

Amplificateur 1 kW à transistor LDMOS



F6BQP

RF Power LDMOS Transistors

High Ruggedness N-Channel Enhancement-Mode Lateral MOSFETs

These high ruggedness devices are designed for use in high VSWR industrial (including laser and plasma exciters), broadcast (analog and digital), aerospace and radio/land mobile applications. They are unmatched input and output designs allowing wide frequency range utilization, between 1.8 and 600 MHz.

- Typical Performance: $V_{DD} = 50$ Volts, $I_{DQ} = 100$ mA

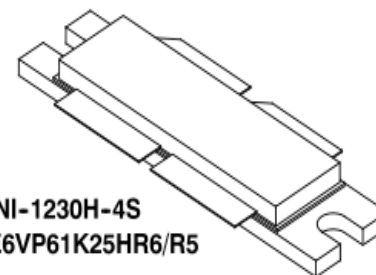
Signal Type	P_{out} (W)	f (MHz)	G_{ps} (dB)	η_D (%)
Pulse (100 μ sec, 20% Duty Cycle)	1250 Peak	230	24.0	74.0
CW	1250 CW	230	22.9	74.6

Application Circuits ⁽¹⁾ — Typical Performance

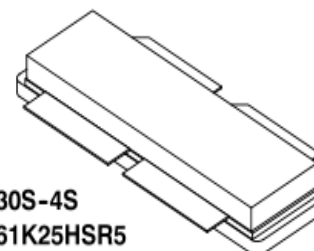
Frequency (MHz)	Signal Type	P_{out} (W)	G_{ps} (dB)	η_D (%)
27	CW	1300	27	81
40	CW	1300	26	85
81.36	CW	1250	27	84
87.5-108	CW	1100	24	80
144-148	CW	1250	26	78
170-230	DVB-T	225	25	30
352	Pulse (200 μ sec, 20% Duty Cycle)	1250	21.5	66
352	CW	1150	20.5	68
500	CW	1000	18	58

MRFE6VP61K25HR6
MRFE6VP61K25HR5
MRFE6VP61K25HSR5
MRFE6VP61K25GSR5

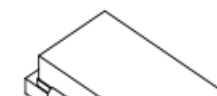
**1.8-600 MHz, 1250 W CW, 50 V
WIDEBAND
RF POWER LDMOS TRANSISTORS**



