

Technote 105 Identifying problems in an emergency

So your band is going on in an hour. You're setting up your gear and something is wrong with your amp...maybe? The following is a systematic troubleshooting guide for when this happens.

1) Don't panic!

Here are the items you should carry with you in case of trouble.

1) Spare guitar cables

2) Spare speaker cables

3) Spare fuses for everything

a. Look at the fuse holders on all your gear and get replacement fuses for each one.

4) A spare preamp tube and power tubes.

5) A new 9 volt battery even if you don't use pedals (you'll see why later)

6) A reliable digital multimeter. Doesn't need to be fancy or expensive.

7) A small flat blade screwdriver for bias adjustment if your amp has that feature.

8) Band Aids. In case of injury. Has nothing to do with fixing your gear but they sure come in handy when you are bleeding.

9) A spare tire for your car. You wouldn't go anywhere without a spare tire would you? Same goes for your gear that you count on to work every time. Stuff goes wrong. If you are prepared, you won't need to freak out.

Your "rig" is just a combination of "sub-systems" consisting of, but not limited to, your guitar, cables, effects, amp and speakers. The trick is to quickly and accurately eliminate each component to narrow the trouble down to one part of the "system". A systematic approach using process of elimination will quickly tell you which component in your "system" has failed.

Symptom = no sound:

1) The first quick check is obviously to make sure everything is securely plugged in and all power indicators are lit on everything and the amp is not in STANDBY. I can't tell you how many times something didn't work simply because a plug was not fully inserted. Also, many amps have a MAIN and an EXTENSION speaker output. Verify you are using the MAIN output first. I've made that mistake myself.

2) Accurately verify if everything is absolutely, 100% dead or can you hear some tiny sound (hum, hiss, a little guitar, anything at all) coming from the speakers. This is important information because there are two different approaches to troubleshooting depending on which symptom you encounter.

3) If you are sure there is absolutely no sound at all, do this:

a. This tells you either the amp or the speakers are dead. Here is a simple and quick speaker test. Get your 9 volt battery which, of course, you have in your emergency kit. Pull the speaker cable end out of your amp and hold it in one hand. Take the 9 volt battery and touch the two battery terminals to the tip and body of the plug simultaneously. You will hear a fairly loud "thump" noise from your speaker cabinet each time you touch the battery. If you hear the "thump", you just verified the speakers and speaker cable are good and can be removed from the list of possible problem components. If you don't hear the "thump" either your cable or your speaker cabinet is at fault. By the way, you can use this same test for your combo amp speakers.

b. A special note is in order here. If you are having the "no or very little sound", do not...I repeat DO NOT just turn everything up louder or, worse, full up and try to play. This is not an acceptable troubleshooting technique. If your speaker cable or cabinet is bad, doing this will quite possibly blow up your tube amp that was probably not broken until you did this. Plus, if you have everything cranked and, by some chance things suddenly start working, you will probably damage your amp, speakers or hearing if everything is cranked.

c. Next is the amp itself. First unplug everything from the amp except for the power cord. One very common failure is a shorted power tube. Many amps have a fuse that is dedicated to protecting the power tubes and transformers. It is usually on the rear panel labeled something like HT or High Voltage or Power Tubes. Remove and inspect this fuse. If it looks burned inside, this is pretty much a sure indication of a shorted power tube. Often a fuse "looks" fine but can still be open (blown). Learn how to measure continuity with your multimeter and use it to verify if the fuse is open or not. If the fuse reads just a couple of ohms on your meter, it is not blown and power tubes are not likely the problem. If you get no reading, infinite or a very high ohm reading, the fuse is blown. If you do have the misfortune of blowing a power tube, which of course will only happen at the most inopportune time, there is a way out. It does require you carry a couple of extra power tubes and at least four of the correct value HT fuse for your

amp. If you do find the fuse is open, your amp will not produce any sound which is why we are talking about this here.

Follow this procedure to hopefully get yourself out of trouble and back "up and running":

- 1) Turn the amplifier power off.
- 2) Replace the blown HT/Powertubes fuse.
- 3) Remove all the power tubes
- 4) Turn the amplifier power on and wait 30 seconds.
- 5) Move the STANDBY switch to the PLAY position.
- 6) Wait 30 seconds again and now turn the amp off.
- 7) Remove and recheck the HT/Powertubes fuse.
- 8) If the fuse is blown, you are screwed. Nothing you can do right now will make it work....sorry. Hope you brought a backup amp. If the fuse is not blown, one of your power tubes is likely shorted, which is good news.
- 9) Put one, and only one of the power tubes back in.
- 10) Turn the POWER switch on, wait 30 seconds and now turn the STANDBY on.
- 11) Next POWER and STANDBY off.
- 12) Recheck the HT/Powertubes fuse. If it is not blown, that tube is good. If it is blown, the tube is bad so get rid of it.
- 13) If the fuse is good, leave that tube in and install another one. Same drill, blown fuse=Bad tube, good fuse=Good tube. See the pattern? If you install the tubes one at a time like this, when you put the shorted one in, the fuse will blow. Once you determine that a tube is, in fact, shorted you have options. If the amp only has two power tubes, you will want to put one of your spare tubes in. Of course you brought them with you right? One note here, I suggest you buy a matched set of four power tubes for your amp. Use two and keep two for the spares. If they are from the same set, you won't need to rebias them and you are good to go. If your amp has four power tubes, you have two choices. You can get through the show with just two power tubes with somewhat reduced performance and headroom and not worry about replacing any tubes. To do this, simply leave in only two of the known good tubes. Install them as one on each end of the row of tubes and leave the center pair out or, put the good pair in the center sockets and leave each end out. Doesn't matter which way.
- 14) On an amp that does not have the HT fuse, you are probably blowing the main fuse. You can use the same procedure to find if you have a shorted power tube. Note: If your amp has a rectifier tube and it blows the main fuse, remove all the power tubes first and see if the fuse still blows. If it does, remove the rectifier tube and recheck with the new fuse. If it does not blow, likely the rectifier tube is bad. Again, know what is in your amp so you can have the proper tubes in case of a problem.