Subject: Re: Class A, AB1, B, C Operation/Modes
Posted by positron on Sun, 05 Mar 2023 06:33:41 GMT
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gofar99 wrote on Wed, 01 March 2023 19:45Hi, Indeed. The way I get around this in all my gear, both commercial and diy is to isolate the signal ground from the chassis. I always use the third wire (AC mains ground) and attach it securely to the chassis. The internal circuitry ground is connected to the chassis via a type X2 capacitor and parallel resistor. (some folks prefer a diode bridge) There can be no other connections between the two grounds. This is important. Beware of chassis mounted jacks as they can defeat the protection. What this does is prevent ground loops through the AC mains but allows the chassis to still protect the users. A side benefit is the chassis still can act as an EMI shield for the internal components. This arrangement complies with electrical standards and makes for a quiet piece of gear no matter what it is connected to. Any faults in the circuitry are either handled by the fuse (an absolute necessity) or at least kept from harming the user. The typical component values are between 0.1 and 0.2uf and 100-150 ohms 1-2 watt size is usually fine. The capacitor needs to be AC mains rated thus the X2 designation. Usually the voltage ratings are 275 or 350 VAC. There are a few less common AC mains rated caps but the X2s are easy to source and not costly. Even though many companies used other common types in the past they are not recommended as they are not self healing and can short through. Good discussion.

The code seems ok, but I am not sure code covers every scenario.
I don't mean to be critical of the code, if I may present an interesting scenario.

The chassis is grounded and as stated above, the fuse size is larger
than the current through the resistor between signal ground and chassis ground.
We also use a capactor across the resistor.

I believe the key is the value of the resistor vs the fuse size.

Now let's suppose the AC wire shorts to signal ground, and 120 vac
occurs between the signal ground and the chassis (worst case scenario).

The resistor will probably overheat and open (depends upon resistor
wattage), so only the capacitor is connected. The impedance of the
cap at 60hz is basically a non factor unless the large ufd value.

The AC voltage between chassis and signal input/output jacks, will be
120 vac. Contacting both the chassis and jack(s) with fingers will
give a nasty shock at minimum.

May I suggest multiple high wattage resistors "X" ohmage in
parallel between chassis and signal ground, creating a high wattage
and very low ohmage resistance. As such, the current through the
resistor is larger than the fuse value, so the fuse blows.
We should be safe.

The musical signal return current through pin 1 will still be very low

due to "X" resistance, yet the risk of shock is virtually zero
as the voltage between signal ground to chassis ground stays very low.

I think the keys are:

1. that the value of the resistor be such that the fuse will blow.

2. The value of the resistor is low enough that one should never be shocked.

I would think this would cover things well.

Other thoughts are much appreciated.

Cheers

pos