NI-1230H-4S
MRFE6VP61K25HR6/R5

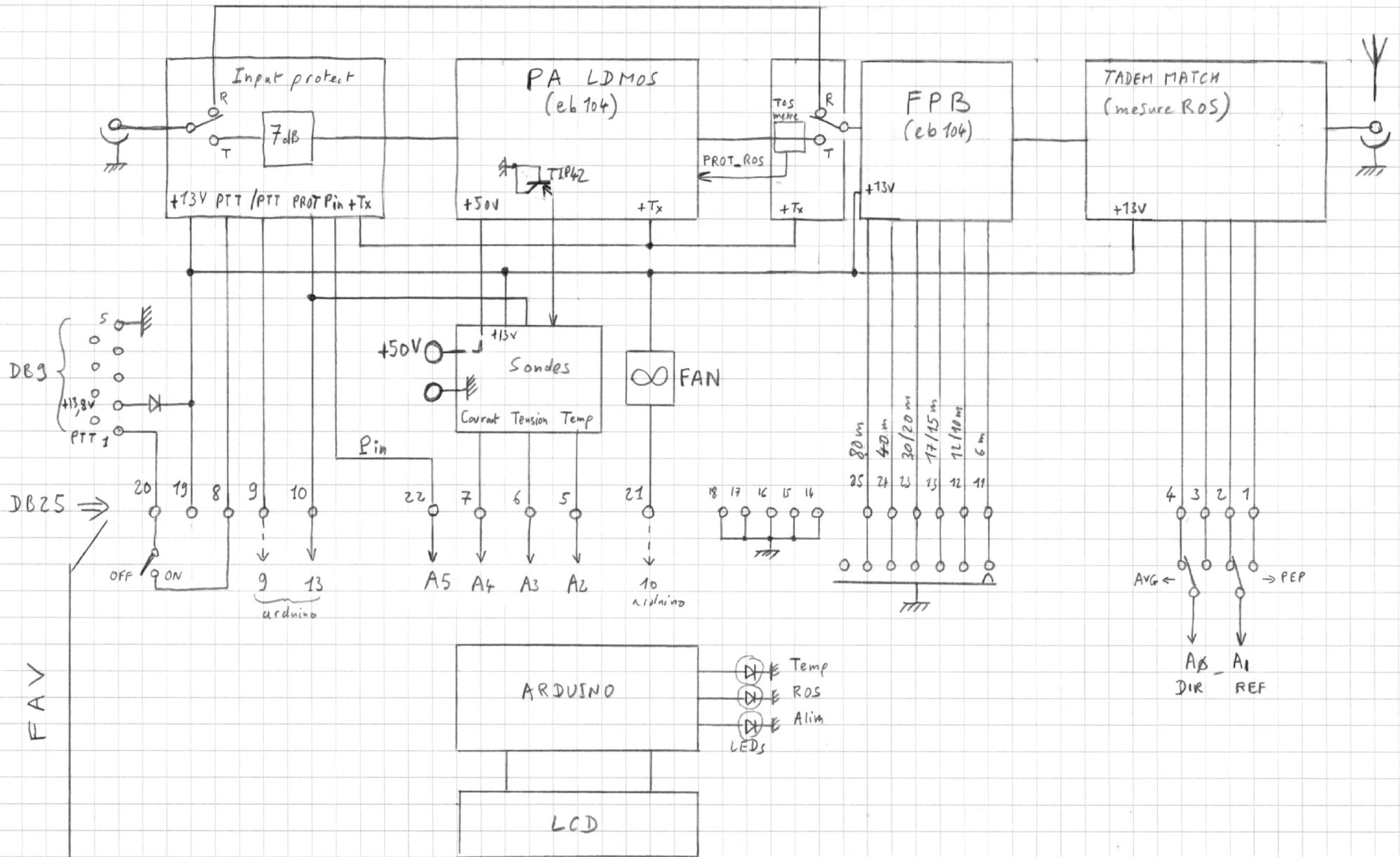


NI-1230S-4S
MRFE6VP61K25HSR5



AMPLI LD MOS Interconnections

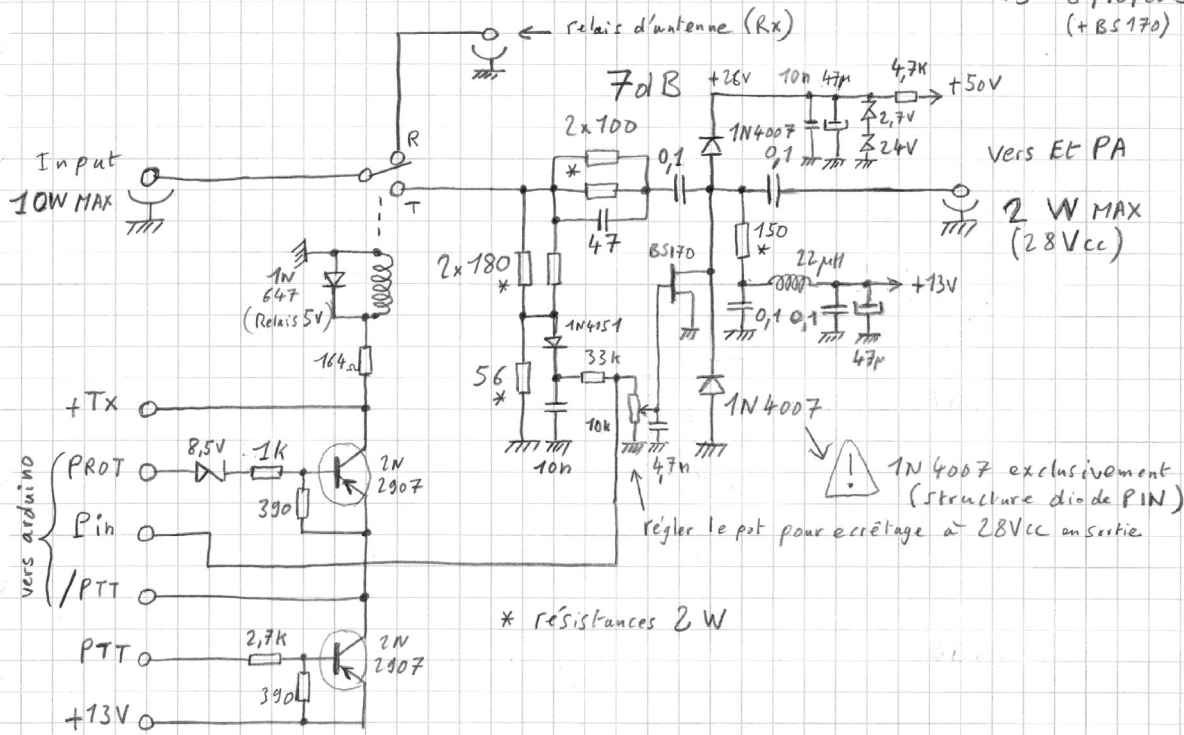
FGBQP 3/2/2019



AMPLI LD MOS

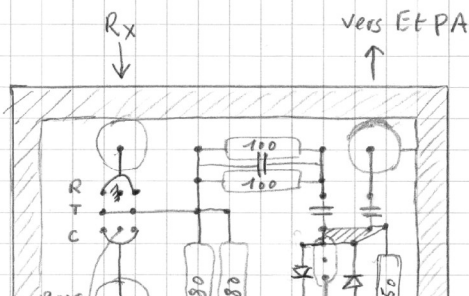
Input protect

F6BQP - 10/04/2019
 Ed 2 - 16/09/2019
 (écrêteur à diodes)
 Ed 3 - 8/10/2019
 (+ BS170)

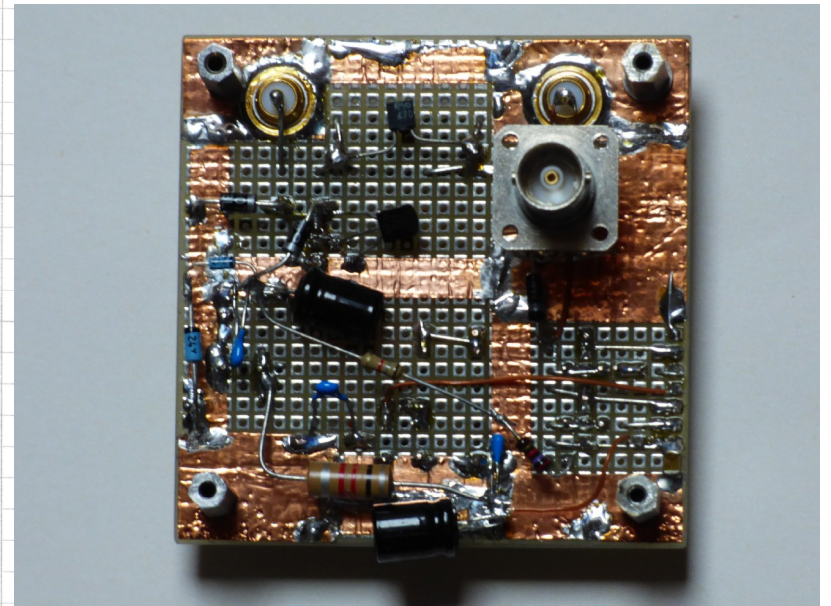
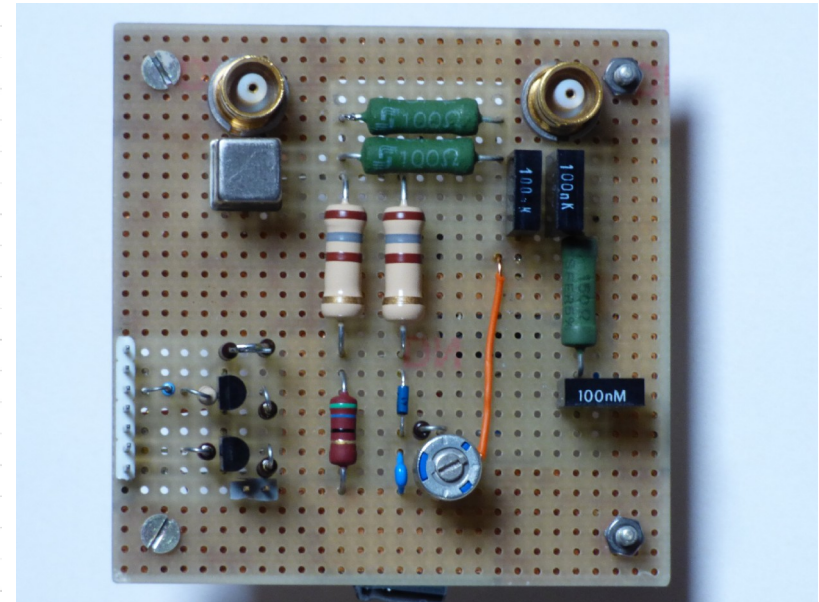


