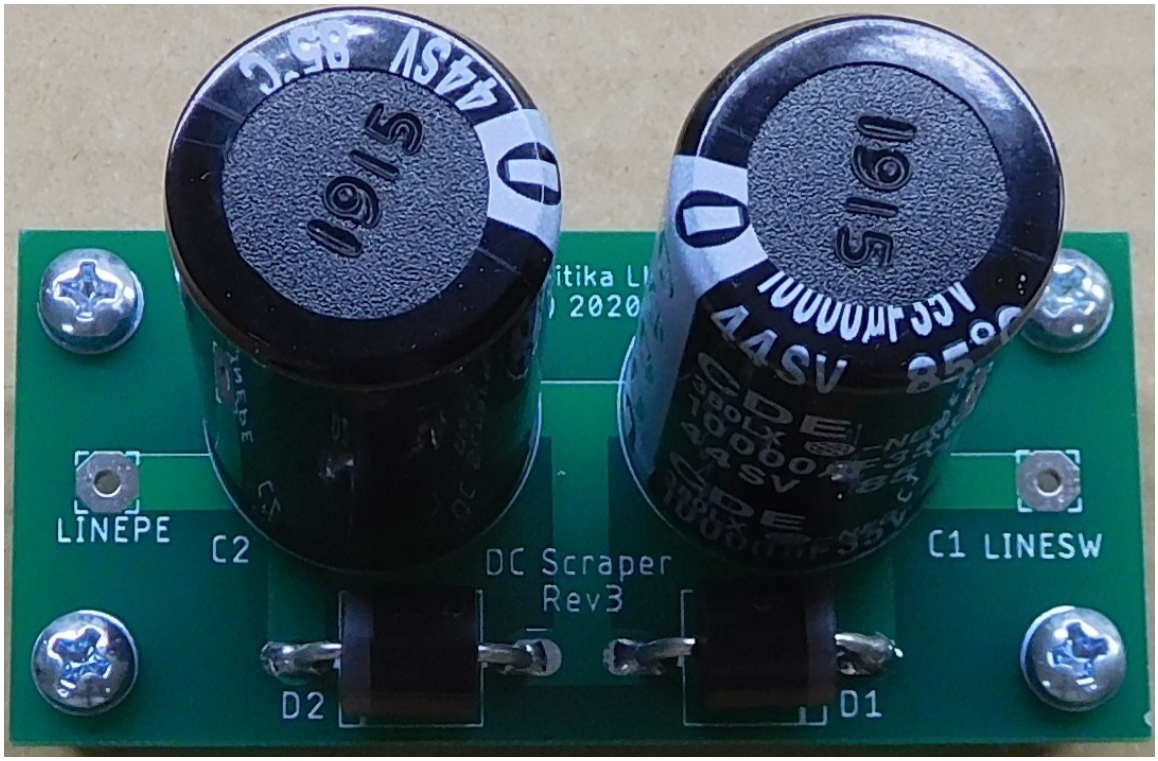
Akitika

DC Scraper Kit for the GT-102

ASSEMBLY MANUAL



Revision 1p03 January 20, 2022

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Section 1: About This Manual

This manual gives the information needed to build and install the DC Scraper into Akitika's GT-102 Stereo Power Amplifier kit.

What is a DC Scraper? The quick answer: It quiets down the toroidal transformer by removing DC from the incoming AC power line.

The longer answer: The voltage that appears at the input to the toroidal transformer is ideally 60 Hz AC, with no Direct Current (DC) component. In a small number of cases, some load on your local power grid will draw asymmetric power. That imposes a small amount of DC onto the large amount of AC that feeds the transformer. That causes the toroid to buzz. The DC Scraper removes the DC component, making the transformer quiet.

The asymmetric load current is typically not steady, as it depends upon what asymmetric loads are cycling on and off. Things that might do this include large motors like those in refrigerators, heat pumps, or air conditioners.

Who Should Attempt this Project?

You can build this kit if you can:

1. Solder (using normal rosin core solder and a soldering iron).
2. Use simple hand tools like screwdrivers, wire cutters, and pliers.
3. Read and follow directions.

