

Icom IC PS-125 Service Manual

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**Service Manual**

Authors: Lawrence Young, K4LXV, Dick Knol PA3DUV

## **Brief operational description of the Icom PS-125 power supply**

### **A. Primary DC supply**

1. AC input voltage is applied through the AC switch, to input fuse F-1 and filters IF1, IF2, and associated capacitors C1-5, C24 & C25, through R-2 to the primary rectifier array D-1. Triac Q-1 that is connected across R-2 conducts once the switching supply starts, thus limiting the voltage drop across R-2. A movable jumper from D-1 to the junction of C-9 & C-10 configures the primary supply for 110-volt operation as a voltage doubler. **For 220-volt operation, this jumper is not connected.** The +310 volt DC output voltage of D1 is connected through L2, & D2 to series connected electrolytic capacitors C-9 & C-10 which filter the DC output voltage of D-1.

### **B. Switching supply**

1. The output of the primary 310V DC supply is now applied to series connected power FETs Q4 & Q5 and the primary of high frequency transformer T-1. Switch mode controller IC, HIC-1, drives the gates of Q4 & Q5. Upon initial power application, Q4 or Q5 will conduct first, thus causing an ac output voltage on all secondary windings of T-1. The voltage of T-1 pins 7 & 8 is rectified by D-8, regulated by D-9 & Q-6 and applied to HIC-1 pin 12 (vcc) to operate HIC-1. The voltage from T-1 pins 9 & 10 is rectified by D23, & filtered by C40 to supply voltage for all IC's and transistors except HIC-1. HIC-1 now begins operating and alternately drives Q4 & Q5 at a high AC frequency.

### **C. Secondary DC supply**

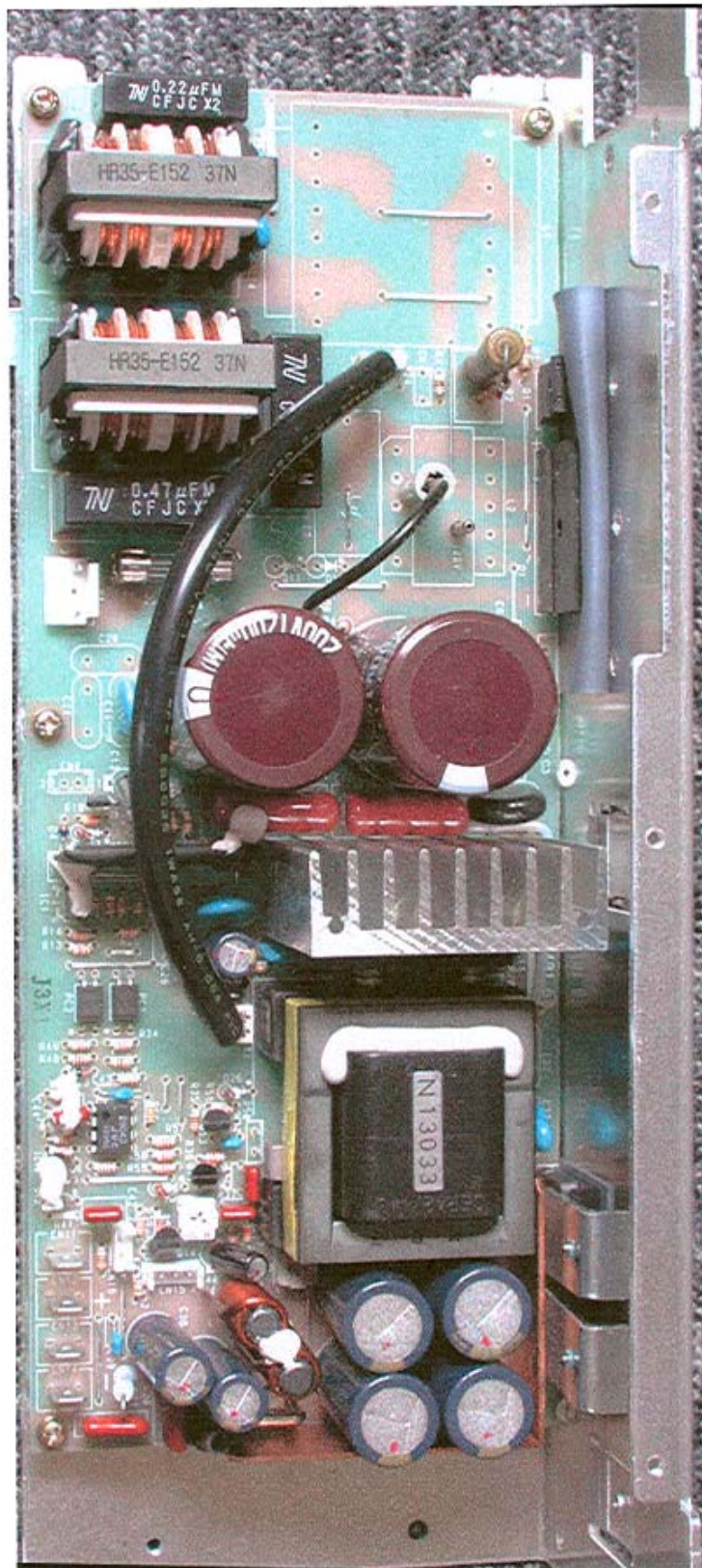
1. T-1 secondary windings pins 12 & 13, 16 & 17, 14 & 15, 10 & 11 and fast recovery diodes D 21 & D22, along with electrolytic capacitors C31,32,33,34.& 35 form the 25 amp 13.8 volt DC output supply. The output is applied to the output terminals through L-12 & L-13.
2. The 13.8 Volt DC output is sensed via R-58 to the base of Q-11, the collector of which drives opto- isolator PC-1. Adjustment of VR-11 adjusts the base voltage of Q-11 thus establishing via HIC-1, the power supply DC output voltage.
3. IC-11 pins 1, 2, & 3 sense the voltage drop across R-31 & R-32 via VR-12 and R-44, to establish via the adjustment of VR-12, the maximum output current limit.
4. Zener diode D-26, Q13, R-48, R-49, PC-2 and associated components detect an over voltage condition of the 13.8 volt supply output.
5. IC-11, pins 5,6, & 7, Q-14 & associated components sense temperature rise inside the supply via Thermistor R54 which touches power transformer T-1 and turns on the fan as appropriate.