* résistances 2 W

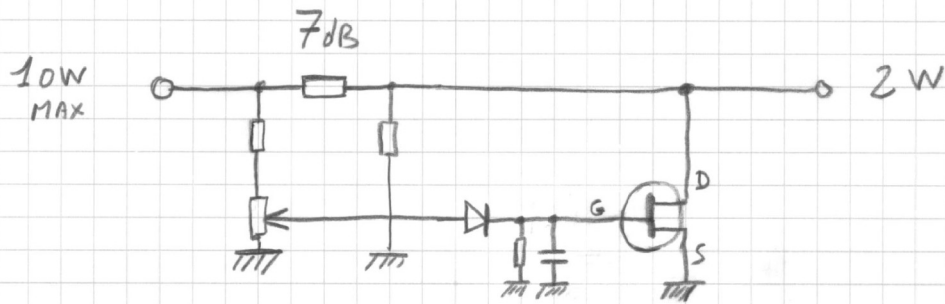
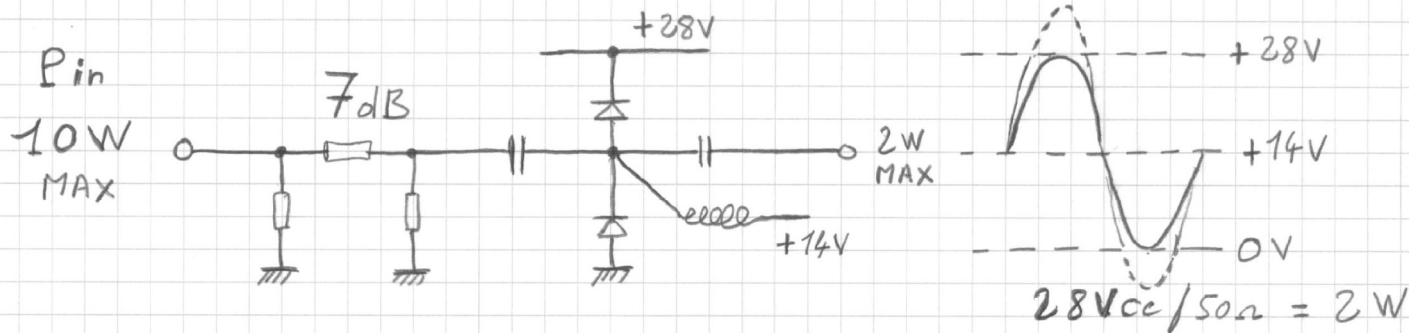
PROT = 0V Normal
 PROT = +5V ⇒ seuil d'alarme dépassé → Force +Tx = 0V
 Pin = 2,5V pour 10W RPTIS à l'entrée (592)
 3,0V 14 (614)



Input protect



Limiteur de puissance



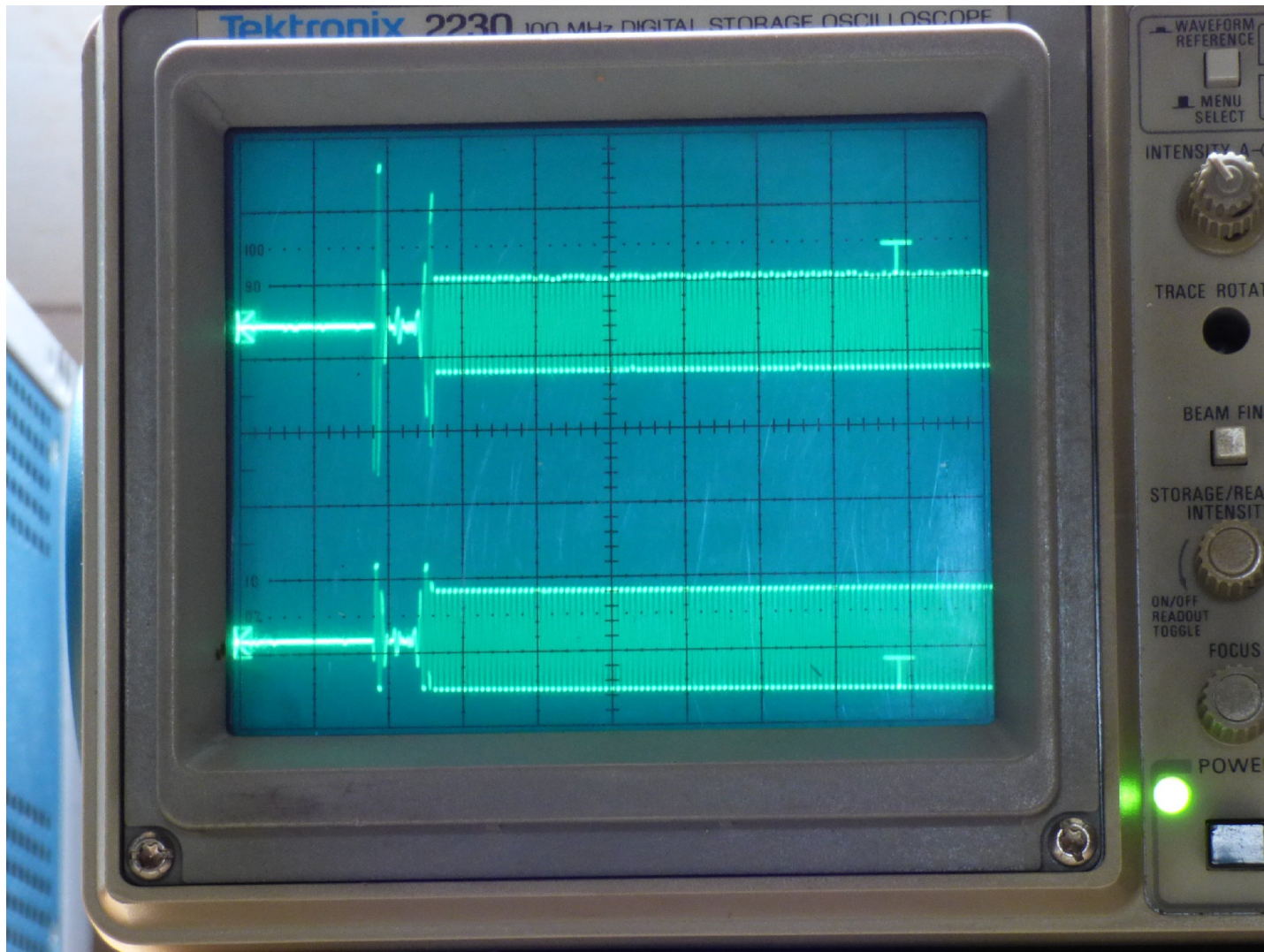
Seuil de conduction du MOS réglé pour Pin = 10W

ATTENUATEUR 7dB ⇒ $\begin{matrix} \xrightarrow{7dB} \\ \xleftarrow{7dB} \end{matrix}$ Si réflexion totale ⇒ Return Loss = 14dB
soit ROS = 1,5

