

Creating Pulse Generator with Controlled Duration

PLC programming for multiple pulses per trigger

This describes one method of generating multi-shot triggers in the GP/GD series cameras by using enable duration control.

By using the internal PLC functions, you can generate multiple pulses and the output is limited to only the enable period. If camera is set to async reset mode (0x00 23 00 00 00 01), it can generate a number of images which are programmed with the multi-shot generator.

Step 1

Make PLC LUT to select enable control. This can be external TTL (TTL Input 0) or GPIO Control Bit (0). In Signal routing Block and Lookup Table, set I0 with TTL Input 0 (default) or GPIO Control Bit 0.

Programmable Logic Controller	
Signal Routing Block and Lookup Table	
I0	GPIO Control Bit 0
I1	TTL Input 1
I2	LVDS Input
I3	Optically-Isolated Input
I4	GPIO Control Bit 1
I5	GPIO Control Bit 0
I6	Pulse Generator 1 Output
I7	Pulse Generator 0 Output

The other inputs are set to the default values since the default settings are appropriate for this application.

Step 2

Configure the pulse generator to create a 10ms pulse per trigger. The first pulse is needed immediately after the trigger. The delay is the minimum and the width is set for 10ms.

Configuration - Advanced	
Signal Routing Block and Lookup Table	
I5	GPIO Control Bit 0
I6	Pulse Generator 1 Output
I7	Pulse Generator 0 Output
Lookup Table Q0 = I0 & I7 Q1 = I1	
Enhanced Function Block	
Pulse Generator 0	
Width (high)	1000
Delay (low)	10
Granularit...	333
Emit perio...	<input checked="" type="checkbox"/>
Trigger mode	Triggered on rising edge
Pulse peri...	10130220

Set the granularity = 333, then each count is 10µs.. Therefore, 10ms width is 1,000.

For this simple example, we set the pulse generator to periodic (continuous) mode. Mark "Emit periodic ...".

Step 3

The LUT now needed to be set up.

The inputs to the trigger are coming from pulse generator_0 output and the trigger.

$$Q0 = I0 \ \& \ I7$$

This logic generates a trigger which is enabled when I0 is active high. Q1 is an output to monitor functions. I1 is default strobe output (exposure signal).

Optional LUT programming

Asynchronous trigger with Enable edge:

If pulse generator is required to reset at enable edge, we cannot use the periodic mode of pulse generator but instead use a rising edge trigger. To make feed back to repeat multiple pulses, the LUT is programmed to create the feedback from the Pulse generator output to input. Q9 (input to pulse generator 0) is connected to the enable pulse and its own inverted output.

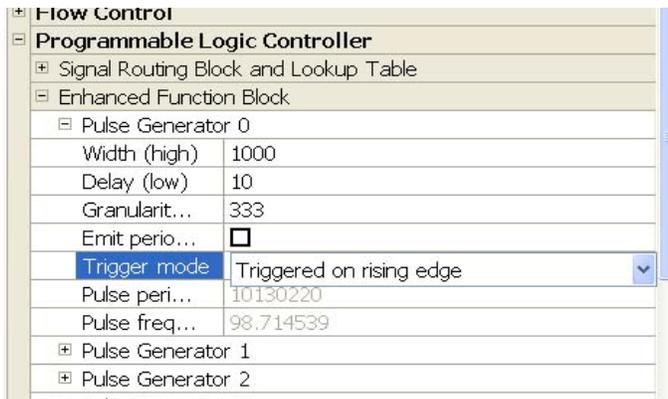
In this example, the enable pulse is active low (pulses are output when I0 is low).

Configuration - Advanced	
Signal Routing Block and Lookup Table	
I0	GPIO Control Bit 0
I1	TTL Input 1
I2	LVDS Input
I3	Optically-Isolated Input
I4	GPIO Control Bit 1
I5	GPIO Control Bit 0
I6	Pulse Generator 1 Output
I7	Pulse Generator 0 Output
Lookup Table Q0 = (!I0 & !I7) Q1 = I1 Q9 = (!I0 & !I7)	
Enhanced Function Block	
Name: Lookup Table	

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Pulse Generator Control from Coyote:

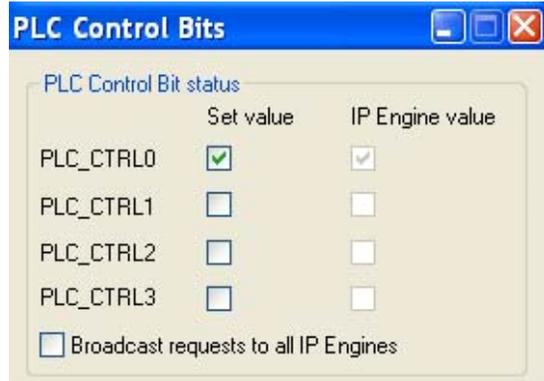
Normal programming is shown in Enhanced Function Block.



GPIO Control Bit:

In IP Engine tab, the Control Bit is used.

By marking Set value, the GPIO Control goes to high. By demarking, it goes to low. In this application, pulses are output during high and disabled during low.



In the Coyote application, you can use another method in IP Engine tab.



In this application, the frame rate is controlled with three parameters. For the simplest case, you can choose Width variation as the variables. Since the Granularity is fixed at 10µs, any multiple of Width dictates the frame rate. In the example, 1000 represent 10ms period of frame rate = 100 fps. If 25 fps is required, set the Width to 4000 (=40ms = 25fps).