It helps if you:

1. know a bit about electronics, or
2. have a friend who knows a bit about electronics
3. can get to YouTube to watch a few helpful videos about the assembly process (none are posted as of this version of the manual).

Tools you'll need

You'll need the following tools:

1. Phillips screwdriver (#1 and #2)
2. Pliers or nut drivers suitable for #4 and #6 hardware
3. needle nose pliers (helpful, but not strictly necessary)
4. pencil type soldering iron of 35 to 50 Watts (no huge honking soldering guns or blowtorches)
5. wire cutters and strippers
6. An awl or center-punch and a ruler.
7. A power drill with 1/16" and 9/64" diameter drill bits.

Helpful Tools

These tools aren't strictly necessary, but make building the kit easier.

1. magnifying glass, if you're over 42!

Important Safety Notes

By purchasing, using, or assembling this kit, you have agreed to hold Akitika LLC harmless for any injuries you may receive in its assembly and/or use. To prevent injuries:

- Wear safety glasses when soldering or clipping wires to prevent eye injuries.
- Always unplug the power before working on the amplifier.
- Large capacitors hold lots of energy for a long time. Before you put your hands into the amplifier:
    - Pull the AC plug!
    - Wait 2 full minutes for the capacitors to discharge!
- Remove jewelry and rings from your hands and wrists, or anything that might dangle into the amplifier or fall from a shirt pocket.
- If working on the equipment with the power on, keep one hand in your pocket, especially if you're near the power supply or power supply wires. This can prevent serious shocks.
- Build with a buddy nearby. If you've ignored all the previous advice, they can dial 911 or get you to the hospital.
- Read and understand the safety manuals of all the tools you use.

About Components

We reserve the right to make design/or component changes at any time without prior notification.

Recommended Solder

The kit must be assembled with 60/40 Rosin Core solder. The recommended diameter is 0.032 inches. Among many such sources of solder, I have used Radio Shack part number 64-009. It contains 8 oz. of solder, which is much more than you'll need to assemble the kit.

Warranty

With the exception of fuses, Akitika will replace for free any parts of a correctly assembled product that fails within one year of the date of purchase when the equipment has been used in home stereo applications. It is the responsibility of the kit builder to install the replacement part(s). This warranty applies to the original purchaser only. It does not apply to units that have been physically or electrically abused, modified without prior factory authorization, or assembled with other than 60/40 Rosin Core solder. Akitika LLC's liability shall in no event exceed the cost paid to Akitika LLC for the kit.

Section 2: Adding holes to your GT-102 chassis

Recent production GT-102 Chassis already has these holes

If your GT-102 is of the most recent production, then the chassis bottom has already been drilled to accept the DC Scraper kit. Flip the main chassis over to inspect the bottom. The holes will be toward the back of the chassis, on a line between the power switch and the power entrance connector. If your GT-102 already has those holes, consider yourself fortunate, and move on to Section 3.