(Pour un transceiver 100W ajouter au moins 6dB soit 13dB d'atténuation)

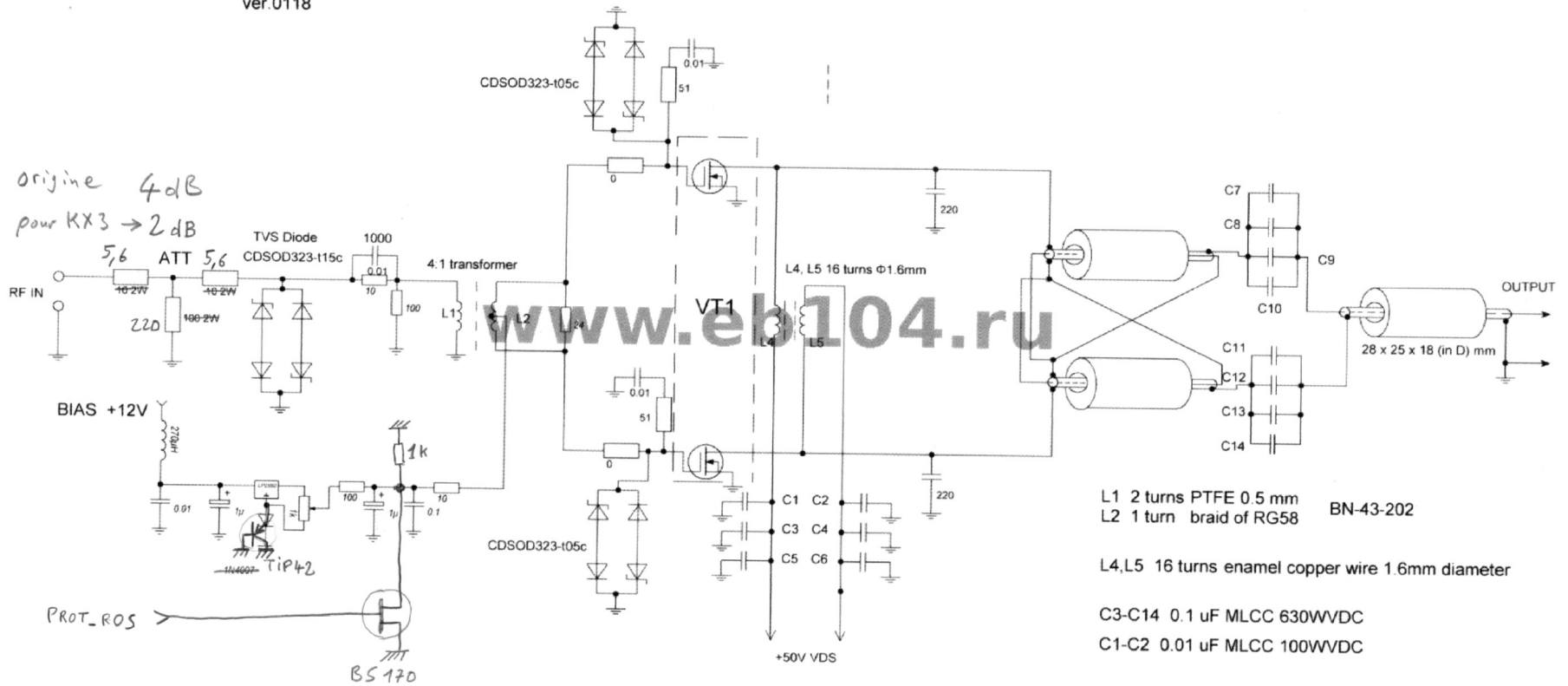
Action de l'écréteur avec FT847 10W AM

trace du haut : overshoot à 3 X la tension soit 90W
trace du bas : en sortie de l'écréteur



Module ampli eb104

✓ 1200W LDMOS HF POWER AMPLIFIER BLF188XR MRFE6VP61K25H
ver.0118



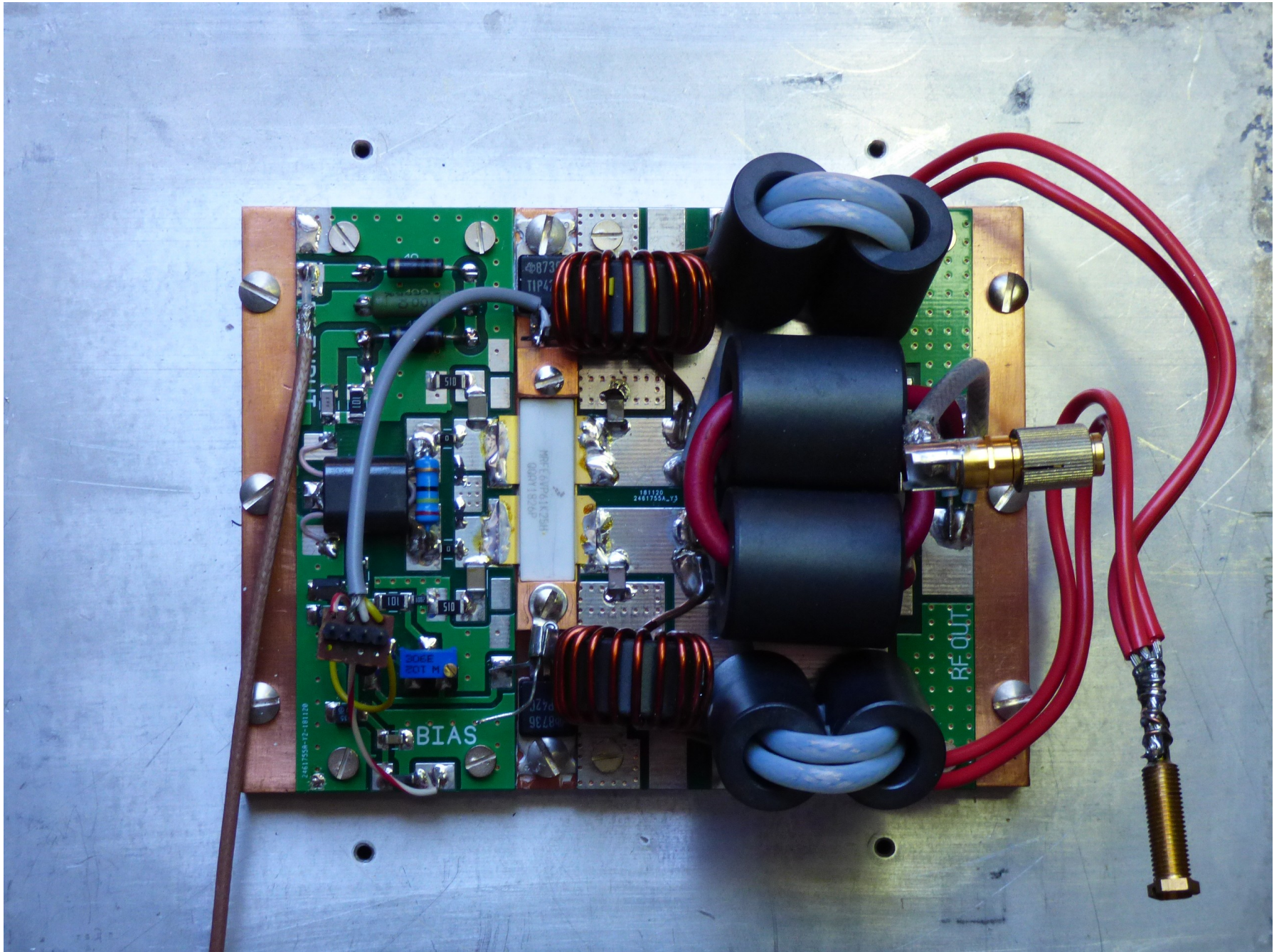
L1 2 turns PTFE 0.5 mm
L2 1 turn braid of RG58 BN-43-202

