



# Hewlett-Packard 6114A Precision Power Supply Teardown

Tear down of old HP 6114A Precision Power Supply, a work of art, its specs rival some of the best produced today.

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## INTRODUCTION

On this site we often bemoan the lack of repairability of modern devices. This device is the complete opposite of this modern ethos; this device hails from an era when device repair was not only common but was expected. This is evidenced even in the [user/service manual](#) (which clocks in at over 60pgs) with full schematic and parts list, detailed explanations on how different subsystems work, how to properly maintain the device, as well as the usual stuff on how to properly use the device and safety precautions.

### WARNINGS:

This device connects to mains voltage. Always unplug the device before opening.

This device has several large capacitors which can not only easily store enough charge to kill you but can store this charge for LONG periods of time. If you must work on the capacitors discharge them properly before servicing.

As with any mains equipment treat it with the respect it deserves.

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### TOOLS:

- [Phillips #1 Screwdriver](#) (1)
- [iFixit Opening Tools](#) (1)

*Not remotely necessary but can be a slight help at points*

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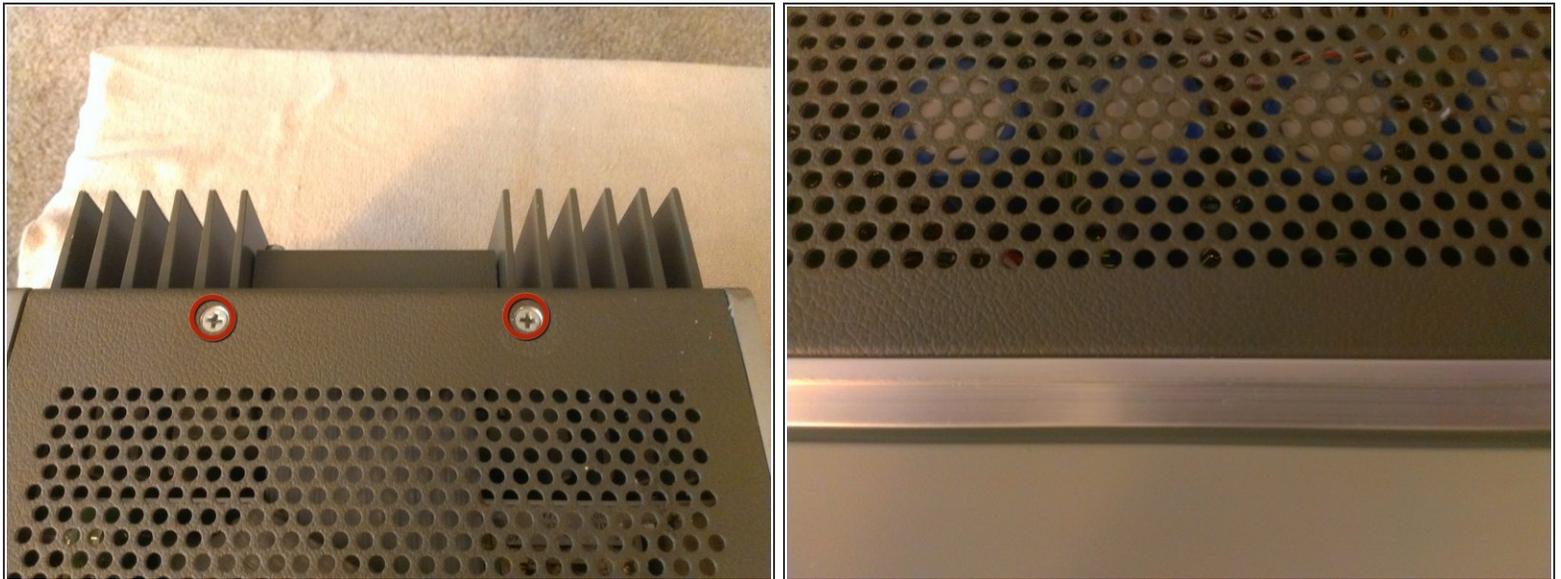
## Step 1 — Hewlett-Packard 6114A Precision Power Supply Teardown



**⚠ Caution:** The power supply contains very large capacitors that can remain energized for extended periods of time. Touching the capacitor wires may cause serious injury. Use a [capacitor discharge probe](#) to safely rid the capacitors of dangerous charges.

