

Station Grounding and Lightening Protection

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Lightning Can Hit Anywhere!

- “Only God Can Hit a One Iron”
(Lee Trevino – after recovering from a lightning strike during the Western Open golf tournament near Chicago in the ‘80s)

Big Picture Ground System

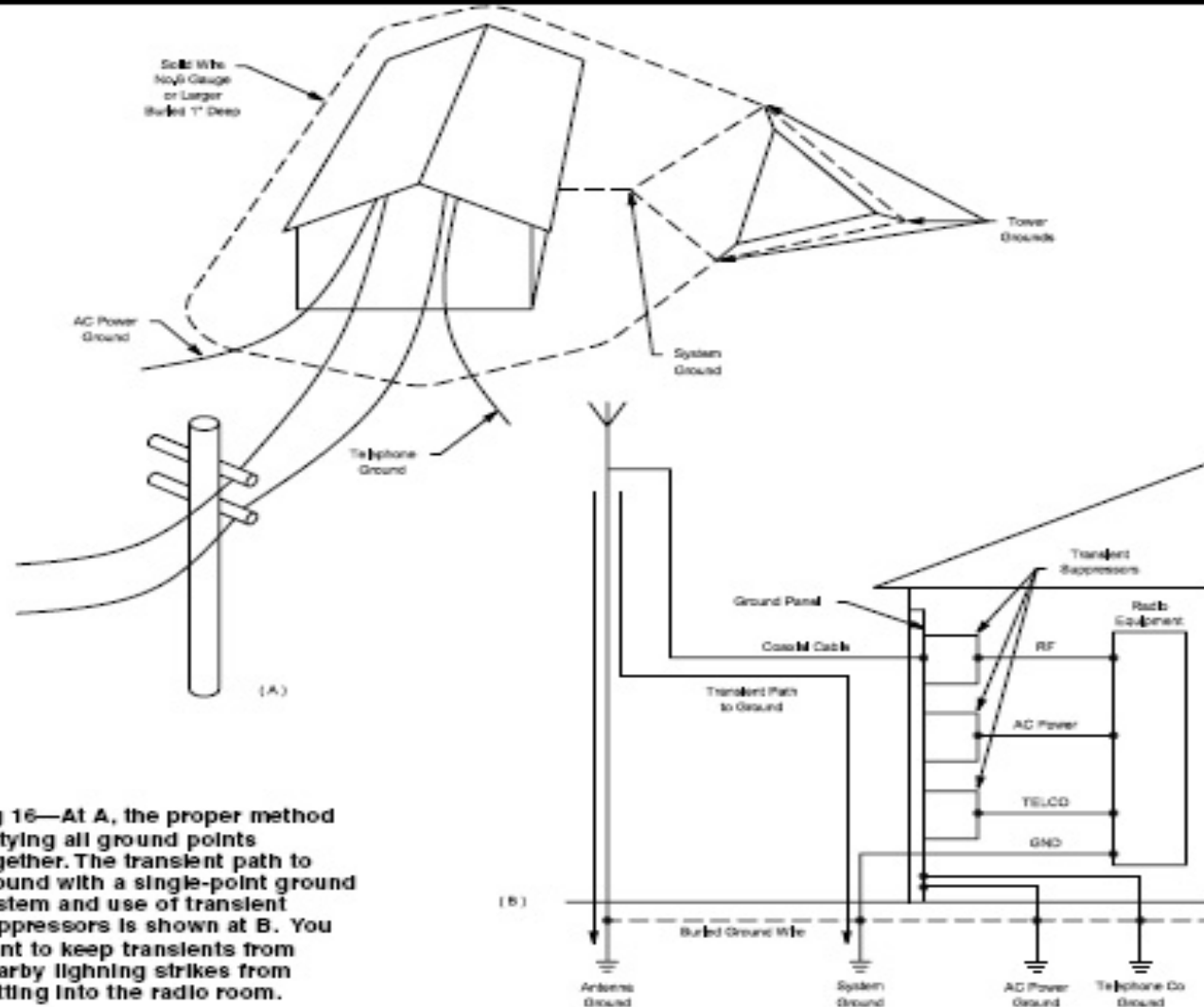
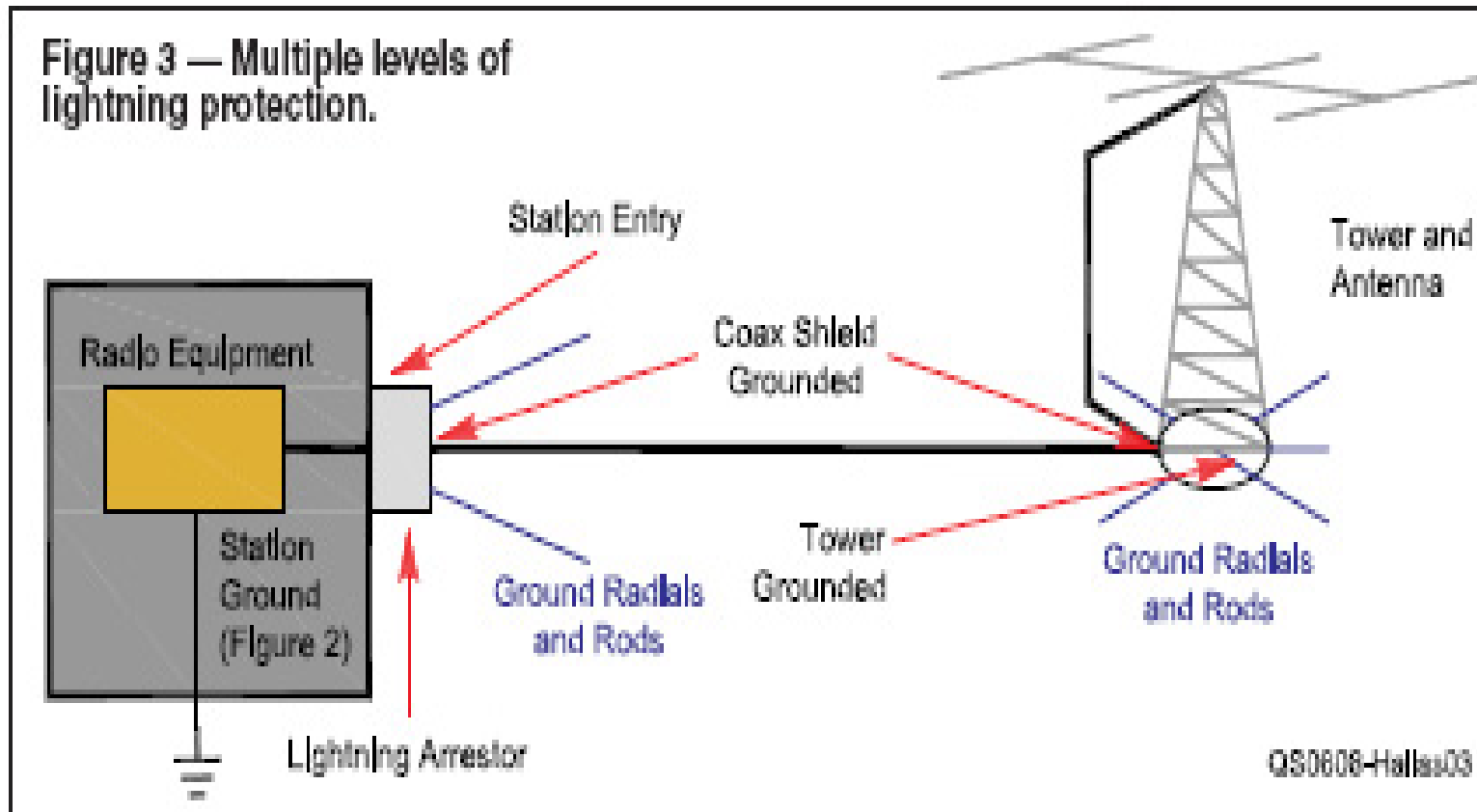


