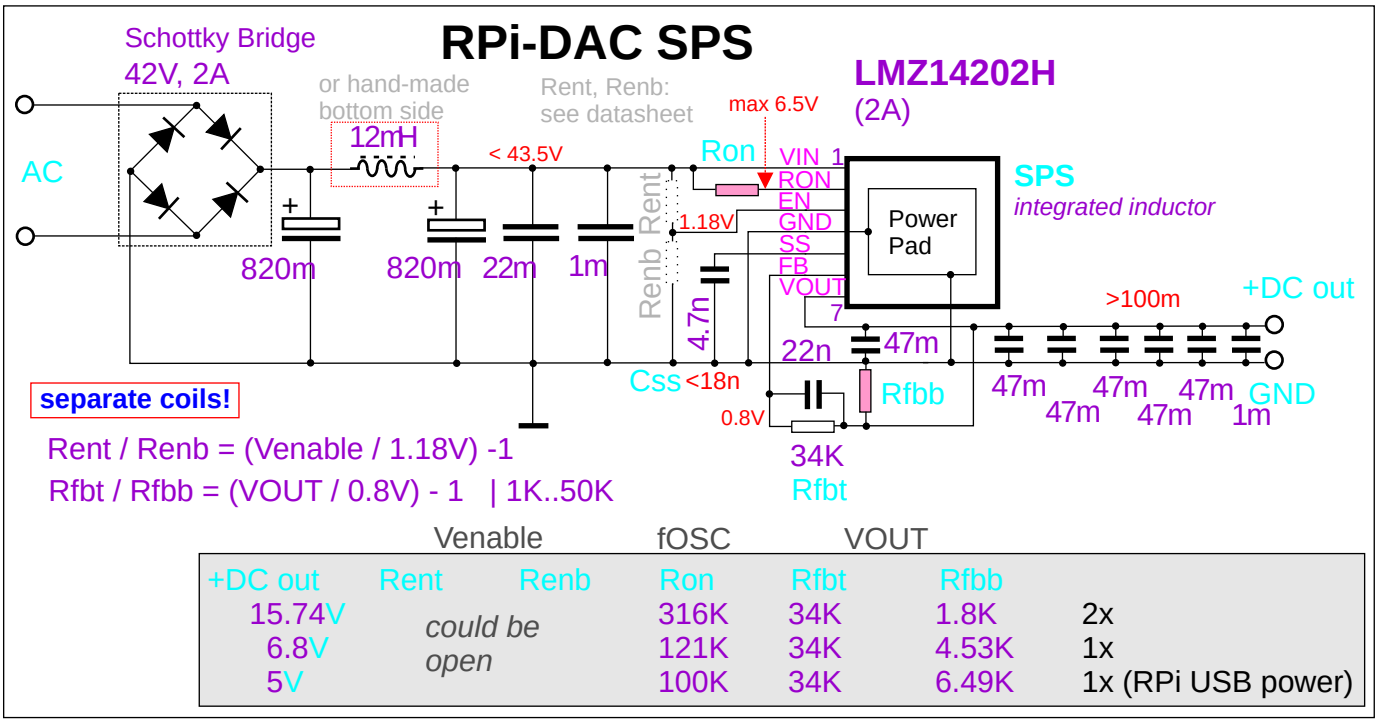