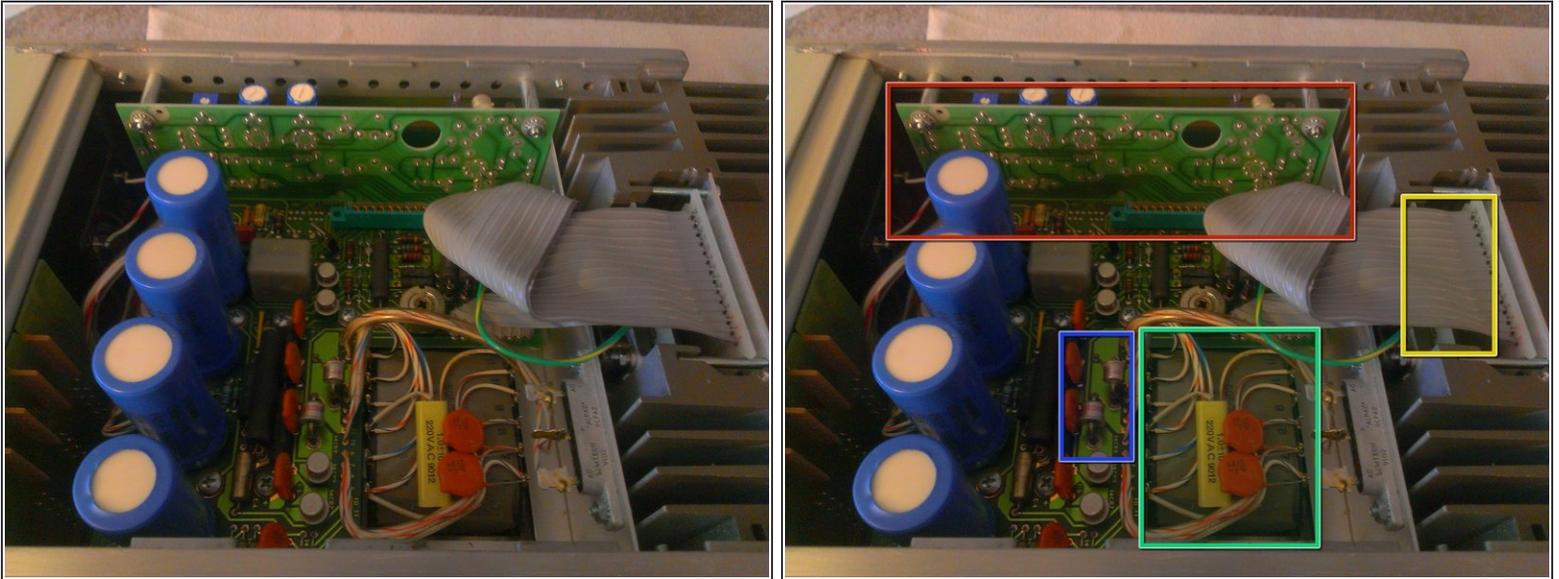
- This first image shows how you adjust the output voltage. You push the button above the number to raise the digit and the button below it to lower it. Including the fine adjustment potentiometer on the right this provides you with 5 significant figures of control.
- The second image shows the current control dial. This model has the Option 14 ten turn current control installed. It allows very fine precision control of the output current, theoretically with a resolution down to around 1mA.
- This last image shows the rest of the features on the front. The power switch, a switch that switches the meter between volts and amps, and lastly the overvoltage limit.