Fig 16—At A, the proper method of tying all ground points together. The transient path to ground with a single-point ground system and use of transient suppressors is shown at B. You want to keep transients from nearby lightning strikes from getting into the radio room.

Multi Levels of Protection



Grounding Aerial View

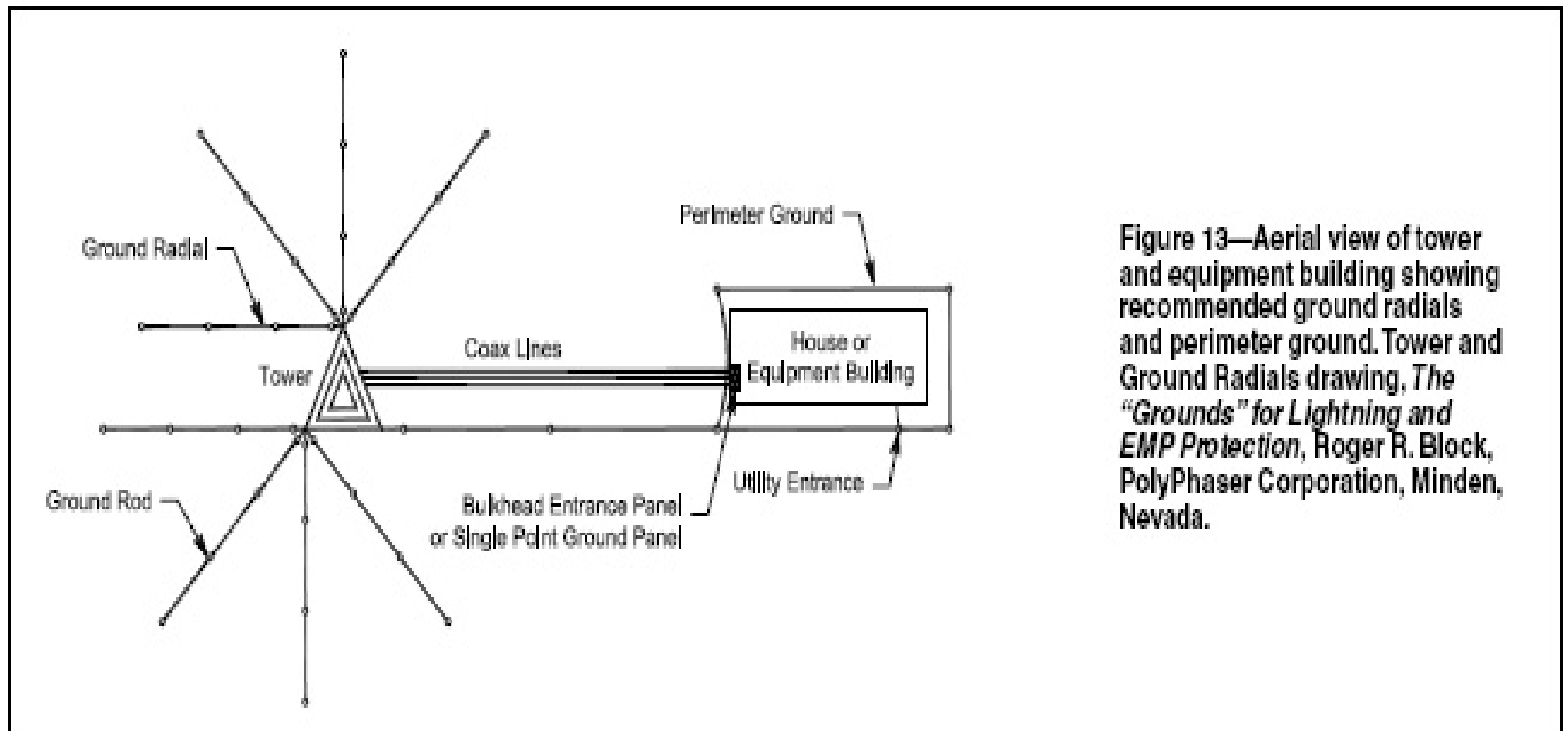


Figure 13—Aerial view of tower and equipment building showing recommended ground radials and perimeter ground. Tower and Ground Radials drawing, *The "Grounds" for Lightning and EMP Protection*, Roger R. Block, PolyPhaser Corporation, Minden, Nevada.