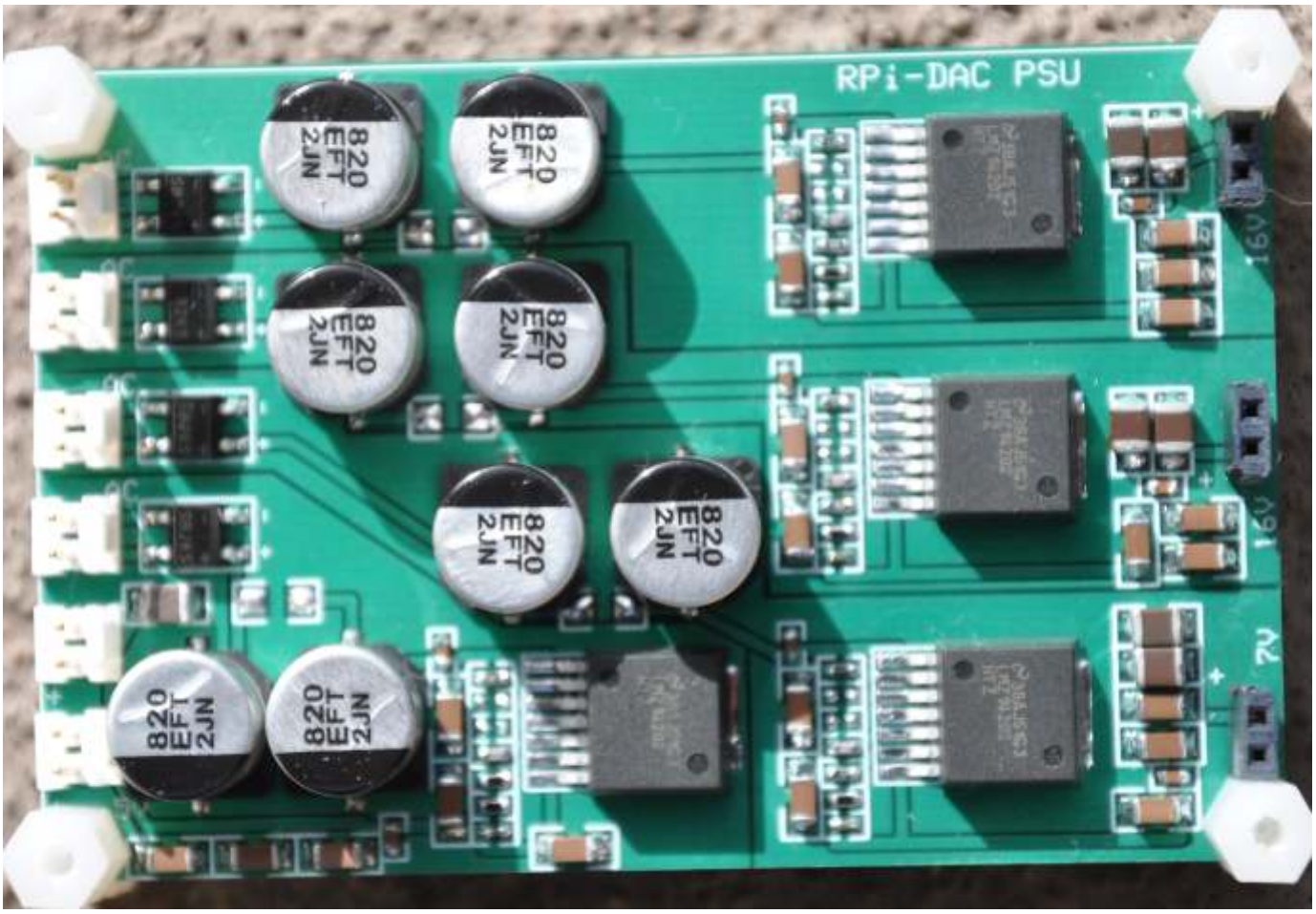
Schematics



