

PIC source code: " Tune For Max " rev 1 (12/2009) by Theo F/YO8RCM adapted and modified rev 2 by F1FRV.

PIC 18F1320 with internal oscillator "INTOSC" at 8 MHz. No xtal, as precise timings are not needed ....

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**Outputs:**

- 1 / Pin 6 RA2: Voltage 0 V for logic control CW (+) of the tuning inductor.
- 2 / Pin 7 RA3: Voltage 0 V for logic control CCW (-) of the tuning inductor.
- 3/ Pin 18 RB3: Linearized 0 to 5 V for 0 to 1kW for RF-355 ( 0 to 2 kW for RF-353) sent to meter.

**Inputs:**

- 1 / Pin 1 RA0: Measure voltage representing forward power (FWD PWR). Non linear.
- 2 / Pin 2 RA1: Measure voltage representing reflected power (REF PWR). Non linear.
- 3 / Pin 8 RB0: "PTT". Pull up on the input . Set to ground in transmission .
- 4 / PIN 9 RB1: For pushbutton "TUNE". Pull up on the input . Set to ground, to start the automatic tuning process .
- 5 / PIN 11 RB5: For switch "FWD/REF". Pull up on the input . Set to ground, to have FWD power display on meter, and, when switch is open , display on meter REF power .
- 6 / PIN 17 RB2: For jumper "SLOPE". Pull up on the input . Set to ground, to have meter linear scale 1 kW @ 5 V with TP1 5.39 V , and , when jumper is absent , have meter linear scale 775 W @ 5 V with TP1 7 V (by default in amplifier) .

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**Tuning routines SIMPLIFIED description:**

If RB0 is at ground (Transmission)  
AND  
If RB1 is at ground (Tuning request)

Measure forward power voltage (FWD PWR). Accuracy is limited at ~3.5 mV (5V / 1310.72), This gives an hysteresis corresponding to ~ 3.5 Watts on scale 5V = 1 kW. Send 0 to 5 V linearized to meter.

Set output CW at 0 V, coil runs CW, check if FWD PWR voltage increases.  
If it increases, we remains on CW.  
If it decreases, set output CW at +5 V, and switch to CCW at 0 V, coil runs CCW.

FWD PWR voltage will increase. It will continue until it will be reduced again, then switch the active output to +5 V, as the maximum FWD PWR voltage is exceeded. Tuning is now OK.

Depress push button "TUNE", before any new tuning request .

Then loops from beginning.....

At any time, during tuning,  
If the PTT input RB0 goes to +5 V (Reception)  
OR  
If TUNE input RB1 goes to +5 V (no more tuning request)

The 2 outputs CW and CCW are set to +5 V to stop coil as it is, and loops from beginning.

**Other features:**

If RB5 is at ground (FWD power display) , front panel meter measures forward power (FWD PWR).

If RB5 is open (REF power display) , front panel meter measures reflected power (REF PWR).

