

SAFETY AWARENESS -- OBJECTIVES

1. Provide an awareness of the potential electrical hazards found in radios and test equipment equipment.
2. Instill applicable safety principles, acceptable work practices and engineered controls.
3. Outline proper response to an incident.
4. Be aware of preventative measures.

HAZARD THRESHOLD FOR ELECTRIC CURRENT THROUGH THE BODY

- Voltage greater than 50 volts, current greater than 5 mA presents a significant hazard
 - Let-go threshold is 9 to 16 mA
 - Invasive current exceeds the body's ability to control voluntary and autonomic processes
 - Victim may need help to free themselves.
 - 30 mA and above is possibly FATAL
 - Respiratory paralysis
 - Heart fibrillation
 - Internal burns
 - Indirect reactions
 - Falls, burns, explosions

RESPONSE TO ELECTRICAL SHOCK

- Do not touch the victim if they are still in contact with the electrical energy source
- Disconnect the source of electricity
- Use a non-conductive object to separate the victim from the contact point
- If not breathing, initiate CPR
- Call 911

AFTER AN ELECTRICAL SHOCK

- Anyone receiving an electrical shock should get medical attention
 - Delayed effects persist over a 24 to 72 hour period.
 - Stop any bleeding.
- Reconstruct what happened
 - Remedy the immediate situation.
 - Institute long-term corrective actions.
 - Notify CHRS staff of the incident and remediation.

AC-Powered Radios

- They use a power transformer
- A shorted line bypass cap or power transformer may make chassis “live”
- B+ may be several hundred volts
 - Dangerous to life
 - Significant stored energy in filter caps

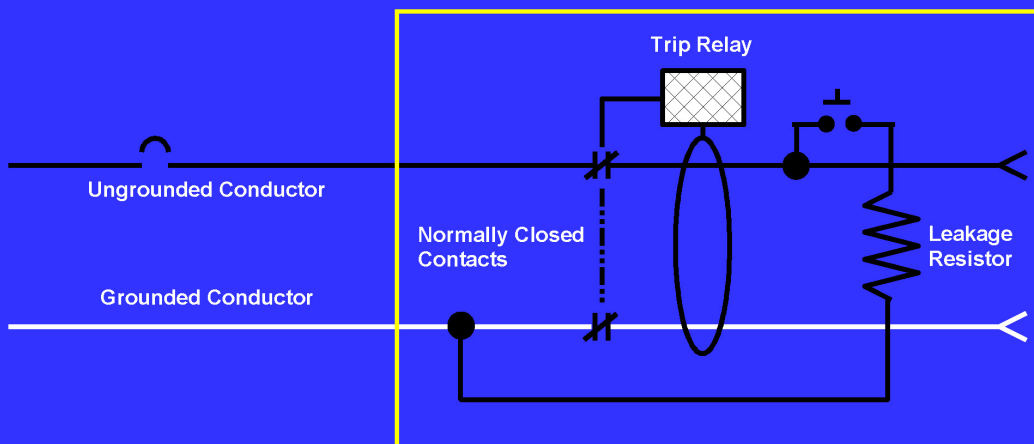
AC-DC Radios

- These radios do not have a power transformer
- The AC plugs are usually unpolarized
- The chassis may be “hot”
- Series-filament configuration
 - One open heater, no tube lights
 - No indication that the radio is powered
- Must an isolation transformer

GROUNDING AND ISOLATION

- AC/DC sets particularly dangerous
 - Circuit ground connected to one side of line
 - AC plug probably non-polarized
- Isolation transformers must be used
 - Variacs usually do not contain an isolation transformer
 - Ground-Fault Current Interrupters also save lives
- AC sets may have shorted line bypass capacitor or faulty power transformer
 - Ground the chassis of an AC set.
 - Use a GFCI outlet.

HOW GFCI's WORK

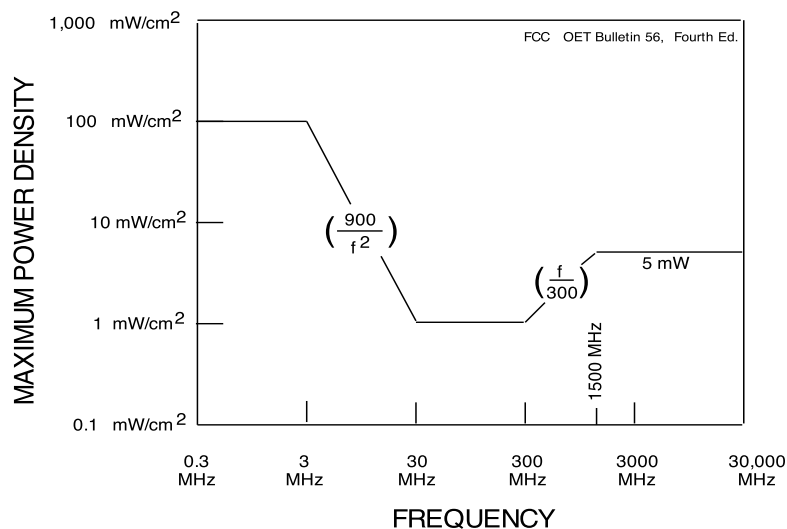


STORED ELECTRICAL ENERGY

- Capacitors and inductors can store energy
 - Discharge power supply filter capacitors
 - Use a small-value power resistor known to be good
 - Don't do it with a screwdriver
- Discharge HV capacitors on TV sets
 - The CRT forms a capacitor between the inner and outer aquadag coating.
 - A charged CRT may cause you to drop it.
- An inductor that has current flowing through it will generate a dangerous voltage pulse if suddenly disconnected.

RADIO-FREQUENCY ENERGY

- RF is non-ionizing, but heats the skin and may cause cataract.



YOUR CHECKLIST

- Are you wide awake, willing and able?
- Have you removed jewelry, necklaces or other items that may be dangerous around electrical equipment?
- Is the working environment safe?
- Do you have a partner to help?
- Do you know where the first aid kit is?
- Do you know the rules of lifting heavy objects? e.g. bend at the knees.

Quiz

- Should you be working alone?
- Why use an isolation transformer?
- What is the highest “safe” voltage, current?
- Can inductors give a shock?
- What should you do if you co-worker suddenly is receiving a shock and can't pull away?
- What is the emergency telephone number?
- Where is the first aid kit?