## Step 2



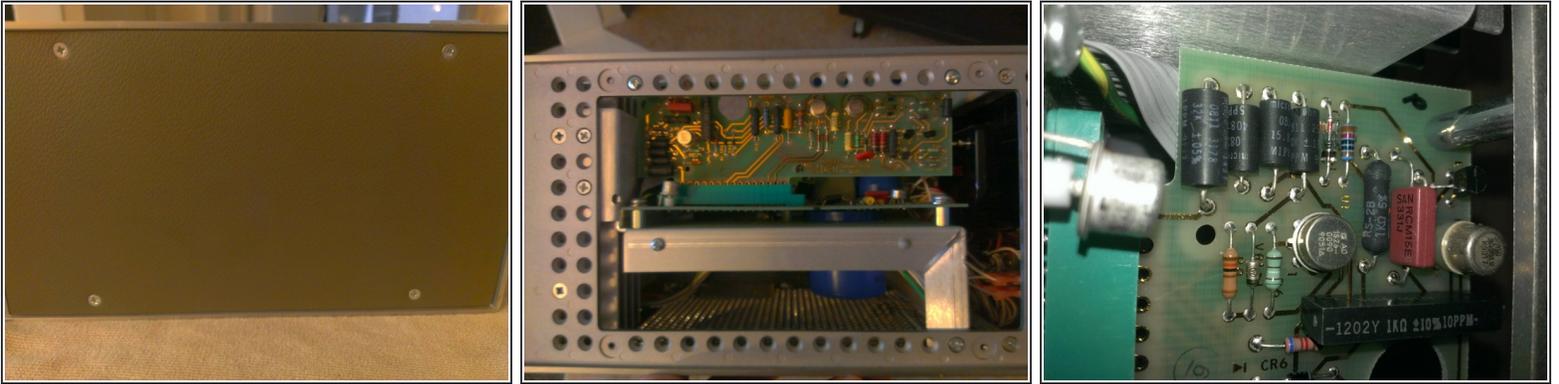
- Remove the two screws at the back of the device.
- Apply pressure along the aluminum lip at the front, sliding the panel backwards off of its clips.
- Lift up along this lip to remove the panel. It should remove easily.

### Step 3



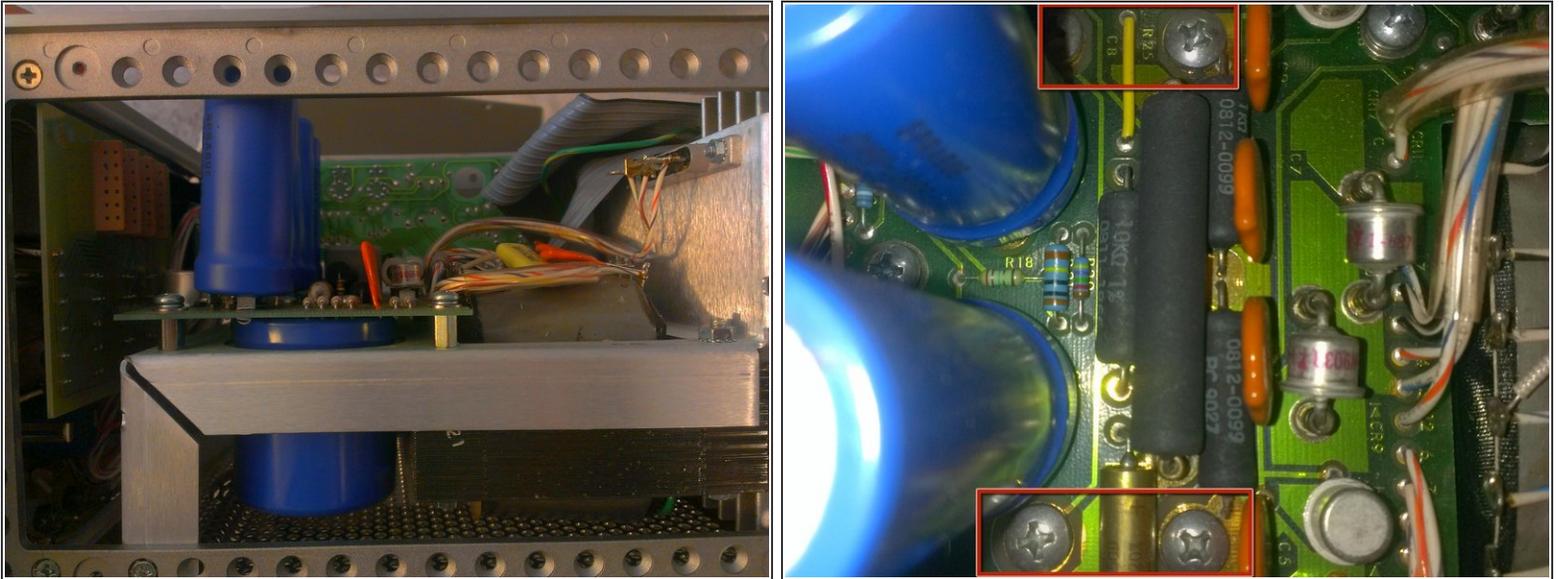
- First view of the insides. The large blue cylinders on the left are 490uF 85V Sprague Capacitors (Made In USA).
- In the second image, I highlight a few parts. The items in the blue box are some odd can diodes, on top in the red box is a fully replaceable board on a standoff, the seafoam green is the main power transformer (17 taps) and hiding under the ribbon at the yellow box are the pass transistors.
- I hesitate saying this because of those horrible gold scavengers but it appears all of the traces on the board all gold plated. Even 40 years later it beautifully shiny.

