

Classic Instruments

SN7 4Z

Installation Manual

Table of Contents

Welcome from the Team at Classic Instruments!	3
Before You Get Started	4
Speedometer Application	4
Connecting the SN74Z	4
SN74Z Dip Switch Settings	5
Classic Instruments Speedometer Dip Switch Settings	6
SN74Z Speedometer Calibration Modes	6
Instant Calibration Mode	6
Real-Time Calibration Mode	7
Marked Mile Calibration Mode	8
Tachometer (Standard Ignition) Application	9
Connecting the SN74Z	9
SN74Z Dip Switch Settings	10
SN74Z Standard Ignition Tachometer Calibration	10
Tachometer (Diesel) Application	11
Flywheel Signal	11
Connecting the SN74Z	11
SN74Z Flywheel Tach Signal Dip Switch Settings	11
Flywheel Signal Tachometer Calibration	12
Alternator Signal	13
Connecting the SN74Z	13
SN74Z Alternator Tach Signal Dip Switch Settings	14
Alternator Signal Tachometer Calibration	14

Welcome from the Team at Classic Instruments!

Our congratulations and appreciation for your purchase of one of the finest quality sets of specialty instruments ever produced! Your instrument set has been conceived, designed, and manufactured by Classic Instruments, Inc. in the U.S.A. Each instrument has been tested and certified for accuracy and quality before packaging and shipping.

For trouble-free installation and operation follow the instructions exactly as outlined. Your instruments were assembled to precise specifications and although each has a seven (7) year warranty covering defective parts and workmanship – this warranty will not cover instruments or sender units which have been installed incorrectly.

Follow our recommended procedures for installation and proper hookup to maintain the value and appearance of your instrument set during many future years of accurate and dependable service!

LIMITED WARRANTY

Classic Instruments, Inc. (CI) warrants to the original purchaser that any CI product manufactured or supplied by CI will be free from defects in material and workmanship under normal use and service for a period of seven (7) years from date of purchase.

Improper installation, use of sending units other than CI's or attempted repair or adjustments by other than CI shall void this warranty. Disassembly of any instruments or senders for whatever reason shall specifically void this warranty.

It's always easy to look to a part for an issue with your set. Before you conclude that a part may be bad, thoroughly check your work. Today's semiconductors and passive components have reached incredibly high reliability levels, but there is still room for error in our human construction skills. However, on rare occasions a sour part can slip through. Please be aware that testing can usually determine if the part was truly defective or damaged by assembly or usage. Don't be afraid of telling us that you "blew it", we're all human and in most cases, replacement parts are very reasonably priced.

Purchaser requesting a product to be repaired or replaced under warranty must first call CI at 1-800-575-0461 before the return of defective part. Send defective part to 826 Moll Drive, Boyne City, MI 49712, USA. Include a written description of the failure with defective part.

Purchaser agrees and accepts that under no circumstances will a warranty replacement be furnished until CI has first received, inspected, and tested the returned part.

All other warranties expressed or implied are hereby excluded including any implied warranty of merchandise and implied warranty of fitness for a particular purpose. The sole and exclusive remedy for breach of this warranty is limited to the replacement set forth above.

It is expressly agreed that there shall be no further remedy for consequential or other type of damage, including any claim for loss of profit, engine damage or injury.

TECHNICAL ASSISTANCE

1-800-575-0461

OR

Visit our website for the latest in gauge design and updates to our installation manual

www.classicinstruments.com

Before You Get Started

The SN74Z has been designed to cover a wide variety of speedometer and tachometer applications. With the wide variety of functions, there are a couple ways the SN74Z can be connected and calibrated. Please note that the SN74Z can work with either a speedometer or tachometer but NOT at the same time.

Follow the instructions under the section relating to your application (*i.e. Speedometer Application, "Tachometer Standard Ignition Application", or "Tachometer Diesel Application"*) and disregard all other instructions.