## PS-125 parts list

Item	Description	Qty ea.
Q1	TM1641S-L Triac	1
Q2	2SC4002 NPN transistor	1
Q3, 12	DTC 114E digital transistor	2
Q4, 5	FS22SM-9 Power Mosfet transistor	2 or FS22SM-10 or NTE 2970
Q6	2SC3246 NPN transistor	1
Q13	2SA733 PNP transistor	1
Q11,14	2SC945 NPN transistor	2
HIC-1	MB 2013A switching controller IC	1
IC 1	S80745	1
IC 11	LM2904 dip op amp	1
IC 12	LM 431 precision regulator	1
PC 1, PC 2	PS2561 opto isolators	2
D1	R8V1506 Bridge rectifier	1
D2	FMN-G12S 200V 5A fast recovery diode	1
D3,25,26	15 volt ½ w zener diode	3
D4,5,6	ISS270A diode	3
D10,11	RG1C, 1kv 1A fast recovery diode	2
D23	ERA91-02 diode	1
D24	7 volt zener diode	1
D21, D22	KCQ60A04 fast recovery power diode	2
F1	fuse, 5x20mm, 4A (120V) 3A (230V)	1 RS 270-1055 or 270-1054
R2	ERU5TAK6R8 1.6 W fuse resistor	1 Panasonic
C1, C2	0.47uf, 250V	2
C3, C4, C11, C18	.0022uf	4
C5, C37, C38, C41	0.22uf	4
C6, C7, C8	76pf	3
C9, C10	1200uf 200V electrolytic	2
C12	41pf	1
C13, C40	22uf 50V	2
C14, C16	470pf 1KV	2
C15, C17	0.56uf 1KV	2
C19	100uf 35V	1
C28	0.22uf 50V	1
C31, C32, C33, C34	2200uf 35V	4
C35, C36	1000uf 25V	2
C39, C43, C44, C45	0.1uf 50V	4
C42	0.33uf 50V	1
Fan	12V DC, 60 x 60 x 20 mm ,14.5 CFM (ADDA)	1 AD0612MX-C70GL-LF

