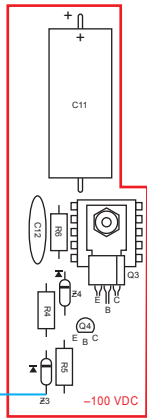


# The Display Power Supply



## Minus -100v Path

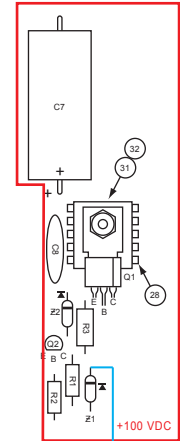
**Step #2m.**  
-118v DC at bottom of Z3.  
0v = Open D4  
or faulty C11.

**Step #3m.**  
-114v DC at bottom of Z3.  
Around 4v more than measurement #2m ?  
No = faulty Z3?  
Then measure R4 as 39K ohms with power turned off.  
Replace R1 with 39K 1W (or even 2W) if not between 37 and 41K.

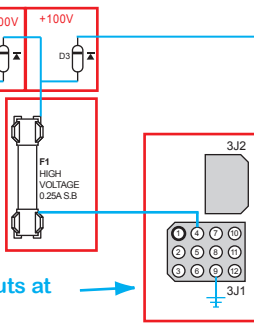
## Plus +100v Path

**Step #2p.**  
+120v DC at top Z1.  
0v = Open D3  
or faulty C7.

**Step #3p.**  
+116v DC at bottom of Z1.  
Around 4v less than measurement #2p ?  
No = faulty Z1?  
Then measure R1 as 39K ohms with power turned off.  
Replace R1 with 39K 1W (or even 2W) if not between 37 and 41K.



#1.b 0v AC blown Fuse.  
#1.a 90v AC to Gnd.  
Check AC to inputs at 3J1-4 and 3J1-9.  
**AC AND FUSE CHECKS**



**Step #4m.**  
-100v DC at bottom of Z4 (non-banded end).  
Not 0v, but voltage is wrong = Replace Z2.  
0v = Q4 faulty, replace with MPSD02 (npn).  
Be sure and measure R5 is 680 ohms with power off. Replace R5 with larger 1.2K ohm 1/2 W resistor, as a recommended upgrade.

**Step #5m.**  
-100v DC bottom of C12, and at output pin 3J5-3.  
0v or same voltage as #2m, Q3 is faulty.  
Can be replaced with MJE15031, but must be mounted with legs 'twisted' as pinouts are different.

**Step #4p.**  
+104v DC at top of Z2 (banded end).  
Not 0v, but voltage is wrong = Replace Z2.  
0v = Q2 faulty, replace with MPSD52 (pnp).  
Be sure and measure R2 is 680 ohms with power off. Replace R2 with larger 1.2K ohm 1/2 W resistor, as a recommended upgrade.

**Step #5p.**  
+104v DC top of C8, and at output pin 3J5-4.  
0v or same voltage as #2p, Q1 is faulty.  
Can be replaced with MJE15030, but must be mounted with legs 'twisted' as pinouts are different.

## REPLACEMENT PARTS AND NOTES:

1N4730A	Zener Diode, 3.9v ZR1 / ZR3
1N4763A	Zener Diode, 91v ZR2 / ZR4 (Better, as it lowers display voltage)†
1N4764A	Zener Diode, 100v alternative for ZR2 / ZR4 †
1N4004	1Amp 400v Rectifier D3 / D4
MJE15030	NPN Transistor (SDS-201 alternative) Q1 ††
2N5401	PNP Transistor (MPSD52 alternative) Q2
MJE15031	NPN Transistor (SDS-202 alternative) Q3 ††
2N5551	NPN Transistor (MPSD02 alternative) Q4
39K 2W	Resistor 39K ohm, 2 Watt (Good alternative for 39K ½ watt and 39K 1 watt R1 / R4)
1.2K ½W	Resistor 1.2K ohm ½ Watt (Good alternative for 680, ½ watt R2 / R5)
330K ½W	Resistor, 330K ohm ½ Watt R3 / R6
100uF @ 160V	Axial Electrolytic capacitor 100uF rated 160 volt C7 / C11 for Systems 3 through 6 (C1 / C3 for Systems 7)
0.1uF @ 500V	Ceramic disc capacitor 0.1uF rated at 500 volt C8 / C12 for Systems 3 through 6 (C2 / C4 for Systems 7)

† Use of 1N4763A's in place of 1N4764A's reduces the output voltage by 9 volts. This lowers the voltage to the displays and display drivers to approximately 91 volts. Although there is a minimal reduction in display brightness, the advantage to this voltage reduction is a longer lifespan in both displays and display drivers. Some displays will not work with the reduced voltage. If your display is excessively dim, strobos or doesn't work after rebuilding the supply - install 1N4764A's in place of ZR2 and ZR4.

†† There are no current replacements for obsolete SDS-201 and SDS-202 transistors. MJE15030 and MJE15031 transistors can be used to replace these but due to different pin outs - the transistor legs MUST be crossed as shown here at GPE: [http://www.greatplainselectronics.com/Downloads/W3-11\\_HV\\_Kit.pdf](http://www.greatplainselectronics.com/Downloads/W3-11_HV_Kit.pdf)  
A great place to buy your rebuild kits for pinball PSUs and HV Display Driver Boards.