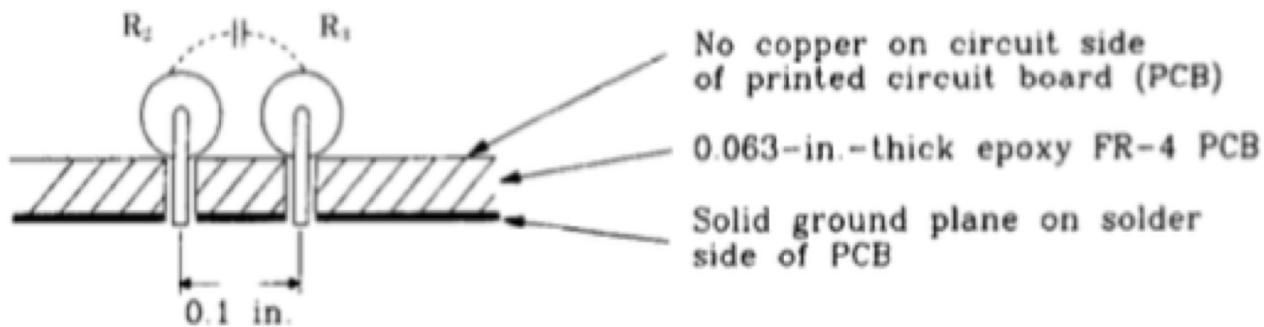


Crosstalk

- What is Crosstalk? – Why should we care? 1/2min
- How to calculate mutual capacitance? 1min
- How to calculate mutual inductance? 1min
- Ground planes – Lumped & Distributed 1min
- NEXT & FEXT 1min
- NEXT becoming FEXT problem 1/2min

