Pitstop Fuel Timer

Operating Manual

Doug Shelby Engineering

Revised: 8/25/2013

DSE Fuel Timer – Operating Manual

Table Of Contents

DSE Fuel Timer – Operating Manual

1. The Fuel Timer is designed to provide a real-time indication of the fueling time between the pit crewman fueling the car and an engineer on the timing stand. The engineer programs the system with a time for fueling and the system indicates to the crewman when to stop fueling. The system includes graphical user interface software, an embedded microcontroller timing system, and LED hardware for indication to the crewman. The system uses an analog input to determine when the fuel probe has been inserted or removed (typically via pressure sensor), and the embedded device accurately times fueling while providing a real-time indication to the crewman (LEDs) and to the engineer (software). Programmable features of the system include: stop time, trigger thresholds, error detection, LED brightness, LED lighting patterns etc.

2.
   - https://sites.google.com/site/dsefueltimer/download

3.
   - Plug in the USB cable to the control box
   - Plug in Power and SENSOR / LED loom

4.
   - Plug in the USB cable to PC and wait for Windows to begin its driver installation process. After a few moments, the process will fail.
   - Click on the Start Menu, and open up the Control Panel.
   - While in the Control Panel, navigate to System and Security. Next, click on System. Once the System window is up, open the Device Manager.
   - Look under USB, you should see device named "UNKOWN DEVICE"
   - Right click on the "UNKNOWN DEVICE" and choose the "Update Driver Software" option.
   - Next, choose the "Browse my computer for Driver software" option.
   - Finally, navigate to and select the fuel timer driver file, named **"FuelTimerDriver.inf"**, located in the "Drivers" folder of the program files DSE folder.
   - Windows may warn you about unsigned drivers, but continue and it will finish up the driver installation from there.

5.
   - Once familiar with the software a system test can be done by setting the "trigger over" value at less than 0(-0.5); creating a valid setpoint; and arming the sensor.

6. Software Instructions and System Operation

The Status Tab

COM PORT: Com Port the timer is connected to. See device manager if unsure, *hint*: try the last one in the list as it will remember the last port it connected to.

CONNECT BUTTON: Once the com port has been selected, click this button to connect to the device.

ARM/DISARM BUTTONS: Starts/stops the fuel timer. The timer should be armed just before a fuel stop and disarmed under idle conditions (see state descriptions below).

STATE INDICATION: The timer operates based upon a state machine (see figure 1). This indicates the "state" of the fueling process that the system is in. States descriptions are as follows:

DSE Fuel Timer – Operating Manual

Disarmed: This is the idle state, you are connected to the system but not having a pit stop. The device is waiting to be programmed and armed for your next stop. All other settings can be programmed in this state (thresholds, LED brightness, etc).

Armed: This is the state you should be in when the car is coming in for a pit stop. Enter in a time into the set point entry and push the "Arm" button. Now the timer has been programmed with a time and is waiting for the fuel probe to be inserted (aka: analog input to trip over the trigger threshold).

Fueling: The fuel probe has been inserted, timing has started, and the LED's are indicating fueling status to the crewman. In most LED patterns, the GREEN LED's will come on to indicate the fuel probe has been inserted. Once fueling is complete the timer will return to the *Disarmed* state.

Interrupted: The fuel probe has been pulled out before the programmed time has expired. In most patterns, the GREEN LED's will go off to indicate the probe has been removed. The timer has stopped, and the RED LED's are frozen in their current state. The probe can be re-inserted to finish off fueling and the timer will revert to the *Fueling* state.