**That's All Fox !!!!!!!!!!!!!!!!**

**Enjoy .....**

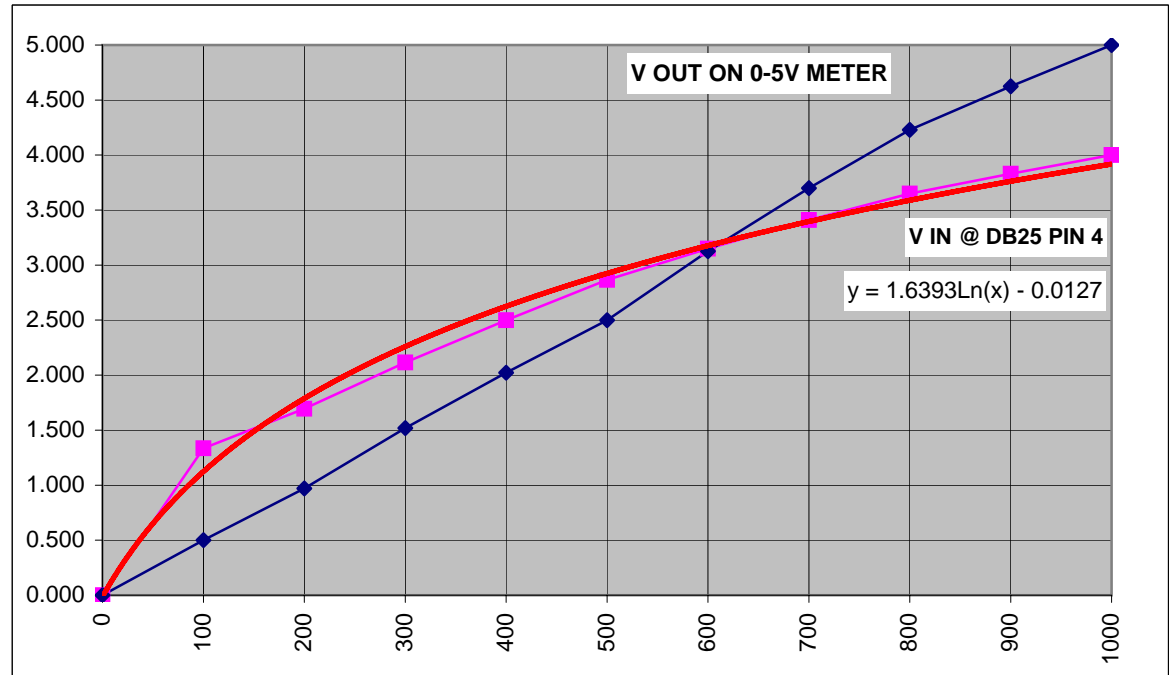
**Web site:** <http://f1frv.free.fr>

**Mail to:** [f1frv@sfr.fr](mailto:f1frv@sfr.fr)

# Linéarisation **approximative** de l'affichage de puissance des amplis HARRIS par le PIC de "TUNE FOR MAX"

F1FRV 05/2012 V4.3

V FWD @ DB25	P OUT W	V FWD @ TP1	Power W on meter	Volts on meter	Max Error %
0.000	0		0	0.00	0.00
1.335	100		100	0.50	0.00
1.695	200		194	0.97	-3.06
<b>2.115</b>	<b>300</b>		304	1.52	1.25
2.500	400		404	2.02	1.08
2.866	<b>500</b>	<b>5.390</b>	500	2.50	0.00
3.150	600		625	3.13	4.03
3.410	700		740	3.70	5.39
3.650	800		846	4.23	5.40
3.830	900		925	4.63	2.71
4.000	1000		1000	5.00	0.00



## VALEURS POUR PROGRAMMATION DU PIC AVEC 5.39 V @ TP1

P min	P max	V IN min	V IN max	Range V	Range W	For PIC	Slope
0	100	0.000	1.335	1.335	100	LP slope	74.906
100	500	1.335	2.866	1.531	400	MP slope	261.267
500	1000	2.866	4.000	1.134	500	HP slope	440.917

## VALEURS POUR PROGRAMMATION DU PIC AVEC 7 V @ TP1

P min	P max	V IN min	V IN max	Range V	Range W	For PIC	Slope
0	100	0.000	1.770	1.770	100	LP slope	56.497
100	500	1.770	3.960	2.190	400	MP slope	182.648
500	775	3.960	5.000	1.040	275	HP slope	264.423

**DUE TO INTERNAL ~3 dB ATTENUATOR INSIDE AMPLIFIER INPUT CIRCUIT, ~100 W INPUT ARE REQUIRED TO HAVE 1 kW OUTPUT**

**NOTA Pour réglage facile, utiliser 300 W mesurés avec un wattmètre précis en sortie d'ampli (~ 30 W input).**

**Régler ajustable R7 pour avoir 2.115 V sur la sortie V FORWARD, pin 4 sur la DB25.**

**Pour avoir exactement 300 W, si votre TX ne permet pas le réglage de puissance en continu ( TS-480 par exemple) mettre un peu plus de puissance en entrée, et ajuster les 300 W en dérèglant légèrement la self du PI (CW ou CCW).**

