LUTRON®

For Your Information ...

APPLICATION NOTE #13

Minimizing Radio Frequency Interference

Overview

Solid-state dimmers operate by turning the current on and off 120 times per second to achieve the dimming effect. This rapid current switching may cause radio frequency interference (RFI) — an audible buzzing noise — with sensitive audio and radio equipment. Although every Lutron dimmer contains a filter to suppress RFI, applications with sensitive equipment may require additional filtering. Typical examples of RFI-sensitive equipment are AM radios, stereo sound systems, broadcasting equipment, intercom systems, public address systems and wireless telephones.

RFI can be transmitted in two ways:

- Radiated
- Conducted

Note: *The suggestions in this application note will help minimize RFI; however, they do not guarantee that RFI will be completely eliminated.*

Radiated RFI

All wiring that carries dimmer-controlled current can act as an antenna to radiate RFI into the air waves. Any sensitive equipment that is in close proximity to this wiring can pick up the RFI and generate noise into its system (see Figure 1). Also, this could occur if the wiring for sensitive equipment runs along side the wiring for the dimmer.

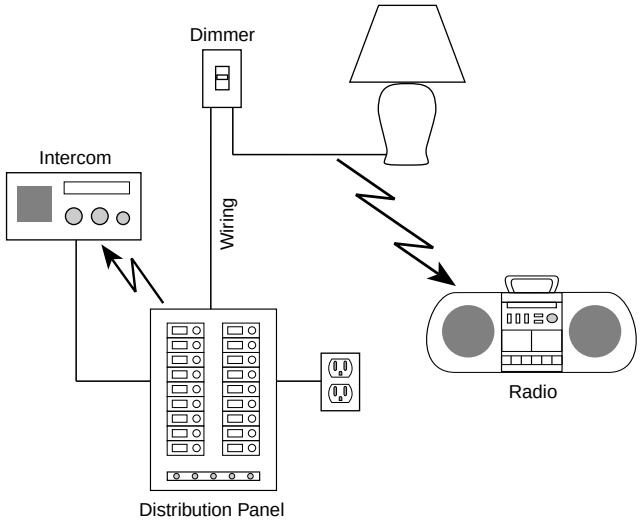

Figure 1: Example of Radiated RFI

The following are three possible ways to minimize radiated RFI:

- Physically separate the RFI-sensitive equipment from the dimmer and its wiring.
- Run dimmer wiring in its own metal conduit.
- Use a lamp debuzzing coil (available from Lutron) to filter the RFI. See reverse side for more details.

Conducted RFI

In some cases, RFI is conducted through the building wiring and directly into the AC power supply of the sensitive equipment (see Figure 2).

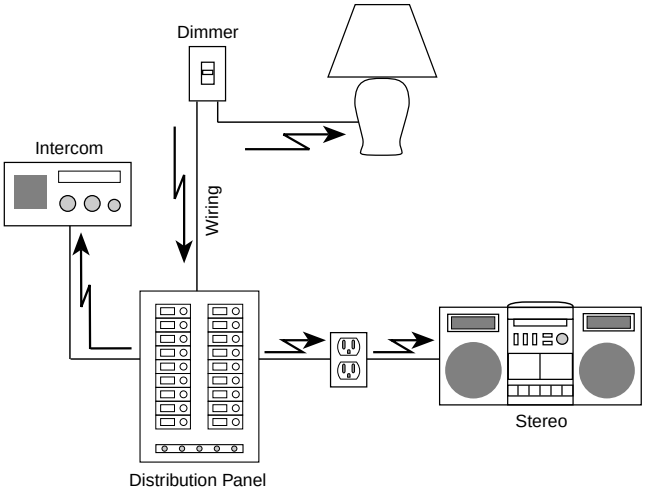

Figure 2: Example of Conducted RFI

To minimize conducted RFI, follow these guidelines:

- Feed sensitive equipment from a circuit without a dimmer on it.
- Add a power-line filter to the sensitive equipment. (Power-line filters may be purchased at most electrical suppliers and distributors.)
- Use shielded wire for all microphones and input cables. Also, use low-impedance balanced microphone cables, because they are less susceptible to interference than high-impedance types.
- Make sure all equipment is grounded. Connect all shields to ground at one point. Ground lighting fixture metal housings properly.
- Use a lamp debuzzing coil (available from Lutron) to filter the RFI (refer to the following section).

Lamp Debuzzing Coils (LDCs)

The most effective way to reduce RFI is to install a lamp debuzzing coil (LDC) into the lighting circuit. Lamp debuzzing coils reduce RFI by slowing down the inrush of current during the rapid switching cycle of the dimmer. As the current inrush is slowed down, the effect is that RFI on sensitive equipment is reduced.

The type of LDC required depends on the total wattage of the dimmer's lighting load. Lutron has two LDC models available to help reduce lamp buzzing. Listed below are the model numbers of the Lutron LDC models and their respective capacities.

Model	Rated Capacity
LDC-10-TCP	600-1200W
LDC-16-TCP	1201-1920W

Note: For loads less than 600W, call the toll-free ***Lutron Technical Assistance Hotline:*** (800) 523-9466.

LDCs may be wired in series with the dimmer on its line side or load side (see Figure 3). For maximum RFI suppression keep the wiring between the LDC and the dimmer as short as possible. Each dimmer requires its own LDC.

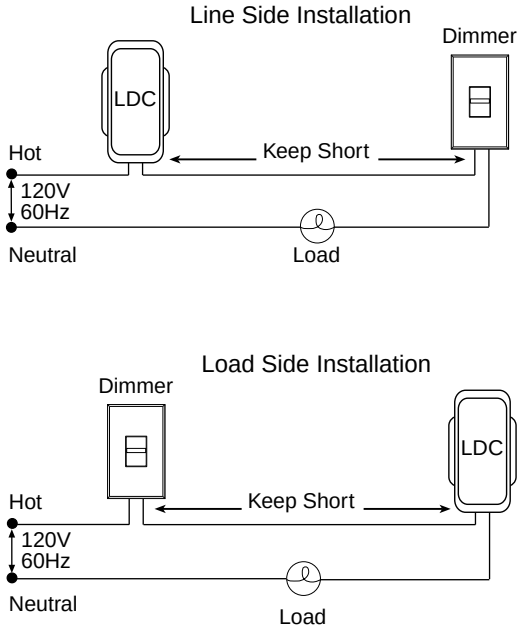

Figure 3: LCD Wiring Diagram

During normal operation, LDCs may make an audible buzz and, therefore, should be mounted in an area where the noise will not be objectionable (e.g., an electrical closet, a basement, or above a drop ceiling). LDCs are designed to easily mount onto a standard 4" x 4" junction box. They are UL listed and thermally protected.

Note: *For further information on LDCs, see our Lamp Debuzzing Coil specification sheet (P/N 360-212).*

Worldwide Technical and Sales Assistance

If you need assistance call the toll-free ***Lutron Technical Assistance Hotline:***

(800) 523-9466 (U.S.A., Canada, and the Caribbean)
Other countries call (610) 282-3800

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