

*C1	25000 MFD 40V	(2010610)	Heat Sink Grease Capsule	(3050200)
C2	.001	(2010370)	P.C. Board	(4040220)
C3	470 MFD 16V	(2010570)	Heat Sink	
C4	.001	(2010370)	(Small on PS3A & PS15)	(4020100)
C5	.01	(2010410)	(Large on PS25)	(4020150)
C6	.01	(2010410)	3 Keystone Pins	(4060130)
IC1	723	(1050190)	Hardware	
			Instruction Sheet	(5010203)
Q1	TIP 3055 or equiv.	(1020060)	*C1 is not supplied with PS3A kit. When using PS3A with external pass transistors, R7 is changed to 100 ohm 1W resistor (2020110)	
R1	5.6K 1/2W	(2020295)		
R2	2K Pot	(2020510)		
R3	4.7K 1/2W	(2020290)		
R4	5.6K 1/2W	(2020300)		

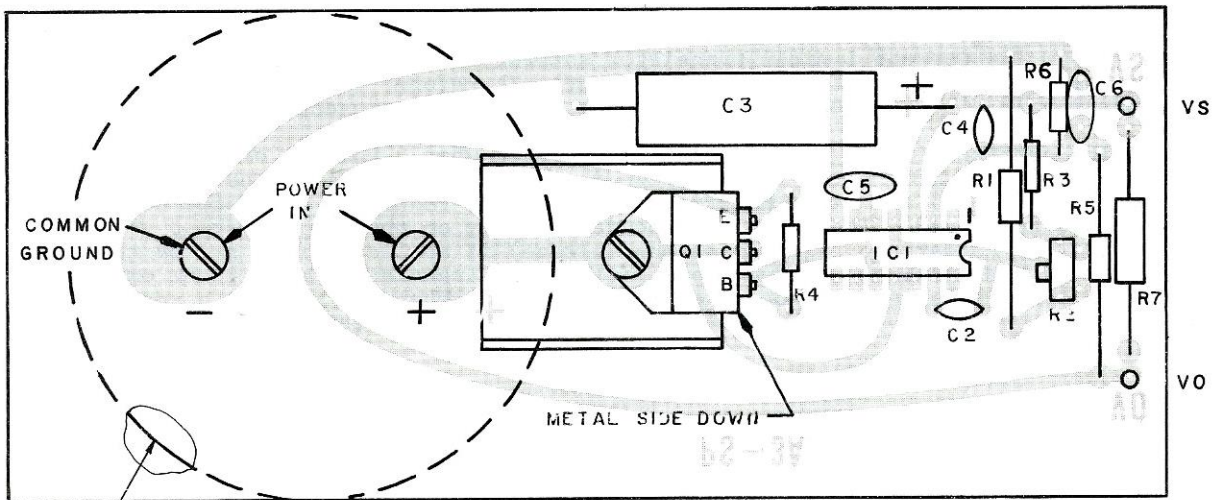
R5 and R6 determine the foldback current limiting characteristics of the supplies to limit the short circuit current to less than 2 amps. They are specified as follows:

	R5	R6	R7
PS3012	330 ohm	3.3K	100 ohm
PS25 Series	330 ohm	3K	100 ohm
PS15	390 ohm	3K	100 ohm
Repeaters	390 ohm	3K	100 ohm
PS3A Modules	390 ohm	3K	.1 ohm *

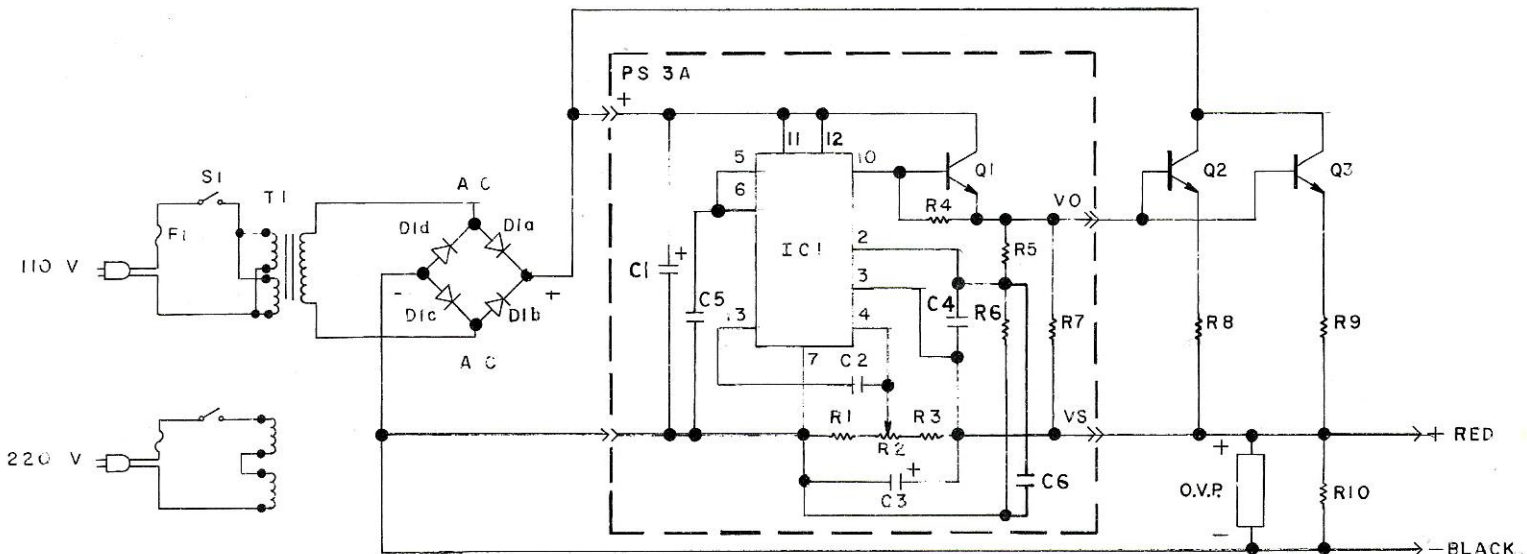
Due to component tolerances, it may be necessary to vary the value of R6 to provide proper foldback limiting.