Speedometer Application

Connecting the SN74Z

- 1) Connect switched +12VDC power to the SN74Z terminal marked **+12 VOLTS**.
- 2) Connect a good ground to the SN74Z terminal marked **GROUND**.
- 3) Connect the red wire of a Classic Instruments SN16 / SN16F pulse signal generator to the SN74Z terminal marked **SENDER +**. *If you are not using a pulse signal generator, this terminal is not used.*
- 4) Connect ¹⁾ one wire of an electronic transmission's vehicle speed sensor (VSS), ²⁾ one wire of a 2-wire pulse signal generator or ³⁾ the black wire of a Classic Instruments SN16 / SN16F pulse signal generator to the SN74Z terminal marked **SENDER -**.
- 5) Connect ¹⁾ one wire of an electronic transmission's vehicle speed sensor (VSS), ²⁾ one wire of a 2-wire pulse signal generator, ³⁾ the white wire of a Classic Instruments SN16 / SN16F pulse signal generator or ⁴⁾ a Computer (*ECM / PCM*) generated speed signal to the SN74Z terminal marked **SPEEDO IN**.
- 6) Connect the signal post of your speedometer to the SN74Z terminal marked **OUTPUT**.
- 7) ^{Optional:} The SN74Z terminal marked **CRUISE** puts out an 8,000 pulse per mile 12-volt square wave signal that can be used as a signal source for a cruise control, lockup converter, etc...
- 8) Connect two wires from a momentary contact pushbutton to the two terminals on the SN74Z marked **BUTTON**. *A pushbutton is also mounted to the SN74Z that can be used in place of a remote button attached to the BUTTON terminals.*

