# Shifter Sensor

The Shifter sensor or Range Switch is important for the TCU to select the correct shift pattern for each shifter position. This is a requirement of the transmission. It will indicate to the TCU which gear may not be exceeded. For example, if the shifter is in position 2, the TCU will not shift above 2nd gear unless it is allowed in that position. It will also tell the TCU to engage engine brake clutches etc. this switch is calibrated in the software.

Settings
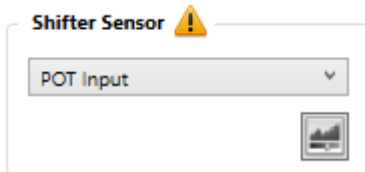
This signal is a critical setting which means it is saved separate from the 4 maps. It can only be calibrated in MAP 1 and does not change when other maps are loaded in the TCU. The Clone function will alter this calibration to the Clone map.

This block will set up the type of shifter position sensor on different transmissions. Some will be blanked out by the firmware and other will leave the installer choices on his method of wiring. Note that the TCU is mostly concern in reverse so that it will prevent shifting gears as the shift solenoids as this action will put some transmissions in neutral or lock mode which can be detrimental.
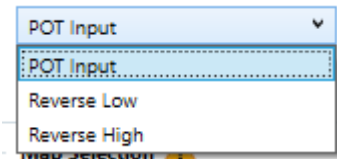
Pot Input
The software will indicate all the shifter positions if the TCU has a signal representing all the different positions. This selection is for shifters with a potentiometer to indicate the lever position like the Spitronics Shifter or some Ford shifter models. Spitronics also manufacture a resistor encoder board for shifters with complex logic selector switches. The advantage is that the TCU only requires one input for multiple switches. This values for the shifter must be calibrated If this button is not available it is either Pre Ver 3.2 firmware or the TCU is currently on a Map greater than 1. In the last case click on *1 Map* do the calibration and then click on *4 Map Switch* before you save the data to TCU. The older versions were preprogrammed and could not be changed. Note than most transmissions require the shifter sensor to prevent solenoid operations in certain shifter positions and for the transmission to operate correctly. Also to activate Squad functions to eliminate transmission shock when lever move to R or D positions.

Reverse Low
This setting is used where a switch is mounted on the shifter which gives a ground signal when reverse is selected. Note that the software will only indicate drive or reverse.

Reverse High

This setting is used where the signal is connected to the reverse light between the switch and the bulb. It is a positive signal that switch on the reverse lights. The bulbs need to be working as they act as pull down resistors. Note that the software will only indicate drive or reverse.

 Click on this button to enter calibration mode.

If your shifter or transmission has only 3 positions, 3 & 4 will be hidden.

Put the Shifter in Park. As a test you can go through all the positions to position up to 1st in sequence to see if the real time value change significantly. Note that the value must change for each position of the shifter. Some shifters have the same value in park and neutral then only park will be indicated on the software.
Put the Shifter in Park and click on P. It will become green. Go through the other positions R, N, D, 2 & 1. Put the Shifter in Park again and click **Save & Close**. Then click the save to TCU button to make the calibration permanent.

Sensor Hardware Description

The Shifter sensor is normally situated on the transmission where the shifter lever enters the transmission. Some transmissions do not have this sensor and it may be situated in the shifter itself. Other transmissions have hydraulic switches inside the transmission. These switches may only operate when the engine is running like GM 4 speed transmissions. If there is no sensor available, you may connect the sensor wire to the reverse light or a reverse ground switch. The TCU must know when it is in reverse to prevent shifting forward gears. This is an option for first generation 4 speed boxes that were not very complicated.

There are two different types of sensors. Analogue and Digital. The TCU requires an analogue signal that can be calibrated. If it is a digital sensor, Spitronics has a converter board that convert the signal to analogue. The digital switches can be serial or parallel switches so we designed 2 different converter boards. The type is also listed with the harness numbers as well as the diode boards on the top label of your drawing. Make sure you have the correct ones before wiring.

Shifter Converter Drawing

Spitronics Shifter
The Spitronics shifter has a serial shifter switch that convert the positions to analog signal by a series

of resistors with progressive values. The TCU will measure the resistance and then calculate in which position it is. Note that Orion has a 1 K pull-up resistor built into the harness because the hardware is also ECU capable.

Shifter

1K 470R 330R 220R 100R

R N D 2 1 P A

Red To 12 Way Pin 8

Green
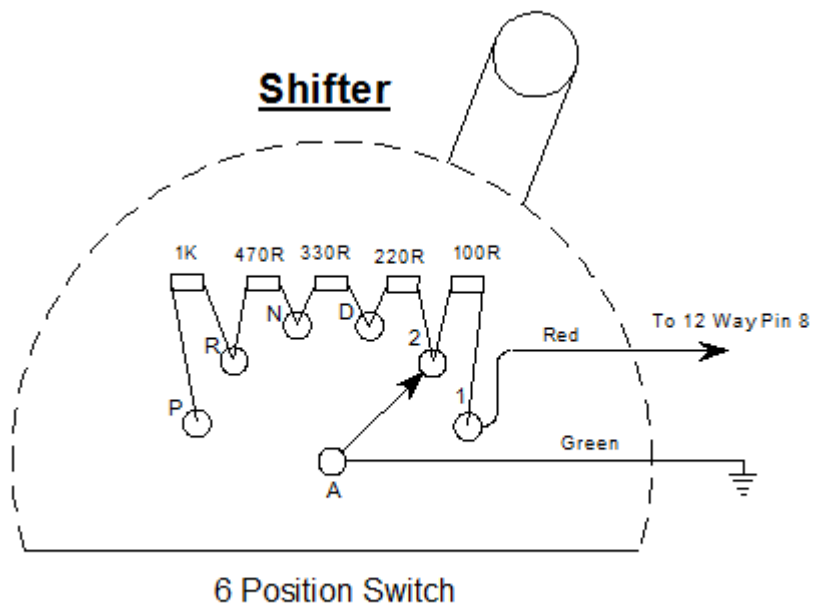
6 Position Switch

GM Shifter sensors:

The GM transmissions have parallel pressure switches that connects to oil channels inside. The switch pattern indicates position of the shifter lever. Spitronics has a parallel converter board with progressive resistor values to convert this digital pattern to an analog signal. The drawing in the Example below is for the 5L40E.

From Ignition Start → Blue 86 Red To starter solenoid 87 87a

GM Transmission

Connector

2 P/N 85 30

19 1K C

16 2K2 A

7 4K7 B Red
To TCU 12 Way Pin 8

11 10K P

4

1uF

Green

12V Battery