Capacitance

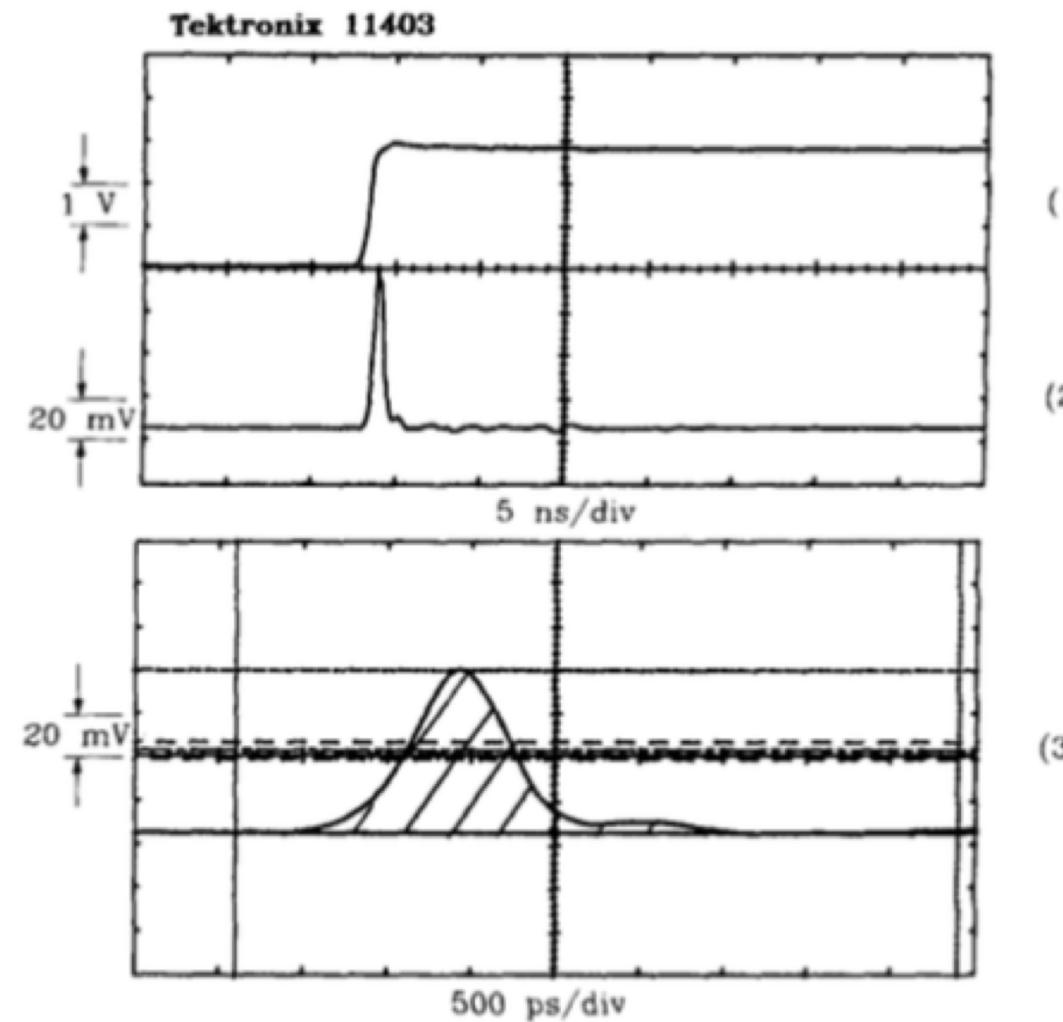


$$C_M = \frac{\text{area}}{R_B \Delta V} = \frac{56.48 \text{ pV-s}}{(50 \Omega)(2.7 \text{ V/div})} 0.4 \text{ pF}$$

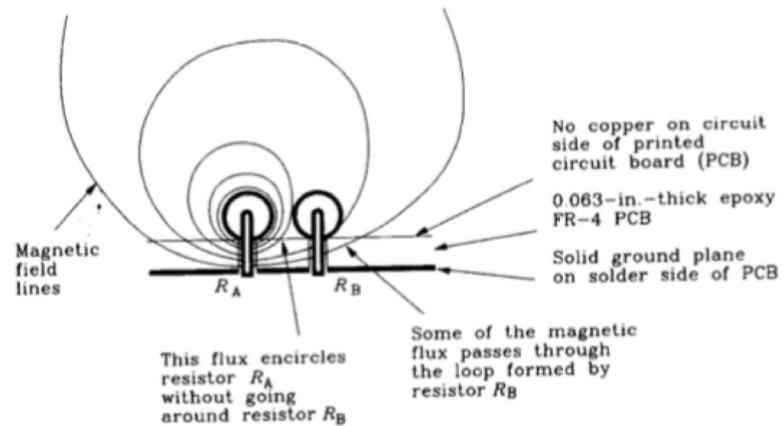
$$I_M = C_M \frac{\Delta V}{T_r}$$

$$\text{Crosstalk} = \frac{R_B I_M}{\Delta V} = \frac{R_B C_M}{T_r}$$

$$\text{Crosstalk} = \frac{R_B C_M}{T_r} = \frac{(50)(0.4) \text{ pF}}{800 \text{ ps}} = 0.025$$