* If the PS3A is used with external pass transistors, change to 100 ohm.

For the PS3012 only, R5 has a 1 mfd capacitor placed across it on the top of the board, and C3 is replaced on the board by a 220 ohm 2 watt resistor.



PS 3A COMPONENT VIEW



CIRCUIT DESCRIPTION

The PS-3A regulator card can supply up to 6 amps of regulated 12-14 volts from an unregulated source. It is designed for communications equipment where maximum current is drawn less than 50 percent of the time. For continuous operation, it must be derated to 3 amps with the heat sink supplied. The maximum current is limited by the power dissipation (input voltage minus output times current) and the current capabilities of the pass transistor, which is 90 watts and 10 amps respectively at room temperature for the TIP3055. With a supply voltage of 20 volts, the PS3A will handle 6 amps by adding additional heat sinking to keep the case temperature of the TIP3055 below 120° centigrade. With the addition of external pass transistors, currents up to amps can be regulated.

When using the PS3A without external pass transistors, the maximum short circuit current is 6 amps. When used with external pass transistors, R-7 is changed to 100 ohms. The maximum current of 6 amps is multiplied by the number of pass transistors. The unregulated input must be at least two volts above the output under load to keep the pass transistors out of saturation. Any ripple on the input voltage must be added to the 2 volts difference. When the pass transistor saturates regulation is lost.

THEORY OF OPERATION

The 723 is a precision voltage regulator chip that contains a zener voltage reference, operational amplifier, current limiter, and pass transistor. A portion of the output voltage controlled by R-4 is compared to a reference voltage, any difference or error is amplified by the op-amp and changes the bias on the internal pass transistor to eliminate the error. The reference voltage for the 723 is 7.15 volts. Therefore, the output voltage is the ratio of the voltage divider (consisting of R-1, 2, and 3) times 7.15. The current limiter transistor saturates when a voltage of .6 is applied between pins 2 and 3, shutting down the output. Therefore, with a .1 ohm resistor for R-5, the supply will shut down when a current of 6 amps is reached.

The current limiting section of IC1 operates when a voltage of +.6 volts is applied between pins 2 and 3 of IC1. This voltage is the algebraic sum of the opposing voltages developed across R-5 and R-7. Reverse voltage is the result of regulator current through R-5 and R-6 to ground. Its value is dependent mainly on the supply output voltage and the value of R-6. Forward voltage (disabling voltage) is applied across R-7 by the current through the parallel E-B junctions of the pass transistors and .1 ohm emitter resistors. Its value is a function of load current. When the voltage across R-7 is .6 volts higher than the voltage across R-5, current limiting results.

SUPPLIES USING OVP

The over-voltage protection (OVP) is essentially a crowbar circuit which prevents the output voltage from rising above 14 volts. If the supply voltage (pot on PS3A board) is set too high, the OVP will shut down the supply as soon as it is turned on. To reset the OVP: turn the power off - wait about one minute for the filter capacitor to discharge - turn the regulator pot down - reapply power - adjust the regulator pot for the desired output voltage.

ASSEMBLY

Install IC first. The TIP 3055 transistor is installed with the metal side down. The 6-32 screw holds the transistor on top of the heat sink. Be sure to use some silicon grease between the heat sink and the transistor. The metal part of the transistor is internally connected to the collector. Therefore, the screw and heat sink have full voltage on them. Care should be taken to prevent them from grounding out. Observe polarity on the electrolytic condensers. The board is usually mounted by the filter condenser. If it is used without the filter condenser (when used with an existing filtered unregulated supply) it may be mounted on stand offs by drilling mounting holes in the corners of the board.