

FULL ELECTRONIC / ANTENNA SIDE  
FOR THE LIGHTNING RADAR  
ORIGINAL DESIGN BY FRANK KOOIMAN  
DRAWING & ADAPTATION BY  
ON4LDZ / DANIELV37  
Daniel Verschueren  
REV 3.0 / 09-2008

!!! Set the same gain on both channels !!!

Do not forget to shortcut SLQ1 & SLQ2 if no options are used

!!! IMPORTANT !!!  
C200-C201-C202 & C300-C301-C302  
Must be determined for 10KHZ  
in conjunction with the antenna

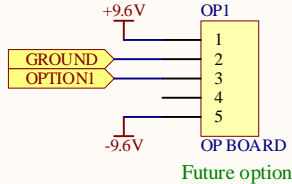
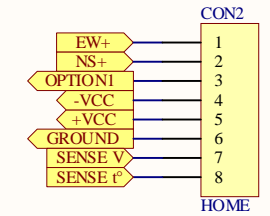
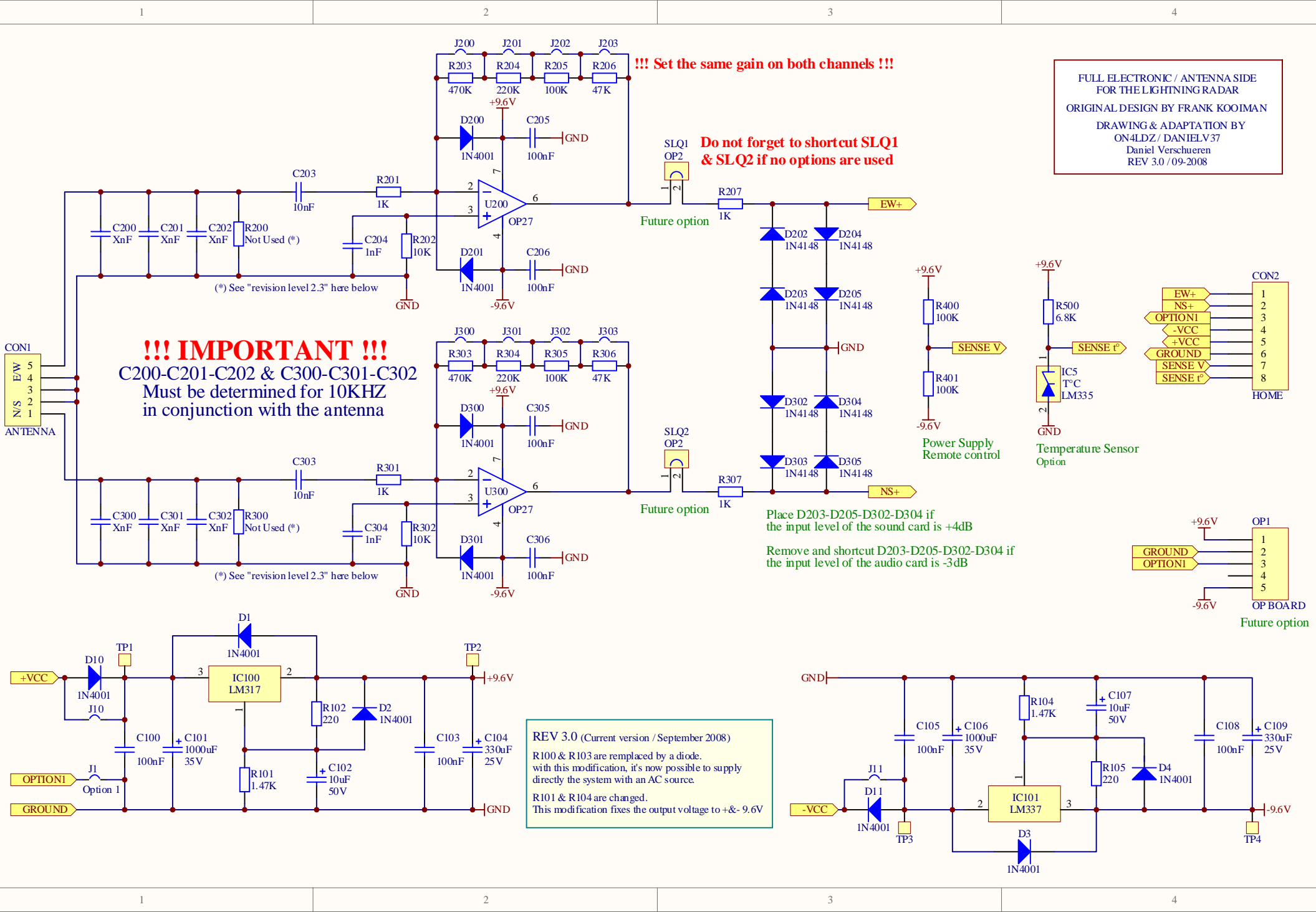
(\*) See "revision level 2.3" here below