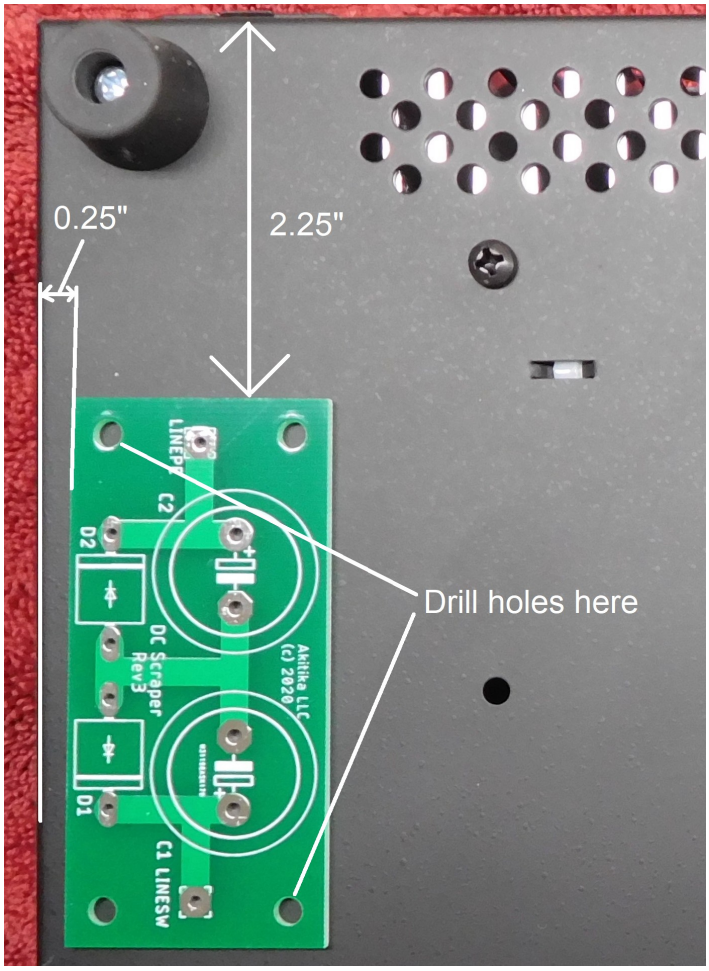

Figure 1-Using the PCB to locate the 2 new mounting holes. New production units will already have these holes drilled.

You'll need to add two holes to early production GT-102 chassis

Old production of the GT-102 main chassis does not have pre-drilled DC scraper mounting holes. You will need to add two holes using the method described in this section.

Remove the PCB from the DC scraper kit. You will use it as a template to locate two new mounting holes in the GT-102 chassis.

Here are the steps:

1. Unplug the GT-102.
2. Remove the 11 screws that hold the top on and put them in a safe place.
3. Remove the top, and put it in a safe place.
4. Lay out a towel on your bench-top to avoid scratching the finish of your GT-102.
5. Turn the GT-102 upside down with the back panel facing away from you. The power entrance connector will be at the back left.
6. Remove the blank PCB from the parts bag, and locate it on the bottom of the GT-102 in the manner shown in Figure 1.
7. Once the PCB is located in the right place, it might be helpful to temporarily hold it down with masking tape.
8. Use an awl or centerpunch t mark the center of the two indicated holes in Figure 1.
9. Drill a pair of 1/16” holes in the indicated places. This gives you a chance to recover if you find that the drill has wandered.
10. If both holes are relatively consistently located within the PCB holes, then remove the PCB and set it aside for safe keeping.
11. Turn the amp right-side up, and locate the holes on the inside of the chassis, and loosely fit a piece of tape over each hole. The object is that the tape will catch most of the metal filings generated when you add the holes.
12. Turn the chassis back upside down and drill out the two new 1/16” holes that you made with a 9/64” drill.
13. Use the PCB to check again that the holes landed in the correct places in the chassis.
14. Turn the chassis back to right-side up. Remove the tape, and de-burr the 9/64” holes you just drilled. My favorite way to do this is to use a large drill (for example, 3/8”) in your power drill.
    a. Use a slow speed and light pressure.
    b. Remember, the object is just to remove the burrs
    c. The burrs that you remove will likely stick to the large drill. Clean off the drill-tip between de-burring operations.
15. Clean-up any metal shavings that result from adding the hole. A little masking tape dabbed onto the filings captures them nicely.

Section 3: Building the DC Scraper Circuit board

The DC scraper board is quick and easy to build. Insert components on the component side (silk screen side) of the PCB. Note that all the leads are quite heavy in this kit, so you may have to use a bit more heat, solder, and time than you may be accustomed to.

