



QADC Trigger



[Return to
Home Page](#)

A Motorola Low-Level Driver Component

The QADC Trigger driver executes in conjunction with the Engine Position driver to produce a pulse referenced to a tooth on the crankshaft. The application software specifies the tooth number that begins the pulse, the polarity of the pulse, and the pulse width.

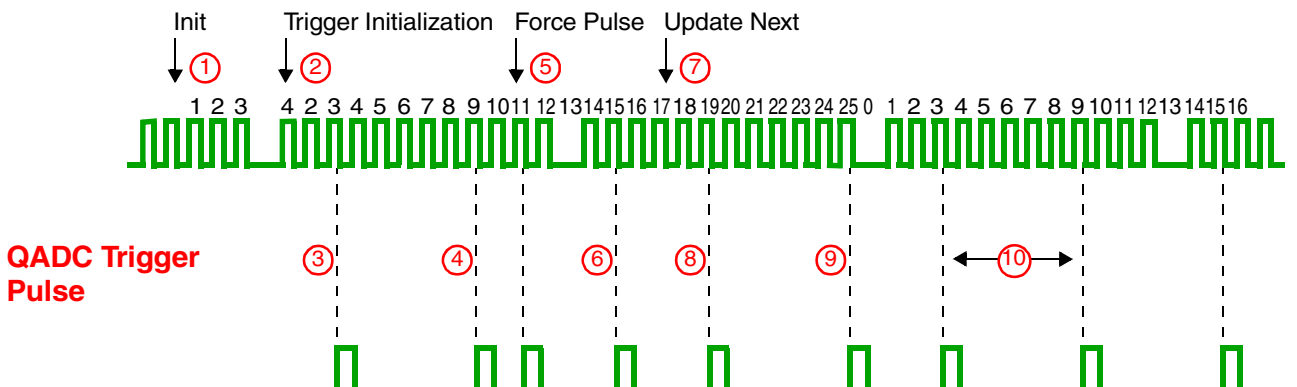
The pulse is continually repeated throughout the engine cycle, with a constant number of teeth between the start of each pulse. The end result is a pattern of evenly spaced pulses matched to the position of the engine regardless of engine speed. The driver may be initialized on multiple TPU channels, each channel running independently of the others.

The QADC Trigger is a “set and forget” function. Once initialized, the driver produces the next pulse that would occur in normal scheduling of the pulse series and continues autonomously without further application software intervention.

The application may update the position of the next pulse at any time. In this case, the driver begins the next pulse at the requested tooth number and repeats the new pulse pattern until the end of the engine cycle when it reverts back to the values given at initialization. The application may also force an output pulse, on command, at any time. After a forced pulse, subsequent pulses occur at the repetition rate requested in the most recent initialization call as if the forced pulse had not occurred.

The diagram below illustrates the normal operation for the QADC Trigger driver. The example shows a 13-tooth wheel with one missing tooth. The circled numbers represent actions or events this example illustrates, and are described in the table on the back of this datasheet.

Crankshaft



①	The Crank and Cam functions are initialized.
②	The QADC Trigger driver is initialized with a positive polarity. The first pulse will begin at tooth 3 and then repeat every six teeth thereafter.
③	When the tooth count increments to three, the driver begins the first pulse.
④	Six teeth later, the driver issues the next pulse.
⑤	The application forces an extra pulse.
⑥	Six teeth after the prior regularly scheduled pulse (not the forced pulse), the driver issues the next pulse.
⑦	The application requests that the next pulse begin at tooth 19.
⑧	When the tooth count increments to 19, the drivers issues a pulse.
⑨	Six teeth later, the driver begins the next pulse.
⑩	At the beginning of the next cycle, the driver reverts back to the original values (from Step ①). The driver, therefore, begins a pulse at tooth 3 and repeats the pulse 6 teeth later.

The Low Level Driver System

The Low Level Driver system includes a set of drivers with an API that interfaces to and controls the hardware for a microcontroller unit (such as the Motorola MPC555)

Engine Position

Tracks the angular position in the engine cycle based on input from an automobile's crankshaft and camshaft sensors

Spark & DTS

Generates pulses defined by duration and end angle; can be used to time the firing of spark plugs

Fuel

Generates pulses immediately upon request or defined by duration and end angle; can be used to control fuel injection duration and frequency

Speed Measurement

Determines the speed of a rotating shaft

Synchronous PWM

Synchronizes an output pulse width modulation (PWM) signal to an input PWM signal

Synchronous Output

Transmits a clock signal and serial data, following a specific protocol

Angle Toggle

Toggles an output pin and generates interrupts on selected crank angles

QADC Trigger

Generates pulses defined by a start angle and duration

Knock Window

Generates pulses defined by a start and end angle

Discrete Input/Output (DIO)

Operates as a general-purpose digital input or output pin



[Return to Home Page](#)

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