L4, L5 16 turns enamel copper wire 1.6mm diameter

C3-C14 0.1 uF MLCC 630WVDC

C1-C2 0.01 uF MLCC 100WVDC

Module ampli eb104

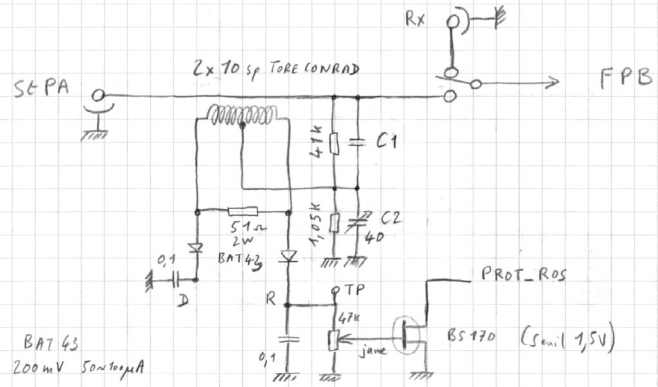


Protection ROS

AMPLI LDMOS

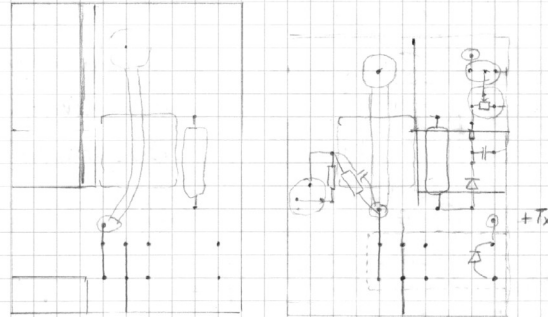
Protection ROS + relais antenne

F8B&P 10/09/2019



BAT43
200mV 50mA typ A

PROT-ROS
BS170 (5mA, 1.5V)



$C1 = 0$ $C2 \approx 35 \mu\text{F}$ FPB 50 MHz réglage à 28 MHz (mini de Refl / 50)

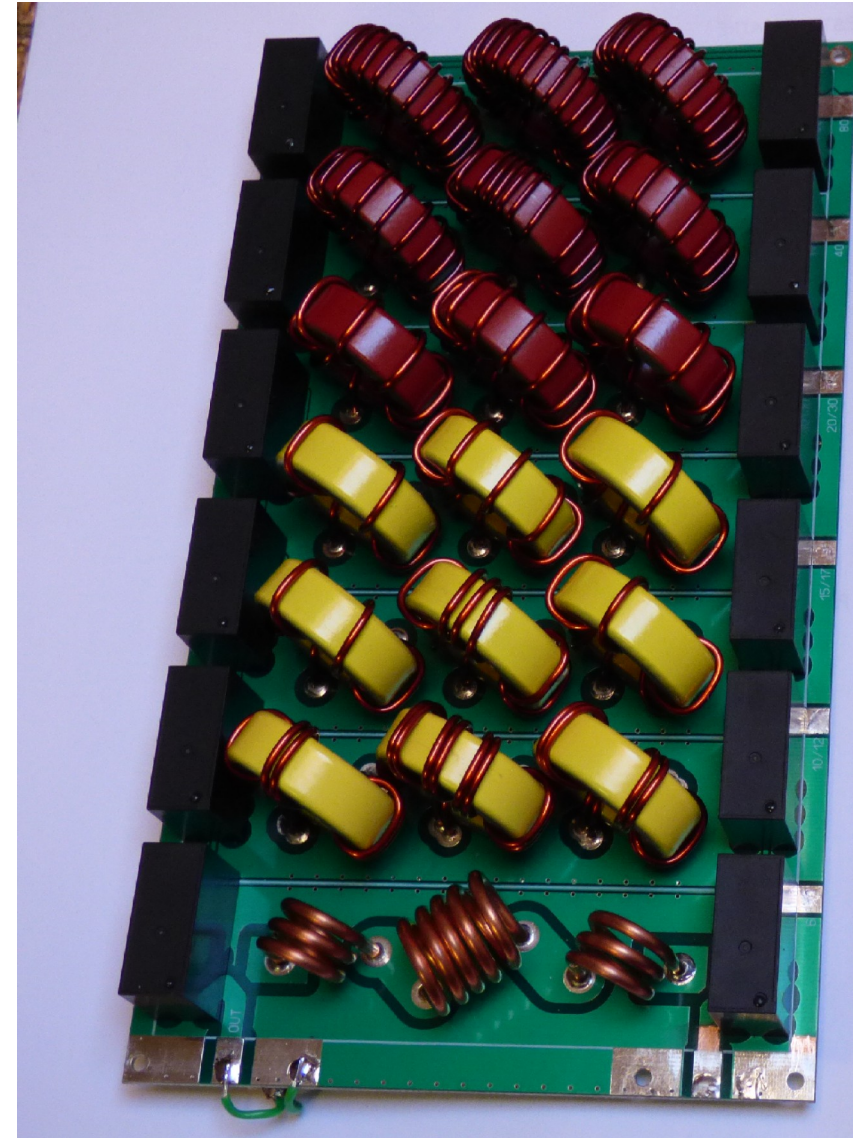
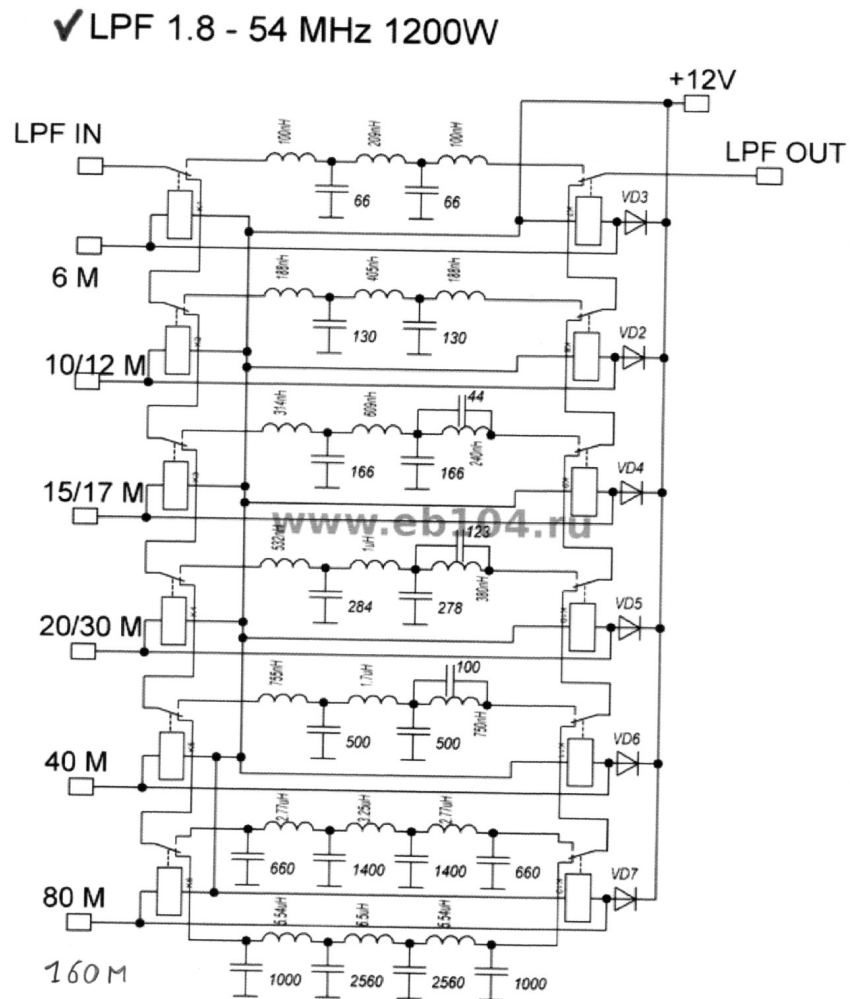
100W	Ref	Dir		
	50n	33n		33n
	v	v		Tous réglés
3,7	0,1	0,3	4,7	19% 20%
14,2	0,1	0,8	4,5	18% 20%
28,4	0,1	0,7	4,5	15% 16%