Wiring Diagrams on Following Page

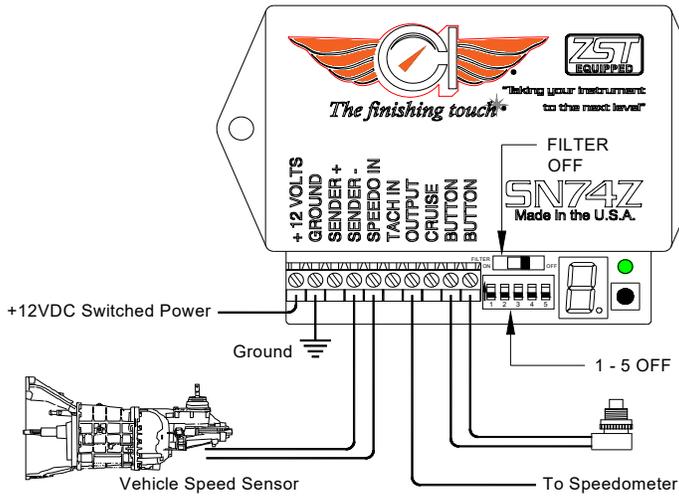


Figure 1: Vehicle Speed Sensor (VSS) Connection

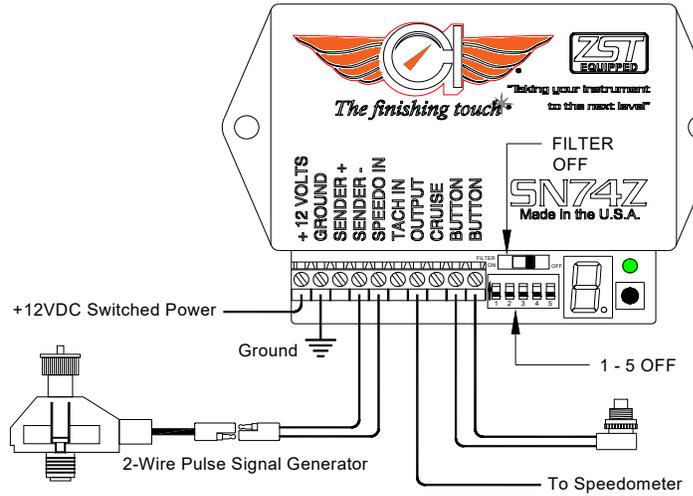


Figure 2: 2-wire Pulse Signal Generator Connection

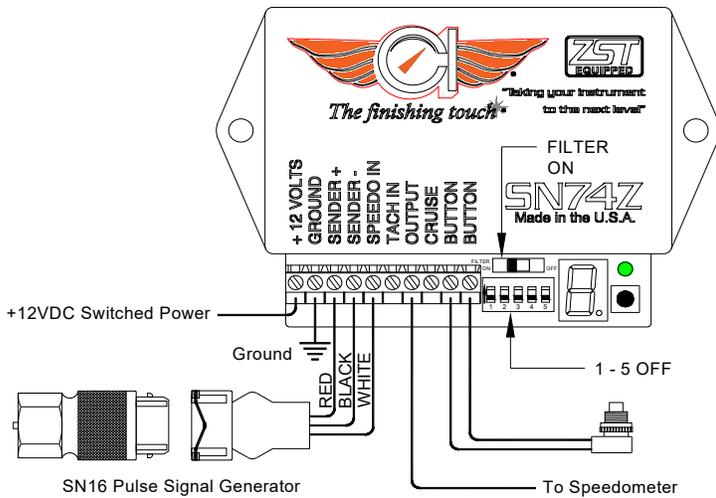


Figure 3: SN16 Pulse Signal Generator Connection

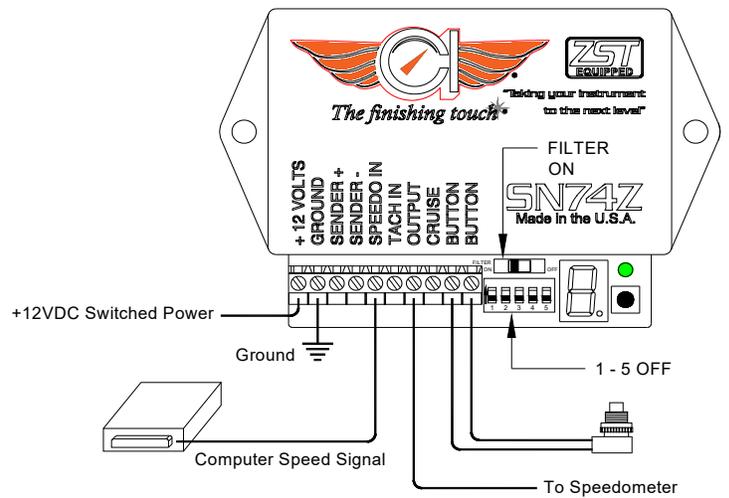


Figure 4: ECM/PCM Speed Signal Connection

SN74Z Dip Switch Settings

- Dip Switch #1:
 - Set switch #1 ON to set the output to 8,000 pulses per mile (ppm). (*Classic Instruments speedometers that have 8 dip switches on the back require 8,000 ppm*)
 - Set switch #1 OFF to set the output to 16,000 pulses per mile (ppm). (*Classic Instruments speedometers that have 12 dip switches on the back require 16,000ppm*)
- Filter Switch:
 - Set the Filter Switch ON for square wave speed signals such as ECM / PCM speed signals or SN16 / SN16F pulse signal generator signals.
 - Set the Filter Switch OFF for sine wave speed signals such as OEM vehicle speed sensor (VSS) signals or SN96 / SN95 pulse signal generator signals. (*sine wave signal sensors always have 2 wires*)
- Dip Switches #2 - #5 are NOT used

Classic Instruments Speedometer Dip Switch Settings

Classic Instruments speedometers have a row of rocker switches on the back that are used to calibrate the speedometer in certain applications. However, if you are using a SN74Z, the speedometer rocker switches are not used to calibrate the speedometer.

The rocker switches of the speedometer only need to be set to the default setting. Early model Classic Instruments speedometers came with 8 rocker switches and have a different default setting than newer Classic Instruments speedometers with 12 rocker switches. Check the number of dip switches your speedometer has and set them to the default setting.