Sensor Error: This state is entered when the system has determined that there is something wrong with the sensor connection to the fuel probe (low voltage). This could be an indicator of a disconnected connector, wiring issue, or a faulty sensor. This state can be entered at any time, and is determined by the voltage setting in the "error under" threshold. Once the error is resolved, the system returns to the *Disarmed* state.
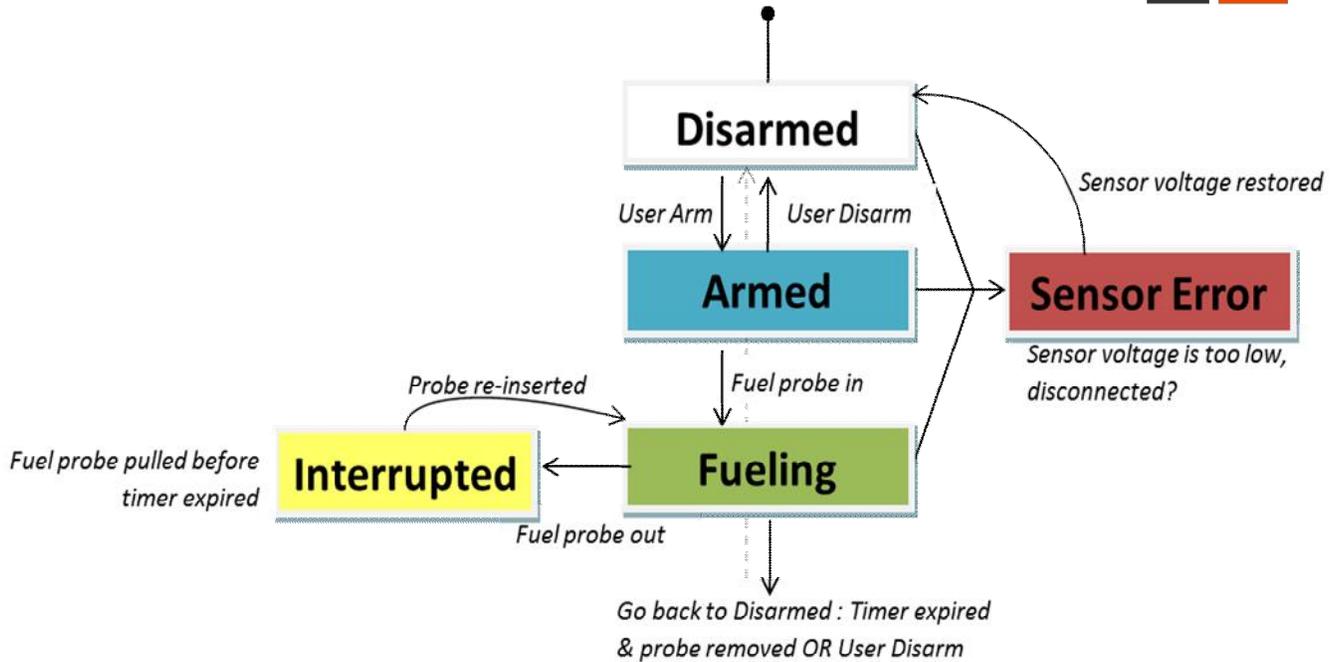
DSE Fuel Timer – Operating Manual

Figure 1 – Fuel Timer System State Machine

TIMER INDICATION: This is the time left to finish fueling once the system has been armed and the probe has been inserted. This counts downward from the set point entry value.

ELAPSED INDICATION: This indicates the time that fueler had the fuel probe inserted for. This counts upward and stops only when the probe has been removed OR the system has been manually disarmed.

SETPOINT: This is how long the engineer would like to fuel the car for. The timer is programmed with this time once it has been armed just before the stop.

SENSOR VOLTAGE: This is a real-time indicator of voltage from the fuel probe sensor. Used for reference.

The Settings Tab

DSE Fuel Timer – Operating Manual
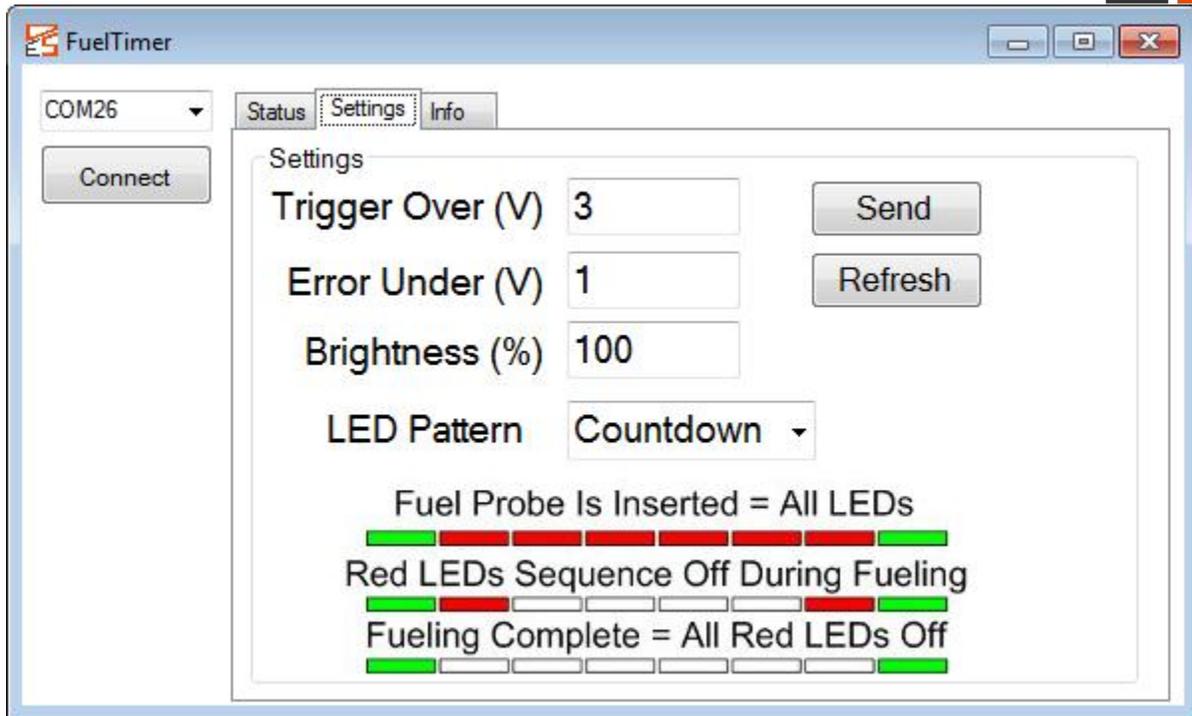
TRIGGER OVER VOLTAGE: This is the voltage from your sensor that tells the system that the fuel probe has been inserted (over this threshold = probe inserted).