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Place D203-D205-D302-D304 if  
the input level of the sound card is +4dB

Remove and shortcut D203-D205-D302-D304 if  
the input level of the audio card is -3dB

REV 3.0 (Current version / September 2008)  
R100 & R103 are replaced by a diode.  
with this modification, it's now possible to supply  
directly the system with an AC source.  
R101 & R104 are changed.  
This modification fixes the output voltage to +/- 9.6V



# CONNECTION HELP

FOR THE LIGHTNING RADAR PCB kit

The power supply is made by using a simple AC transformer.

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**AC Transformer**  
**9V to 12V AC OUTPUT**  
**100mA**



**DO NOT USE TRANSFORMER WITH GROUND CONNECTION**

GROUND POWER SUPPLY & GROUND SIGNAL connected to GROUND

9V to 12V AC - 100mA

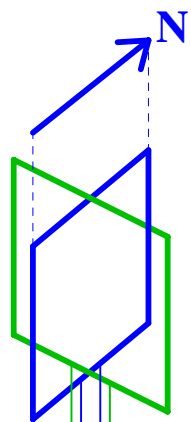
**!!! When AC transformer is used, do not forget to link pins 4 & 5 !!!  
!!! J10 & J11 must be opened when AC power supply is used !!!**

Use shield cable if lenght > 5m

LINE < 40m

TO IN-LINE INPUT

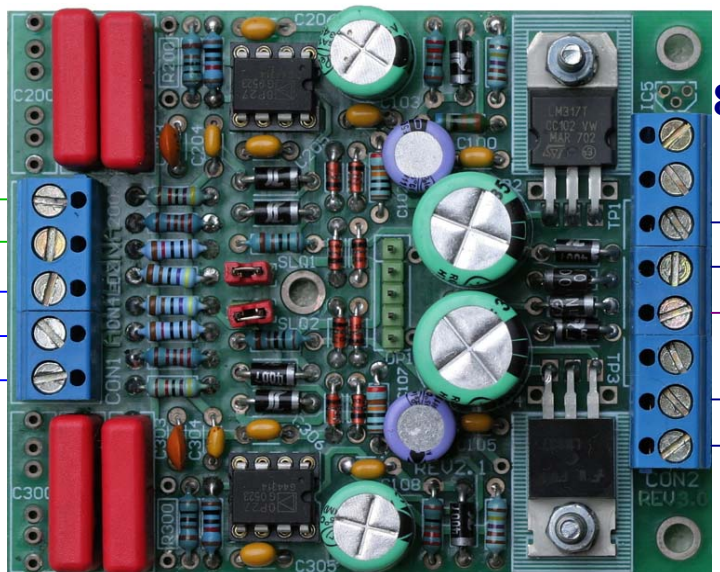
GROUND  
RIGHT  
LEFT



5  
E/W  
Ground for shield  
COPPER TUBE  
N/S  
1

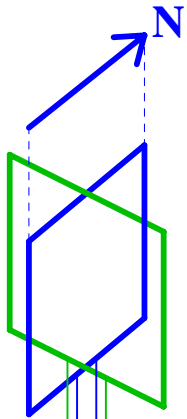
TIPS:  
To check if both channels have the same gain, shortcut the pin 1 & 5 on CON1. LR will show on the RADAR MAP a angle detection only and exactly at 45° and 225°.