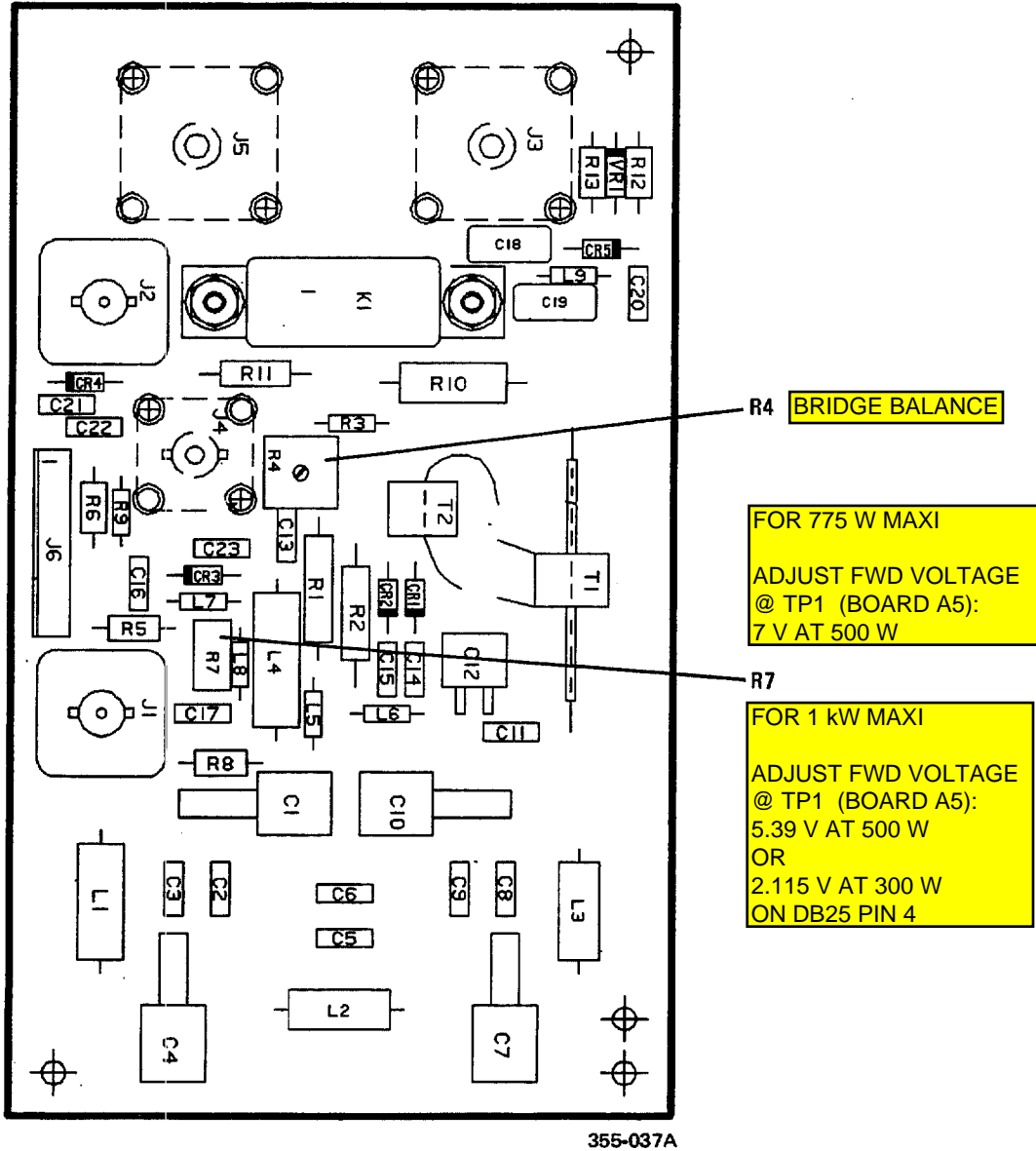