- 12 Dip Switch Speedometer:
 - Switches **5, 6, 7, 8 OPEN** (*pushed in away from the number side of the switch*). All other switches (**1, 2, 3, 4 & 9, 10, 11, 12**) **CLOSED** (*pushed in toward the number side of the switch*).
- 8 Dip Switch Speedometer:
 - Switches **2, 6, 7, 8 OPEN** (*pushed in away from the number side of the switch*). All other switches (**1, 3, 4, 5**) **CLOSED** (*pushed in toward the number side of the switch*).

SN74Z Speedometer Calibration Modes

There are three calibration modes you can use to calibrate the SN74Z. Use whichever mode seems easiest for your application. It is not necessary to perform all calibration modes.

Instant Calibration Mode

- Start with vehicle power off.
- Press and hold the calibration button and start the engine. *Once the engine is running, release the button.*
- The LED digit will display **C**, indicating entry into module select mode.
- After a few seconds, the LED digit will display **S**, **r** or **F**. Tap the button to cycle round robin through these setup options. Press and hold the button when the LED digit displays **S** (*indicating setup for speedometer applications*).
- Release the button when the LED digit displays **C**, indicating entry into calibration mode.
- Tap the button to change the LED digit to **1** indicating instant calibration mode. *Continuing to tap the button will cycle round robin through the calibration modes 1, 2, 3 and F.*
- Press and hold the button with the LED digit indicating **1** until the **1** starts blinking.
- Begin driving at 30 mph based on GPS or a pace car. (*The green LED on the SN74Z should blink indicating that it is getting a signal*).
- While driving steady at that speed, press and hold the button until the LED digit changes back to **C** (*to confirm that calibration is saved*).
- The speedometer should now begin reading 30 mph.
- Press and hold the button while the LED digit displays **C** to exit calibration mode. (*Tap the button to cycle round robin through the calibration modes again if you would like to perform another calibration*).

Real-Time Calibration Mode

- Start with vehicle power off.
- Press and hold the calibration button and start the engine. *Once the engine is running, release the button.*
- The LED digit will display **C**, indicating entry into module select mode.
- After a few seconds, the LED digit will display **S**, **r** or **F**. Tap the button to cycle round robin through these setup options. Press and hold the button when the LED digit displays **S** (*indicating setup for speedometer applications*).
- Release the button when the LED digit displays **C**, indicating entry into calibration mode.
- Tap the button to change the LED digit to **2** indicating real-time calibration mode. *Continuing to tap the button will cycle round robin through the calibration modes 1, 2, 3 and F.*
- Press and hold the button with the LED digit indicating **2** until the **2** starts blinking.
- Begin driving a known speed. (*The green LED on the SN74Z should blink, indicating that it is getting a signal*).
- Press and hold the button to change the speed shown on the speedometer. The first time the button is pressed and held, the speed shown on the speedometer will increase. The second time the button is pressed and held, the speed shown on the speedometer will decrease.
 - The SN74Z will alternate increasing or decreasing the speed shown on the speedometer each time the button is pressed. Press and hold the button to fine tune the speed shown on the speedometer.
- Once the speedometer is reading the correct speed, wait 8 seconds without pushing the button (*in order to save the calibration*). The LED digit will change back to **C** to confirm calibration is saved.
- Press and hold the button while the LED digit displays **C** to exit calibration mode. (*Tap the button to cycle round robin through the calibration modes again if you would like to perform another calibration*).

