6.002 Demo# 19B
Impedance Matching   **Agarwal   Fall 2000**
Lecture 25

Purpose: To show the effects of delay (the speed of light not infinite), and that an open circuit does not always behave as stated in 6.002, various length cables are attached to a square wave input and the oscilloscope (also at the input). We show the signal reflected from the other end when the impedance is not matched with a 50 Ohm termination.

Steps:
1. Show the input square wave on the scope.
2. Connect a long cable with an open circuit on the far end, and show the new (input + reflection) waveform on the scope. The speed of light can be calculated using the length of the cable and the delay between the input transition and the arrival of the reflection.
3. Terminate the cable using the 50 Ohm termination, and show the reflection disappears.

(also to scope)

Open /terminated

(Open circuit)
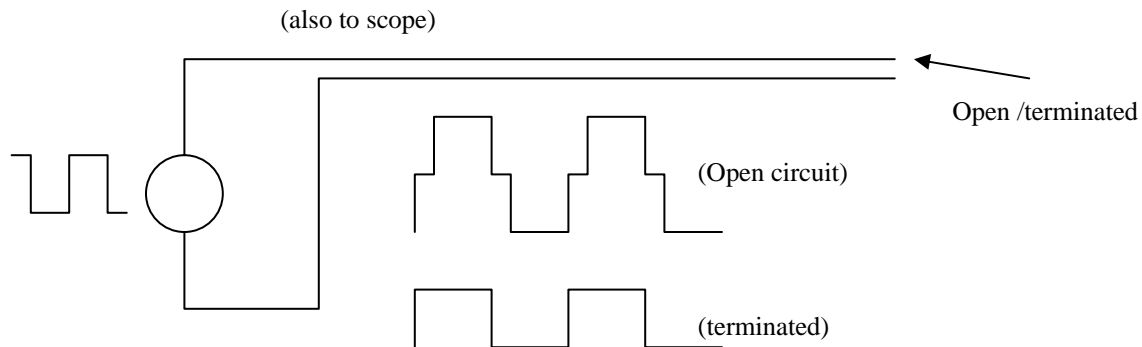
(terminated)

Description: Impedance Matching of a very long cable, using termination of 50 Ohm resistor

See schematic diagram next page for more detail

Oscilloscope Setup

CH	V/DIV	OFFSET	MODE	FUNC	MATH	VERTICAL	HORIZONTAL
1 off				off			
2 off				off			
3 off				off			
4 on	5	0	DC	off			
Horizontal: 2 us		**Acquisition:**		**AUTO AUTO 4**		**Trigger:**	**CH4**

Waveform Generator Setup					Power Supply Setup				
UNIT	WAVE	AMP	OFFSET	FREQ	+6 off	+25 off	-25 off	OUTPUT	
FG2	Square	10	0	100 KHZ				Trigger: INT	

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Prof. Agarwal Spring 99