Inductance



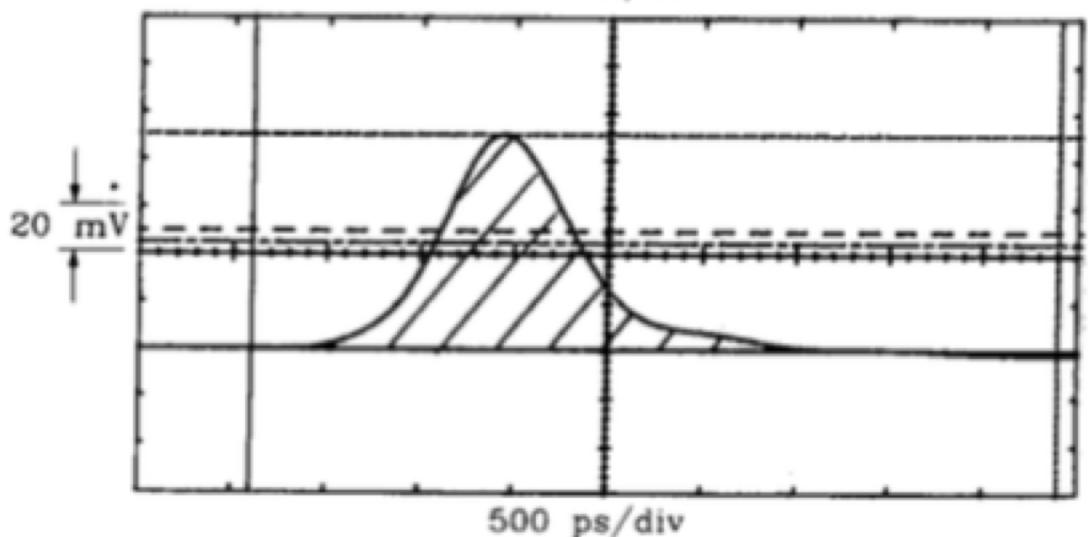
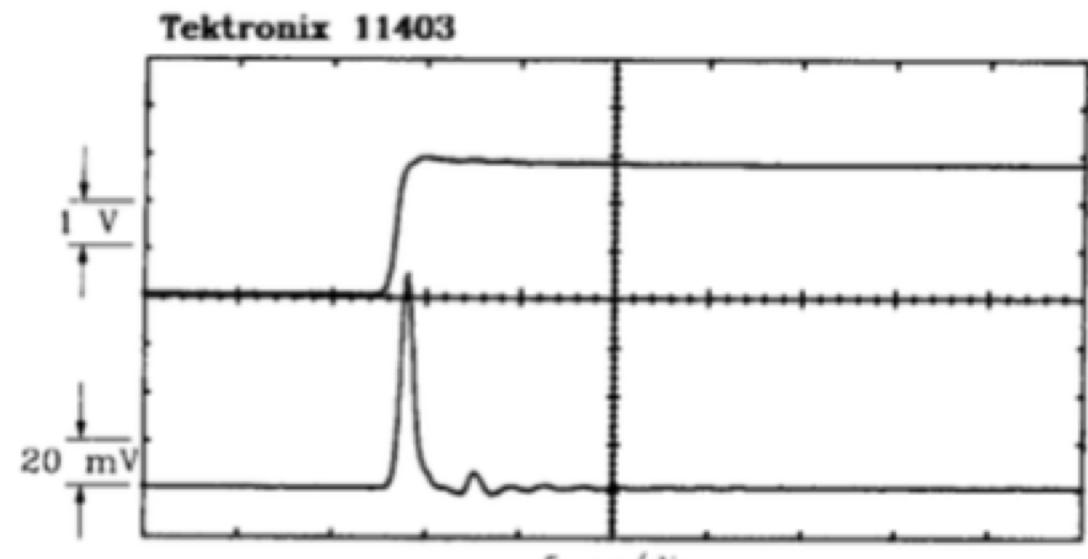
$$L_M = \frac{(\text{area})(2R_A)}{\Delta V} \approx 3.0 \text{ nH}$$

where area = 80 pVs (from Fig. 1.22)
 $\Delta V = 2.7 \text{ V}$ (from Fig. 1.22)
 $R_A = 50 \Omega$ (from Fig. 1.20)

