UNIT-2

Microwave Engineering

Faraday Rotation

•The electrons in the ionosphere along with the Earth's magnetic field cause a rotation in the plane . which creates a cross-polarized component with linear polarization and a loss of circular polarization.

•When no faraday rotation is present

• The received power is proportional to E 2 O

• A faraday rotation of some degrees will result in the copolarized component of the received signal being reduced to Eco = E cos__

•Faraday rotation controlled varies by one order of magnitude between day and night as solar illumination exerts a major control on the level of ionospheric activity.

• Faraday rotation can be minimized by employing circular polarization, and in fact, some satellite communication systems use circular polarization to avoid the problem.

Microwave Isolators and Circulators:

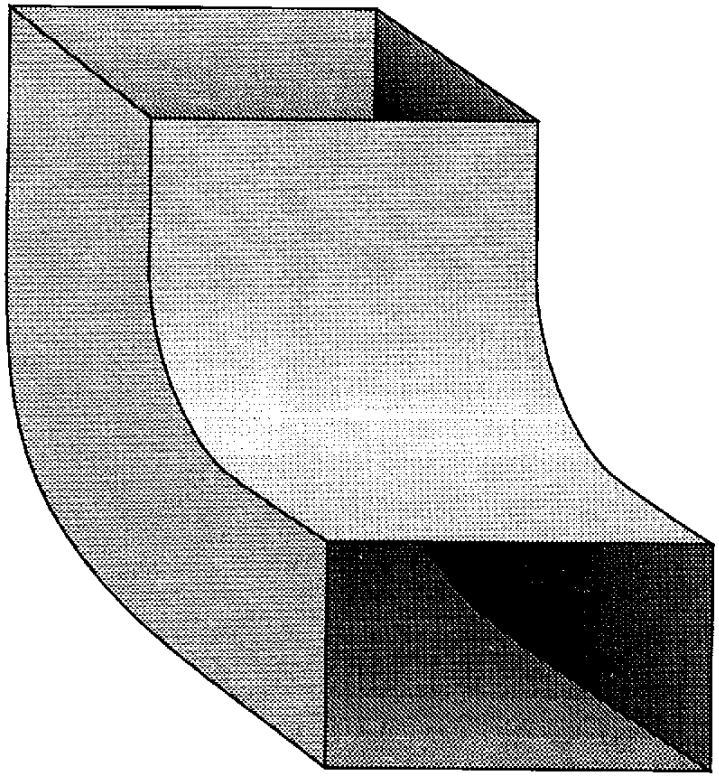
Directional Coupler

- Launches or receives power in only 1 direction
- Used to split some of power into a second guide
- Can use probes or holes