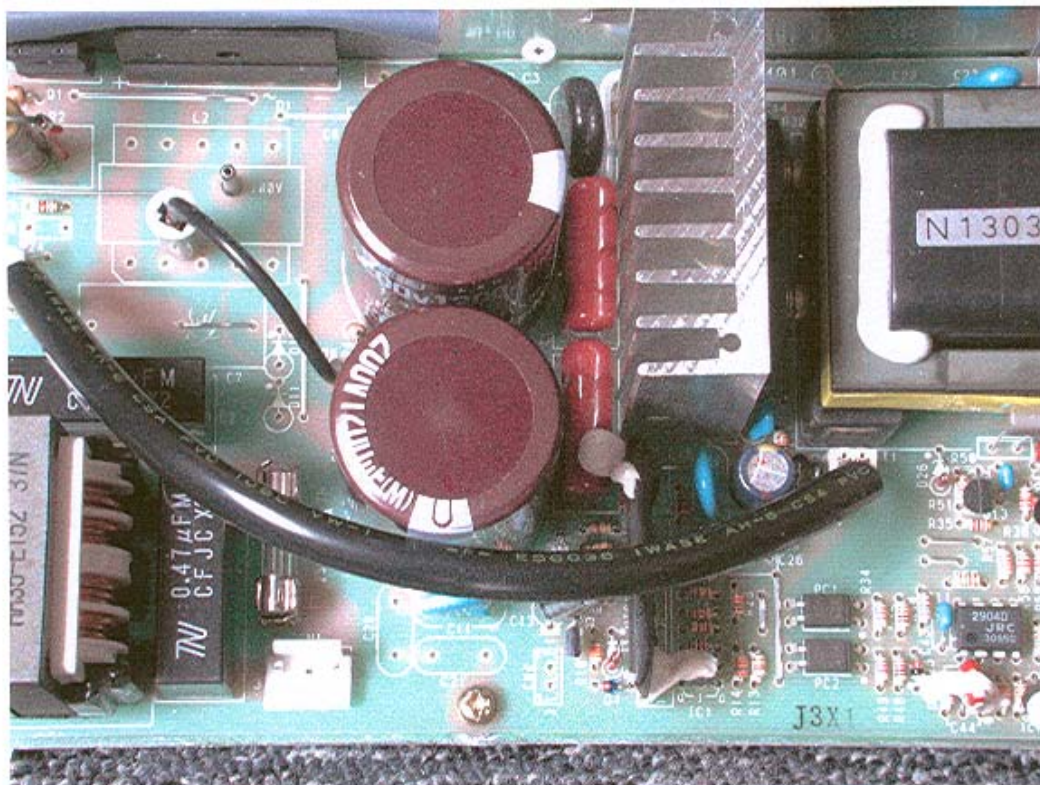
Note: VR-11 adjusts Output Voltage  
 VR-12 adjusts Output Current