Amplifier as close as possible to the antenna system



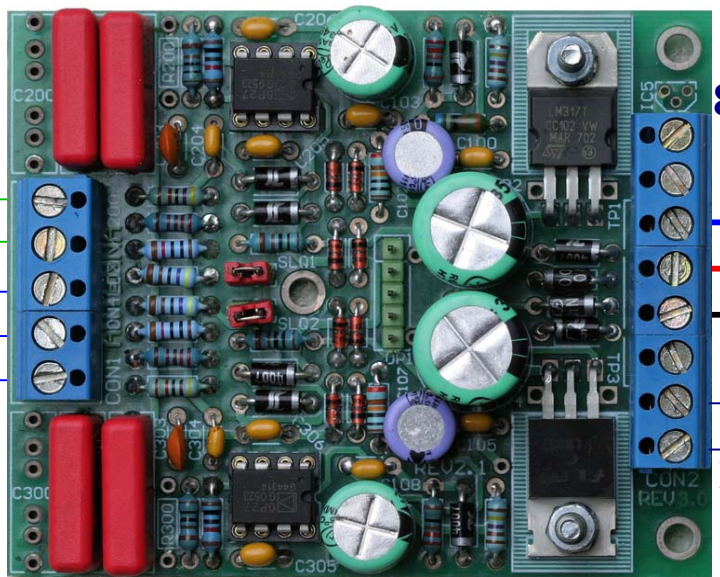
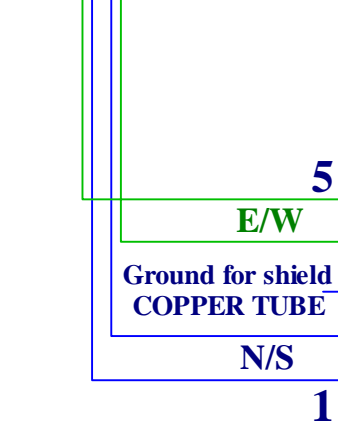
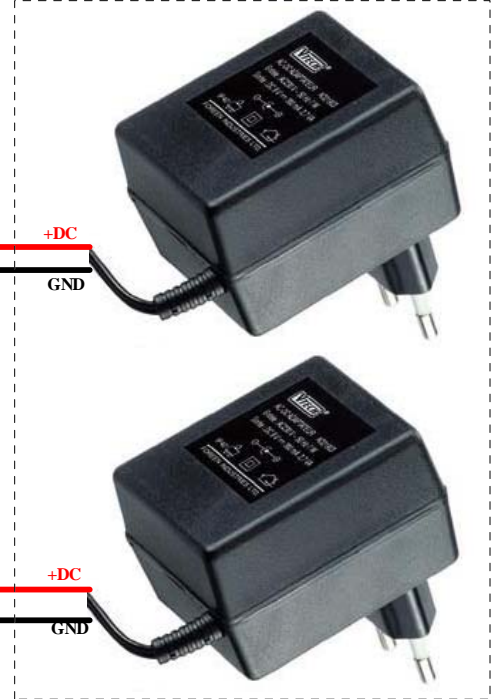
8

1



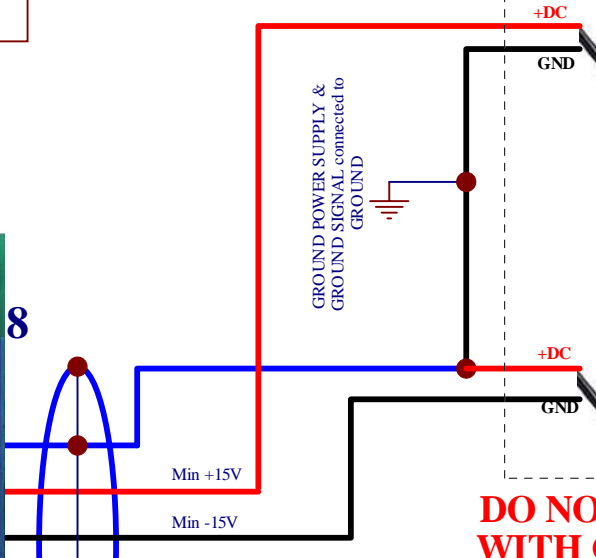
**CONNECTION HELP**  
 FOR THE LIGHTNING RADAR PCB kit  
 The power supply is made by using two  
 DC transformers.  
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 REV 3.0 / 2008

**2x DC Transformer**  
 Minimum 12V DC OUTPUT 100mA

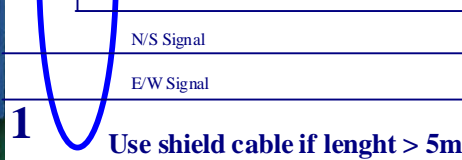


TIPS:  
 To check if both channels have the same gain,  
 shortcut the pin 1 & 5 on CON1.  
 LR will show on the RADAR MAP a angle  
 detection only and exactly at 45° and 225°.

