OPUSFSCTQ

Opus Software Limited

FSC Motorised TQ Driver for the Prepar3D Version 4.5 and Version 5 Simulators

User Guide

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Introduction

The **OPUSFSCTQ.EXE** program is supplied free of charge as part of the OpusFSI v6 software installation. The latest release version for OpusFSI v6 can be downloaded from the following link,

http://www.opussoftware.co.uk/opusfsi/OpusFSI_v6.msi

Beta versions of OpusMSFS are often posted and these may include upgrades to the TQ driver software. Details are usually posted in the **Announcements** topic of our **SimForums**.

https://www.simforums.com/FORUMS/opus-software_forum49.html

All software can be downloaded from our Downloads web page,

http://www.opussoftware.co.uk/opusfsi/downloads.htm

Software Installation

Simply install the downloaded OpusFSI_v6.msi Microsoft Installation File into its default C:\OpusFSI_v6 folder. Other install drives may be specified but always install OpusFSI into a 'root' folder, that is, do not install OpusFSI into any sub-folder.

Create a Shortcut

After installing the OpusFSI software we recommend you create a shortcut on your desktop for the OPUSFSCTQ driver program. This shortcut will allow you to manually start your driver without too much fuss.

1. In Windows Explorer, navigate to your installation folder (OpusFSI_v6) and right-click on the OPUSFSCTQ.EXE program.

2. Select the **Show more options - Send to - Desktop (create shortcut)** option. Rename the shortcut to 'OpusFSI v6 FSCTQ'.

3. Right-click on the new desktop icon, select **Properties**, in the Shortcut tab check the program is configured to **Start In:** your installation folder (c:\OpusFSI_v6). Select the **Shortcut** tab, click on **Advanced** and tick the checkbox to **Run as Administrator**.

The OPUSFSCTQ driver program accepts the following optional program arguments,

- **TEST** - Operates in test mode
- **MOTORISED** - Selects the Motorised operation (default)
- **NONMOTORISED** - Selects the Non-Motorised operation

By default the driver program powers up in the MOTORISED state.

General Operation

The OPUSFSCTQ driver uses the SimConnect interface to the Prepar3D simulator. At present the OPUSFSCTQ driver uses an assigned serial COM port to communicate with the Motorised TQ.

Prior to using the driver you must ensure the **PMDG SDK** will communicate its data via SimConnect. To do this first browse to your Prepar3D installation folder then navigate to the PMDG\PMDG 737 NGXu sub folder.

Finally use Notepad to edit the **737NGXu_Options.ini** file and make sure the following two lines are included,

[SDK]
EnableDataBroadcast=1

Now you are ready to run OpusFSI and then run the OPUSFSCTQ driver. You will be presented with the following form (you may need to minimise or window the simulator's display).

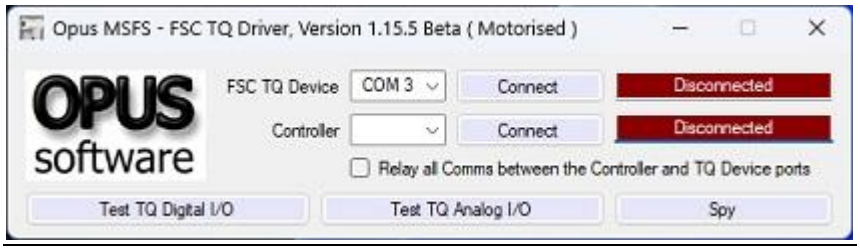
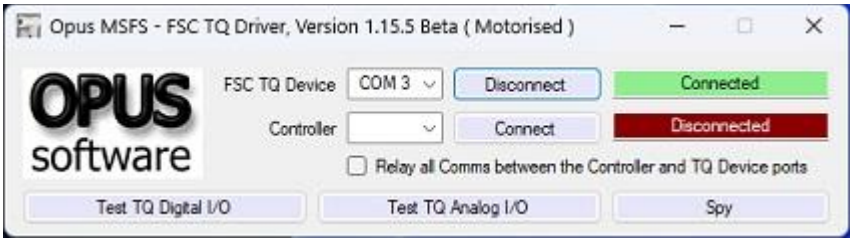


Figure 1 - FSC Motorised TQ Driver Main Form

First Time Using the Driver

The first time you use the driver simply select the TQ's assigned serial COM port and click on the **Connect** button. If a good connection is made then the button's legend will change to **Disconnect** and the status box will turn green and display the **Connected** message.



After connecting you should use the Test… dialogs to check and calibrate the interface with the Motorised TQ.

N.B.

The driver software will remember your configured options and all positions of displayed dialogs along with the driver's main form.

All the greyed out items are options used in 'in house' for testing and diagnostics.

The driver will not establish its connection with the simulator if the simulator is Paused.

