

## 6.002 Demo# 19B

### Impedance Matching

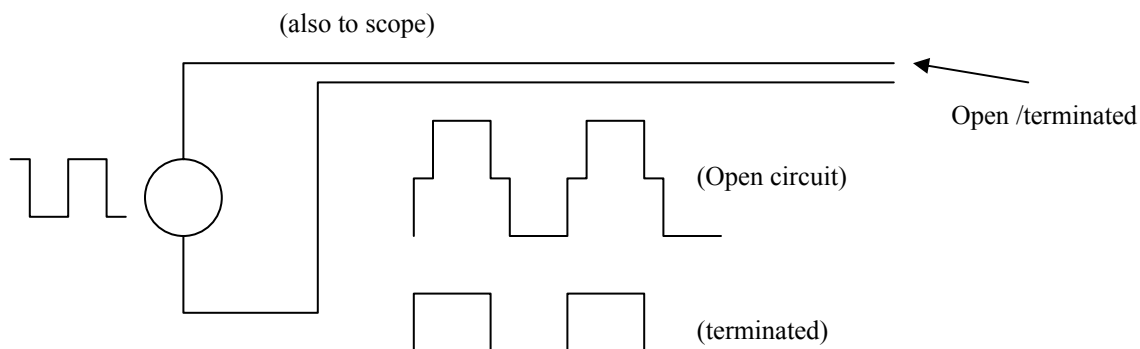
### Lecture 25

Agarwal Fall 2000

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.



**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

