

Experiment C-11

Pulsed Transmission Lines

In this experiment, it is necessary to understand every connection and hence to reduce reflections. This includes the oscilloscope.

1. Measure the characteristic impedance of RG174.
2. Measure the signal velocity on RG174. Calibrate the scope with an LC ring circuit. Compare your result with the expected result from the known cable properties.
3. Reproduce and understand some of the results on page 40 of Lewis and Wells. Account for the various time constants and amplitudes.
4. Produce a short rectangular pulse from a longer pulse by delay line clipping.
5. For a short pulse input, investigate the amplitude and width of the output as a function of the cable length. Compare with expectation. See UCRL CC2-1 and CC2-2.

References:

1. UCRL Counting Handbook (UCRL 3307), Section CC2
2. Lewis and Wells, *Millimicrosecond Techniques*, McGraw-Hill (1954)
3. S. Goldman, *Transformation Calculus and Electrical Transients*, Prentice-Hall, NY (1945)
4. Ramo and Whinnery, *Fields and Waves in Modern Radio*, John-Wiley, NY (1953) 2nd Edition
5. Millman and Taub, *Pulse Digital Circuits*, McGraw-Hill, NY (1956) Chapter 10