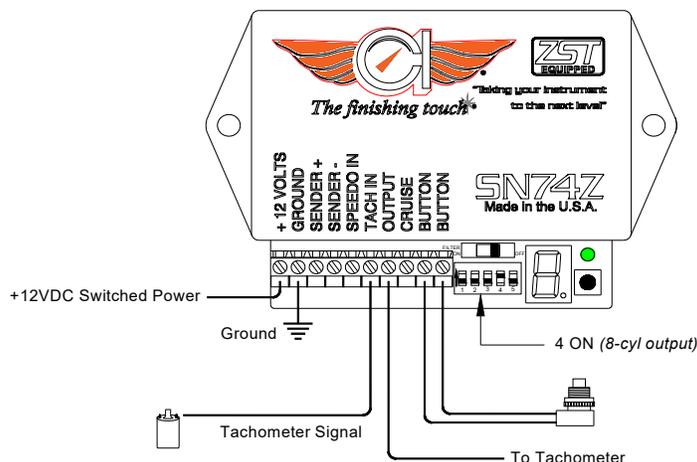
Marked Mile Calibration Mode

- Start with vehicle power off.
- Press and hold the calibration button and start the engine. *Once the engine is running, release the button.*
- The LED digit will display **C**, indicating entry into module select mode.
- After a few seconds, the LED digit will display **S**, **r** or **F**. Tap the button to cycle round robin through these setup options. Press and hold the button when the LED digit displays **S** (*indicating setup for speedometer applications*).
- Release the button when the LED digit displays **C**, indicating entry into calibration mode.
- Tap the button to change the LED digit to **3** indicating marked mile calibration mode. *Continuing to tap the button will cycle round robin through the calibration modes 1, 2, 3 and F.*
- Press and hold the button with the LED digit indicating **3** until the **3** starts blinking.
- Begin driving a known mile. (*The green LED on the SN74Z should blink, indicating that it is getting a signal*).
 - When driving the known mile, the speedometer will not indicate any speed. This is normal.
- At the end of the known mile, press and hold the button until the LED digit changes back to **C** to confirm calibration is saved.
- Press and hold the button while the LED digit displays **C** to exit calibration mode. (*Tap the button to cycle round robin through the calibration modes again if you would like to perform another calibration*).

Tachometer (Standard Ignition) Application

Connecting the SN74Z

- 1) Connect switched +12VDC power to the SN74Z terminal marked **+12 VOLTS**.
- 2) Connect a good ground to the SN74Z terminal marked **GROUND**.
- 3) Connect the tachometer signal to the SN74Z terminal marked **TACH IN**. See below for common tachometer signal locations.
 - a. STANDARD POINTS & CONDENSER SYSTEM
 - i. Connect to the negative side of the coil (usually marked as “-”).
 - b. GMC – HEI (High Energy Ignition System)
 - i. Connect to the “TACH” terminal on coil side of distributor cap.
 - c. MSD (Multiple Spark Discharge System)
 - i. Connect to the TACH signal from the MSD box.
 - d. VERTEX MAGNETO SYSTEM
 - i. Connect to the “KILL” terminal on the side of a Vertex magneto body. An external adapter such as an MSD “Pro Mag Tach Converter” #8132 may be required.
 - e. ACCEL IGNITION COILS
 - i. Connect to the negative side of the coil. CAUTION! Some Accel ignition coils require the tach signal wire to be connected to the “+” terminal on the coil! PLEASE carefully read Accel’s instructions before connecting ignition coil.
 - f. MALLORY IGNITION
 - i. Connect to the negative terminal side of coil (usually marked as “-“)
 - g. ECM TACHOMETER SIGNAL
 - i. Connect to the signal from the computer. The SN74Z typically needs to be set on the 4 cylinder input (*showing 2 on LED digit*) setting.
 - h. MULTIPLE COIL IGNITION SYSTEMS
 - i. A tach adapter may be required for these ignition systems. A tach signal driver such as the MSD #8919, which produces a 12V square wave signal, is recommended. Please check with manufacturer for your specific application.
 - i. FOR ALL OTHER IGNITION SYSTEMS, PLEASE REFER TO THE OWNER’S MANUAL FOR THE TACHOMETER SIGNAL LOCATION.
- 4) Connect the signal post of your tachometer to the SN74Z terminal marked **OUTPUT**.
- 5) Connect two wires from a momentary contact pushbutton to the two terminals on the SN74Z marked **BUTTON**. A pushbutton is also mounted to the SN74Z that can be used in place of a remote button attached to the **BUTTON** terminals.