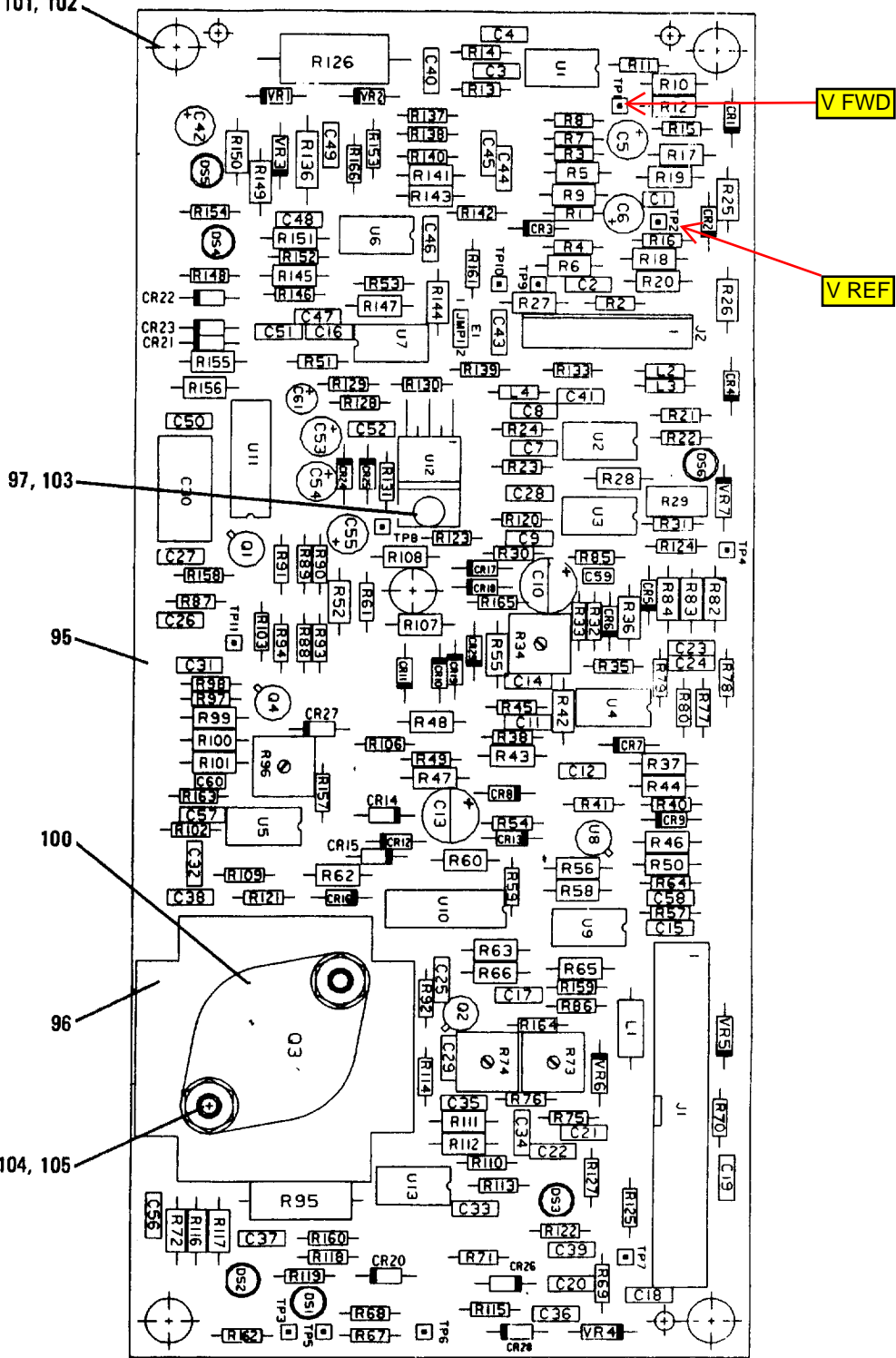