	Venable		fOSC	VOUT		
+DC out	Rent	Renb	Ron	Rfbt	Rfbb	
15.74V	*could be open*		316K	34K	1.8K	2x
6.8V			121K	34K	4.53K	1x
5V			100K	34K	6.49K	1x (RPi USB power)

4x: 2x 16V (DAC), **1**x 7V (DAC), **1**x 5V (RPi USB, fan)

Equipped SPS



BOM

Component	Value	pcs	package	Digikey part	Comments	Price	Sum	
Bridge Rectifier	60V, 2A	4		641-1434-1-ND	RECT	0.84	3.36	
LMZ14202H	2A	4	TO-PMOD-7	LMZ14202HTZ/NOPBCT-ND	SPS, 2A	13.79	55.16	
Resistor	100K	1	0603	P100KDBCT-ND	Ron, 5V, 0.1%	0.63	0.63	0603i=1608m
	121K	1	0603	P121KDBCT-ND	Ron, 7V, 0.1%	0.63	0.63	
	316K	2	0603	P316KDBCT-ND	Ron, 17V, 0.1%	0.63	1.26	
	34K	4	0603	P34KDBCT-ND	Rfbt, all, 0.1%	0.63	2.52	
	6.49K	1	0603	P6.49KDBCT-ND	Rfbb, 5V, 0.1%	0.63	0.63	
	5.36K	1	0603	P5.36KHCT-ND	Rfbb, 7.3V, 1%	0.10	0.10	
or:	4.53K	1	0603	P4.53KDBCT-ND	Rfbb, 6.8V, 0.1%	0.63	0.63	
	1.8K	2	0603	P1.8KDBCT-ND	Rfbb, 15.74V, 0.1%	0.63	1.26	
Capacitor	1µ	8	0603	445-7468-1-ND	50V	0.13	1.04	
	47µ	28	1206	445-11717-1-ND	25V, 20%	1.25	35.00	available??
or:	22µ	28	1206	1276-3047-1-ND	25V	0.50	14.00	or: 33/47µ
or:	33µ	28	1206	445-11710-1-ND	25V	1.25	35.00	1206i=3216m
	820µ	8	SMD 12x12	PCE5011CT-ND	25V	1.42	11.36	
	4.7n	4	0603	445-2712-1-ND	25V, 5%	0.24	0.96	
	22n	4	0603	1276-1995-1-ND	25V, 5%	0.10	0.40	
Inductor	12µH	4	SMD 7x7.8	308-1870-1-ND	2A	0.82	3.28	or hand made
Power Filter	10A	1	Rack Mount	603-1149-ND	switch, fuse	13.04	13.04	or w/o filter?
Connector	1x2 male	8		A30786-ND	gold	0.85	6.80	
connector cables	1x2 female	3			connect DC-DAC			
Sum							117.06 + TAX	
Weiliang Transformer	50VA	1	Toroid	http://diyhifishop.com/115v232	2*15V, 2*9V	47.88	47.88	

prices in USD

Soldering

There is nothing special or really complicated.
Just to mention:
- the inductors are soldered at the bottom side
- instead of the SMD inductors, hand-made inductors or resistors can be used (optional with through-holes)
- the Renb and Rent can be omitted (used to set the switch-on/off voltage, can be left open)
- there are enough pads to solder 22...47mcapacitors, select the ones you can get
- the 820melectrolytes are the largest which can be soldered, smaller values could be selected
- if soldering the 820melectrolytes - check for shortcuts to neighbor traces (small tolerances !)
- check the right order how to solder electrolytes - it can be difficult to go between already soldered parts
- solder the power pads of the LMZ14202H at last when all is working and checked, solder from the bottom side

- for input and output connectors - select if you want to have male or female
- if stacked with RPi-DAC - make sure to have the right combination (PCBs are connected via these connectors - male vs. female)

