

(a)

### Conducted and Radiated EMI Sources

- produce the other source of EMI in another portion of board:  
  { complicated coupling }

Noise Source:-

- Amplified Noise
- Spurious harmonics
- Switching noise
- power bus ringing
- unideal clocks
- other induced/coupled signal that originates from radiated EMI.

Sources of radiated EMI.

- cavity resonances in board
- Standing waves on unterminated transmission lines
- Other source of conducted EMI that induces signal in radiating element / cavity.

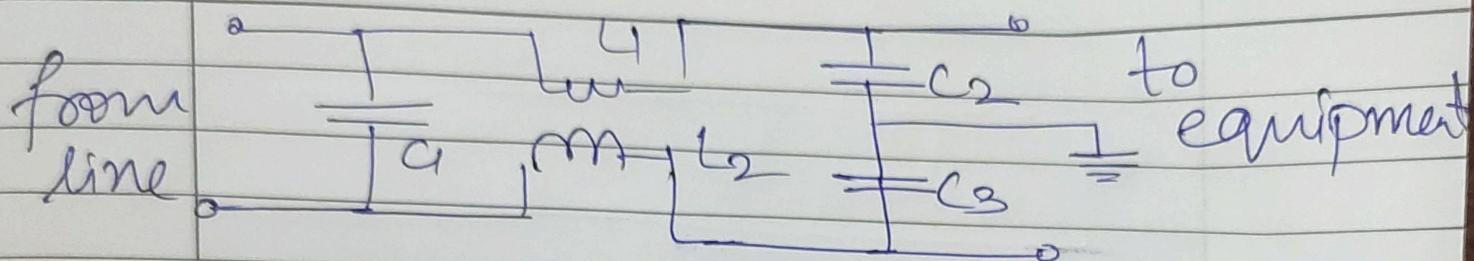
(b) ~~#~~ Digital part is very noisy. During switching, digital comp. draws large, fast current spikes from its supply. These have high noise immunity.

~~#~~ Analog part is very vulnerable to noise

So if we keep their digital and analog ground same, there will be high probability that noise from digital circuit affects analog circuit, so it becomes a mixed signal.

This issue with keeping analog and digital ground same and hence it is essential to separate analog from digital circuitry.

(c)



Coupling paths:-

- common ground impedance
- common mode, radiated field to cable
- differential mode , " "
- cross talk
- conductive path via power line.

To Avoid EMI

- Use shield over cables
- Application of filters for any interference
- conventional grounding of PCB and cabinet
- Sustaining separation bet<sup>n</sup> cables of different signal levels .
- Prevent victim equipment from receiving undesired radiation .

EMI causes adverse effect on instrumentation signals.

Sources of EMI:-

- Variable freq drives
- Soft Start motor starters
- SCR heater controller
- Power contacts.
- AC/DC motor
- AC/DC generator.

To Avoid EMI; 3 basic elements causing EMI noise;

- receiving device that gets affected.
- coupling channel b/w source & receiver.