Figure 6-1. Output Filter PWB Assy



98, 99, 101, 102



355-055

Figure 7-13. Power Control PWB Assy, A5

HARRIS AMPLIFIERS RF-353 & RF-355  
 " TUNE FOR MAX " FOR AUTOMATIC OPERATION

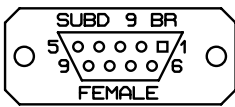
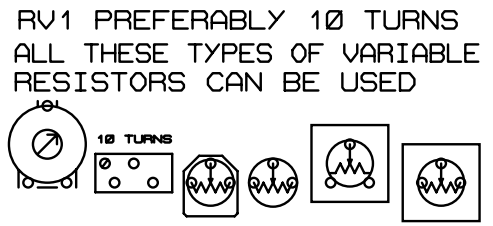
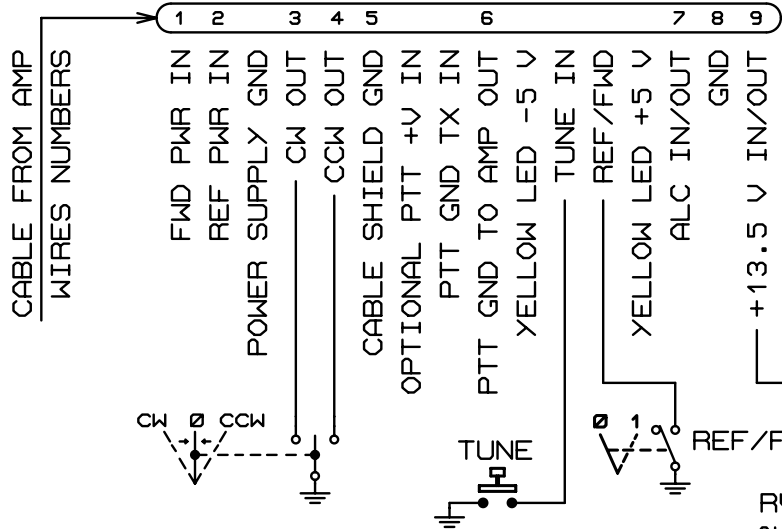
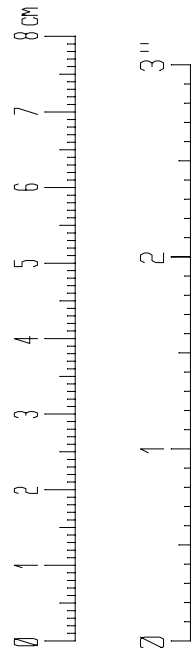
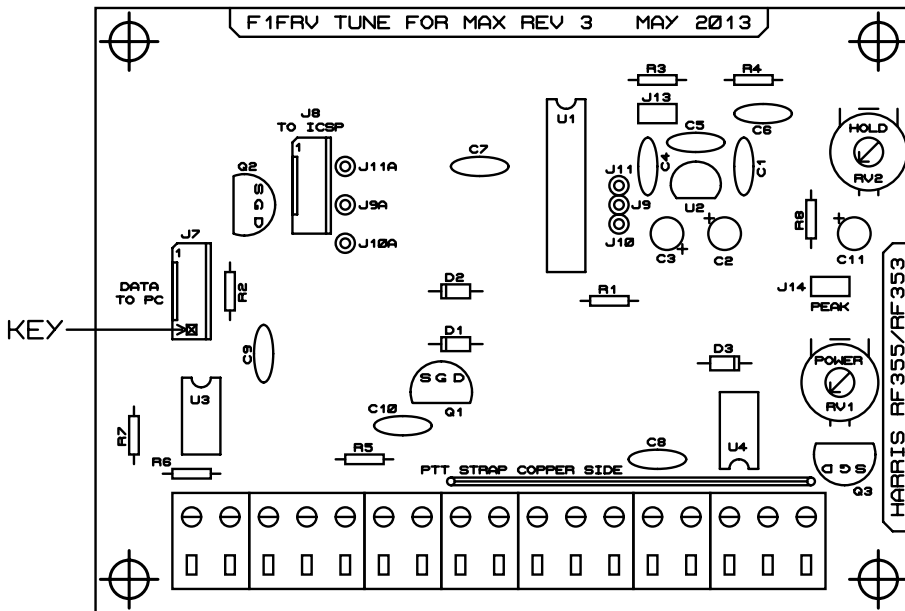
DATE: 05/2013 REV: 3  
 BY: f1frv@esfr.fr  
 DOC Nr: AMATEUR RADIO

NOTA:

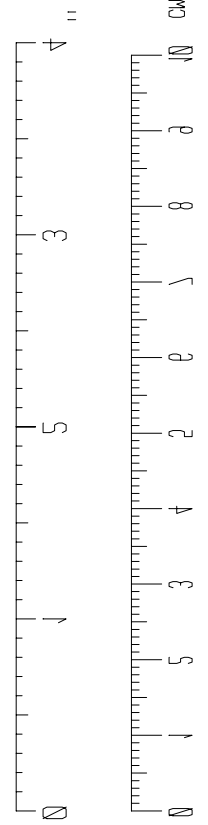
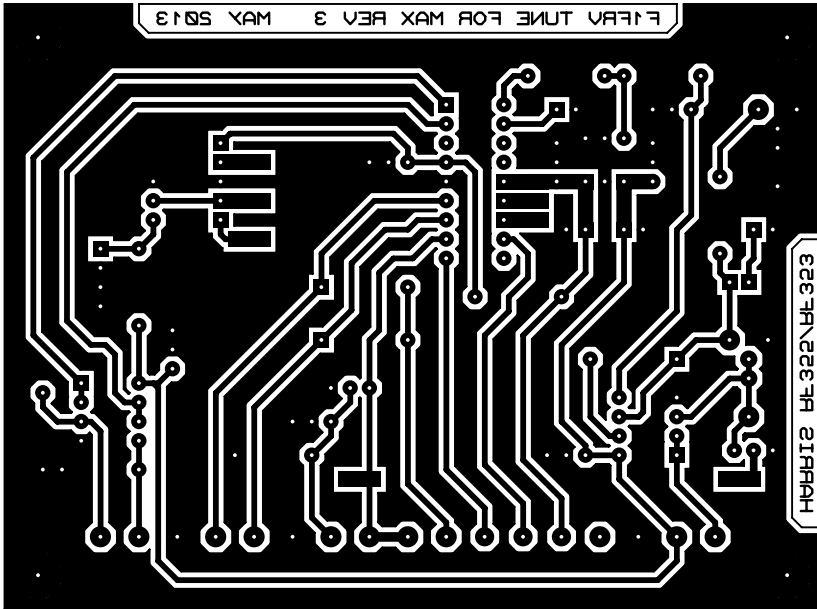
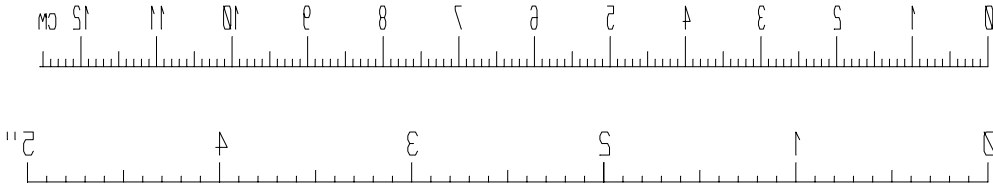
J7 TO J11, Q2, R2 AND THE 3 STRAPS (COPPER SIDE)  
 BETWEEN J9-J9A, J10-J10A, J11-J11A  
 ARE NOT NEEDED FOR NORMAL END USER OPERATION.  
 THEY ARE ONLY REQUESTED FOR PIC DEBUGGING.



PCB 4.25 " x 3.15 " 142 HOLES  
 PCB 108 x 80 mm 142 TROUS



8 WIRES + SHIELD TO AMPLIFIER  
 CONNECTOR ON REMOTE CONTROL BOX REAR PLATE





HARRIS AMPLIFIERS RF-353 / RF-355  
AUTOMATIC TUNE FOR MAX  
MADE IN FRANCE  
Design and Hardware by Dominique F1FRU  
PIC code by Theo F/Y08RCM and Dominique F1FRU  
PIC 18F1320 May 2013 Rev 1.99g

