

## W5JGV High Voltage Switching Power Supply HVPS-1

### Component Parts List

120 Volt Version - Updated July 10, 2004

#### PARTS LIST - Resistors

R1 - 5 Ohms 10 W  
R2, R3 - 22 Ohm 1/4 W  
R4 - 47 Ohm 25 Watt  
R5 - 2500 Ohms 100 W  
R6 - 20 Ohms 50 W  
R7 - 15 x 100 K 1/4 W in series. (HV metering)  
(Trim value as needed to make M1 read 0-1500 V)  
R8 - R11 - 470 Ohms 1/2 W  
R12 - 33 K 1/4 W  
R13, R34, R35 - 100 K 1/4 W  
R14, R27, R28 - 10 K 1/4 W  
R15 - 5100 + 270 Ohms in series  
(adjust for an oscillator frequency of 27 KHz)  
R16 - 3900 Ohms 1/4 W  
R17 - R19 - 120 K 2 W  
R20 - 12 K 1 W  
R21 - 3900 Ohms + 220 Ohms 1/4 W in parallel  
(adjust for +10.5 V output)  
R22 - 2700 Ohms 1/4 W  
R23 - 1000 Ohms 1/2 W  
R24, R25 - 3900 Ohms 1/4 W  
R26 - 43 Ohms 5 W (T3 loading- see text.)  
R29 - 270 Ohms 1/4 W  
R30 - 390 Ohms 1/4 W  
R31, R33 - 820 Ohms 1/4 W  
R32 - 1500 Ohms 1/4 W  
R34 - 8200 Ohms 1/4 W  
VR1 - 4700 Ohms  
VR2, VR3 - 10 K Ohms

#### PARTS LIST - Diodes, Transistors & Integrated Circuits

D1, D2 - 25 A - 350 V (bridge rectifier from old computer power supply)  
Connect both AC leads on bridge together.  
Connect the + and - bridge outputs to the filter capacitors.)  
D3 - D44, D48, D49 - UF4007 - 1 A - 1 KV, 75 nS recovery time  
D45, D46 - 1N4001 - 1 A - 50 V  
D50, D51, D57 - 1N914  
D47, D54 - LED  
Q1, Q2 - HGTC27N120BN (Use separate heat sinks;  
Use no insulators; bolt transistors directly to the heat sinks)  
Q3, Q4 - TIP-42 (Use separate heat sinks;  
Use no insulators; bolt transistors directly to the heat sinks)  
U1 - TL-494, KA-7500-B, KA-7500-C, NTE-1729  
U2 - LM-317T (Adjustable regulator)  
U3 - NTE-4093B (Quad Dual Input CMOS NAND Schmidt Trigger)  
U4 - 7805 (+5 V @ 1A Fixed Regulator)  
ZD1 - 12 V - 1 W Zener  
ZD2 - 1,000 V - 1 W Zener (selected 1N4005-6-7 diode)  
ZD3 - 8.2 V - 1 W Zener

#### PARTS LIST - Miscellaneous

F1 - 15 Ampere fuse  
FL1 - 15 Amp noise filter (from old computer power supply)  
K1 - DPDT 20 Ampere relay  
K2 - 3 Second Time Delay to ON, DPST 5 Ampere relay  
M1 - 1 mA FS, marked 0 - 15 VDC, Radio Shack 270-1754  
S1 - SPST 20 Ampere switch  
Y1 - Y2 - 4 W 130 V "nite-lite" bulbs

#### PARTS LIST - Capacitors

C1 - 12 uF - 250 V poly film (6 x 2 Uf - 250 V from old computer power supplies)  
C2 - 4700 pF - 1 KV disk (from old computer power supply)  
C3, C4 - 4080 uF - 200 V electrolytic (6 x 680 Uf -250 V from old computer power supplies)  
C5 - 600 pF - 2500 V Mica (see text)  
C6 - 2 uF (2 x 1 uF - 2000 VAC from old microwave ovens)  
C7 - 1.0 uF Mylar  
C8 - 4400 pF - 50 V Disk (4700 pF OK)  
C9 - 470 uF - 35V Electrolytic (mount close to U1)  
C10 - (not used)  
C11 - 220 uF - 25 V (tantalum preferred)  
C12 - 2200 uF - 50 V electrolytic  
C13 - .01 uF 50V disc  
C14 - 4.7 uF 16 V Electrolytic  
C15 - 330 uF 16 V Electrolytic  
C16, C17 - 1000 uF 10 v Electrolytic  
C18 - 1000 pF Disk

#### PARTS LIST - Inductors

L1 - Core - from old TV flyback transformer  
About 1 CM<sup>2</sup> cross section area.  
Winding 245 turns # 21 AWG or as needed  
to obtain 56 mHy with no air gap in core.  
Adjust core air gap for 11.6 mHy inductance  
with no DC in winding.

#### PARTS LIST - Transformers

T1 - Core #43 or "J" material, 3/4"od x 1/2" id x 3/8" high (from old computer power supply.)  
Primary 10 turns bifilar wound (10-0-10.)  
Each Secondary 15 turns close wound. All windings #26 AWG from CAT5-E cable.  
T2 - Core requires (1) Ferroxcube "U-Core" P/N U100/57/25-3C90, and (1) "I-Core" P/N I100/57/25-3C90  
Primary 15 turns of 8 parallel strands of #18 AWG enameled wire wound over secondary.  
Wind the primary winding over the secondary winding.  
See text for winding and assembly instructions.  
Secondary 205 turns # 18 enameled. Wind the the secondary closest to core.  
See text for winding and assembly instructions.  
T3 - Core #43 or "J" material, 1"od x 9/16" id x 15/32" high (from old computer power supply.)  
Primary is a single pass-through of the primary lead from T2.  
Secondary 23 turns bifilar wound (23-0-23) #26 AWG from CAT5-E cable.  
T4 - Radio Shack - # 273-1366 - 24 VAC-CT @ 300 MA