A transmission line is formed by two identical parallel tracks in a printed circuit board as shown in the attached jpeg. The line has a length of 50mm and all terminations are of 70Ω. The line can be assumed to be lossless.

1. Use equations 1 and 2 to calculate the magnitude of the NEXT and FEXT voltages generated in the victim conductor when the source voltage, Vin, in the aggressor conductor is a step voltage of 2V with a rise time of 100ps.
2. Sketch the NEXT and FEXT waveforms.

The following two equations are for a lossless line:

Zo = This is the formula for characteristic impedance. L= Line inductance (400nH per m). C=Line capacitance (80pF per m).

Vp = This is the formula for the velocity of propagation. L= Line inductance (400nH per m). C=Line capacitance (80pF per m).

Vs = Vin This is the formula for the voltage at the input to the aggressor conductor.

Vin = source voltage. Rin = Aggressor input resistance. Zo = characteristic impedance

VNE = KNE [Vs(t)-Vs(t-2td)] (1a) Equation for NEXT

KNE = (C Zo + ) (1b) Equation for near end coupling coefficient. C=Mutual capacitance (10pF per m). L=Mutual inductance (80nH per m)

VFE = KFE ι[Vs(t-td)] (2a) Equation for FEXT. ι= length of the line

KFE = (C Zo - ) (2b) Equation for far end coupling coefficient. C=Mutual capacitance (10pF per m). L=Mutual inductance (80nH per m)