COAX Grounding

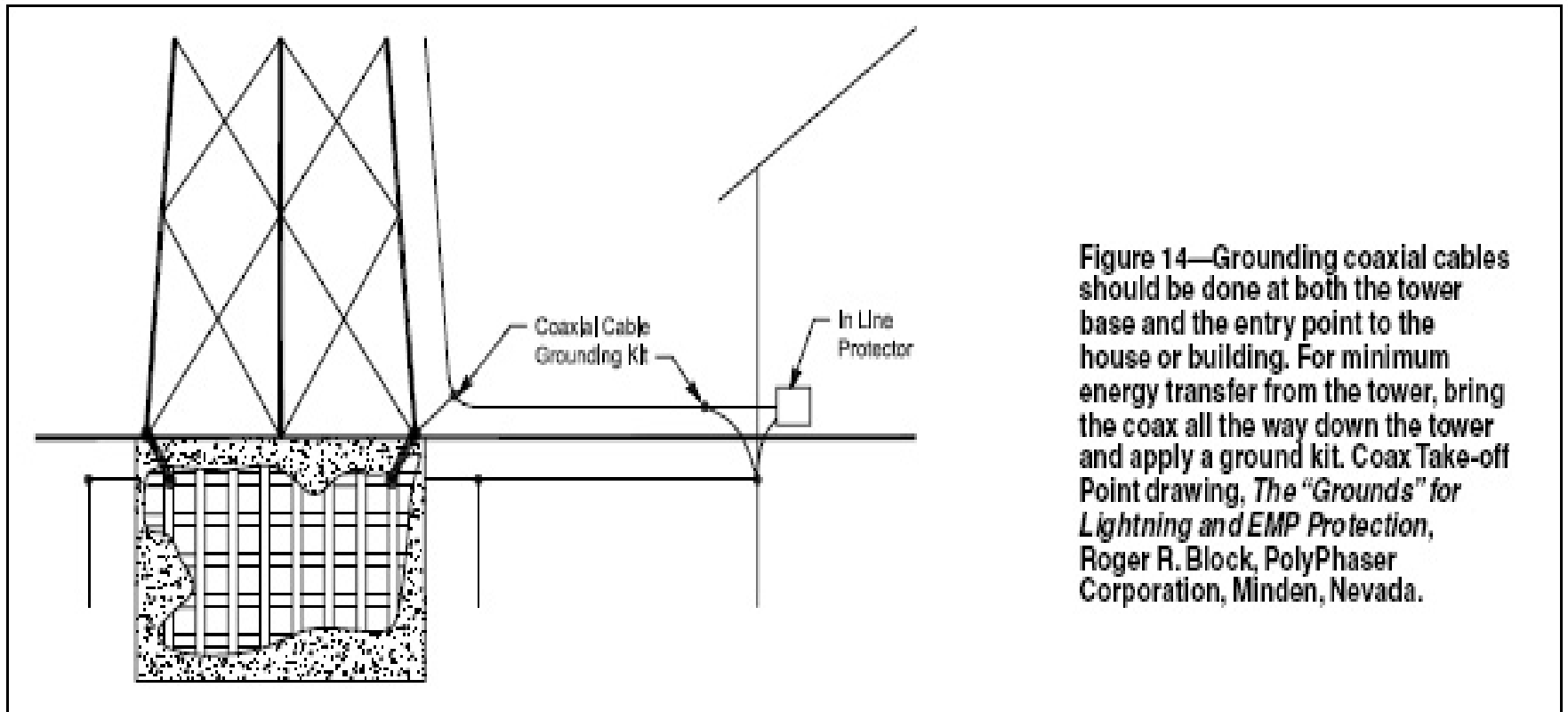


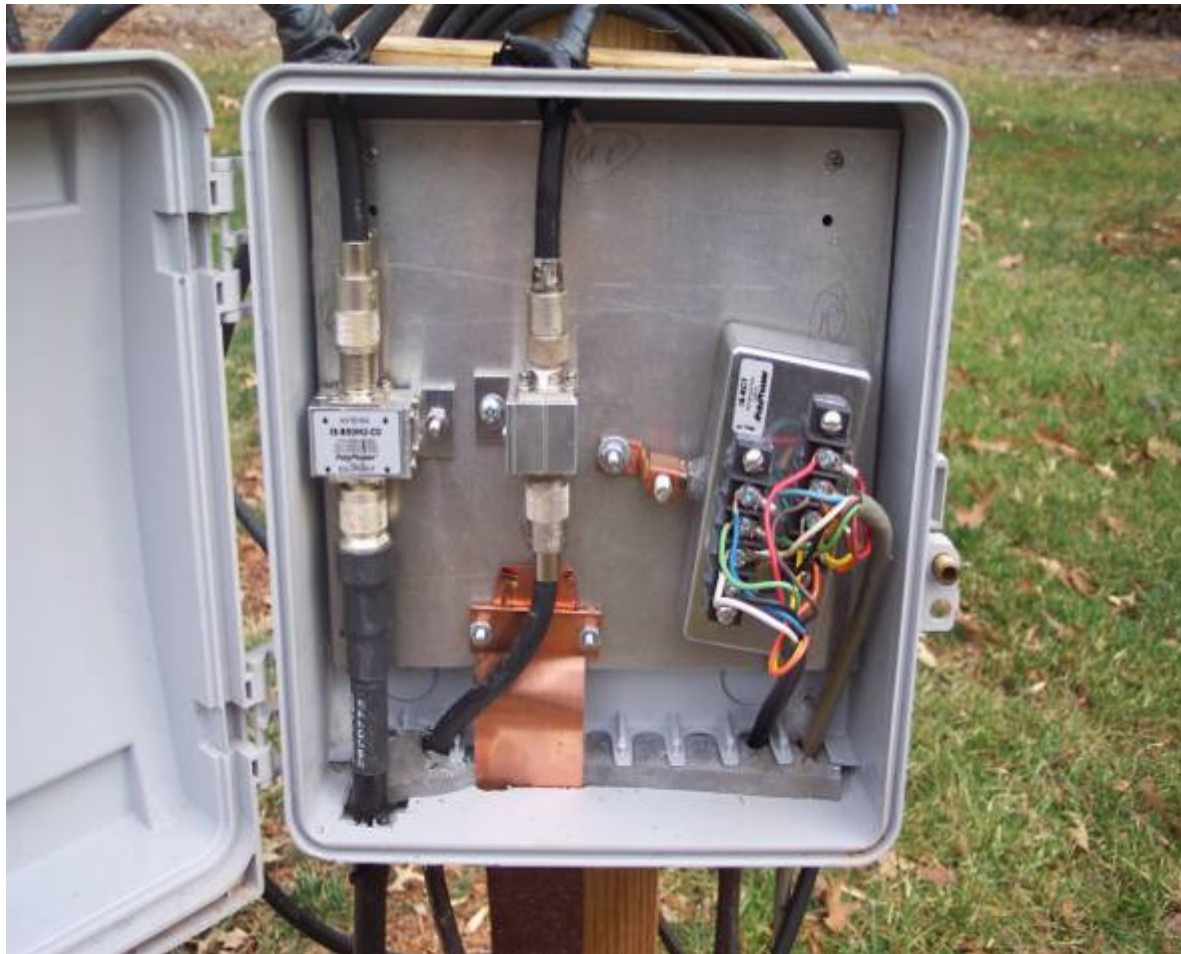
Figure 14—Grounding coaxial cables should be done at both the tower base and the entry point to the house or building. For minimum energy transfer from the tower, bring the coax all the way down the tower and apply a ground kit. Coax Take-off Point drawing, *The "Grounds" for Lightning and EMP Protection*, Roger R. Block, PolyPhaser Corporation, Minden, Nevada.