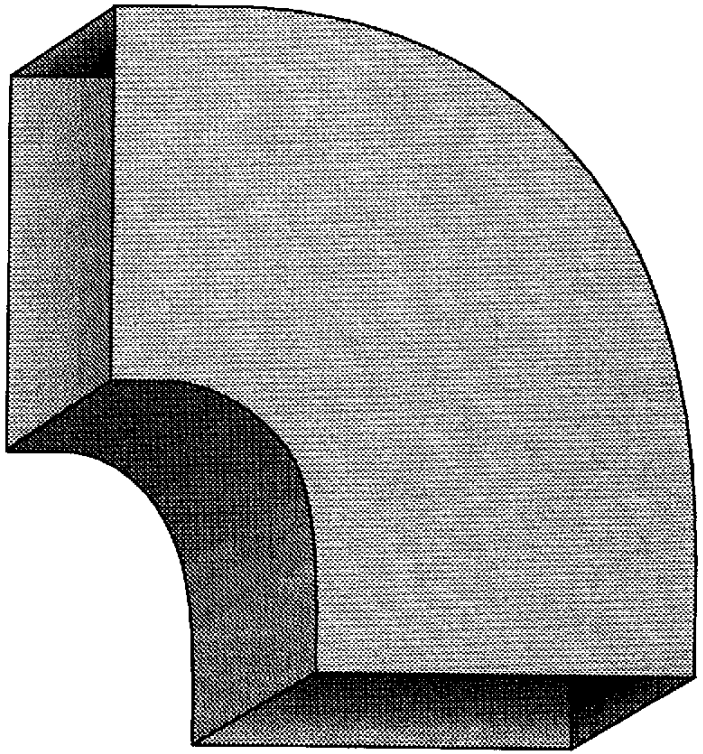
Passive Compenents

- Bends
  - Called E-plane or H-Plane bends depending on the direction of bending
- Tees
  - Also have E and H-plane varieties
  - Hybrid or magic tee combines both and can be used for isolation

Waveguide Bends



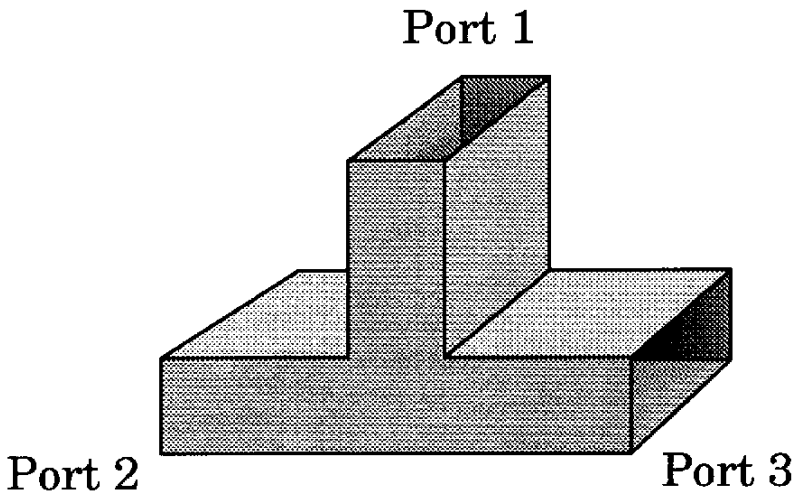
(a) E–Plane Bend



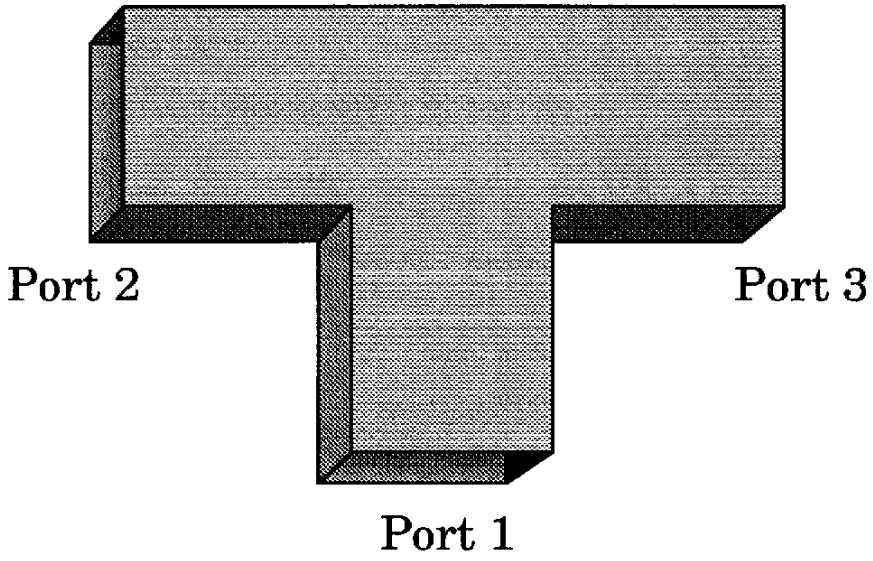
(b) H–Plane Bend

Transparency 258 (Figure 19.14)

