Spitronics Simulator3 Manual

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1. Introduction

The Spitronics Simulator is a diagnostic tool designed to help you test Spitronics products.

The Spitronics simulator is compatible with:
- Spitronics ECU's; EMU, TITAN, VENUS, PLUTO, PLUTO2, SATURN MERCURY and MERCURY2
- TCU's; TITAN, NEPTUNE, NEPTUNE2, MERCURY and MERCURY2
- Firing modules; F10, F11 and all newer modules
- Idle control1/2; TYPE 1 and 2
- Selective non Spitronics management units with the correct harness for the simulator.

Please read through the manual to make sure you follow the correct setup requirements.

2. Hardware Setup

⚠ **Important!**
ECU's is automatically grounded through the 12 way connector, do not apply a separate ground to the unit, unless testing an old EMU or a TITAN TCU

Power is supplied to the simulator through the 12V jack that is fitted to the simulator either through the 12V power supply sold with the unit or battery.

2.1. Connecting Instructions

1. Connect the power supply to the 12V jack on the simulator.
2. Connect the unit (MERCURY, VENUS etc.).
3. Make sure the green power (PWR) LED on the simulator comes on when power is applied. Also the units LED's will switch on and this will signify that the unit is powered up.

3. Inputs and Outputs

3.1. LED Indicators : ECU

The LED's will indicate all simulated outputs:

Relay = Fuel Relay
P7 = Positive Coil Driver 7
P5 = Positive Coil Driver 5
P3 = Positive Coil Driver 3
P1 = Positive Coil Driver 1
GP1 = General Purpose Output 1
N1 = Negative Injector Driver 1
N3 = Negative Injector Driver 3
N5 = Negative Injector Driver 5
N7 = Negative Injector Driver 7
GP2 = General Purpose Output 2
PWR = Power

E-Relay = Electronic Relay
P8 = Positive Coil Driver 8
P6 = Positive Coil Driver 6
P4 = Positive Coil Driver 4
P2 = Positive Coil Driver 2
RPM = RPM Output
N2 = Negative Injector Driver 2
N4 = Negative Injector Driver 4
N6 = Negative Injector Driver 6
N8 = Negative Injector Driver 8
5V = Monitor the Units 5V Output
TRIG = Simulator Trigger

3.2. Turning Knobs : ECU

The Turning knobs simulates all inputs:

TPS = Throttle Position Sensor
POT = Potentiometer
MAP = Manifold Absolute Pressure Sensor
Altitude = Altitude Pressure Sensor
Water = Water Temp Sensor
Air = Air Temp Sensor

RPM = Engine Revolutions per minute
Cam1 = Cam Sensor Degrees
Cam2 = Cam Sensor Degrees
Speed = Road Speed
Lambda = Exhaust Gas Sensor
Fuel Pressure = Fuel Pressure Sensor

3.3. Up and Down Buttons

These two buttons are mainly for TCU testing to simulate the up and down shift buttons. The buttons are connected to the DB44 and can be used for other purposes as well.

4. Program Button

The program button is not only there to put the simulator in the correct program, it can be used to change the RPM speed to simulate high and low speeds as well as removing RPM from the unit to test startup or fuel relay. If the simulator is set on 0 RPM and the power is removed for a very short time and put back on again the PRM's will still be 0 and the unit will switch the fuel relay driver on and then off again if there is still no RPM's to simulate fuel pump prime when the key is turned on.

5. Connecters

5.1. DB44

The DB44 connecter connects to the MERCURY and VENUS harnesses that will connect to the specific unit you want to test.

5.2. 12V DC Power Jack

The Power Jack for applying power to the Simulator.

5.3. 6Way

The 6Way connecter connects to your programmer so you can update your simulator's firmware if there are new features available. Be sure to never upload incorrect firmware

into the simulator as it will lock the internal processor. Once the processor is locked the simulator will have to be sent back to Spitronics to be repaired.

5.4. 8Way

The 8Way is for future use

6. Signal Simulating

The simulator is capable of simulating more than 30 different triggers; Crank and TDC (Top Dead Center) position sensors as well as two Cam sensors can be simulated and can be selected by the program button located on the simulator. The simulator program can be changed via the program button located on the simulator.

7. Changing Programs

> ⚠ **Note**
> When programming the Simulator, two rapid flashes signifies a zero

1. Switch the simulator off.
2. Hold the button in while turning the power on to enter program mode.
3. Release the button and press once, the green trigger LED will indicating the current mode of the simulator. If the simulator is in the correct mode and do not want to change the mode, simply just switch the power off and on again to retain that mode.
4. Enter the new program: press the program button on the simulator to enter a program

> ⚠ **Note**
> Press the button 5 times in succession to enter a zero in the first character. Press the button 10 times to enter a zero in the second character.