ERROR UNDER VOLTAGE: This is the voltage from your sensor that tells the system that there is something wrong with the sensor (under this threshold = sensor error). It is suggested the sensor be a 1-5V output (or 4-20mA) type for this feature to show that a sensor may be disconnected or faulty.

BRIGHTNESS %: Programmable from 0-%100, brightness control for LED's. Test to determine appropriate levels.

LED PATTERN: Indicates the selected LED patterns that will be shown to the crewman during fueling. The graphic below the dropdown menu provides a short description of the pattern (ex. COUNTDOWN = GREEN & RED LED's on when fuel probe goes in, last 3 red LED's will turn off during last 3 seconds of fueling 2-1-0. GREEN stays on until fuel probe removed.
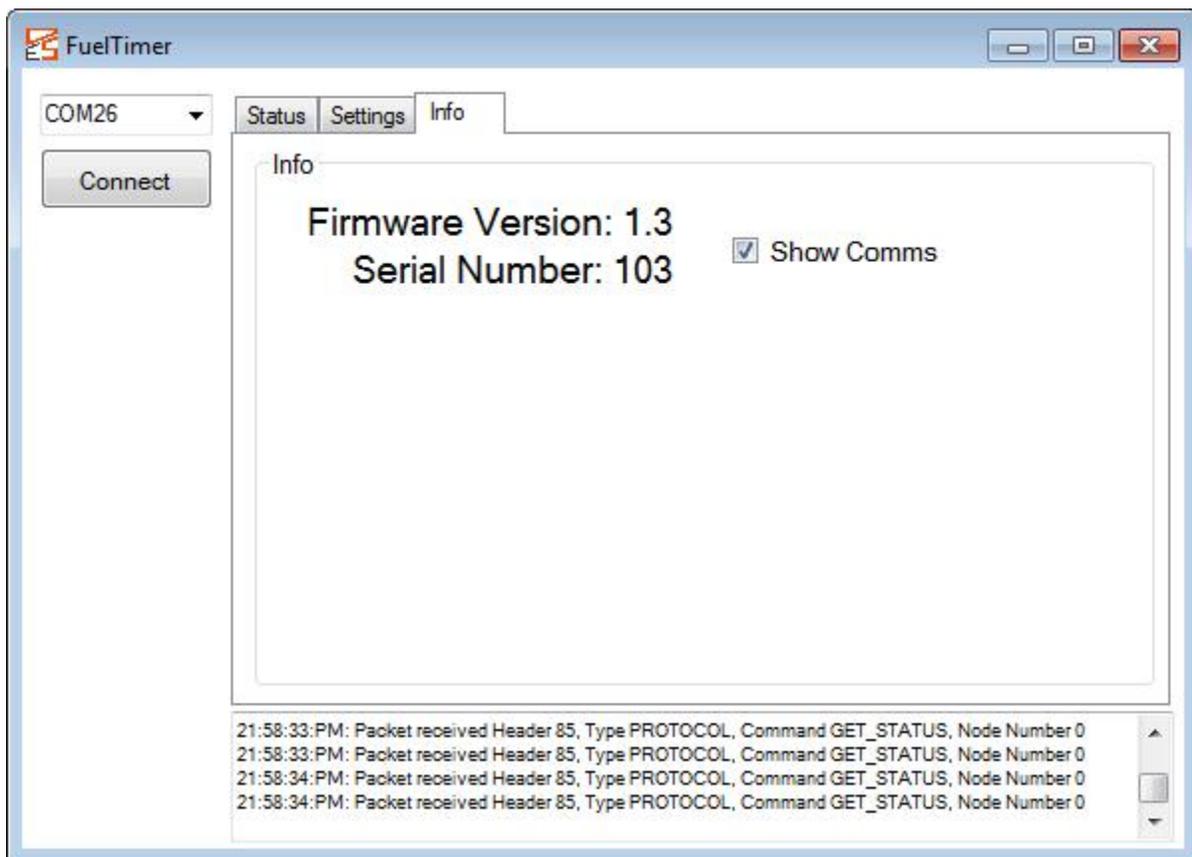
DSE Fuel Timer – Operating Manual

SEND BUTTON: Programs all settings displayed on the settings tab to the device. The device immediately echo's all of the settings back to the PC and updates the software display.

REFRESH BUTTON: Immediately reads all settings from the device. It can be used to confirm that settings have /have not been programmed to the system. They system does read all programmed settings when the device is initially connected via the "connect" button.

The Info Tab

FIRMWARE VERSION: self explanatory

SERIAL NUMBER: self explanatory

SHOW COMMS: This checkbox will cause the software to show an extra dialog box at the bottom of the screen for diagnostic purposes. This box shows the communications between the PC and the embedded system. Most of these messages shown are from the embedded microcontroller system that is constantly broadcasting a stream of data to the PC to keep the display updated. Traffic sent down to the embedded system (sending settings) can also be seen in this window. If communication difficulties are experienced, a copy and paste of the text this window can be sent in to support in order to diagnose any issues.