

## FUNCTION GENERATOR

"Build This Function Generator" (Radio-Electronics, May 1988) caught my eye because the discrete-components-based function generator I am presently using shows signs of impending death. Mr. Wannamaker's project appears to be a versatile, precise piece of equipment.


However, I am troubled by the grounding. The schematics show the utility ground (green wire in the cord) and the analog ground (one terminal of T-1) connected to the same point. That seems to invite unnecessary ground-loop noise and hum.

Generally, the only reason to connect the utility ground to the box is to protect personnel from an accidental shock if the 120-volt line shorts to the chassis. The power-supply secondary is connected to a ground plane, or to the chassis, to reduce stray capacitive coupling within the circuit by providing lower-impedance capacitive coupling to ground.

On a metal chassis, both grounds are usually the same. Your photographs, however, seem to show a plastic case with a metallic front panel. If the power switch and fuse holder are moved to the back panel, and the leads kept properly short, there is no danger from an electrified case except through the transformer-mounting screws. Those can be connected to the green wire, but kept separate from the analog-circuit ground.

If the project is built in a two- or three-part metal enclosure, and R30 is connected to the front panel as suggested, a noisy output may result from imperfect contact between the painted enclosure parts. That connection is in the ground circuit, bypassed only by the relatively high-impedance wires to the ground jacks.

When a plastic case is used, a



capacitive ground environment can be created by mounting grounded sheet metal on stand-offs immediately adjacent to the circuit board. Better yet, a ground plane can be designed into the circuit board, to be connected to the case and to the utility ground, or not, as the designer chooses

The second problem with the article is that you have edited out almost all of the circuit description, and much of what remains is confusing. Of course, I can puzzle out most of the circuit for myself, and Exar can provide a data sheet for the XR2206, but I have come to expect better from Radio-Electronics. I realize it was a long article; I wish you had opted to spread it out over two issues.

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*The project, with the grounding shown, worked fine. We saw no reason to change the author's design.—Editor*