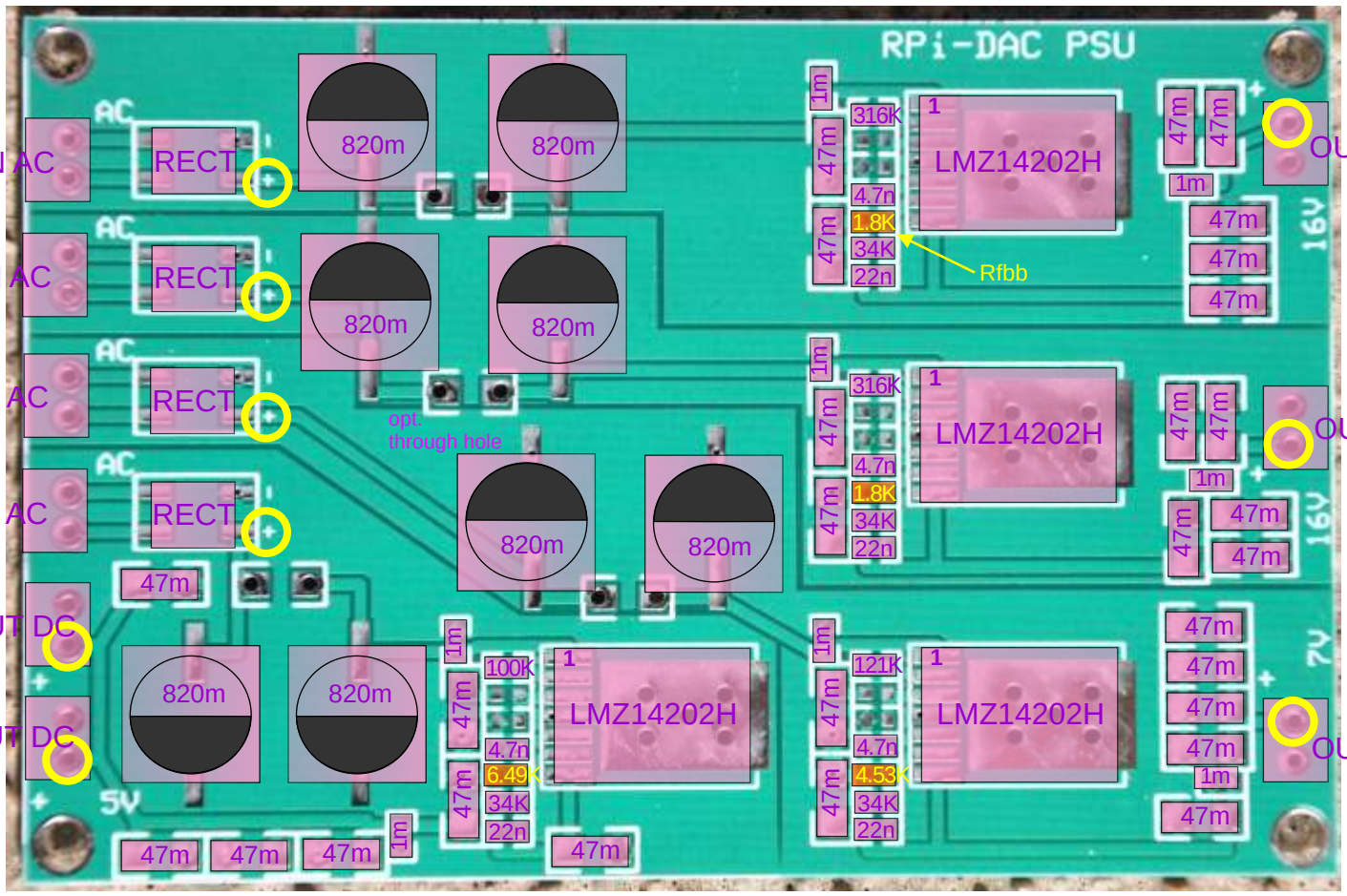
Operation

You can use any transformer, or several separate ones.
The suggested one is:
http://diyhifishop.com/115v230v-50w-high-quality-audio-rcore-transformer-p-61.html