500W \Rightarrow 11V direct
100W \rightarrow 4,7V
ROS=2 \Rightarrow Refl=3,7V sur TP
ROS=3,4

réglage du 11/09/2019

V	I repos
3,2	1,7A
3,3	
3,4	
3,5	1,6A
3,6	
3,7	1,5A
3,8	1,4
3,9	1,3
4	1,1
4,1	0,9
4,2	0,6
4,3	0,4
4,4	0,2
4,5	0,1
4,6	0

Filtres Passe-bas eb104

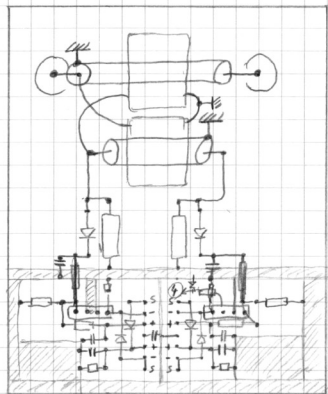
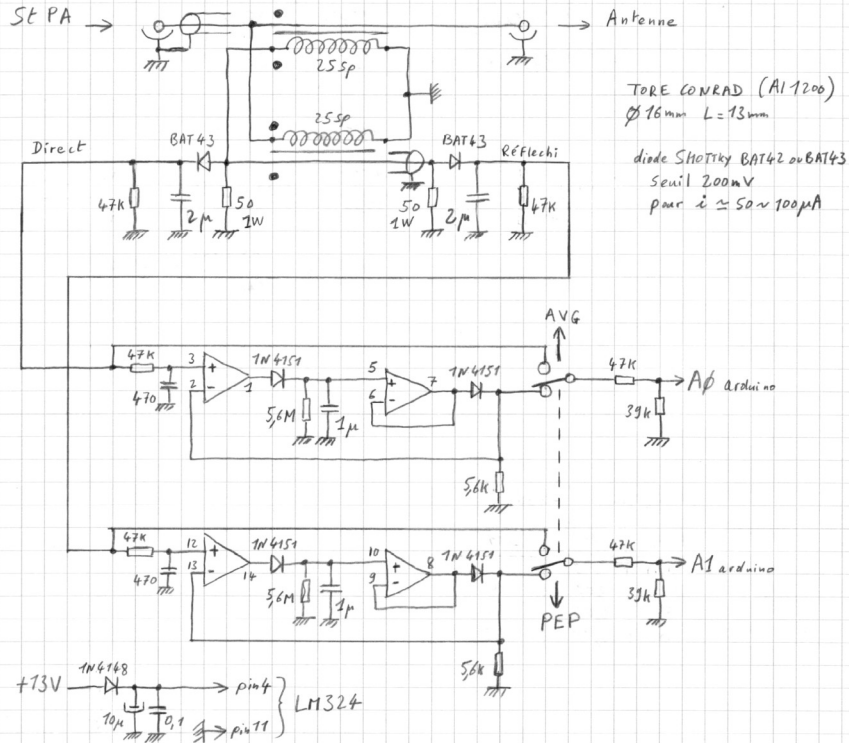


Tandem match

AMPLI LD Mos

TANDEM MATCH
+ Wattmètre (moyen/crête)