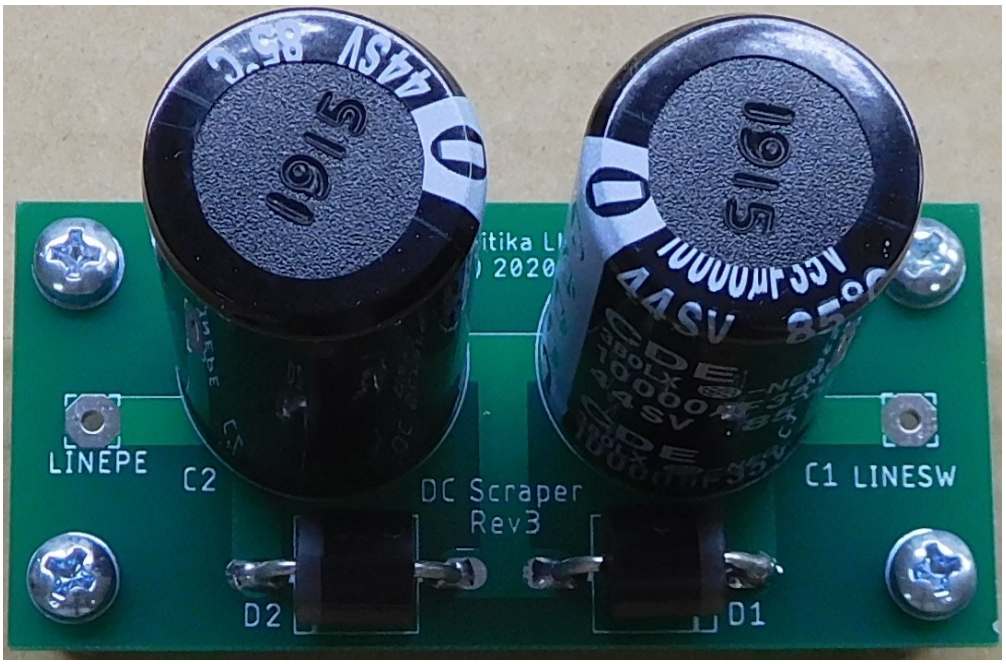

Figure 2-Assembled PCB

Diodes

Diodes are polarized. Make sure that the white stripe on the diode matches the white stripe on the silk-screen. Install and solder the diodes.

Designation	Description	Done (✓)
D1	6 Amp 400 PIV diode	
D2	6 Amp 400 PIV diode	

Capacitors

These capacitors are polarized. Make sure that the negative stripe on the capacitor faces away from the + sign on the silk-screen. Note that both negative stripes face each other in the center of the PCB when the capacitors are installed correctly.

Try and keep the cap perpendicular to the PCB and seated flush on the PCB. We recommend soldering just one lead of a cap, then double checking the installation. If there's a problem, it's easy to cure with just one lead soldered. If all is well, then solder the other lead of the capacitor.

Designation	Description	Done (✓)
C1	10,000 µF 35 Volt snap-in capacitor	
C2	10,000 µF 35 Volt snap-in capacitor	

Compare your assembly to Figure 2 to make sure that everything is installed correctly.

Stand-offs

Install the four ½" stand-offs using silver-colored 6-32 sems screws (supplied).

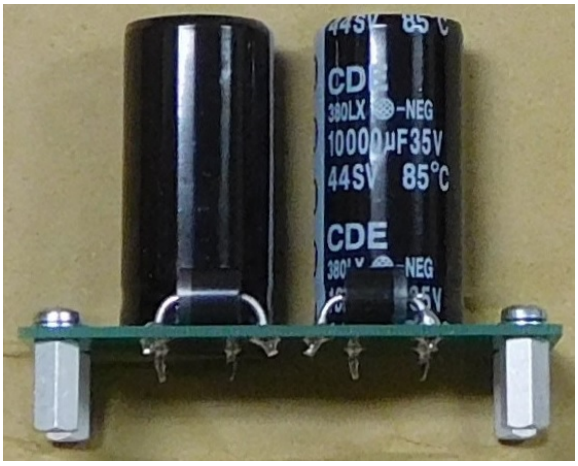

Figure 3-install the standoffs

Section 4: Installing the DC Scraper Circuit board

Now it's time to install the DC Scraper Circuit board. ***Make sure that the GT-102 is disconnected from all power sources.***

