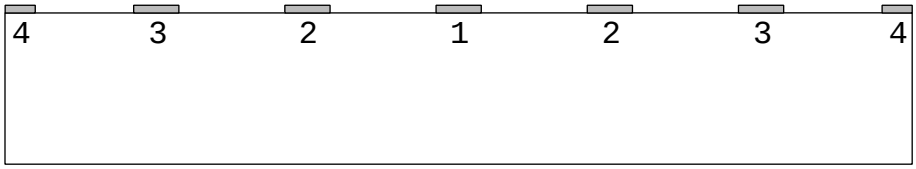
23/10/98

Maxwell Simulation of CDF Layer 00 Cable Capacitance

Geometry



Strip Pitch	0.1 mm
Strip Width	0.025 mm
Substrate Thickness	0.1 mm
Top cover (optional)	0.05 mm
Metal Thickness	0.005 mm
Substrate ε_r	4.3

Results

Electrode	**C (pF/m) (no top)**	**C (pF/m) (top)**
C^1_{Total}	44.50	71.20
C^1_2	14.50	26.00
C^1_3	3.15	4.45
C^1_4	0.25	0.33

Further Studies

Substrate Thickness

Capacitance as a function of substrate thickness; $e_r = 4.3$

Electrode	100 µm	50 µm
C^1_{Total}	44.50	34.48
C^1_2	14.50	10.88
C^1_3	3.15	2.31
C^1_4	0.25	0.19

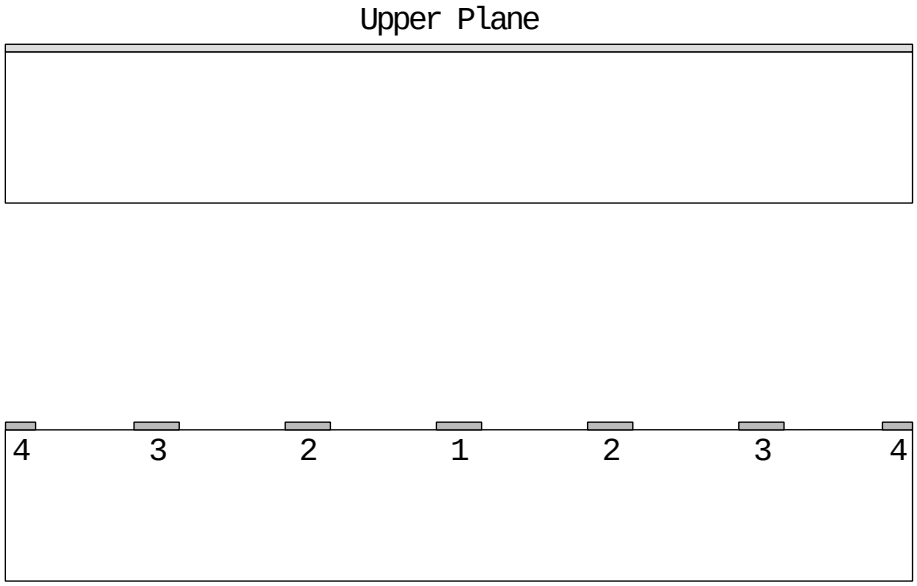
Relative Permitivity

Capacitance as a function of substrate relative permitivity with a substrate thickness of 50 µm.

Relative Permitivity	Total Strip Capacitance (pF/m)
3.00	32.40
3.25	34.00
3.50	35.60
3.75	37.30
4.00	38.90
4.30	40.90

Stacking

The effects of stacking were simulated by considering the geometry shown below. The cables on either side of that of interest were simulated as continuous planes. Simulations were run with a substrate thickness of 50 µm and a relative permitivity of 3.0 The physical air gap was set to 250 µm, 150 µm and 50 µm.



Electrode	**250 µm gap (pF/m)**	**150 µm gap (pF/m)**	**50 µm gap (pF/m)**
C^1_{Total}	33.10	33.50	38.60
C^1_2	10.90	10.10	7.30
C^1_3	1.70	1.35	0.60
C^1_4	0.01	0.01	0.00
C^1_{upper}	2.60	4.90	11.50
C^1_{lower}	2.60	4.80	11.50