F6BQP
30/03/2019

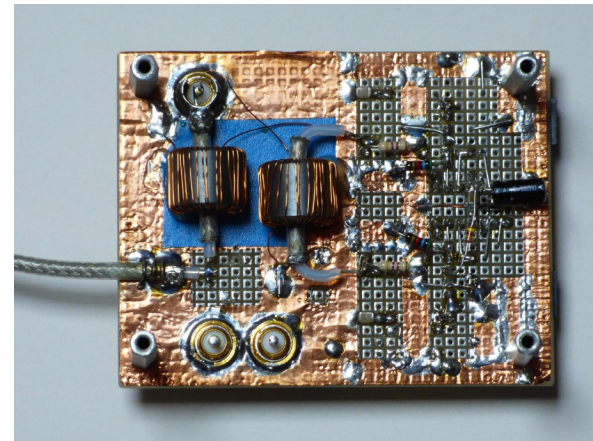
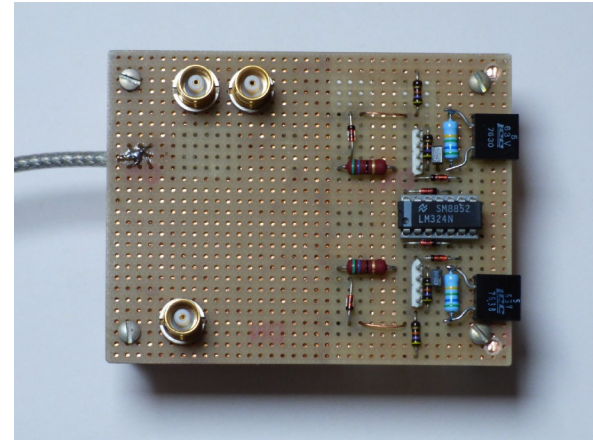


pour 400WRMS \rightarrow 200Vc / 50a
 ou secondaire $\frac{200}{25} = 8V - 0,2V = 7,8V$ détecté (théorique)
 7,1V mesuré
 3,2V mesuré sur entrée analogique arduino
 (tension analogique MAX 5V $\hat{=}$ \approx 950W)

$$47k // (47 + 39k) = 30k / 2\mu = \frac{1}{2\pi RC} = 2,6kHz$$

$RC = 60ms$

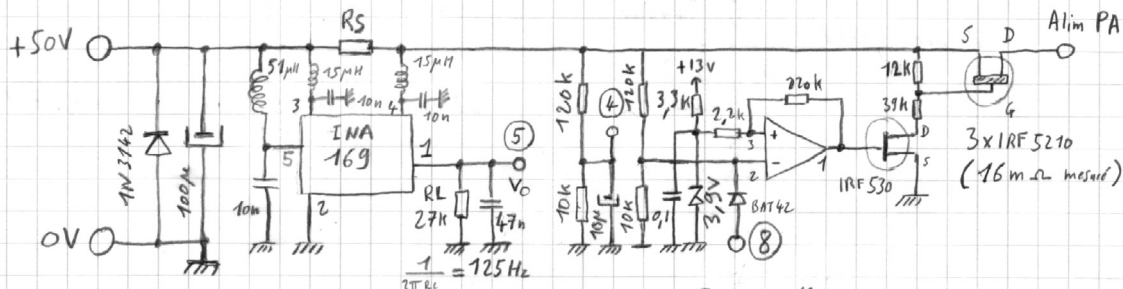
$$50a \cdot 2\mu \Rightarrow RC = 0,1ms$$



sondes

AMPLI LDMOS Sondes | Courant
Tension
Température

F6BQP 15/06/2019



$$V_o = I \times R_s \times R_L$$

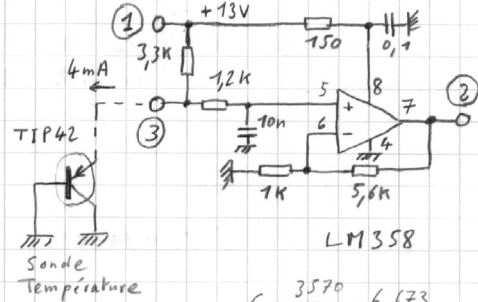
$$R_s = 44 \text{ cm Fil Cu } \phi 1,5 \text{ mm}^2 \approx 5,4 \text{ m}\Omega$$

$$V_o = R_s \times R_L \times I = 5,4 \times 27 \times I = 146 \text{ mV/A}$$

soit $\approx 34 \text{ A}$ pour 5V
(33,7A mesuré)

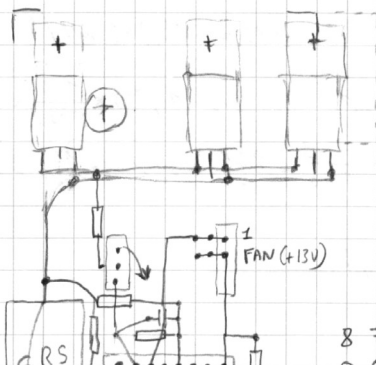
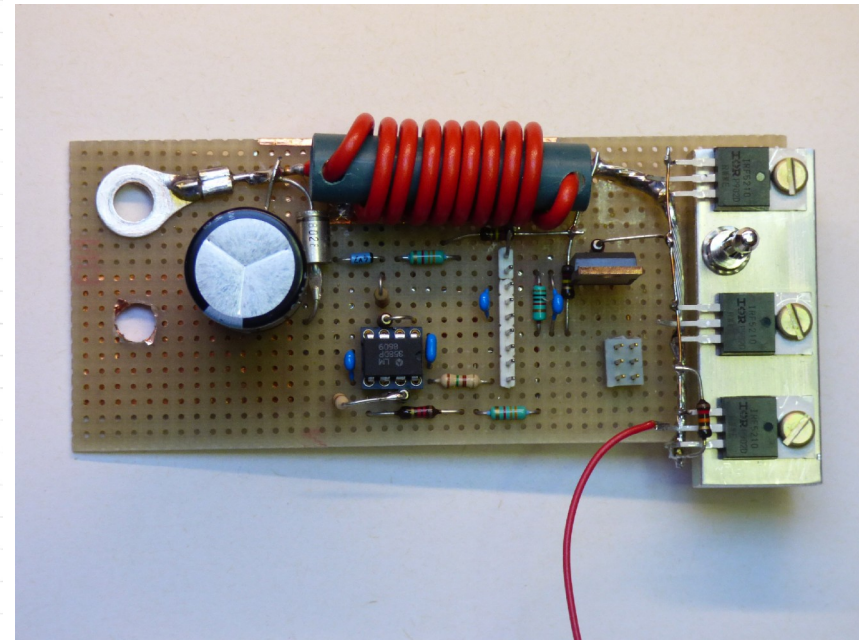