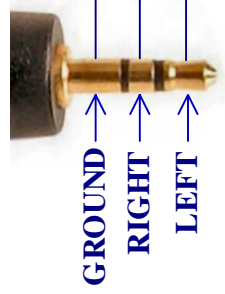
Amplifier as close as possible  
 to the antenna system



**DO NOT USE TRANSFORMER  
 WITH GROUND CONNECTION**

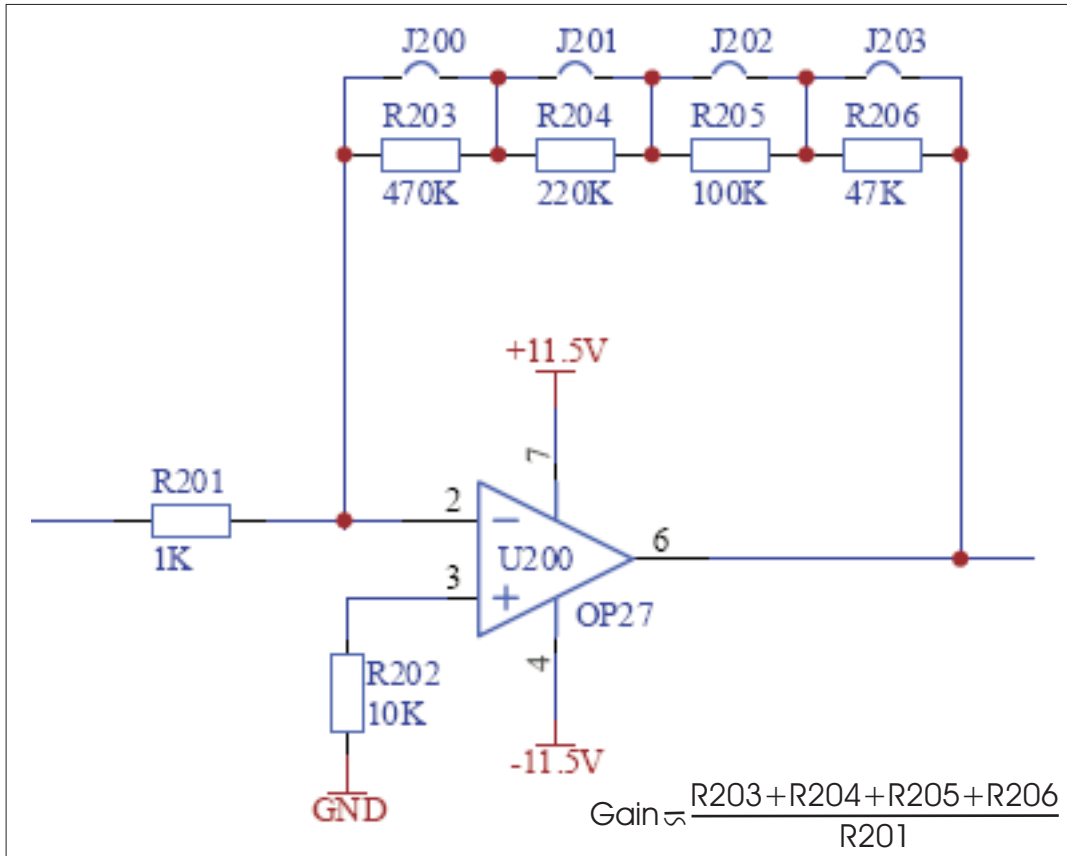


LINE < 40m



TO IN-LINE INPUT

# How to set the Gain of the amplifiers ?



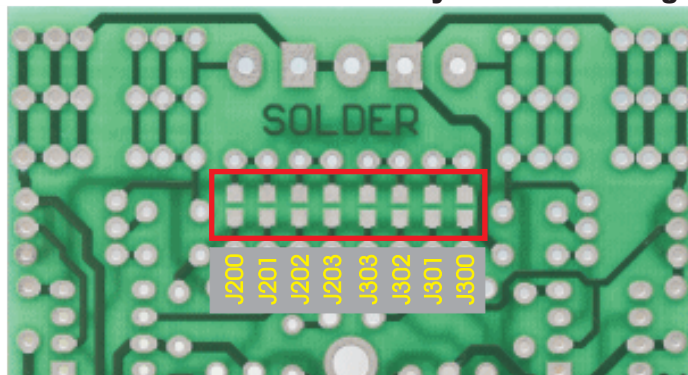
When you will set or change the gain of the amplifiers, you can close or open the small J switches.