1. Identify the twisted black-white wire pair that connects the power entrance connector to the power switch.
2. Sit the DC scraper circuit board in its approximate position in the housing. This will guide you where to cut the ***black wire*** of the black/white pair.
    a. Orient the circuit board so that
        i. the LINESW terminal is closest to the power switch.
        ii. The LINEPE terminal is closest to the power entrance connector.
3. Cut the black wire where it passes the center of the DC scraper circuit board.
4. Remove ¼" of insulation from both ends of the newly cut black wire.
5. Twist each end of the newly cut wire.
6. Insert the black wire that connects to the power switch into the solder side of the LINESW terminal. Solder it on the component side.
7. Insert the black wire that connects to the power entrance connector into the solder side of the LINEPE terminal. Solder it on the component side.
8. Dress the wires in a natural way that avoids pinching them.
9. Install the DC Scraper circuit board using two 6-32x1/4" black oxide Philips screws installed from the outside of the chassis and catching the threaded holes in two of the stand-offs. Tighten these screws!

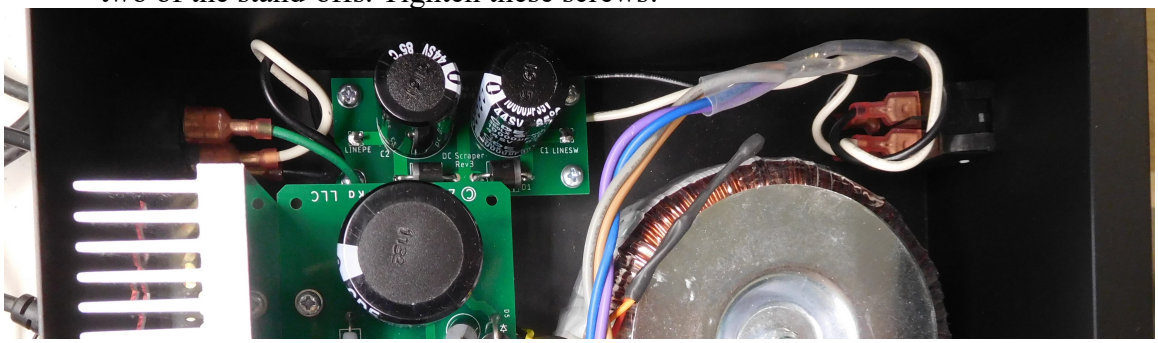

Figure 4-DC scraper installed into a GT-102

Section 5: Test

Turn the amp right-side up. Inspect it to make sure that there are no bits of metal from the drilling operations remaining. Make sure again that the black/white power wires are not pinched. When all is well, reconnect the power cord. Make sure that the power switch is off.

Stand back a bit from the amplifier. We ask you to do this in case you have installed a capacitor or diode backwards. Doing so might cause a capacitor to explode, which could be dangerous.

Turn the power switch on. There should be no drama. In about 10 seconds, the LED's on the amp boards should come on, accompanied in the usual way by a click of the speaker muting relays. As an added check, you could measure the 72-volt DC output of the power supply. It should still be essentially 72 volts.

Section 6: Reassemble the Power Amp

Assuming all went well put the cover back on and re-install the 11 screws that hold it in place. You may now return your amplifier to your listening system.

Schematic

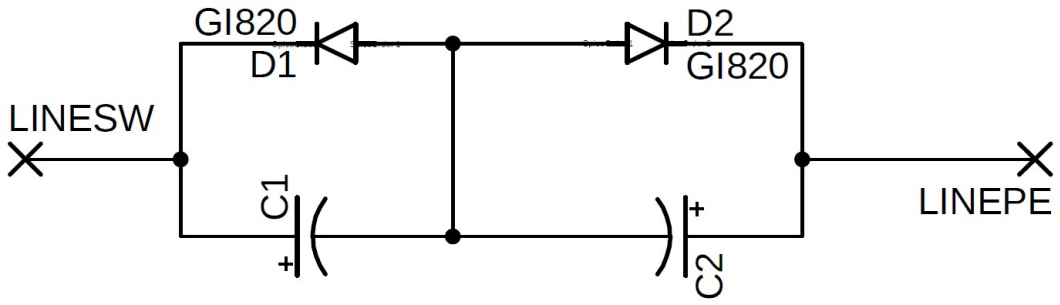

Figure 5-DC Scraper schematic