K9MBQ Tower Base Ground

- 50 ft #4 wire radial each leg; 3-8 ft ground rods each spaced @ 16ft



Coax & Rotor Cable Shunts

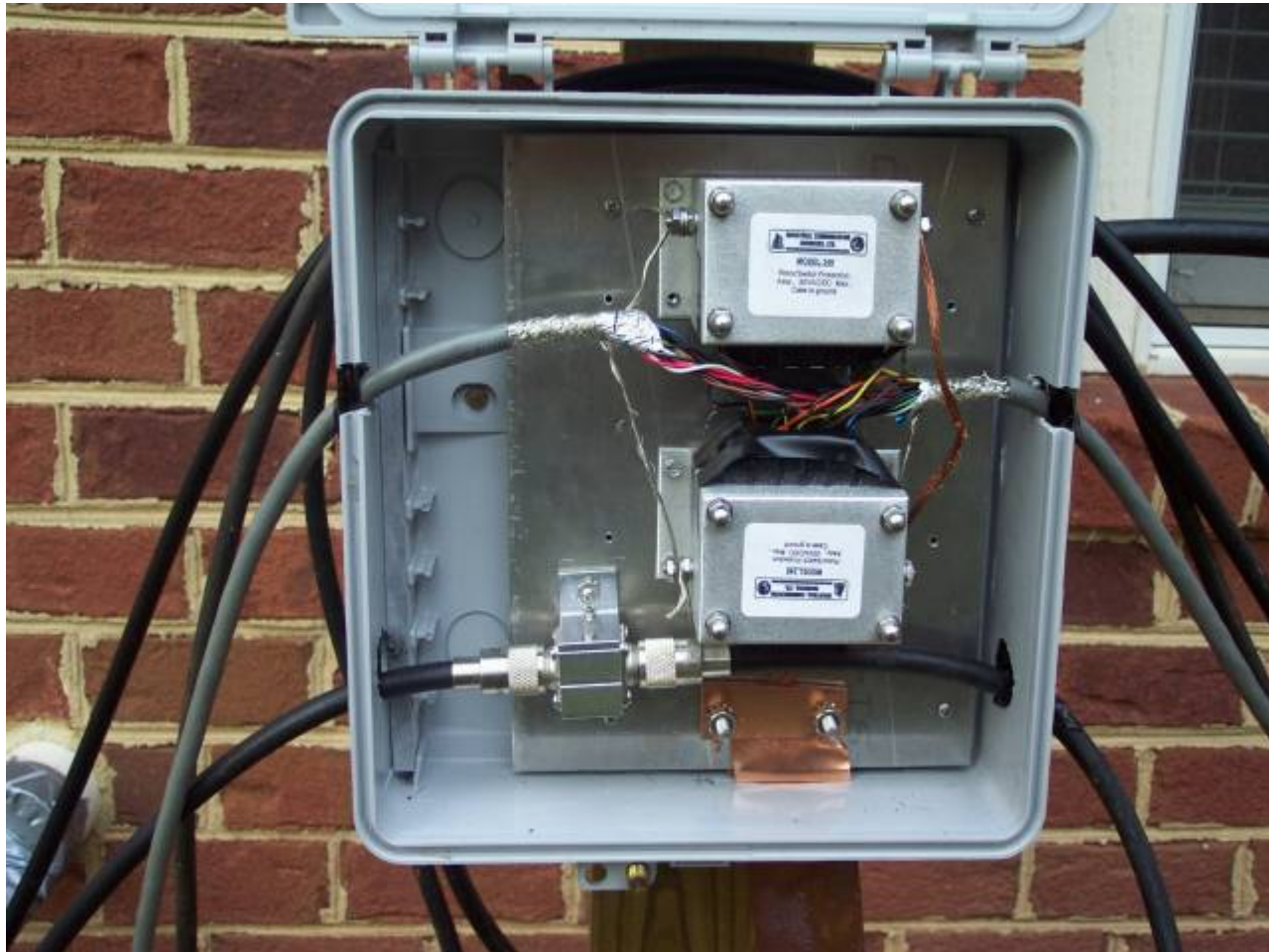


Shack Outside Ground System

- 3-50ft #4 Radials w/ 3-8ft Ground rods each
- Tower, A/C, and Shack grounds interconnected w/ 3 in copper Strap – 8 ft Rods every 16ft.