## Step 4



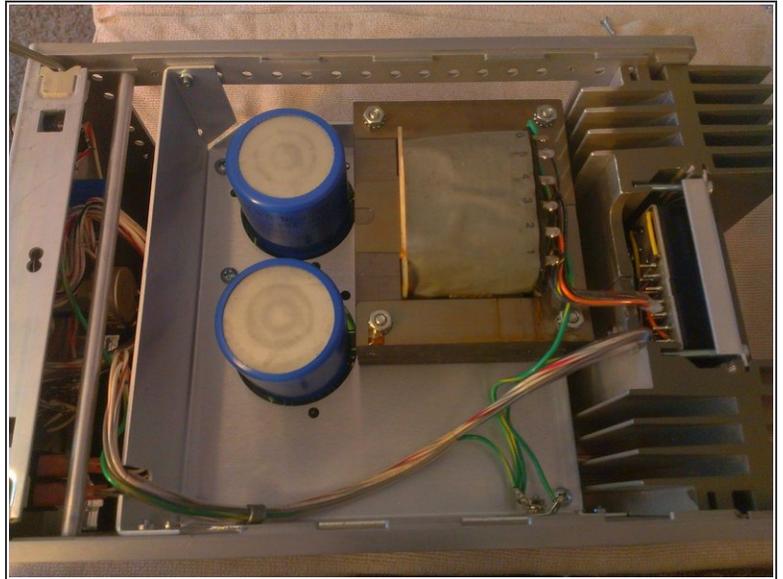
- Remove the four screws on the side panel and it falls right off.
- Exposing this beautiful piece of work inside. This appears to be the main voltage adjustment board, as it has multiple trim-pots on it
- Everything on this board is top notch. Precision resistors from micro ohm(1%, 0.1%, 0.05%), larger resistors from Dale, capacitors from Sangamo and Sprague, Zener diodes and transistors from Motorola, potentiometer from Allen-Bradly, Vishay and Bourns, op-amps from Analog Devices. It's like a who's who of American electronic components companies.
- The manual says the Op-Amps are from Sprague but they clearly have the AD logo on them.