INA169 Topview



LM358

$$G = \frac{3570}{562} = 6,673 \text{ mesuré}$$



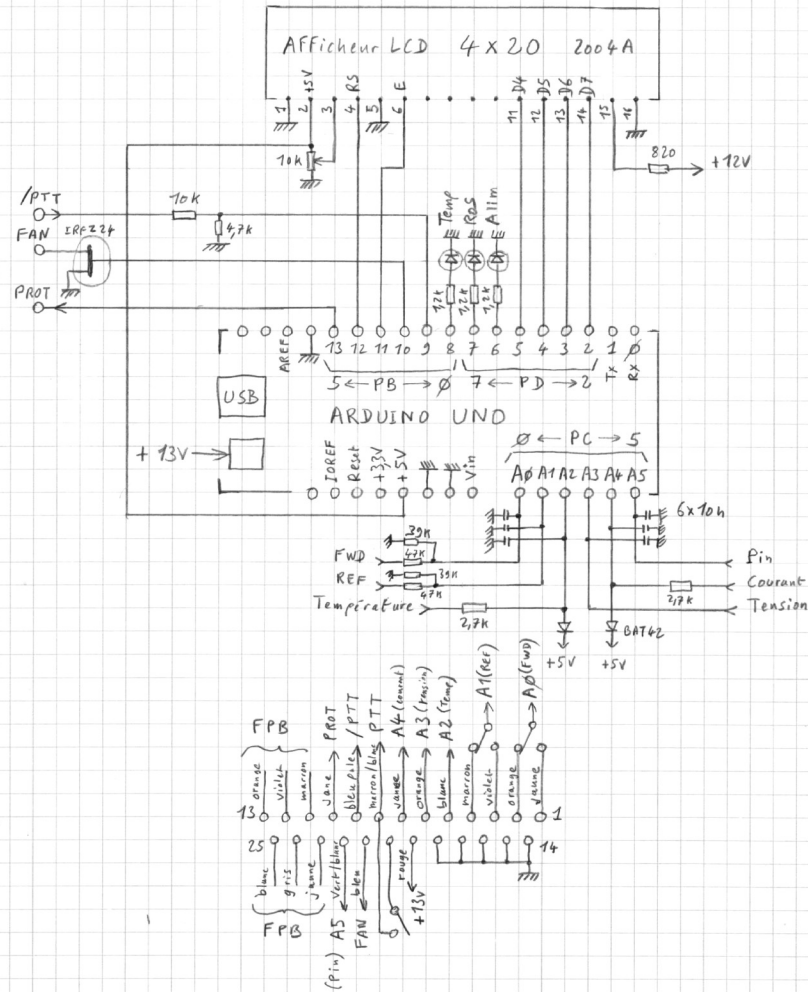
8 7 6 5 4 3 2 1

Arduino

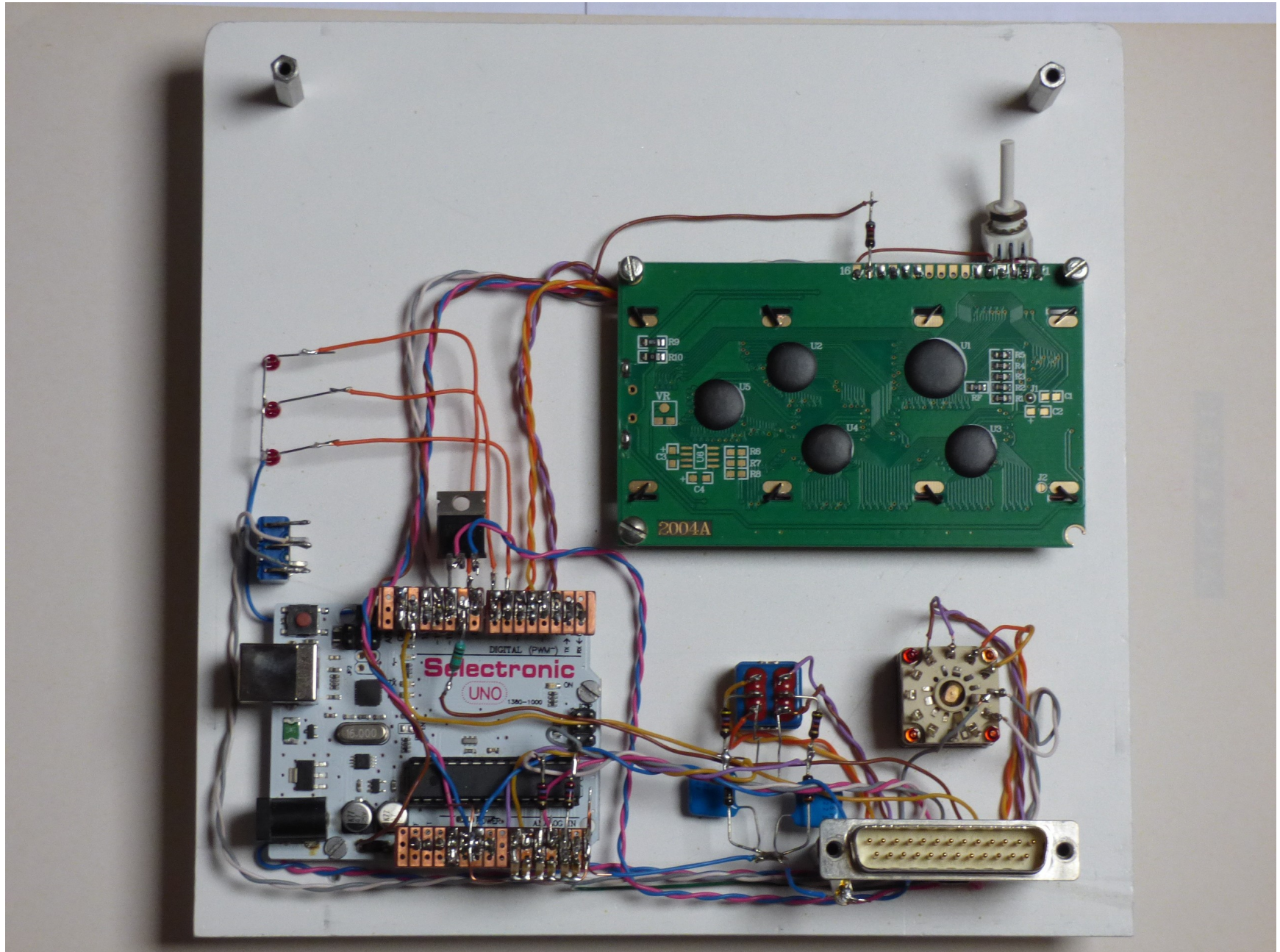
AMPLI LDMOS

ARDUINO

F6BQP
30/03/2019



Face avant (Arduino)



Fournisseurs

		QSJ
Module ampli	eb104.ru	110 \$
FPB	eb104.ru	200 \$
Transistor LDMOS	mouser.fr	185 €
Plaque cuivre	F5CYS rfmecca.com	56 €
Composants divers	farnell.fr	

Ampli décamerique 1kW à transistor LDMOS

Retrouvez tous les schémas, photos, videos, logiciel Arduino ici :

<http://f6bqp.free.fr/amplildmos.php>

Liens internet

- <https://eb104.ru/karta-sayta/directory>
- https://www.w6pql.com/1_kw_sspa_for_1_8-54_mhz.htm
- <http://www.pa0fri.com/>