There are 15 possibilities of gain

	J200	J201	J202	J203	J303	J302	J301	J300
47x	●	●	●	○	○	●	●	●
100x	●	●	○	●	●	○	●	●
147x	●	●	○	○	○	○	●	●
220x	●	○	●	●	●	●	○	●
267x	●	○	●	○	○	●	○	●
320x	●	○	○	●	●	○	○	●
367x	●	○	○	○	○	○	○	●
470x	○	●	●	●	●	●	●	○
517x	○	●	●	○	○	●	○	○
570x	○	●	○	●	●	○	●	○
617x	○	●	○	○	○	○	●	○
690x	○	○	●	●	●	●	○	○
737x	○	○	●	○	○	●	○	○
790x	○	○	○	●	●	○	○	○
837x	○	○	○	○	○	○	○	○

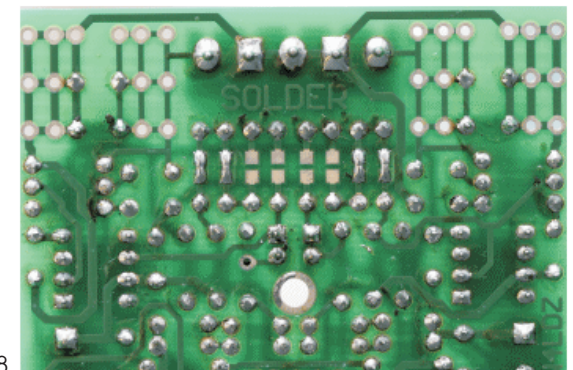
○ J Switch Open  
● J Switch Close

To localise the J switch, reverse the PCB and look for the inscription "SOLDER". The J switches are localized by the red rectangle.