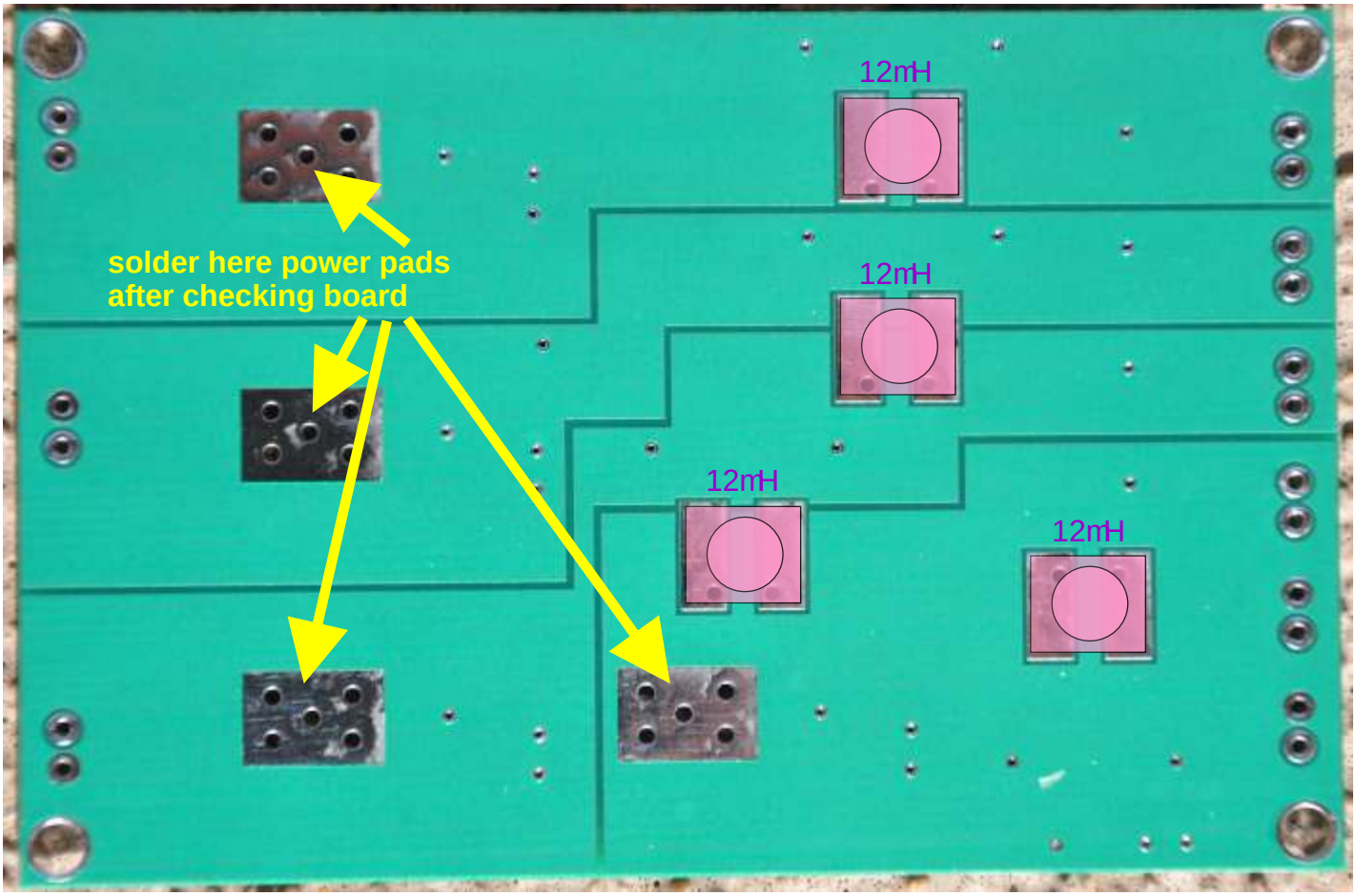
If you want to use with RPi-DAC:
- use a separate coil, without center tap, for the two 16V rails

ATT:
Even some of the components (e.g. rectifier bridge, LMZ14202H) have a wide input voltage range
- bear in mind:
the max. voltage after rectification depends on the used voltage range of capacitors, e.g. 25V (DC) for 820m->max. 17.7V AC