4.1 Example1: To enter program 09 to simulate a 36-1 trigger, enter a zero by pressing the button 5 times, then the simulator will confirm a zero by flashing

back twice fast, enter a 9 by pressing the button 9 times, the simulator will then flash the program back at you to confirm the correct program. The simulator is now in program 09.

4.2 Example2: To enter program 12 to simulate a 60-2 trigger, enter a 1 by pressing the button once, when the simulator has confirmed a 1 by flashing back once, enter a 2 by pressing the button twice, the simulator will then flash the program back to confirm the correct program. The simulator is now in program 12.

5. The simulator power off automatically, just press the power on again to apply the changes.

8. Programming the Simulator

The simulator firmware can be updated as new versions are released. In most cases the new firmware will activate more triggers to be simulated and new features.

⚠ **Important!**
Remember to hold the power button down when connecting to the simulator with the firmware programmer, the unit has a relay build in so as soon as you connect the relay will disconnect the power and the simulator will not have power to program.

⚠ **Important!**
Do not attempt to upload any non-simulator related firmware onto the simulator, the simulator may be damaged and will have to be send back to Spitronics to be repaired.

9. Testing a Spitronics TCU

⚠ **Important!**
Note that when testing a TCU unit on the simulator that the inputs and output will work different from an ECU. This is because the TCU has less inputs and outputs than the ECU.

When testing a TCU, put the simulator in mode 45, with this mode you can change the engine speed and road speed individually to simulate what happens on a motor car while driving. The TCU has positive outputs so the positive (Red) LED's will be used to display the solenoids.

When testing a TCU or a Neptune TCU use the NEPTUNE harness. (Sold separately)
When testing a Mercury TCU use the MERCURY TCU harness. (Sold separately)

9.1. LED Indicators : TCU

The LED's will indicate all simulated outputs:

Relay = Fuel Relay (Mercury TCU only)
E-Relay = Electronic Relay (Mercury TCU only)

P5 = Solenoid 5 / Line Pressure
P6 = Solenoid 6 / Lockup
P3 = Solenoid 3
P4 = Solenoid 4
P1 = Solenoid 1
P2 = Solenoid 2
GP1 = GPO1 (Mercury TCU only)
RPM = Speedo Output (Mercury TCU only)
N1 = Line Pressure 1 (Mercury TCU only)
N2 = Line Pressure 2 (Mercury TCU only)
N3 = Line Pressure 3 (Mercury TCU only)
N4 = Line Pressure 4 (Mercury TCU only)
N5 = Line Pressure 5 (Mercury TCU only)
N6 = Line Pressure 6 (Mercury TCU only)
GP2 = GPO2 (Mercury TCU only)
PWR = Power
TRIG = Simulator Trigger

9.2. Turning Knobs : TCU

The Turning knobs simulates all inputs:

TPS = Throttle Position Sensor
RPM = Engine Revolutions per minute
POT = Profile Switch
Cam1 = Not Used
MAP = Reverse logic / Shifter
Cam2 = Not Used
Altitude = Not Used
Speed = Road Speed
Water = Oil Temp Sensor (Mercury TCU only)
Lambda = Not Used
Air = Not Used
Fuel Pressure = Not Used

10. Simulator Harness

> ⚠ **Note**
> The simulator has a series of different harnesses for different applications, make sure you have the correct harness.

11. Trigger Table

11.1. Crank Gears

Program	Trigger
Program 01	8-1 Gear - 16 Pulse/Rpm (1. 8 Teeth Crank Pulse with 1 Tooth Slot)
Program 02	12-1 Gear - 12 Pulse/Rpm (1. 11 Teeth Crank Pulse with 1 Tooth Slot)
Program 03	12+1 Gear - 60 Pulse/Rpm - Magnetic (1. 12 Teeth Crank Pulse with 1 TDC Tooth
Program 04	12+Home Gear - 12 Pulse/Rpm (1. 12 Tooth Crank Pulse) (2. 1 Tooth Cam Home Pulse)
Program 05	18-1 Gear - 18 Pulse/Rpm (1. 17 Teeth Crank Pulse with 1 Tooth Slot)
Program 06	24-1 - 24 Pulse/Rpm - Magnetic (1. 23 Teeth Crank Pulse with 1 Tooth Slot)
Program 07	24-2 Gear - 24 Pulse/Rpm

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(1. 22 Teeth Crank Pulse with 2 Tooth Slot)

Program 08 .....30-2 Gear - 30 Pulse/Rpm
(1. 28 Teeth Crank Pulse with 2 Tooth Slot)

Program 09 .....36-1 Gear - 36 Pulse/Rpm
(1. 35 Teeth Crank Pulse with 1 Tooth Slot)

