

Glitch Catching with the Fluke CombiScope™ and the Oscilloscope Evaluation Kit

Glitches!

Glitches are unwanted short duration events. They are usually associated with logic circuits but similar phenomena are also found in analog circuits. Glitches can be caused by timing errors, cross-talk or external interference and always happen at the worst possible time.

Logic analyzers can be used to catch glitches in digital circuits but they are more of a design tool and are not as widely used as oscilloscopes. Furthermore, they don't work on analog circuits and don't have the triggering flexibility found in just one channel of an oscilloscope.

With the Fluke CombiScope™ you can easily catch randomly occurring glitches and using the Fluke CombiScope Evaluation Kit, you can practice catching them yourself.

Where are they?

Test point three, TP3, on the evaluation board has a signal made up of two free running pulse trains. The pulse durations are approximately 25 microseconds and 75 microseconds with pulse repetition rates of approximately 500 Hz and 275 Hz respectively. See Figure 1.

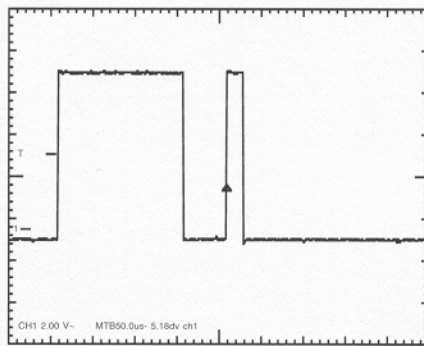


Figure 1. The two pulses found on TP3 on the CombiScope evaluation board.

When the two positive pulses are almost coincident, a very short negative pulse is formed between them. See Figure 2. It appears randomly as the pulses are not synchronized.

This short negative event is exactly like a negative glitch.

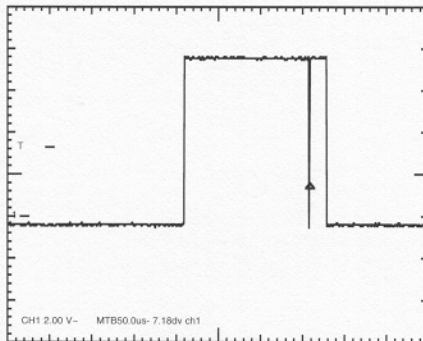


Figure 2. When the pulses occur next to each other, a negative is formed.

How to catch the glitch

1. Switch on the CombiScope and connect a probe to channel 1.
2. Connect the probe to the probe adjustment signal, press AUTOSET and adjust the probe trimmer to get a good square-wave.
3. Switch on the evaluation board by inserting the battery with the correct polarity.
4. Connect the probe to TP3 on the Evaluation Board and press AUTOSET. You will see the two sets of pulses running through each other.
5. Switch to the oscilloscope to digital storage mode.
6. Press the TRIGGER menu button and select the following:
Trigger to **LOGIC**
Trigger mode to **GLITCH**
Glitch type to **NEGATIVE** " \neg "
Time qualifier to **t2 < x.xx μ s**
7. Using the cursor TRACK control set **t2 = 0.50 μ s**.
8. Turn the TRIGGER POSITION knob counter-clockwise to put the trigger point in the middle of the screen.
9. Set the timebase to 50 μ s/div.
10. Press the ACQUIRE button and in the menu switch on the peak detector, PEAK DET.
11. Press SINGLE and wait.

The CombiScope will trigger sooner or later. The powerful logic triggering catches the glitch while the peak detector ensures that the glitch does not fall between samples. The 200 MS/s sample rate (100 MS/s PM 3380A/70A/90A) can catch glitches as short as 5 ns (10 ns). The trigger circuit will trigger on glitches as short as 2 ns on 200 MHz models and 4 ns on 100 MHz models.

You can experiment with the setting of t2. It is possible to catch glitches on the evaluation board down to approximately 50 ns. The limiting factor is the rise and fall times of the pulses which are approximately 50 ns. This type of glitch seldom occurs, and usually when you least expect it.

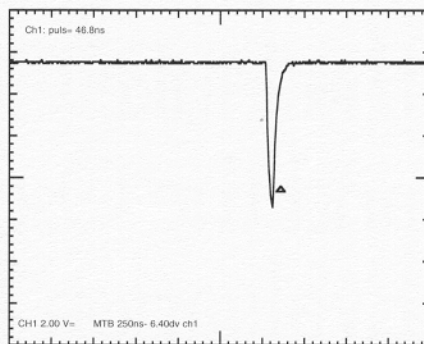


Figure 3. Automatic pulse measurement reveals the width of the glitch.

Fluke Corporation

P.O. Box 9090, Everett, WA USA 98206

Fluke Europe B.V.

P.O. Box 1186, 5602 BD Eindhoven, The Netherlands

For more information call:

In the U.S.A. (800) 443-5853 or Fax (206) 356-5116

In Europe (31 40) 644200 or Fax (31 40) 644222

In Canada (905) 890-7600 or Fax (905) 890-6866

From other countries (206) 356-5500

© Copyright 1995, Fluke Corporation. All rights reserved.

Printed in U.S.A. B0286A-14U9506/NL EN

Printed on recycled paper.

FLUKE®