DC Power Supply, 50W, Fixed or Variable Voltage

Model XAPS-50

Assembly Instruction Manual

Rev 1.01

Xkitz.com

Features

- Regulated DC power supply
- Either variable or fixed output – depending on assembly option
- Output voltage: 3V – 36V
- Output Current: 2A max.
- Large filter caps for clean output - ideal for audio amplifier applications
- Very compact PCB – easily fits in a small enclosure
- This is an beginner level electronic kit containing 14 components and 1 PCB (1.75" x 2.25"), and can be assembled in less than 1 hour
- Designed and packaged in the USA

Unpacking Your Kit

Carefully unpack and take stock of the components in your kit. The electronic components are packed in 1 bag labeled 'Bag A'. See Table 1 for a complete listing of your components.

Assembly Instructions

It is very important that you read and understand all of the following instructions before you start your assembly so that you don't make any mistakes that might be difficult to recover from. The assembly should be done in the order listed in Table 1 or you may have difficulty physically accessing components for soldering.

What you'll need

- Soldering iron with small or medium tip
- Damp sponge for tip cleaning
- Solder
- Solder wick or solder sucker in case of solder bridging (stranded wire could substitute)
- Small needle nose pliers.
- Small wire cutters
- Small straight screwdriver
- Magnifying glass to read the markings on the tiny components

General Assembly Guidelines

- **Take your time!!** Most mistakes are made when rushing through the assembly. Taking the time to double check every step will pay off with a first-time functional device.
- In cases where it is necessary to re-form the leads on components (such as resistors and diodes), be very careful not to put stress where the lead enters the component itself. The physical attachment of the lead to the component can sometimes be very fragile and the lead may break off if too much force is applied. Reforming the leads can be done by gripping the lead with small needle-nose pliers at the base of the component while bending the lead on the other side of the pliers.
- Use as little heat and solder as necessary to affix the components to the PCB (printed circuit board). Many of the parts in this kit are temperature sensitive. Overheating may damage them.
- Always clean the soldering iron tip on the damp sponge prior to every solder joint. Re-tin whenever the tip gets a little dull. (tinning is the application of fresh solder to the tip of the iron until its shiny, wipe excess on a damp sponge).
- Inspect the solder joints. They should be shiny and smoothly connect the pad to the lead. A dull looking joint may indicate it is 'cold', meaning that either the pad or the lead weren't heated enough to allow reliable connection. This could lead to erratic operation of the device. Re-flow the joint again with the soldering iron, apply equal heat to both the pad and the lead, apply a little more solder if needed to get a good shiny connection.
- When clipping the excess leads of the through-hole parts, don't try to clip too close to the PCB. Clip just above the solder joint to avoid fracturing the solder joint, which could lead to device failure sometime in the future.
- Carefully inspect each solder joint to make sure you didn't accidentally form a 'solder bridge', or connect two adjacent pads together. Remove solder bridges by using solder wick or a solder sucker. If the bridge is small you may be able to remove it by just reheating the joint and sliding the soldering iron across the bridge. If not, see the next step.
- If you need to remove solder from a hole (or a solder bridge) and you don't have solder wick or a solder sucker, you can use stripped stranded wire in place of solder wick. Place the stranded wire across the hole and touch the soldering iron to the wire, above the hole. As the wire heats it will melt the solder in the hole, and the melted solder will tend to wick up into the stranded wire. When the wire fills up with solder, move a clean part of the wire over the hole and repeat until the hole is clear of solder.

Circuit Board Assembly

You're ready to begin assembling your XAPS-50 circuit board. Assemble the board in the order listed in Table 1. Use the install check boxes on the right side to track your progress. The 'Install Notes' column will alert you to any special instructions (listed below) for each of the components.

Table 1. Circuit Board Parts List (Bag A)

Pack √	Device	Value	Marking	Qty	Reference Designators	Install Notes	Install √
	CIRCUIT BOARD (PCB)	REV 1.0	XAPS-50	1			
	RESISTOR	8.2K	GRY-RED-RED	1	R1	1	
	RESISTOR	1K	BRN-BLK-RED	1	R2		
	CAPACITOR	.1uF	104	2	C1,C4		
	DIODE	1N5401G	1N5401G	4	D1,D2,D3,D4	2	
	TRIMPOT	20K	203	1	VR1	1	
	TERMINAL BLOCK			1	J1	3	
	VOLTAGE REG IC	L200	L200	1	U1	4	
	HEAT SINK			1		4	
	4-40 SCREW			1		4	
	4-40 NUT			1		4	
	ELECTROLYTIC CAPACITOR	2200uF	2200uF	2	C2,C3	5	

Circuit Board Component Installation Notes:

1. You will install either the R1 fixed resistor **OR** the 20K trim-pot VR1, **BUT NOT BOTH**. If you want a fixed (non-variable) output voltage then you'll want to install R1. The 8.2K included in this kit will give an output of 25.3 Volts DC. Consult the formula below to calculate the proper value of R1 to set your desired output voltage. If you want a variable output voltage then you'll install VR1 instead of R1. See below for adjustment instructions.
2. Diodes are polarized devices; which means they won't work if installed the wrong way around. A solid bar on one end of the diode marks the cathode. The cathode goes in the square pad hole on the PCB.
3. Install the terminal blocks so the wire openings face outward.
4. Attach the voltage regulator IC (L200) to the heat sink using the included 4-40 screw and nut; leave it a little loose for now. The VREG leads should point in the same direction as the heat sink mounting tabs. Now insert the assembly into the appropriate PCB holes. Solder the VREG leads, and tighten the nut to secure the heat sink.
5. The electrolytic capacitors are polarized devices, be sure to install them the right way around. The positive lead is longer than the negative lead. The positive lead goes in the square pad hole on the PCB. Note that the polarity is also marked on the outer casing of the caps.

Transformer Selection

You should select a transformer with a maximum secondary voltage of 26VAC, with a power rating of 50VA. You can use a smaller transformer than this, but the maximum current capability will be reduced as well.

Compute Value of R1 to Select Output Voltage

Use the following formula to calculate the proper value of R1 for your desired voltage:

R1 = ((V Out / 2.75) - 1) * 1000

e.g. for 12V output, you'll use a 3.36K resistor for R1:

3.36K = ((12 / 2.75) - 1) * 1000

Adjusting the Variable Voltage Output

Turn trim-pot VR1 all the way **clockwise** to set output voltage to its lowest value. While watching the voltage output with a voltmeter, slowly turn VR1 counter-clockwise to increase the output voltage.

Figure 1. PCB Parts Placement

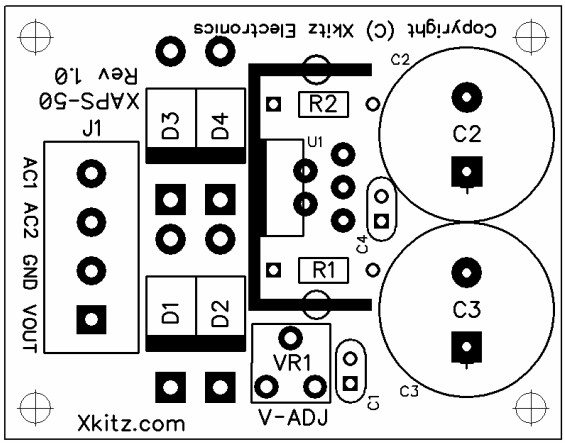

Figure 2. XAPS-50 Schematic