Coax and STEPP-IR Control Line Shunts



I/O Circuit Ideal Ground Approach

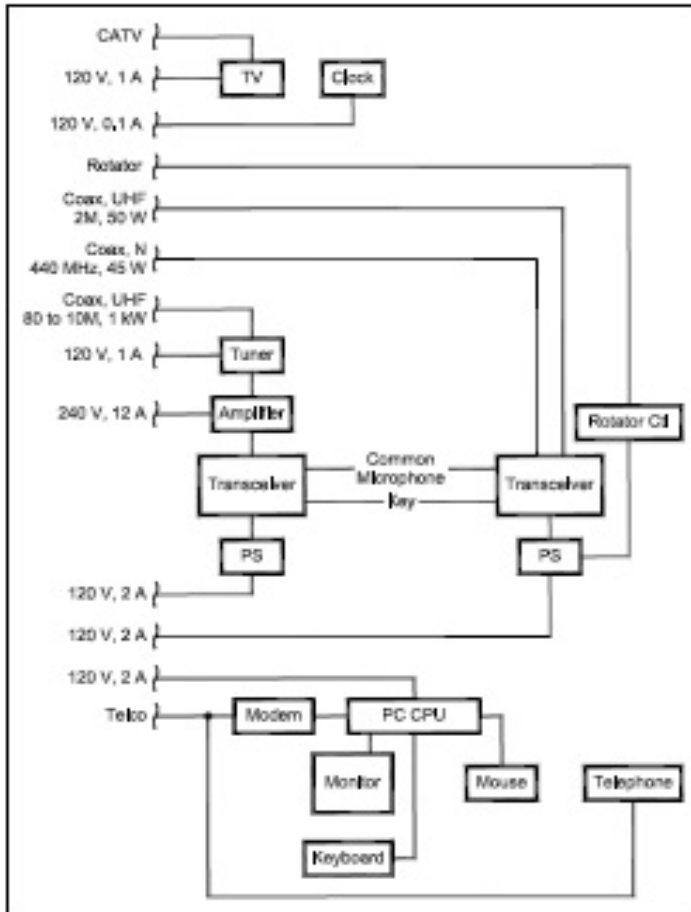


Figure 5—Block diagram of a typical more-complex radio station.

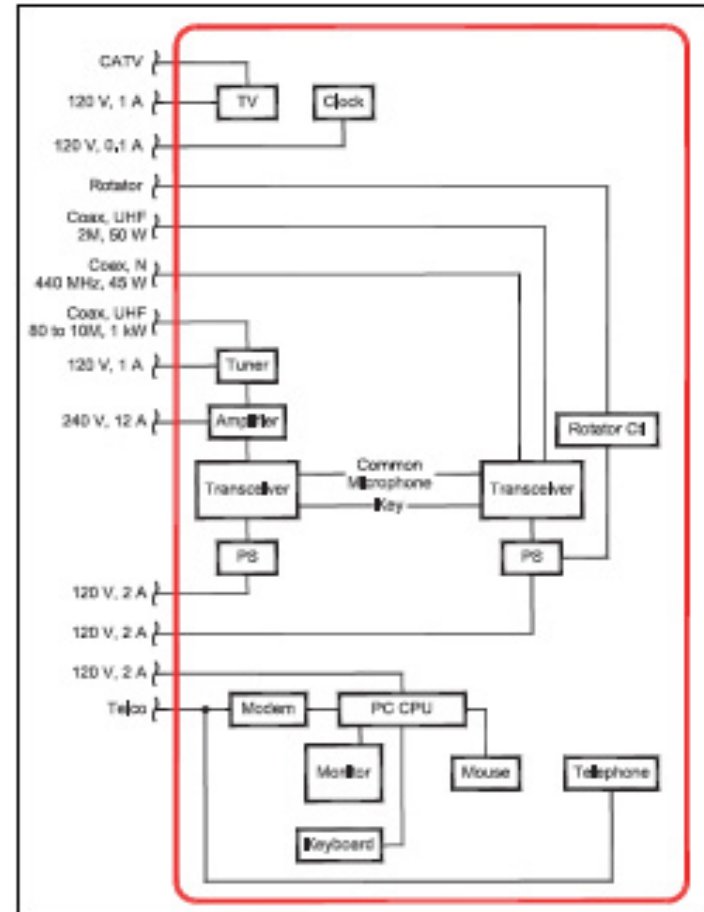


Figure 6—Lines that penetrate the circle are the radio station I/O circuits that must be protected.