SN74Z Dip Switch Settings

- Dip Switch #1: *Not Used*
- Dip Switch #2:
 - Set switch #2 ON for a 4-cylinder tachometer output.
 - For all other applications, set switch #2 OFF.
- Dip Switch #3:
 - Set switch #3 ON for a 6-cylinder tachometer output.
 - For all other applications, set switch #3 OFF.
- Dip Switch #4:
 - Set switch #4 ON for an 8-cylinder tachometer output.
 - For all other applications, set switch #4 OFF.
- Dip Switch #5:
 - Set switch #5 ON for tachometer input signals that come from a coil.
 - Set switch #5 OFF for all other (*low voltage*) tachometer signals.
- Filter Switch: *Not Used*

SN74Z Standard Ignition Tachometer Calibration

- Start with vehicle power off.
- Press and hold the calibration button and start the engine. *Once the engine is running, release the button.*
- The LED digit will display **C**, indicating entry into module select mode.
- After a few seconds, the LED digit will display **S**, **r** or **F**. Tap the button to cycle round robin through these setup options. Press and hold the button when the LED digit displays **r** (*indicating setup for standard ignition tachometer applications*).
- Release the button when the LED digit displays **C**, indicating entry into calibration mode.
- Tap the button so the LED digit displays **h**, **1**, **2**, **3**, **4**, **5** or **6**. Continuing to tap the button will cause the LED digit display to cycle round robin through these (*input signal*) options.
- Tap the button until the correct signal input is displayed on the LED digit.
 - **h**: 1-cylinder input signal.
 - **1**: 2-cylinder input signal.
 - **2**: 4-cylinder input signal. (*most ECM tachometer signals*)
 - **3**: 6-cylinder input signal.
 - **4**: 8-cylinder input signal.
 - **5**: 10-cylinder input signal.
 - **6**: 12-cylinder input signal.
- Press and hold the button to set the input signal mode indicated by the LED digit. The LED will display **C** indicating the setup has been stored.
- Press and hold the button while the LED digit displays **C** to exit calibration mode. (*Tap the button to cycle round robin through the calibration options again if you need to adjust the setting*)

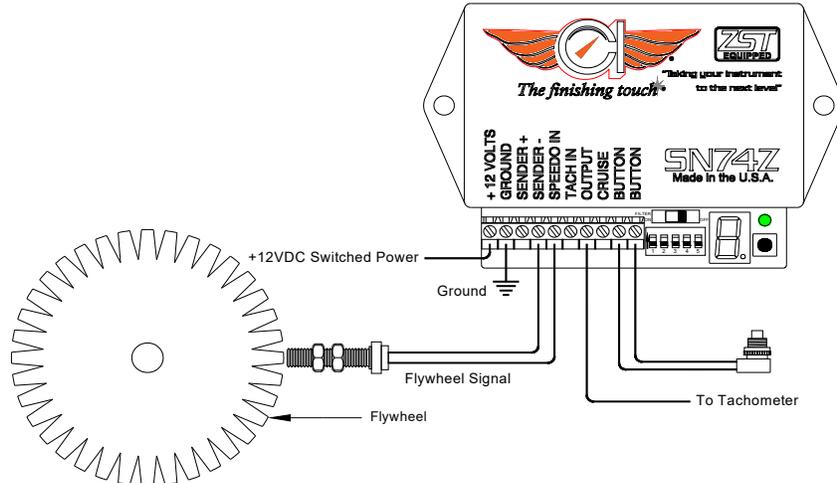
Tachometer (Diesel) Application

Diesel engines typically provide a tachometer signal from either a flywheel sensor or from the alternator. The connection and setup of the SN74Z is different for each setup. Follow the directions below that correspond with your specific signal type.

Flywheel Signal

Connecting the SN74Z

- 1) Connect switched +12VDC power to the SN74Z terminal marked **+12 VOLTS**.
- 2) Connect a good ground to the SN74Z terminal marked **GROUND**.
- 3) Connect one (*either*) wire of the flywheel sensor to the SN74Z terminal marked **SPEEDO IN**.
 - a. Connect the other wire of the flywheel sensor to the SN74Z terminal marked **SENDER -**.
- 4) Connect the signal post or wire of your tachometer to the SN74Z terminal marked **OUTPUT**.
- 5) Connect two wires from a momentary contact pushbutton to the two terminals on the SN74Z marked **BUTTON**. *A pushbutton is also mounted to the SN74Z that can be used in place of a remote button attached to the **BUTTON** terminals. This is the preferred button to be used.*



SN74Z Flywheel Tach Signal Dip Switch Settings

Set the SN74Z dip switches to the setting below that most closely matches your application. If your flywheel matches one of the below options, you can skip the following calibration procedure. If none of the options match your vehicle, turn all dip switches OFF and proceed with the calibration procedure.

