SAFETY GUIDELINES for VINTAGE VALVE EQUIPMENT

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(adapted for Golborne from the author's website 'Vintage Radio World')

These pointers are provided in good faith but no responsibility can be accepted for accidents or injury. The best safety measure is common sense and a careful, considered plan of work. Respect electricity - work safely.

Mains powered radios fall into a number of groups but all require the presence of potentially lethal high voltages. Transformer-equipped sets can offer a greater degree of protection but whether the set is designed for AC mains only and possesses an isolating transformer, or is designed for AC/DC operation and is linked directly to the mains supply, there will be points within the chassis assembly that carry 'raw' mains. It is therefore essential for the restorer to bear these points in mind whenever working on an exposed chassis. It is worth keeping in mind that a radio that once might have been safe could now be compromised by time or by inexpert modification.

Here's a timely reminder that safety must be uppermost in the restorer's mind. This is an excerpt from a letter I received which goes to show that even the experienced and knowledgeable radio enthusiast (which this gentleman certainly was) can make incorrect and potentially dangerous assumptions...

"Saturday night, I was using my version of your power/control box* to get (the radio) going and doing rather well, when without thinking I reached out to the volume control shaft. The (shock) I got was a hefty one. The short of it is, I was fooled by the printing on the back (cover) of the set and the fact that there was a pretty decent sized transformer on the set... can you please use this experience to press home the point of how easily I might have been killed."

*this is a test lamp, see http://www.vintageradioworld.co.uk/projects.htm

The use of the test lamp limited the severity of the shock he suffered but the moral is: never take things for granted and ENSURE, regardless of type of set, that the chassis is never live to full mains potential, only neutral. This can be done easily by the use of a mains neon screwdriver/tester. Touching the chassis with the tester probe when the power is connected should NOT result in the neon lighting. Also, ensure that mains connections are the correct way around and that where chassis should be earthed, as in the case of FULLY ISOLATED transformer-fed power supplies, that it actually IS earthed.

NEVER earth the chassis of AC/DC types and ALWAYS check them for neutral connection. NEVER leave exposed grub-screw heads in the knobs of live-chassis sets. Where such knobs are standard for the set (many AC/DC types use spring-grip push-on knobs, to avoid the use of grub screws, in which case ensure the knobs fit as tightly as possible and double-check to ensure the mains plug is correctly wired) the screw should be sealed with hard wax melted into the hole. The oddity is the fact that the chassis was live in the case quoted. It may be that the transformer primary has shorted to its

laminations, not unheard of with old equipment. It would have been quite possible to produce AC/DC sets without making the chassis live, but few if any makers bothered to do so.

Treat all valve-type mains radios with great respect. Ensure that your work, when completed, cannot pose a danger to any subsequent user or anyone, including children, who may come into contact with the set.

Here are some important general points to note

Your working area should have good illumination.

Build and use a series-type test lamp.

The floor should be made of or covered with well-insulated, dry material such as thick linoleum or carpet. On concrete, a wooden 'duck board' is a good idea. The workbench should be of wooden construction, with a wooden, plastic, thick linoleum or cork surface. **Definitely NOT metal.**

The use of a mains isolating transformer (1:1) gives a good measure of personal protection to the restorer.

More readily and inexpensively available, a residual current circuit breaker, fitted to your mains outlet and supplying ALL your bench i.e. the set under test plus any test equipment in use, also gives protection BUT MUST NOT BE USED TOGETHER WITH AN ISOLATION TRANSFORMER or its safety function will be compromised.

NEVER NEVER NEVER put both hands into or on the chassis of a set and work with one hand only, the other in your pocket, not touching metal-cased service equipment or anything else, unless the set is disconnected from the power supply – and if you do use both hands, watch out for charged electrolytic capacitors.

ALWAYS check the polarity of any fitted mains plug. Do NOT assume that an already-fitted plug is sure to be correctly wired. In fact, it is safest to assume the opposite.

Do NOT rely on the set's own on-off switch for isolation. Turn off at the mains before attempting any work.

If a mains transformer has exposed connections, tape over them, if only temporarily, to avoid inadvertent contact. **Be especially careful if you wear a metal ring, bracelet or 'dangly' necklace.**

A trap for the unwary: Valves, especially output and rectifier types, can become extremely hot in use, as can power resistors.

Avoid contact with electrolytic capacitors as these can hold a charge well after switch-off. Although unlikely to be fatal, such a charge can give you a nasty jolt and could cause injury from the reaction. Such capacitors may be safely discharged through a high value resistor (connected from + terminal to the - terminal or the metal can)

Vintage radios suffer from the ravages of time in a number of ways, even those that have been well stored. All can have dangerously crumbling insulation on power and other

internal leads, capacitors will leak (pass current) and resistors may overheat or cause problems through value changes. Valves themselves are remarkably robust and long-term storage often has little effect except perhaps to soften vacuum with some very old valves.

Safety guidelines (if you read nothing else, read these)

ESSENTIAL: Never connect to the mains until the mains input and HT lines have been checked for condition and for short-circuits. Power the set up using either a test lamp (see 'things to make') or a variac and watch for signs of trouble

ESSENTIAL: Always disconnect completely before taking resistance measurements or touching exposed parts of the chassis

ESSENTIAL: Always work with only one hand inside the set, never by holding the chassis with one hand when working on the set with the other

ESSENTIAL: Ensure electrical safety (properly connected and secure mains cable, secure rear panel, correct knob types) before allowing others to use the set

ESSENTIAL: Avoid damp conditions. If set has been stored in a damp area, allow ample time for moisture to evaporate before testing

HIGHLY RECOMMENDED: Stand on insulating material such as dry carpet

HIGHLY RECOMMENDED: Obtain proper data whenever possible

HIGHLY RECOMMENDED: Use an isolating transformer if you have one, or an RCD (residual current detector) plug or socket

End of section