In-Shack Grounds

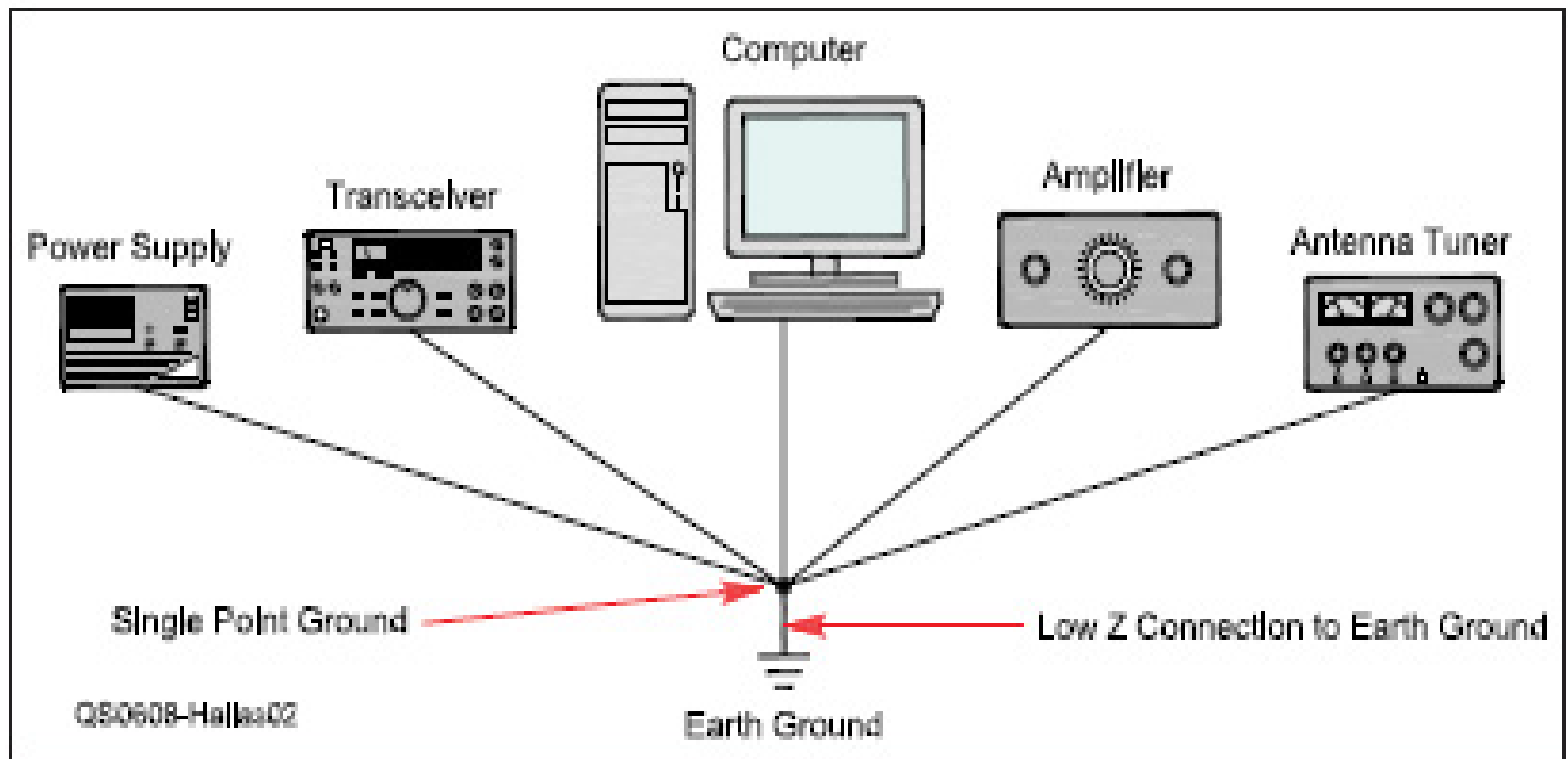


Figure 2 — A properly connected station ground arrangement.

Single Point Ground Connection

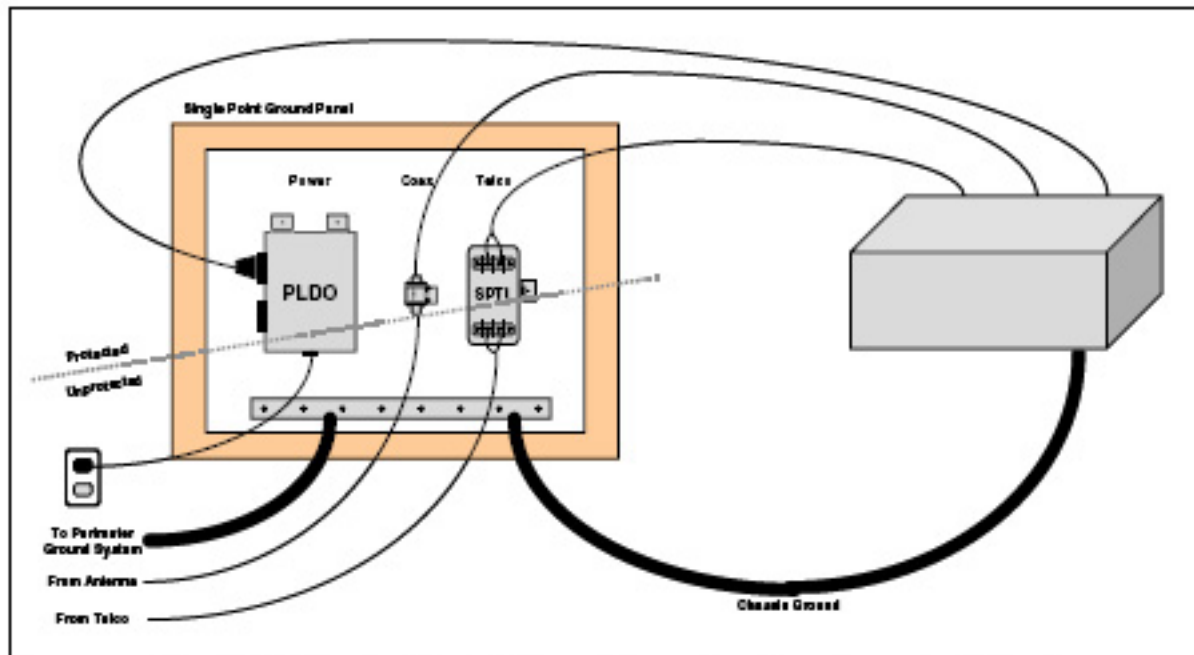


Figure 12—The SPGP showing the division of the protected and unprotected cables.