Part Locations

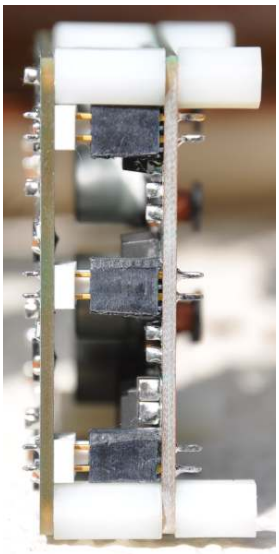


top



buttom

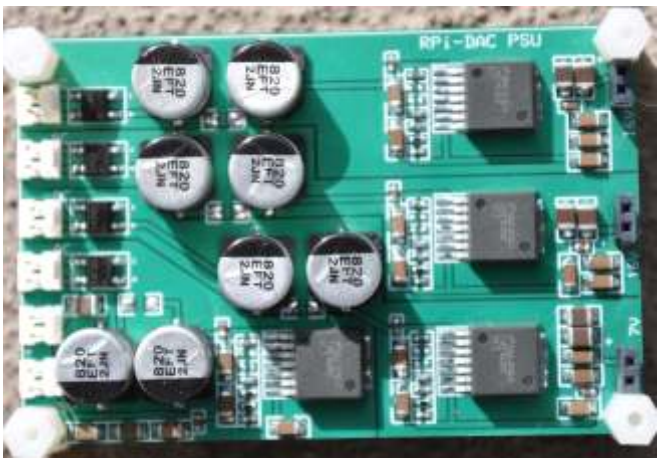
Pictures



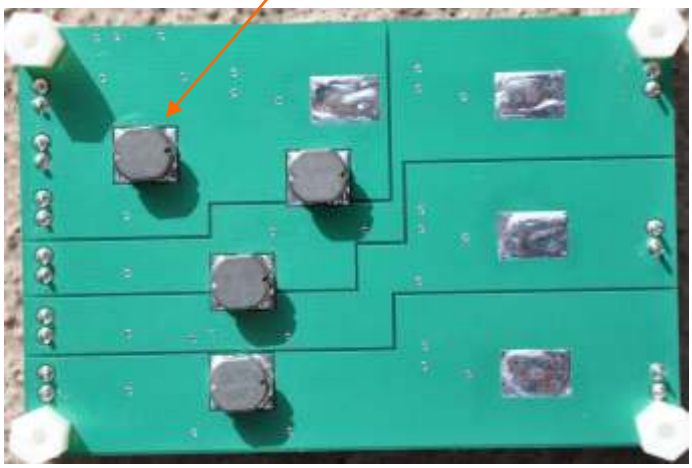
stack with RPi-DAC

stack with RPi-DAC
male - female connectors !

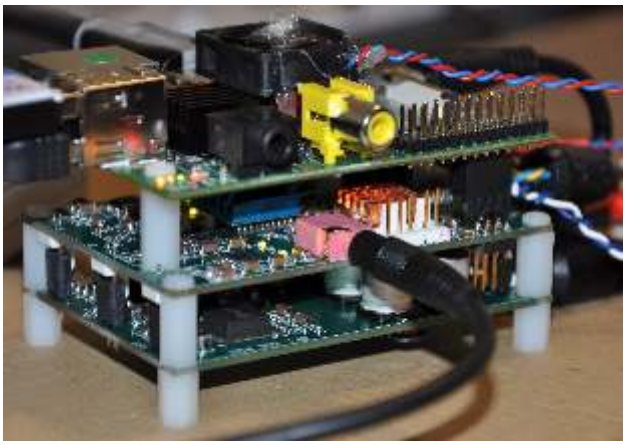
inductors: SMD or hand-made, via through hole
(solder at bottom side)



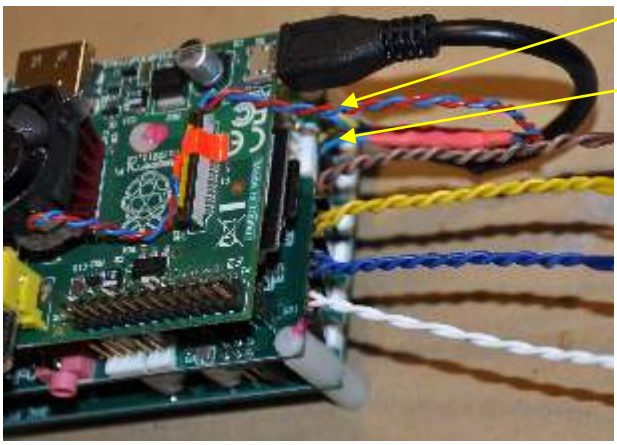
top view



bottom view



stacked with RPi-DAC and RPi



external wiring

DC RPi USB power

DC 5V fan

AC

AC

AC

keep coil separate

AC

could be one AC, 15V rail

Parameters

4 rails, each max. 2A
adjustable Vout via **Rfbb**
max. AC voltage depends in Caps voltage range after DC, e.g. 25V (AC max. 17.7V)