



## MegaSquirt-II Injector Test Mode

This is a special mode designed for flow testing and/or cleaning injectors using MegaSquirt® as a driver. Bruce and Al get several inquiries a week on the JectorRate FI driver setup, enough that we think that adding this mode will be useful.

**Gasoline is dangerous, especially in vapour form. If you use gasoline, it should be in a 'closed system' (One that does not allow vapours or liquid to escape). Be sure to have at least two fire extinguishers on hand, and keep them physically separated so the you will always have a clear path to at least one. Consider using other fluids than gasoline for testing. See this page: [www.not2fast.com/efi/injector\\_info.shtml](http://www.not2fast.com/efi/injector_info.shtml) for some alternative fluids.**

To activate the test mode, you set the 'Injector Test Mode' to 'Test Mode', burn it to flash ("Burn to ECU") and cycle power. To get out of test mode you just turn off the option in MegaTune- you don't have to burn it. The code burn the 'normal mode' setting automatically and then reboots itself, coming up in normal mode.

There is also a 'Repeat Mode' which means to repeat the number of squirts you just. The code resets the Test Mode and repeats. The user can keep sending 'Repeat Mode' (up to 127) if that's easier and the code will keep repeating the number of squirts. Or users can just cycle power without turning off the Test Mode, which is just as easy unless your full time job is testing injectors.

Injector test mode sets up a specific injector pulse width, duty cycle, and an adjustable commanded number of pulses. So, an injector can be plumbed up on a test stand with test fluid, and the injector exercised for a specific number of pulses/widths. And the injector open time and PWM current limit will still be there, so these can be characterized in the flow. The test fluid volume can be measured, alternatively the mass change introduced by the fluid can be measured on a sensitive scale.

Note that flow values will be most accurate for longer pulse widths (up to 65 milliseconds), BUT if you are testing low impedance injectors they will flow too much current at longer pulse widths without some form of current limiting. Since the injector test mode has PWM current limiting, you can use long pulse widths with the test mode, **IF YOU HAVE SET UP THE PWM PARAMETERS**. See this link for information on how to do that: [www.megamanual.com/ms2/configure.htm#pwm](http://www.megamanual.com/ms2/configure.htm#pwm).

The injector test mode allows you to set up:

- **Injector test squirts**, the total number of squirts,
- Injector test **pulse width** per squirt(milliseconds), you can enter up to three decimal places, and
- Off time, which is the time between squirts.

Enter the values you want, then cycle the power to MegaSquirt® to start the test. The MegaSquirt® will fire the injectors for:

$$\text{Time} = \text{Injector test squirts} * (\text{Injector test PW} + \text{Off time})$$

For example, for injector test squirts = 400, Injector test PW = 20.000 and Off time = 60.0, the total duration of the test is:

$$\text{Time} = 400 * (0.020 + 0.060) = 32 \text{ seconds}$$

If you collected 38cc of fuel from 2 injectors during this time, and they had an opening time of 1.0 milliseconds, the flow rate would be:

$$\text{FlowRate (total)} = 60 * \text{Volume}/(\text{Injector Test Squirts} * (\text{Injector test PW} - \text{Opening Time}))$$

$$\text{FlowRate} = 60 * 38\text{cc}/(400 * (0.020 - 0.001)) = 300 \text{ cc/min}$$

Since this is for two injectors, the injectors flow 150 cc/min each.

When the test is complete, test mode then sits there waiting for either a reset command from MegaTune or change the test option and reset to resume normal mode. This could be used on the bench for commercially testing/cleaning injectors or to clean/test them in your car by pulling out the injectors from their pockets and letting them squirt into a can. The cost of a complete MS-II fully assembled is still way cheaper than a commercial tester/cleaner. (Bruce and Al saw one for \$8000 and all it had besides a controller were 8 burettes.)

**Note that in some versions of the code, the program will not come out of injector test mode, unless you change the number of squirts to 0 while the 'test' is running. This then stops the injectors firing. Then you can change the mode to normal.**

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Last Updated: 02/23/2008 22:05:26

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MegaSquirt® is an experimental device intended for educational purposes.  
MegaSquirt® controllers are not for sale or use on [pollution controlled vehicles](#). Check the laws that apply in your locality to determine if using a MegaSquirt® controller is legal for your application.

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