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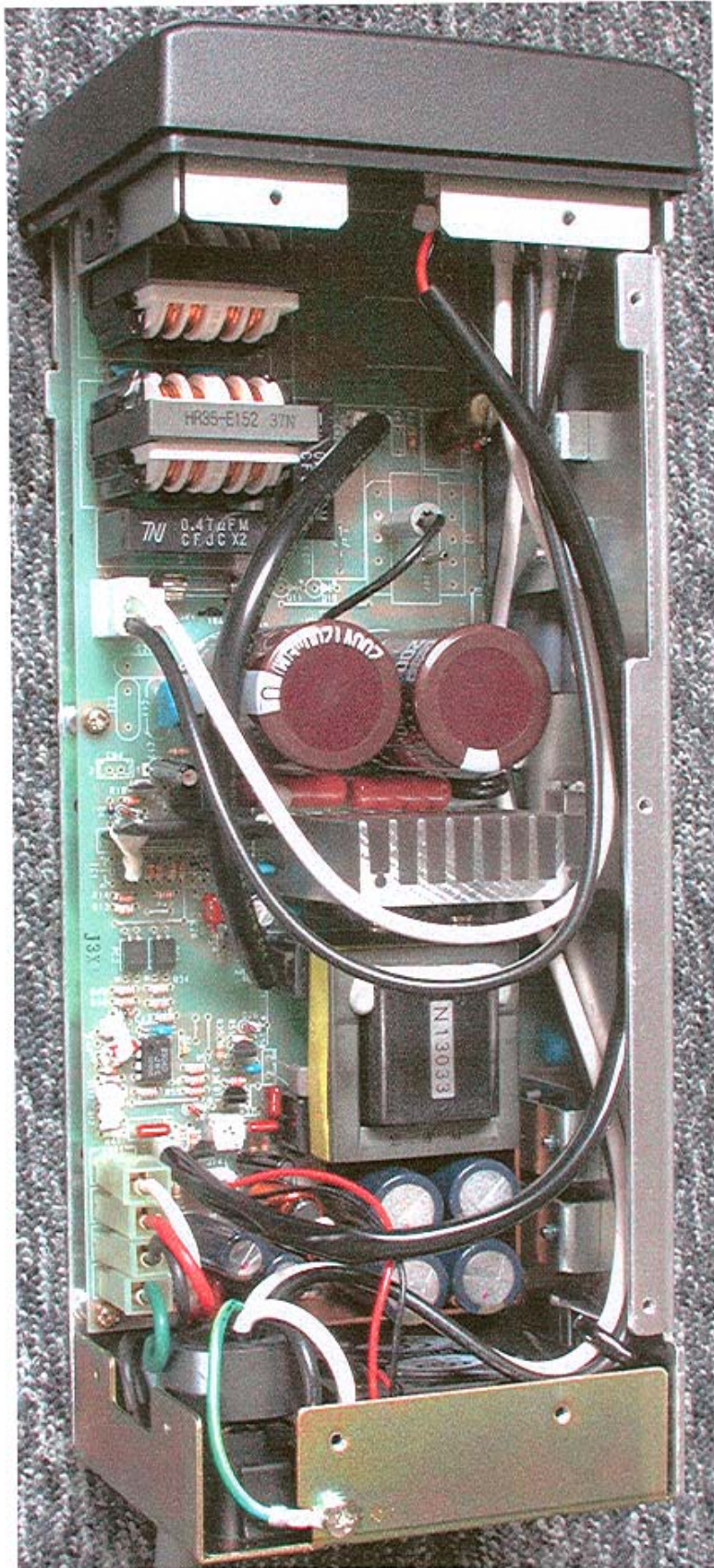
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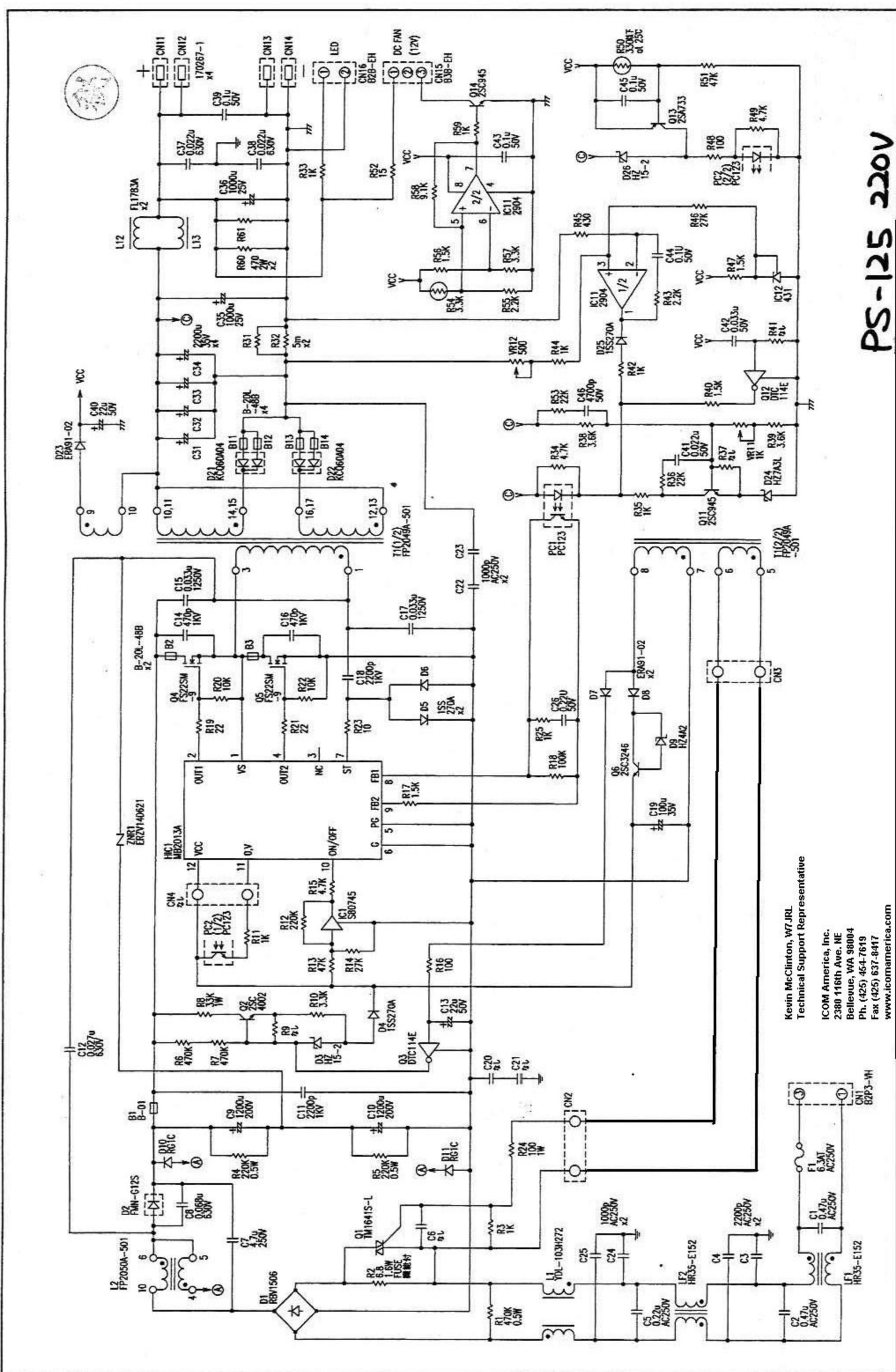
**110-220 V jumper detail**



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# PS-125 220V

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