After you have completed the above connection. Open, position, and size the driver's **Spy** window, then leaving the Spy window open, shutdown and re-start the OPUSFSCTQ driver. You should see something like the following messages within the displayed Spy window (see figure below).

Figure 2 – The Spy Window

Note also that using the Spy window will have an impact on the speed of the driver. Hence the warning, so the Spy window should not be left open in normal operations.

In the Spy window all messages marked as **TX** are actual transmissions to the TQ and all messages marked **RX** are the actual received data from the TQ.

Test TQ Digital I/O

The **Test TQ Digital I/O** dialog allows you to test all digital inputs from and control outputs to the FSC Motorised TQ. The digital inputs are all self explanatory, simply operate the input or switch on the TQ and the signal should register in the dialog, highlighted in a green colour.

The **Trim Up** and **Trim Down** digital outputs operate the TQ's trim wheel, moving the wheel in a clockwise and anti-clockwise direction respectively (the Stab Trim indication will not change as this is a separate analogue control).

The FSC Trim Wheel **Speed** can be set from 2 (slow) to 12 (fast), the default is 7.

To check the **Park Brake Release** you must first set the parking brake; the control will then release the brake lever.

To check the **SPLR UP Release** first move the Speed Brake lever to the **ARM** position, then tick the SPLR UP Release option (you should hear the SPLR motor lock release). You will now be able to move the Speed Brake lever all the way to the **UP** position. Move the lever back to **ARM**, turn off the SPLR UP Release option (you should hear another click) now the Speed Brake lever will only move to the **FLIGHT DETENT** position. This check can only be performed when the spoilers are enabled (**Disable Spoilers** checkbox not ticked) within the Test TQ Analog I/O dialog.

N.B. separate **ENABLED** and **ARMED** Speed Brake calibrated positions allow the Speed Brake lever on the TQ to be raised out of the gate on take off without registering in the ARMED position. This enables the speed brake motor to be controlled during RTO operations in the 737 without generating a 737 Config warning (due to the Speed Brakes being ARMED) during the take off roll.

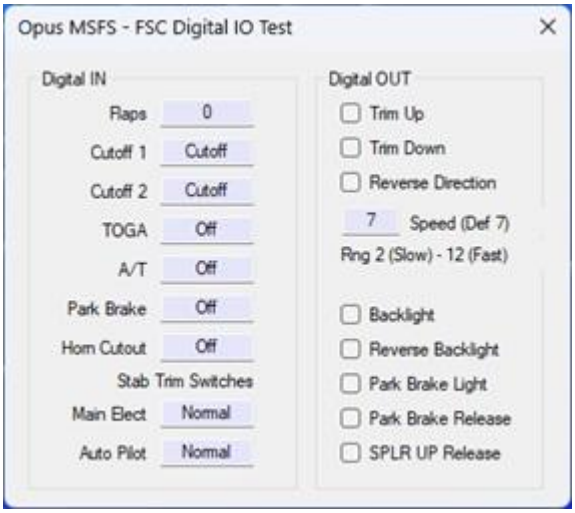


Figure 3 - Test TQ Digital I/O Dialog

Test TQ Analog I/O

The **Test TQ Analog I/O** dialog allows you to test all analogue inputs from and set-point (analogue control) outputs to the FSC Motorised TQ. This dialog is also used to set the required calibration data for your Motorised TQ. Note, the calibrated min and max values will also be updated 'on the fly' so to speak. For example, if the driver detects a larger maximum throttle position then the calibrated Max value will be amended.