Waveguide Tees

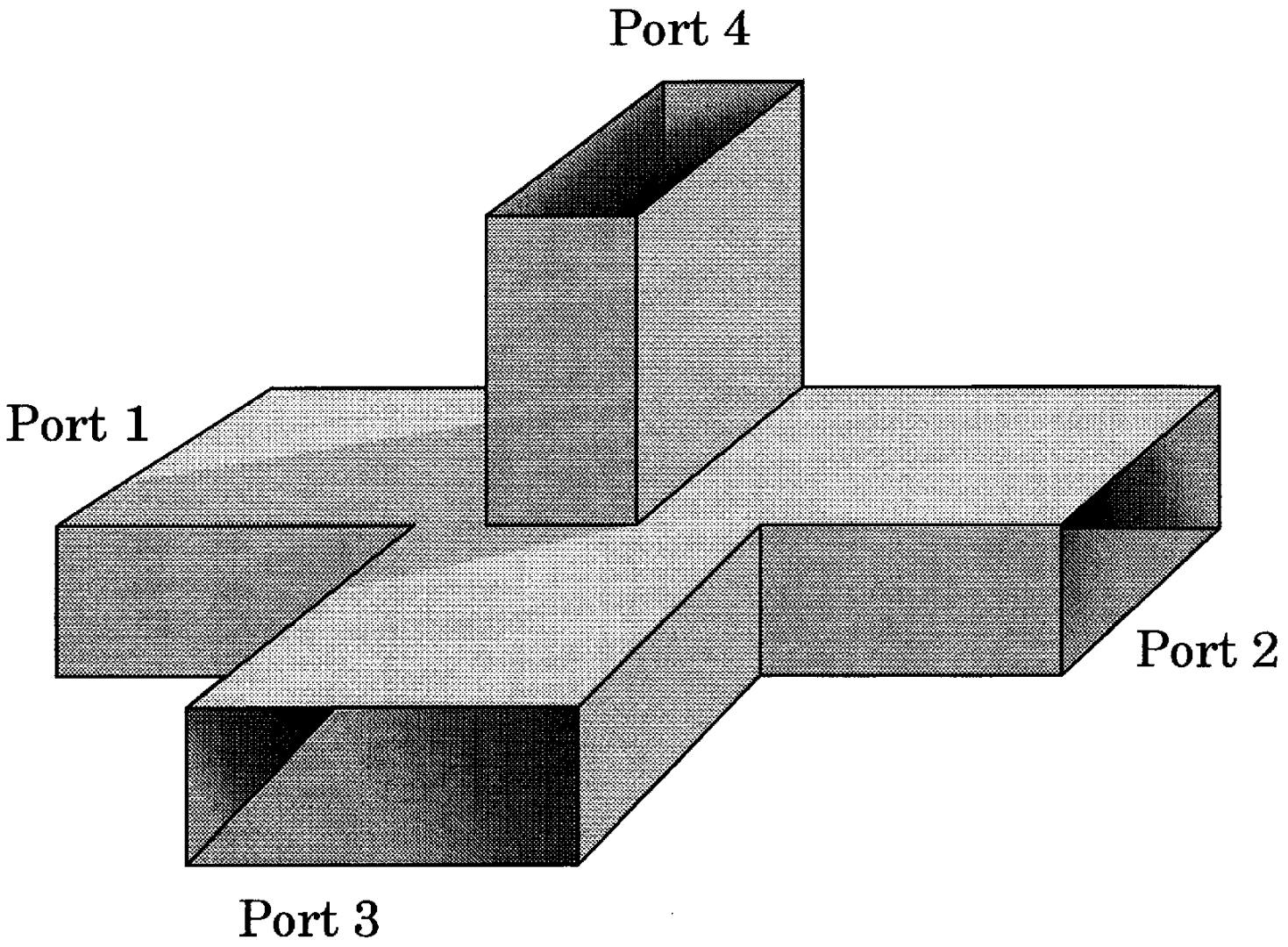


(a) E–Plane Tee



(b) H–Plane Tee

Hybrid Tee



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