Single Point Ground Panel



Figure 11—A typical single-point ground panel.

Single Ground Connection - Example



Commercial Shunts



Figure 8—An in-line ac power protector.



Figure 7—Typical coax protectors, the PolyPhaser IS-50UX and IS-B50LU.

Other Commercial Shunts

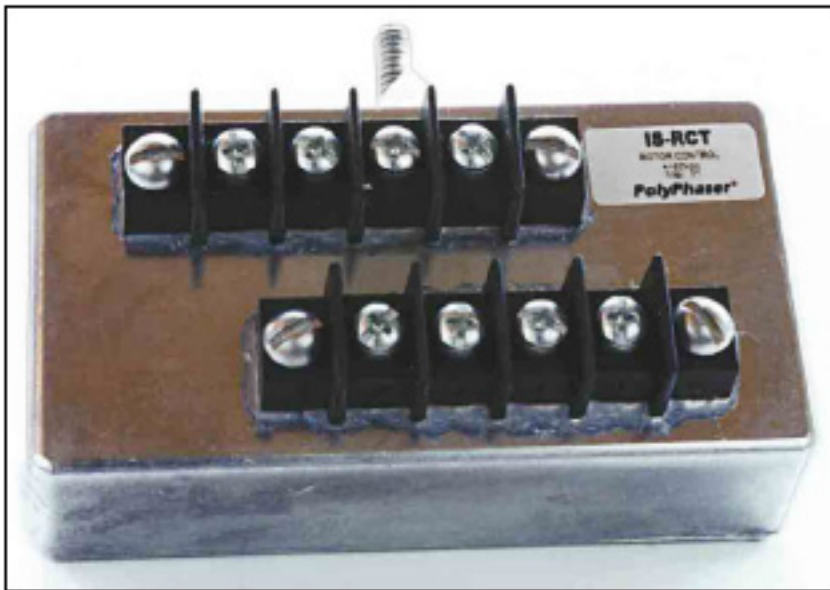


Figure 10—This shunt-type device is capable of protecting up to eight circuit lines with an operating voltage of up to 82 V dc.

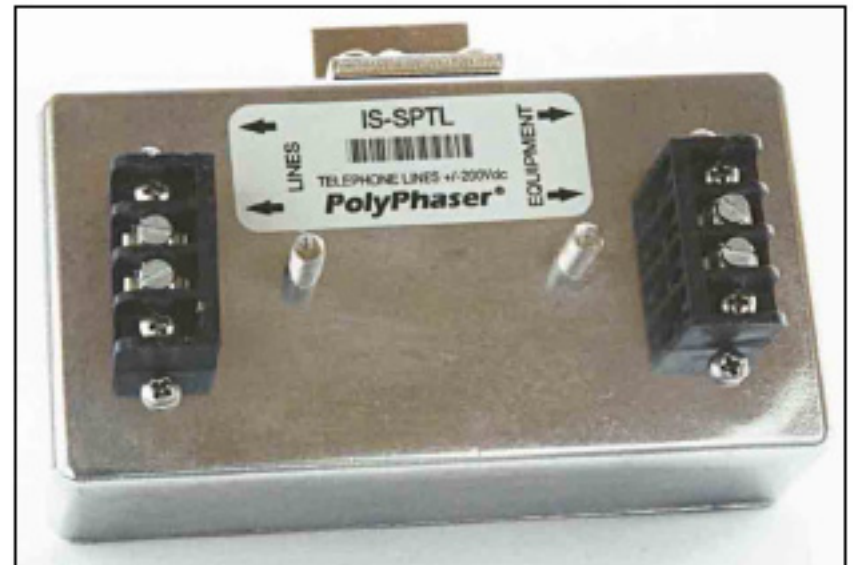


Figure 9—A telephone line protector.

Final Thoughts

- Grounding and Lightning Protection are Prudent Investments!
- Provides Safety and Better RF Ground for Station
- More Difficult for Non-Ground Floor Stations
- Suppliers Readily Available

Grounding/Lightning Protection References

- QST June 2002 - Part 1 : Lightning Protection for the Amateur Station
- QST July 2002 - Part 2
- QST August 2002 – Part 3
- QST Aug 2006 (pg 48) – A Down to Earth View of Station Grounds
- DX Engineering White Paper – Selecting and Installing Lightning Protection Devices ... free on DX Eng web site – DXEngineering.com