

Loud Speaker Protection

By G8MNY

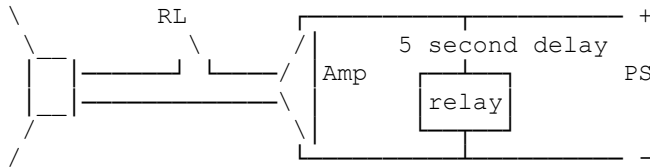
(Updated Dec 08)

(8 Bit ASCII Graphics use code page 437 or 850)

When testing some high power audio amps, there is a risk of blowing up your loud speakers, especially if they are not as well rated as the amp.

TURN ON THUMP

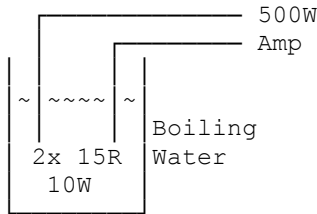
Some amplifiers use a relay to disconnect the LS lines until the amplifier



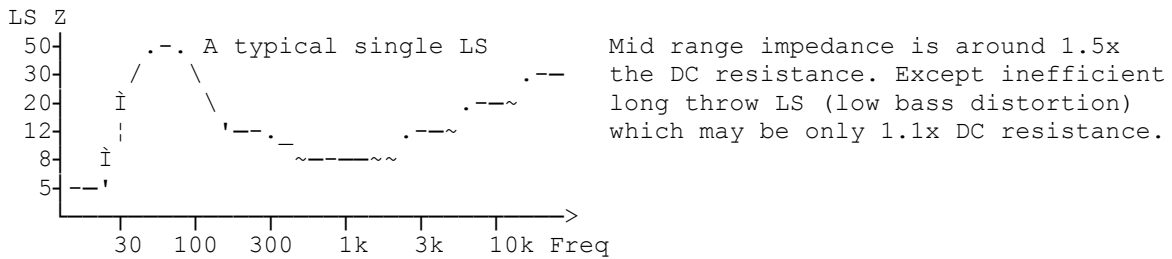
This arrangement can be annoying! But it is possible to incorporate a DC fault disabling system into it.

DUMMY LOAD

It is easy to build a high power dummy load for testing audio amps. This can be just a large 8Ω wire wound resistor in free air or in a jar of water. The water electrical conductivity is many times 8Ω & has no effect, but it does have a huge cooling effect up to 25x that of air, & an upper temperature limit of 100°C that stops heat damage to the load resistor. However corrosion is a problem though, & the load resistor may need replacing every few years!

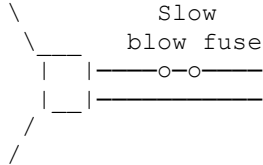


N.B. LS are not resistive & not 8Ω. A dummy load test may not show up some faults, but a good way to soak test an amp without deafening yourself!



LISTENING TEST

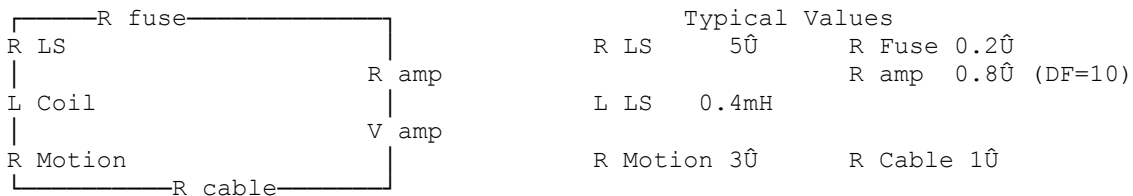
This is often used to assure an amp is OK, both for noise, stability & distortion. You may need to protect your ears as well! But to protect your LS use a series fuse! Many amp faults can give a DC output that will burn up a voice coil in a few seconds, before you are aware of a fault!



LS POWER	LS Z	Pk V	RMS I	Pk I	Fuse Mean I
4	4	5.7	1.0	1.4	0.7
6	4	6.9	1.2	1.7	0.8
20	4	12.6	2.2	3.2	1.5
32	4	16.0	2.8	4.0	1.9
100	4	28.3	5.0	7.1	3.3
200	4	40.0	7.1	10.0	4.7
8	8	11.3	1.0	1.4	0.7
32	8	16.0	2.0	2.8	1.3
50	8	20.0	2.5	3.5	1.7
100	8	28.3	3.5	5.0	2.4
200	8	40.0	5.0	7.1	3.3
400	8	56.6	7.1	10.0	4.7
8	15	11.0	0.7	1.0	0.5
20	15	17.3	1.2	1.6	0.8
32	15	21.9	1.5	2.1	1.0
50	15	27.4	1.8	2.6	1.2
100	15	38.7	2.6	3.7	1.7

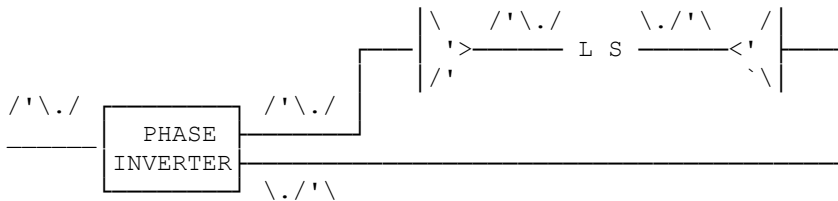
Putting the mean rating of slow blow fuse in the LS line should give adequate protection, without the risk of blowing with music at the rated power.

Adding the fraction of an ohm of fuse in line will not affect the LS damping as some may think, because the LS DC resistance is the main damping R not the amp output Z or its damping factor!



Note the LS peak Voltage has to be supplied by the amps PS rails less the silicon loss, the raw DC available is often much higher, & many amps can deliver peak pulse powers 3-5 times their RMS rating!

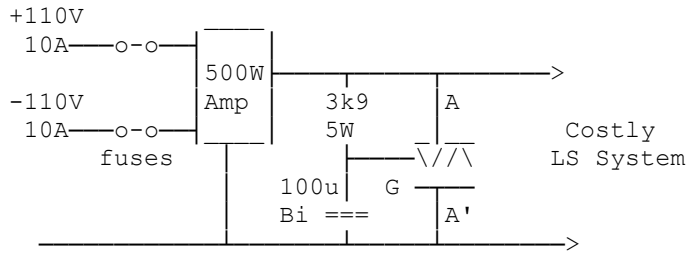
BRIDGED AMPS



Here a DC fault on 1 amp may not be apparent in use until the LS blows up!

CROWBAR

Commercial high power split rail amps sometimes use a crowbar to protect LS systems from a DC amp fault. The circuit is quite simple & can be used across the LS of a bridged amp too.



The bidirectional capacitor will not charge up if only audio AC is present. If any DC over 3V or high power frequencies below 20Hz are present the Triac will be triggered, shorting out the Amp & protecting the LS system. The triac only has to handle the peak fuse current & quite a low current (sensitive) one will do!

Why Don't U send an interesting bul?

73 de John G8MNY @ GB7CIP