Specifications for the standard test signals which is used for FEB studies at Michigan State University.

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May 7, 2010

Introduction

This engineering note describes the standard test signal which is used for FEB (Front End Boards) studies at MSU. Our standard signal is selected to model the typical Milagro PMT pulse waveform. A collection of real PMT pulse waveforms from the Milagro experiment is available here
   http://mildb.umd.edu/wiki/images/a/a3/Plot_feb.pdf.

Setup
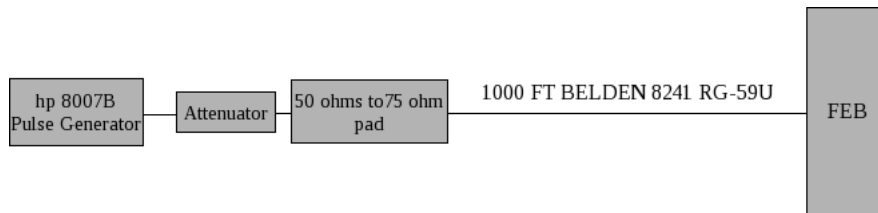
The test signal for our FEB studies is made using a Hewlett Packard 8007B pulse generator. A thousand feet long BELDEN 8241 RG-59U 75 ohms cable is used to connect the pulse generator to the FEB. The hp 8007B pulse generator has a 50 ohms output. A 50 ohms to 75 ohms pad is used to match the pulse generator to the long 75 ohms cable. A set of attenuators are used at the output of the pulse generator to obtain the small amplitude pulses that are required for many of the tests.

Signal Specifications

The following scope trace shows the output signal of the pulse generator when the 1000FT cable is not connected to the pulse generator.
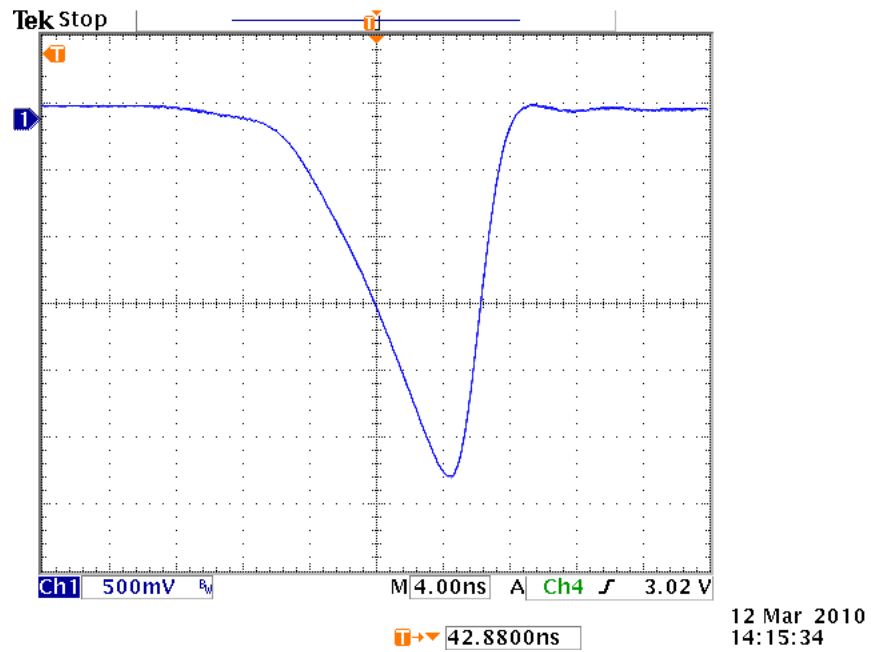
Amplitude [1]	2.72 V
Fall time of the first edge	7.92 ns
Rise time of the second edge	2.06 ns
Full width at half maximum	6.8 ns

[1]During a study the amplitude of the input signal can be a variable

The following scope trace shows the output signal of the pulse generator when the 1000FT cable is connected to the pulse generator.
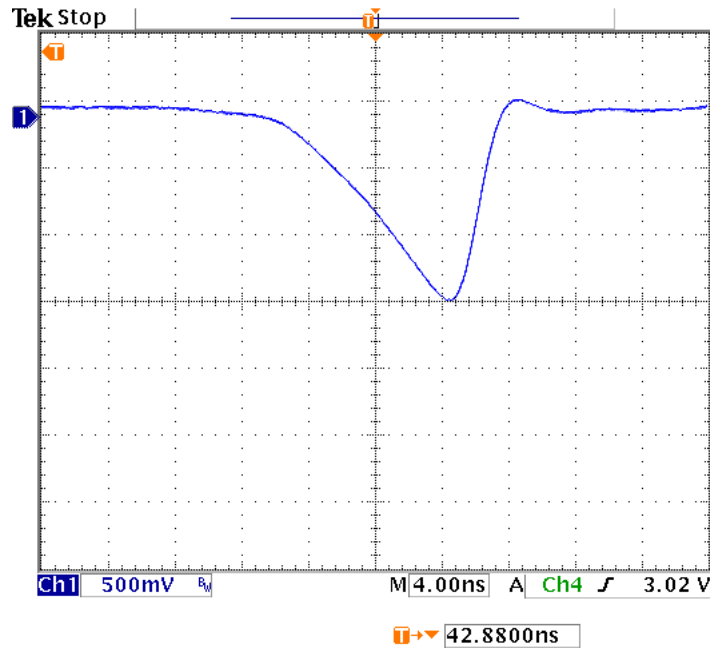
Amplitude	1.46 V
Fall time of the first edge	8.16 ns
Rise time of the second edge	2.16 ns
Full width at half maximum	5.92 ns

The following scope trace shows the input signal of the FEB.
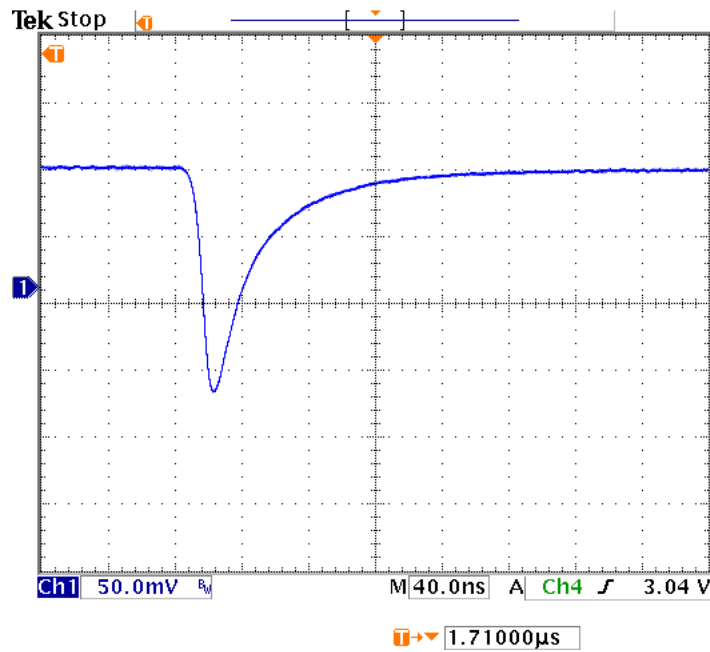
Amplitude	169 mV
Fall time of the first edge	9.6 ns
Rise time of the second edge	76.0 ns
Full width at 25% of maximum amplitude	53.6 ns
Full width at half maximum	26.4 ns
Full width at 75% of maximum amplitude	15.2 ns