Program 10 .....36-2 Gear - 36 Pulse/Rpm
(1. 34 Teeth Crank Pulse with 2 Tooth Slot)

Program 11 .....60-1 Gear - 60 Pulse/Rpm
(1. 59 Teeth Crank Pulse with 1 Tooth Slot)

Program 12 .....60-2 Gear - 60 Pulse/Rpm
(1. 58 Teeth Crank Pulse with 2 Tooth Slot)

Program 13 .....Suzuki 3Cyl 36-4 Gear - 36 Pulse/Rpm
(1. 36 Teeth Crank Pulse with 2x2 Tooth Slots)

Program 14 .....Colt V6 - 18 Pulse/Rpm - Hall Sensors
(1. 3 Pulse Crank Gear)
(2. 4 Pulse ID Cam Gear (3 Small 1 Large))

Program 15 .....Subaru 6&7 Tooth - 36 Pulse/Rpm
(1. 6 Pulse Crank Gear "Weird 6 Tooth")
(2. 7 Pulse Cam Gear "Weird 7 Tooth")

Program 16 .....Subaru 36-6 Gear Pulse/Rpm
(1. 30 Teeth Crank Pulse with 3x2 Tooth Slots)

Program 17 .....Mazda 4+Home - 8 Pulse/Rpm
(1. 4 Tooth Crank Gear)
(2. 1 Tooth Cam Home Pulse)

Program 18 .....Fiat 4Cyl 1.8L 16V 6&3 - 36 Pulse/Rpm - Magnetic Crank Hall Cam
(1. 6 Tooth Crank Gear)
(2. 3 Tooth Cam Home Pulse - 1 Small 2 Large)

Program 19 ……18-6 TDC Home Gear - 18 Pulse/Rpm
(1. 12 Teeth Crank Pulse with 3x2 Tooth Slot)
(2. 1 Tooth Cam Home Pulse - 180°)

11.2. Distributors

Program **Trigger**

Program 30 ……..TEST Program
(1. Crank Pulse)
(2. TDC Pulse)
(3. Cam1 Pulse)
(4. Cam2 Pulse)

Program 31……..24+TDC - 12 Pulse/Rpm
(1. 24 Teeth Distributor Pulse)
(2. TDC Distributor Pulse)

Program 32 ……..Nissan 4Cyl - 30 Pulse/Rpm - Hall Sensors
(1. 4 x Progressive Slots Smaller)

Program 33……..Nissan 6Cyl - 45 Pulse/Rpm - Hall Sensors
(1. 6 x Progressive Slots Smaller)

Program 34 ……..Nissan V8 - 45 Pulse/Rpm - Hall Sensors
(1. 4 x Progressive Slots Smaller + 4 x Intermediate Pulses)

Program 35 ……..Ford Slots 8Cyl - 60 Pulse/Rpm - Hall Sensors
(1. 8 Slots 1 Large 7 Small (Positive Edge))
(Channel 2 Inverted (Negative Edge))

Program 36 ……..Daewoo Matiz 60-6 30 Pulse/Rpm - Magnetic

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(1. 60-2-2-2 Distributor Pulse)
(2. Home Pulse)

Program 37 .....Honda 4Cyl - 12 Pulse/Rpm - Hall Sensors
(1. 4 Slots)
(2. 1 Pulse Home)

Program 38 .....Hyundai 4Cyl 16 Valve 1600 18 Pulse/Rpm - Hall Sensors
(1. 4 Pulse Timing)
(2. 2 Pulse TDC)

Program 39 .....Mazda 4Cyl 12 Pulse/Rpm - Hall Sensors
(1. 4 Pulse Distributer)
(2. 2 Pulse Home)

Program 40 .....Alfa 4Cyl - 76 Pulse/Rpm - Hall Sensors
(1. 4 Slots - First 2 Large then 2 Small)

Program 41 .....Spitronics 4 Slots - 12 Pulse/Rpm - Hall Sensors
(1. 4 Slots - 1 Large 3 Small)

Program 42 .....Spitronics 6Cyl - 45 Pulse/Rpm - Optic
(1. 6 Slots 1 Large 5 Small)

Program 43 .....Nissan SR20 4Cyl - 12 Pulse/Rpm - Hall Sensors
(1. 4 Slots)
(2. 1 Pulse Home)

Program 44 .....Mitsubishi 6Cyl Dizzy - 18 Pulse/Rpm - Hall Sensors
(1. 6 Pulse Trigger)
(2. 2 Pulse Home (1 Small 1 Large))

Program 45 .....Gearbox Test Program - Hall Sensors
(1. Crank Pulse)
(2. Speed Pulse)