DEBUG VERSION WITH VALUES ON SCREEN

AMP U FWD = 3.890  
Meter U FWD = 4.759  
FWD PWR WATTS = 951.9

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Connected to Com1

Bytes Txed : 0

Bytes Rxed :2998



AMP U REF = 0.076  
Meter U REF = 0.028  
REF PWR WATTS = 5.7

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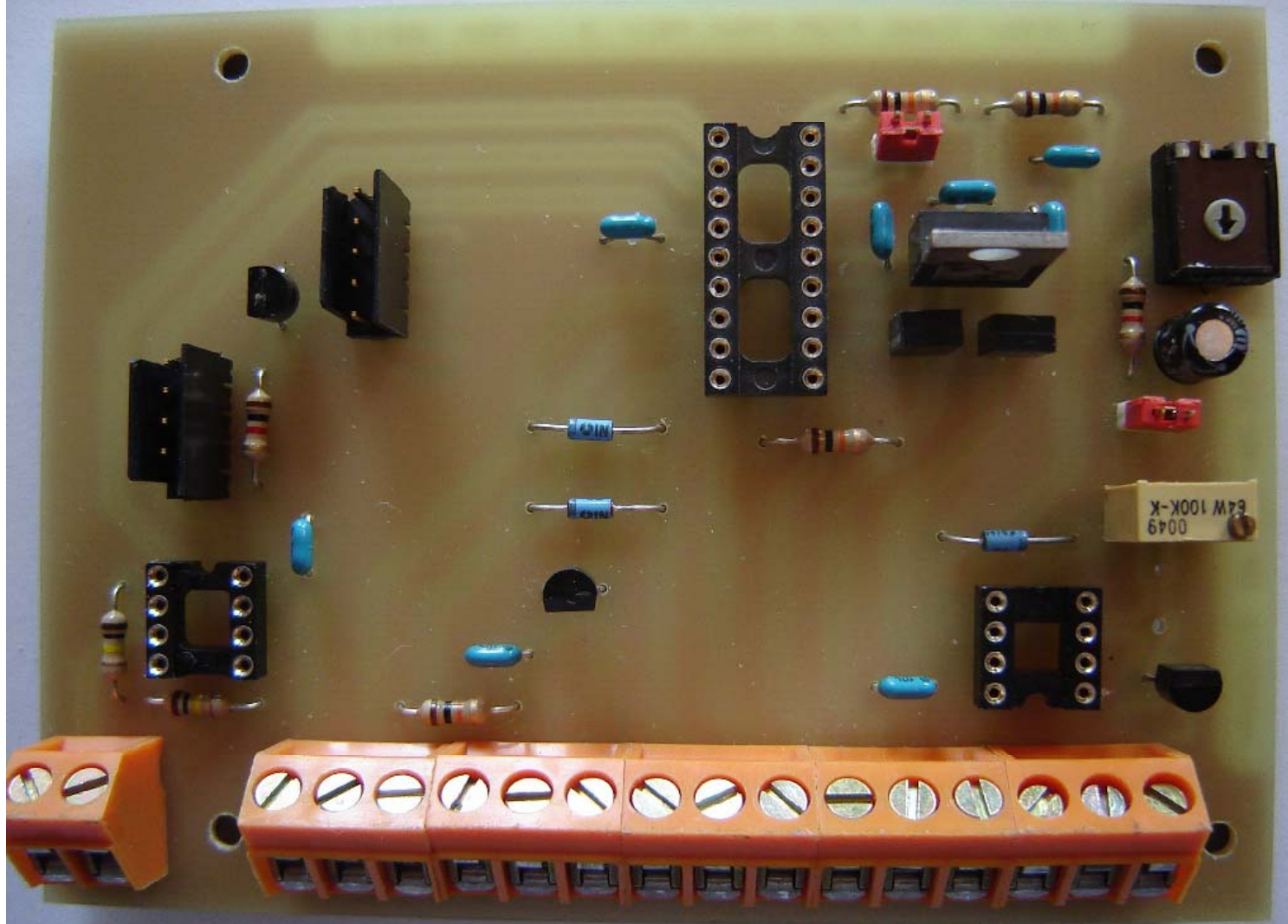
AMP U REF = 0.076  
Meter U REF = 0.028  
REF PWR WATTS = 5.7

Connected to Com1

Bytes Txed : 0

Bytes Rxed :5326





SPECIAL REV 3 PCB WITH THE 4 HOLES AT SAME PLACE AS IN REV 2 , TO FIT IN EXISTING CONTROL BOX