- Dip Switch #1: OFF
- Dip Switch #2:
 - Set switch #2 ON for a 148 tooth flywheel (*Chevy Duramax*)
- Dip Switch #3:
 - Set switch #3 ON for a 152 tooth flywheel (*5.9L Cummins*)
- Dip Switch #4:
 - Set switch #4 ON for a 155 tooth flywheel (*7.3 Ford Powerstroke*)
- Dip Switch #5: OFF
- Filter Switch: OFF

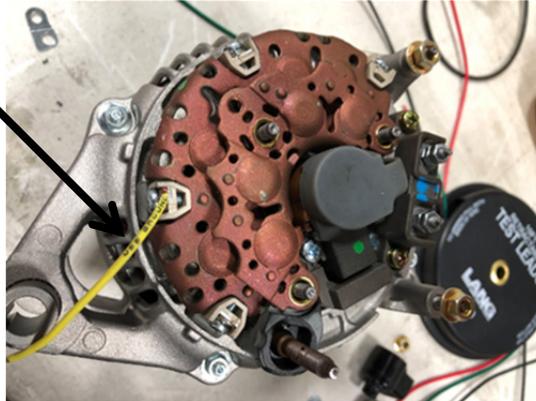
Flywheel Signal Tachometer Calibration

- *Skip this section if you set any of the dip switches to the ON position.*
- Start with vehicle power off.
- Press and hold the calibration button and start the engine. *Once the engine is running, release the button.*
- The LED digit will display **C**, indicating entry into module select mode.
- After a few seconds, the LED digit will display **S**, **r** or **F**. Tap the button to cycle round robin through these setup options. Press and hold the button when the LED digit displays **F** (*indicating setup for flywheel signal tachometer applications*).
- Release the button when the LED digit displays **C**, indicating entry into calibration mode.
- Tap the pushbutton to display the current flywheel teeth number setting followed by **C**.
- Run the engine at a known RPM. The green LED on the SN74Z should blink indicating that it is getting a signal.
- Push and hold the button with the LED display showing **C** until the **C** starts blinking.
- Press and hold the button to change the RPM shown on the tachometer. The first time the button is pressed and held, the RPM shown on the tachometer will increase.
- Quickly tapping the button will alternate the direction of the RPM adjustment. Upon releasing the button, the current adjusted flywheel tooth number will be displayed.
- Press and hold the button to fine tune the RPM shown on the tachometer. Hold the button for at least a second to continue adjusting the RPM in the current direction.
- Once the correct RPM is displayed on your tachometer, wait 8 seconds without pushing the button in order to save the calibration. The LED display will change back to a solid **C** to confirm calibration is saved.
- Press and hold the button while the LED digit displays **C** to exit calibration mode.

