



Letters to the editor

Amplifier earthing

The Forum article on "Should hi-fi amplifiers be earthed or not?" in *Electronics Australia* February 1988 makes a number of interesting points, especially with regard to electrical safety and classes of insulation. However I do believe there is a need to further clarify some aspects of the article and the reported advice obtained from Mr Ron Profit of SAA.

The electrical safety of equipment in Australia and many other major countries is based on three classes of insulation, all of which are deemed to give equal protection against shock. A brief description of each is as follows:

1. Class I

Protection against electric shock is afforded by basic insulation plus the connection of accessible conductive parts to the protective earth.

Basic insulation is generally single layer.

2. Class II

Protection against electric shock is afforded by double insulation or reinforced insulation or by other equivalent systems, there being no provision for protective earthing.

Double insulation consists of basic insulation plus supplementary insulation. Reinforced insulation, which may be single or multilayer, is a system considered to have the equivalent mechanical and electrical strength as double insulation. Other systems include the use of protective impedances and the like.

3. Class III

Protect against electric shock is afforded by supply at safety extra low voltage (SELV), which in AS 3000 is specified as 32V AC or 115V DC.

SELV parts able to be touched must be isolated from higher voltages by the equivalent of Class II insulation.

Tests and dimensional and material requirements for these Classes of insulation are contained in the Australian Standards AS 3100, AS 3300 and AS 3250. For example, the 3750V test mentioned in your article is only one of the tests specified for Class II insulation. Likewise the concept of single layer reinforced insulation was certainly introduced "some time back" as it has been permitted by AS 3100 (AS C100) for

more than 30 years!

As pointed out in your article, AS 3100, AS 3300 and AS 3250 requires that Class II equipment be marked with a "double square" symbol and be not provided with an earthing conductor in the main cord or with the means of connecting such an earthing conductor. The prohibition on the deliberate introduction of an earthing conductor that is not required for electrical safety purposes to Class II equipment is part of the package of requirements that equate the safety levels afforded by Classes I and II.

However there is no prohibition in Australian Standards to the use of Class I for amplifiers. Likewise there is no prohibition on the treatment as Class I i.e., having accessible metal connected to the mains earthing conductor, of an amplifier constructed as Class II but not marked with the "double square" symbol.

As the options available to manufacturers and purchasers of audio systems are clearly covered in the applicable standards there seems to be no need for action by SAA and State Regulatory Authorities as suggested in your article. If your aim is to have amplifiers manufactured with a mains earth connection, perhaps you should encourage manufacturers and suppliers to provide them as current Australian Standards do allow for such equipment.

Peter N. Walsh,

Group Manager Electrotechnology,
Standards Association of Australia.

Comment: Thank you for your letter, which raises a number of additional points. I'll try to discuss these shortly in Forum.

American midget death trap?

Further to your February 1988 article, *Restoring a Vintage American Midget Radio*, I'm afraid very reluctantly I have to knock it a bit, much as I hate doing so, as it dealt with nice nostalgic valve goodies.

Firstly, "hot chassis" sets are death machines. Also Australian Standard 3100 "Definitions and General Requirements for Electrical Materials and Equipment", Clauses 2.29 and 5.1 de-

fine the neutral as live, (it's too easy to swap the wires in the plug) and requires these parts to be guarded respectively. So the only hope of some sort of compliance would be if the set were screwed into a case, and all metal made finger proof. (But try to get an approval?)

Secondly, half-wave rectified mains appliances are prohibited, if the DC so generated exceeds 5mA continuously. This is to prevent corrosion of the installation's earth.

Thirdly, the 25A7GT rectifier valve is rated at 117V AC maximum. Here it cops 240V AC max! Good for selling valves perhaps.

As it was basically a 115V mains voltage set originally, I would regard it as a more legitimate restoration if it were made up again as a 115 volt radio, rather than attempt to convert it by a questionable series resistor system to 240 volts. The 240/115 transformer, is as it was 40 years ago a perfectly legitimate conversion system.

Brian M. Byrne,
Indooroopilly, Qld.

Comment: Your criticism is no doubt valid, Brian. We published the story because it was an interesting one, and gave an insight into the way some old valve sets worked. Many of them did have a live chassis, and quite a few did use the crude series-resistor system to drop excess voltage when operating an essentially 115V circuit from 240V. There are probably very few such sets still around in Australia, but your warnings about the dangers and problems obviously won't go astray.

More phone details?

Re the article "Telephone Toyland", in your September 1987 issue. This was a good start into explaining telephone communications, but how about a follow-up!

For example, the operation of the 800 series Colorfone could be explained in more detail, as no doubt could other types of phones, auto dialers, etc.

You have opened the subject up. Now let's pursue it further.

Brian Plummer,
Hastings, NZ.

Comment: Thanks for the suggestion, Brian. What do other readers think?