## Step 5



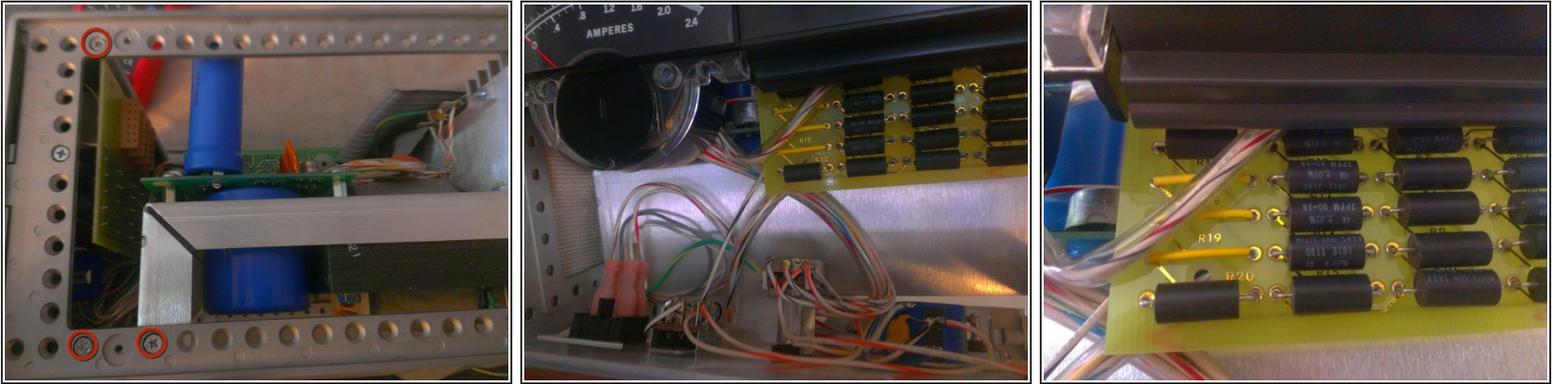
- Repeat the same process on the other panel.
- This side is a bit less interesting. You can see which holds up the main circuit board. You can also see the really large Sprague capacitors (45000uF 45V) likely used as a filter for the rectifier.
- Interestingly, these large capacitors are screw terminal caps and are screwed directly to the board. Next to these screws you can see the large non-inductive wire wound resistors.

## Step 6



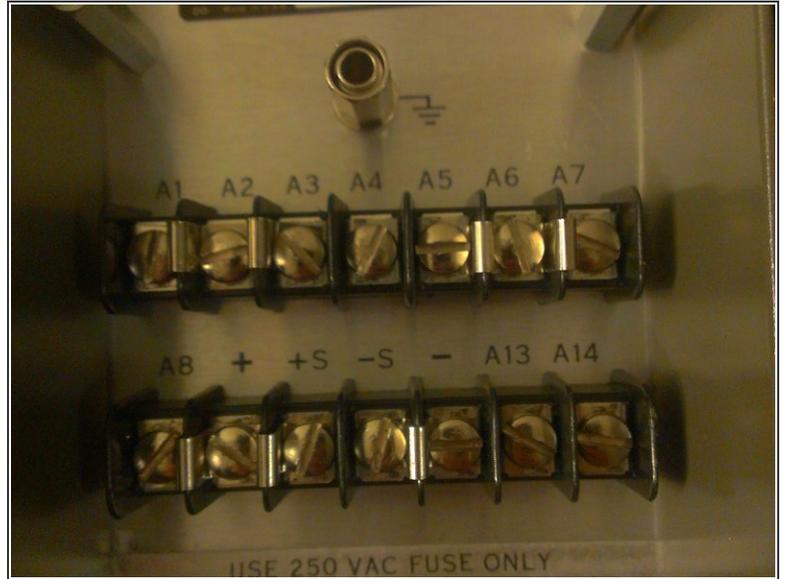
- Removing the bottom is much like removing the top but with one added step.
- Before removing the panel, lift the metal prop bar out of the way so that the bottom can slide out.
- You can see the large filter capacitors the large transformer as well as the large heatsink which allows this to be a passively cooled device.

## Step 7



- To access the front panel, remove these three screws on each side with a #2 philips head screwdriver
- You can then pull the frame wide on each side so that the bottom panel comes off.
- You see the main power switch, the Bourns 10-turn 1K pot which controls the current set point, the smaller Bourns pot which sets the overvoltage crowbar.
- More interesting is the board underneath/behind the voltage selector. This board is populated with lots of ultra high precision resistors, including 0.01% tolerance, 0.025% tolerance and 0.1% tolerance resistors. All are either 1ppm or 2ppm temp coeff. These are ultra high precision even by todays standards.

## Step 8



- On the back side we see the ENORMOUS heat sink which allows this device to be passively cooled.
- Underneath the simple warning cover, we have a plethora of connection points. Most of these are used for remote programming of voltages, running supplies in series or parallel and a variety of other functions. The ones that are important are +, -, S+ and S-.
- The + and - terminals are exactly what you think. They are just rear outputs for the voltage. The S+ and S- are a bit more special, these are sense lines to sense the voltage at a remote point. This is very useful if you are powering something several dozen yards away where the voltage drop in the wire becomes VERY significant.

To reassemble your device, follow these instructions in reverse order.