$$Y = L_M \frac{\Delta V}{R_A T_r}$$

$$\text{Crosstalk} = \frac{L_M}{R_A T_r}$$

$$\text{Crosstalk}_{\text{induc}} = \frac{L_M}{2R_A T_r} = 0.032$$

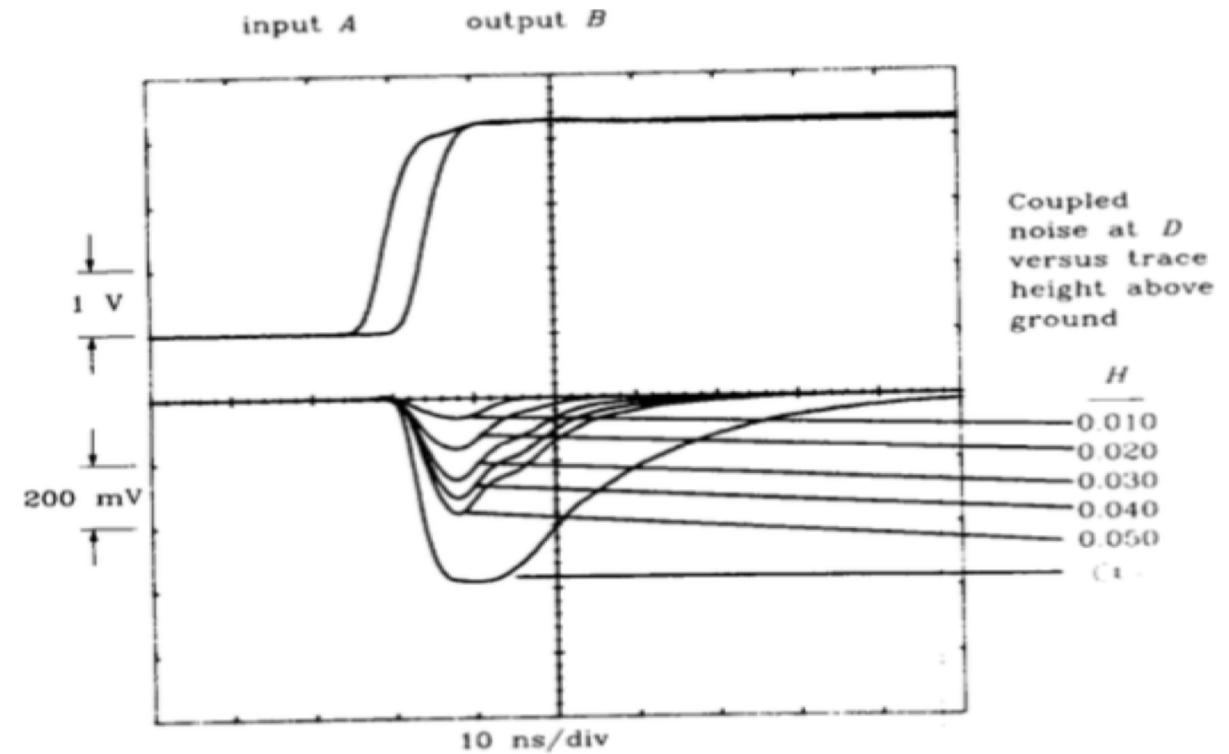
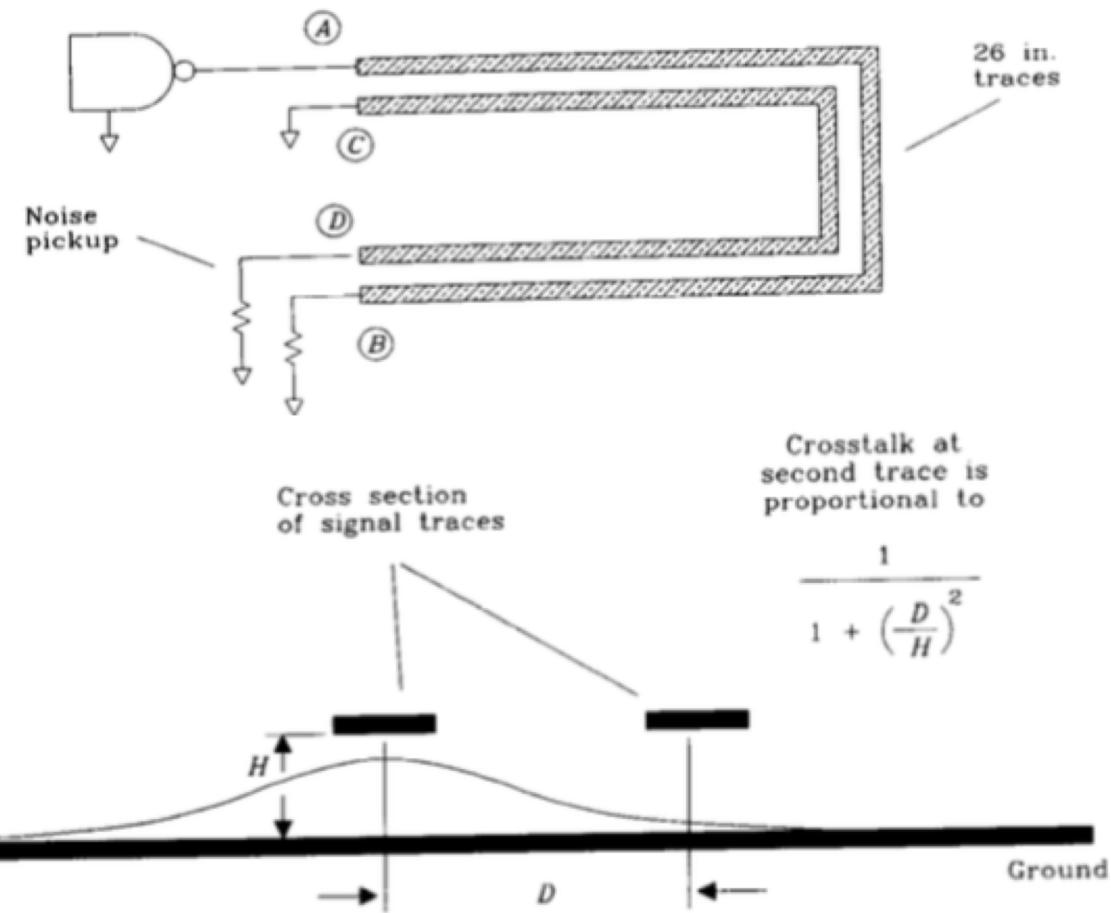