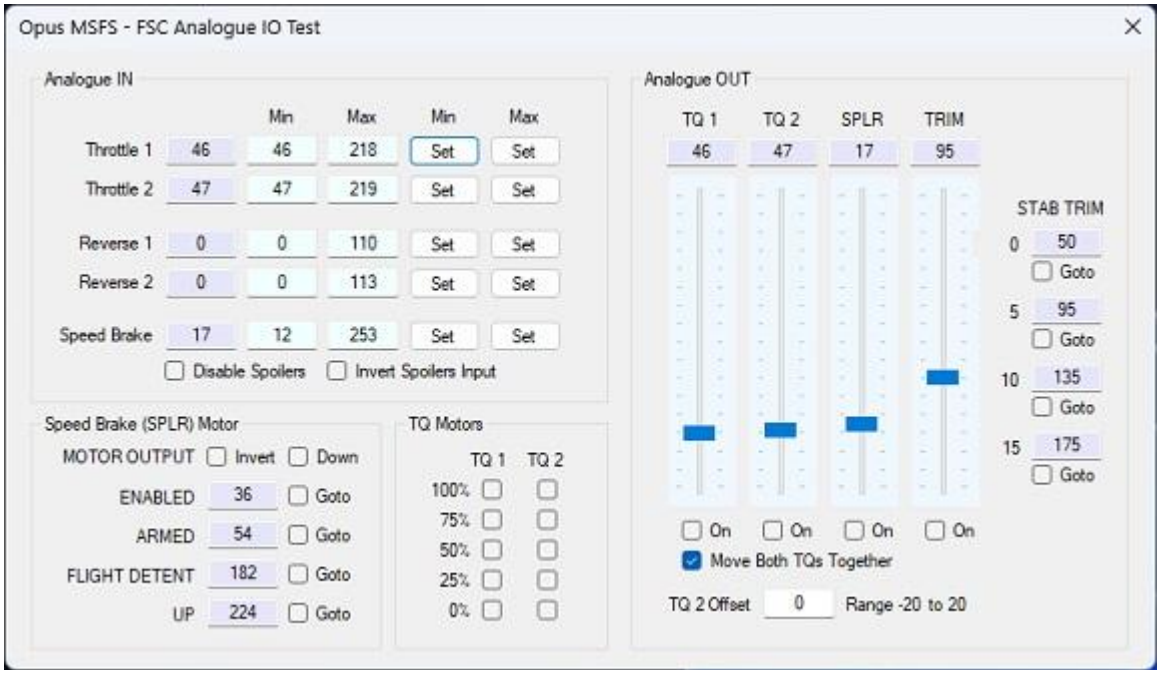


Figure 4 - Test TQ Analog I/O Dialog

The Analogue OUT motor controls should be used with caution. The individual motors can be enabled using the tick boxes below the relevant track bar. When the motors are enabled the position of the control can be adjusted using the sliders (min and max calibrated values are not used to limit the control values) or by typing a value into the control text boxes above the track bars.

Do not enable or move the SPLR position when the Speed Brake lever is locked in the DOWN position. The Speed Brake lever cannot be moved when it is locked down.

Calibrating Your Motorised TQ

First open and position both the **Test TQ Digital I/O** and **Test TQ Analog I/O** dialogs. All calibrations are done using the Test Analog dialog but the **SPLR UP Release** digital control will be needed to calibrate the Speed Brake lever.

Setting the Minimums

This is a simple process. Simply move all levers to their off position so the Speed Brakes will be DOWN, both throttles levers will be fully back, and both reverser levers will be fully down. Now press the **Set** buttons under the **Min** label to assign the minimum input values.

Setting the Maximums

Exercise and move both throttles to the fully forward position. Then ARM the Speed Brake and click on the SPLR UP Release control in the Test Digital dialog. Now move the Speed Brake Lever fully back beyond the UP position. Now press the **Set** buttons under the **Max** label to assign the maximum input values.

For the reverser levers, move both throttle levers fully back. Now raise both reverser levers fully up and down. Press the **Set** buttons under the **Min** and **Max** labels to assign the reverser minimum and maximum input values.

Finally stow the reversers moving both levers fully down.

You have now completed the Max Calibration step.

Checking the Speed Brake Lever

This check can only be performed when the spoilers are enabled, that is when the **Disable Spoilers** checkbox is not ticked.

First move the **Speed Brake** lever to the **ARM** position. Make sure you have released the spoilers by ticking the **SPLR UP Release** option in the Test Digital I/O dialog. The SPLR UP Release control allows full movement of the Speed Brake lever, without it the lever will not move beyond the **FLIGHT DETENT** position.

Starting with the **Speed Brake** lever in the **ARM** position and the **SPLR UP Release** control on;

Click on the **FLIGHT DETENT, UP,** and **ARM Goto** tick boxes to move the Speed Brake lever to each position. The default control values (analogue set-points) of 48, 184, and 224 can be modified to position your Speed Brake lever over the marked positions on the TQ.

When done simply close the Test dialogs.

All calibration data will be saved when you shutdown the OPUSFSCTQ driver program. If needed shutdown and restart the driver program to save all your calibrated data and preferred dialog positions.

Checking the Throttle Synchronisation

First ensure the **Move Both TQs Together** check box is ticked. Now use the **TQ Motors** TQ1 or TQ2 position 'Goto' boxes to command the throttles to various positions. If there is a slight mismatch

of the throttle positions then adjust the value in the **TQ2 Offset** and repeat the 'Goto' tests until both throttle positions are aligned. The **TQ Offset** may range from -20 to 20.

Calibrating the Stab Trim Indicator

At present the Stab Trim Indicator calibration values are fixed within the driver as,

```
Stab Trim Position  0  =  50
Stab Trim Position  5  =  95
Stab Trim Position 10  =  135
Stab Trim Position 15  =  175
```

Calibration of these values will be included within a future version of the driver.

Standard Motor Settings

At present the OpusMSFS driver sets the following motor speed and timing settings,

```
Trim Wheel Speed               =  7  Range 2 to 12, slow to fast
Throttle Servo Motor Max Speed = 10  Range 80 to 5, slow to fast
Throttle Servo Motor Min Speed = 70  Range 80 to 5, slow to fast
Throttle Servo Motor Spin Time = 50  ms
```