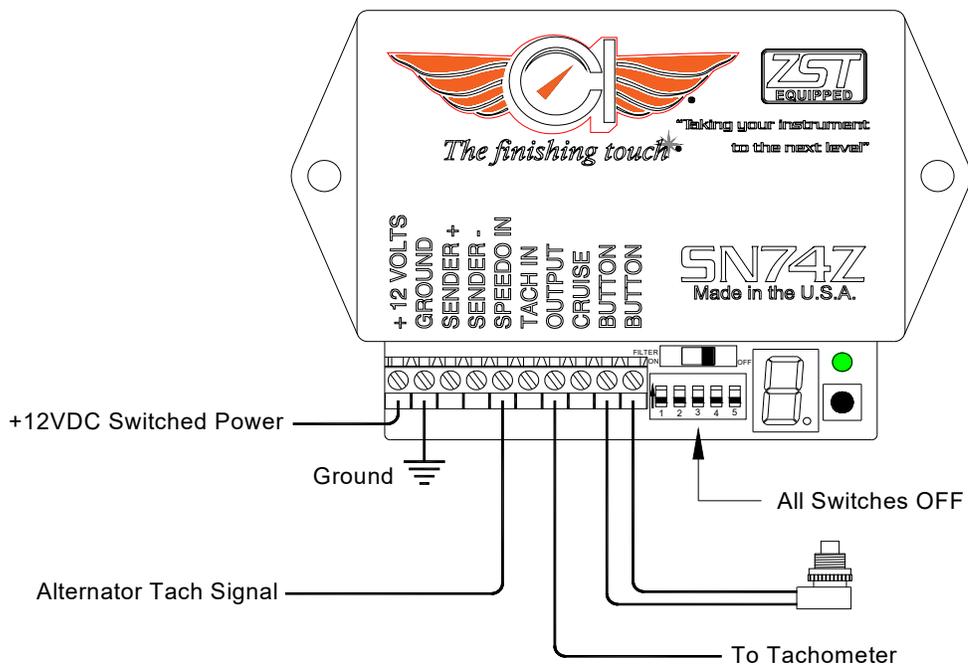
Alternator Signal

Connecting the SN74Z

- 1) Connect switched +12VDC power to the SN74Z terminal marked **+12 VOLTS**.
- 2) Connect a good ground to the SN74Z terminal marked **GROUND**.
- 3) Connect the tach signal wire of the alternator to the SN74Z terminal marked **SPEEDO IN**.
 - a. The signal may be labeled R, W or AC and is located on the back of the alternator.
 - b. If your alternator doesn't have a tach signal (identified in part "a" above), you can tap in to one of the stator screws on the tachometer. Below is an example. The back cover of the alternator was removed and a signal wire was attached to one of the stator screws.



- 4) Connect the signal post or wire of your tachometer to the SN74Z terminal marked **OUTPUT**.
- 5) Connect two wires from a momentary contact pushbutton to the two terminals on the SN74Z marked **BUTTON**. *A pushbutton is also mounted to the SN74Z that can be used in place of a remote button attached to the **BUTTON** terminals. This is the preferred button to be used.*



SN74Z Alternator Tach Signal Dip Switch Settings

Set all SN74Z dip switches to the off position.

- Dip Switch #1: OFF
- Dip Switch #2: OFF
- Dip Switch #3: OFF
- Dip Switch #4: OFF
- Dip Switch #5: OFF
- Filter Switch: OFF

Alternator Signal Tachometer Calibration

- Start with vehicle power off.
- Press and hold the calibration button and start the engine. *Once the engine is running, release the button.*
- The LED digit will display **C**, indicating entry into module select mode.
- After a few seconds, the LED digit will display **S**, **r** or **F**. Tap the button to cycle round robin through these setup options. Press and hold the button when the LED digit displays **S** (*indicating setup for alternator signal tachometer applications*).
- Release the button when the LED digit displays **C**, indicating entry into calibration mode.
- Tap the button to change the LED digit to **2** indicating real-time calibration mode. *Continuing to tap the button will cycle round robin through the calibration modes 1, 2, 3 and F.*
- Press and hold the button with the LED digit indicating **2** until the **2** starts blinking.
- Idle the engine at a known RPM. (*The green LED on the SN74Z should blink, indicating that it is getting a signal*).
- Press and hold the button to change the RPM shown on the tachometer. The first time the button is pressed and held, the RPM shown on the tachometer will increase. The second time the button is pressed and held, the RPM shown on the tachometer will decrease.
 - The SN74Z will alternate increasing or decreasing the RPM shown on the tachometer each time the button is pressed. Press and hold the button to fine tune the RPM shown on the tachometer.
- Once the tachometer is reading the correct RPM, wait 8 seconds without pushing the button (*in order to save the calibration*). The LED digit will change back to **C** to confirm calibration is saved.
- Press and hold the button while the LED digit displays **C** to exit calibration mode.