(1)

(2)

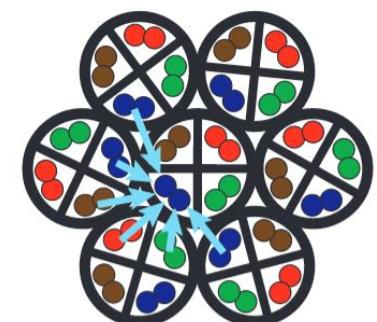
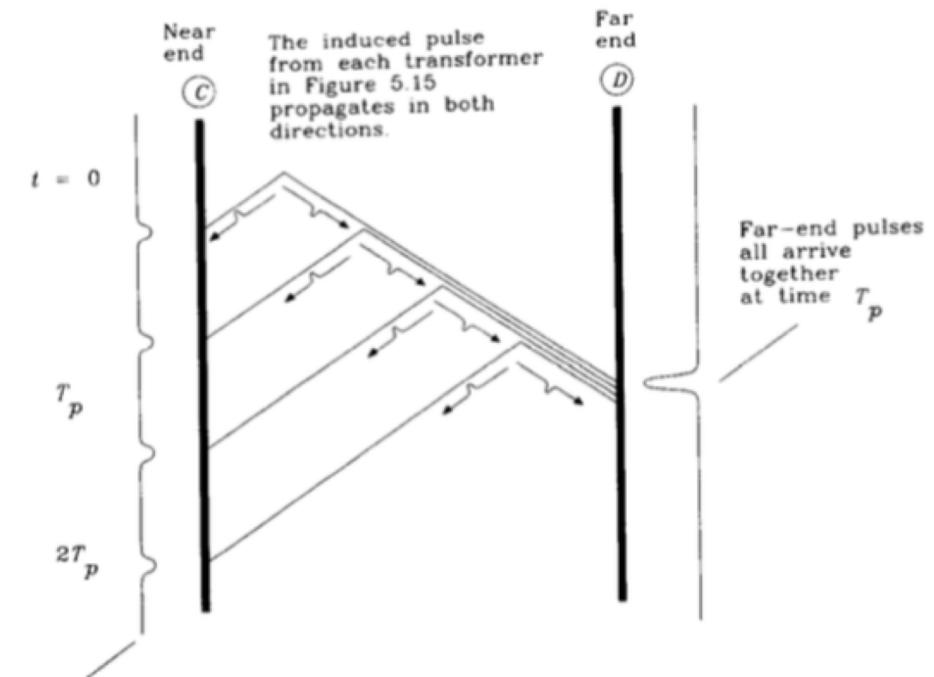
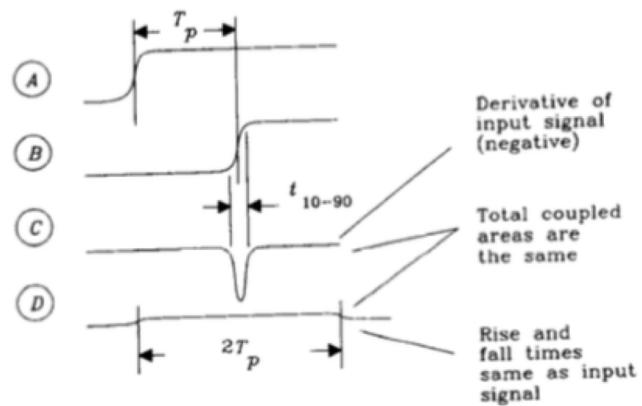
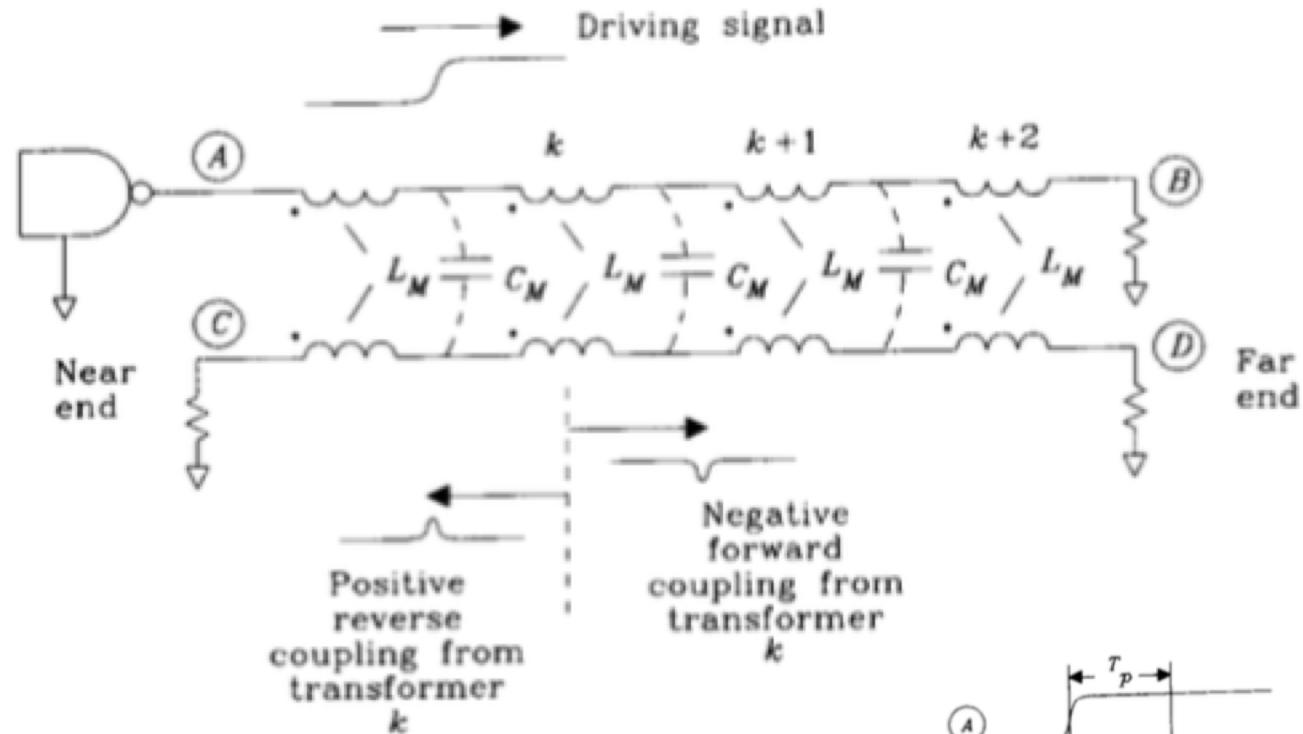
(3)

Ground planes – Lumped



$$\text{Crosstalk} = \frac{K}{1 + (D/H)^2}$$

NEXT & FEXT - Distributed



NEXT becoming FEXT problem