Set the same gain on both channels

This example shows a setting of 147x

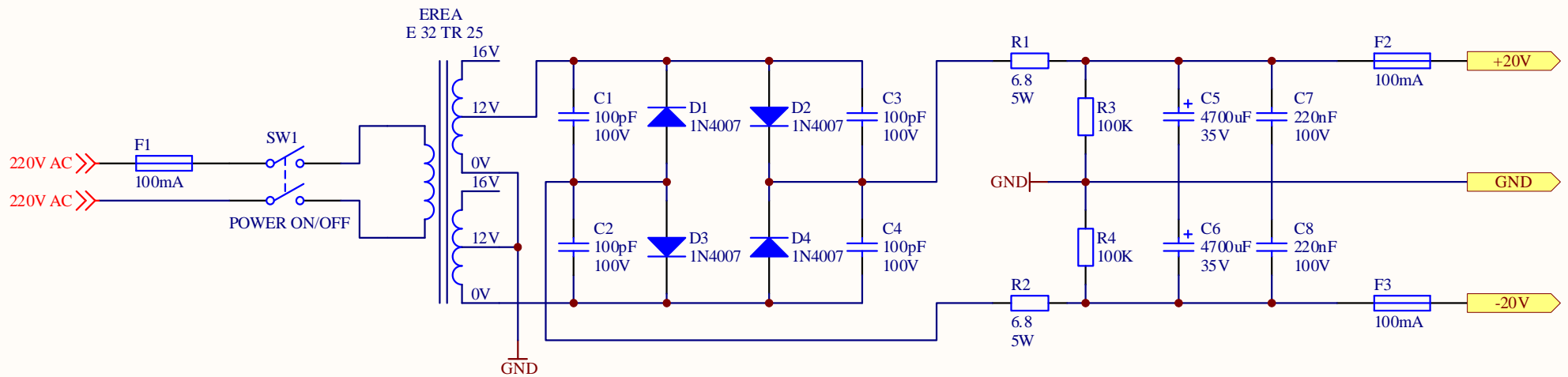


# BILL (REV 3.0)

Description	Designator	Value	Sub-Value	Description	Designator	Value	Sub-Value
Capacitor	C100	100nF	100V	Diode	D204	1N4148	
Polarized Capacitor (Radial)	C101	1000uF	35V	Diode	D205	1N4148	
Polarized Capacitor (Radial)	C102	10uF	50V	Diode	D300	1N4001	
Capacitor	C103	100nF	100V	Diode	D301	1N4001	
Polarized Capacitor (Radial)	C104	330uF	25V	Diode	D302	1N4148	
Capacitor	C105	100nF	100V	Diode	D303	1N4148	
Polarized Capacitor (Radial)	C106	1000uF	35V	Diode	D304	1N4148	
Polarized Capacitor (Radial)	C107	10uF	50V	Diode	D305	1N4148	
Capacitor	C108	100nF	100V	Resistor	R101	1.47K	
Polarized Capacitor (Radial)	C109	330uF	25V	Resistor	R102	220	
Capacitor	C200	XnF	100V	Resistor	R104	1.47K	
Capacitor	C201	XnF	100V	Resistor	R105	220	
Capacitor	C202	XnF	100V	Resistor	R201	1K	
Capacitor	C203	10nF	100V	Resistor	R202	10K	
Capacitor	C204	1nF	100V	Resistor	R203	470K	
Capacitor	C205	100nF	100V	Resistor	R204	220K	
Capacitor	C206	100nF	100V	Resistor	R205	100K	
Capacitor	C300	XnF	100V	Resistor	R206	47K	
Capacitor	C301	XnF	100V	Resistor	R207	1K	
Capacitor	C302	XnF	100V	Resistor	R301	1K	
Capacitor	C303	10nF	100V	Resistor	R302	10K	
Capacitor	C304	1nF	100V	Resistor	R303	470K	
Capacitor	C305	100nF	100V	Resistor	R304	220K	
Capacitor	C306	100nF	100V	Resistor	R305	100K	
Diode	D1	1N4001		Resistor	R306	47K	
Diode	D2	1N4001		Resistor	R307	1K	
Diode	D3	1N4001		Resistor	R400	100K	
Diode	D4	1N4001		Resistor	R401	100K	
Diode	D10	1N4001		Resistor	R500	6.8K	
Diode	D11	1N4001		Ultra-Low Noise, Precision Opera	U200	OP27	
Diode	D200	1N4001		Ultra-Low Noise, Precision Opera	U300	OP27	
Diode	D201	1N4001		Low-Current 1.2V to 37V Voltage	IC100	LM317	
Diode	D202	1N4148		Low-Current 1.2V to 37V Voltage	IC101	LM337	
Diode	D203	1N4148		IC *option	IC5	LM335	

# BILL REV 3.0

Quantity	Description	Value	Sub-Value	Extra
2	Resistor	220	1/8W	
4	Resistor	1K	1/8W	
2	Resistor	1.47K	1/8W	
1	Resistor	6.8K	1/8W	
2	Resistor	10K	1/8W	
2	Resistor	47K	1/8W	
4	Resistor	100K	1/8W	
2	Resistor	220K	1/8W	
2	Resistor	470K	1/8W	
2	Ceramic capacitor	1nF	100V	X7R
2	Ceramic capacitor	10nF	100V	X7R
8	Ceramic capacitor	100nF	100V	X7R
2	Ceramic capacitor *** Cx Tune antenna ***	220nF	100V	X7R
2	Ceramic capacitor *** Cx Tune antenna ***	1uF	100V	X7R
2	Polarized Capacitor (Radial)	10uF	50V	105°
2	Polarized Capacitor (Radial)	330uF	25V	105°
2	Polarized Capacitor (Radial)	1000uF	35V	105°
10	Diode	1N4001		
8	Diode	1N4148		
2	Ultra-Low Noise, Precision Operational Amplifier	OP27		DIP8
1	Low-Current 1.2V to 37V Voltage Regulator	LM317		TO-220
1	Low-Current 1.2V to 37V Voltage Regulator	LM337		TO-220
2	Support Tulip	DIP8		
1	Jumper header	5 pins		
2	Jumper header	2 pins		
2	Jumper			
1	PCB connector	5 positions		
1	PCB connector	8 positions		



PROPOSED POWER SUPPLY  
FOR THE LIGHTNING RADAR

DRAWN BY  
ON4LDZ / DANIELV37

REV 1 / 2006

