



Installation and User Manual

Tach quick start guide

Determine mounting location

We recommend your Tach Emulator be mounted in the cab of the vehicle. The module is water-resistant and can also be mounted in the engine bay away from exhaust components

Running and splicing wires - Run wires from your No-vak Tach/Cruise Emulator to the following locations

Red - 12V key on power source

Black - Ground

White - This is the input tachometer signal
GEN III PCM - Red or Green connector pin 10
GEN IV PCM - Black pin 48

Green - Emulated CKPS signal to the Jeep PCM
TJ/XJ 1996 to 2004 - GY / BK pin A8 of Black Cxn
TJ/JK 2005 to 2018 - BR / LB pin 35 Orange Cxn

Orange - Emulated CMPS signal to the Jeep PCM
TJ/XJ 1996 to 2004 - TN / YL A18 of Black Cxn
TJ/JK 2005 to 2018 - Not Needed

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Start vehicle to verify tachometer calibration

Monitor the Engines' actual RPM through the GM OBDII port using a capable scanner (not supplied)

If the Tachometer gauge does not match the actual engine RPM, follow these steps

1. **Move the Jumper** from the run position to the setup position
2. **Start vehicle and compare tach** with actual RPM
3. **Adjust the tach output** with the small brass screw (potentiometer). Turn the screw in the direction you want the tach needle to move

Pro tip - Raise your engine rpm to 2000 when adjusting your Tach emulator. This will improve accuracy through the entire range of the gauge

4. **Move the jumper** from the top SETUP pin to the bottom RUN pin

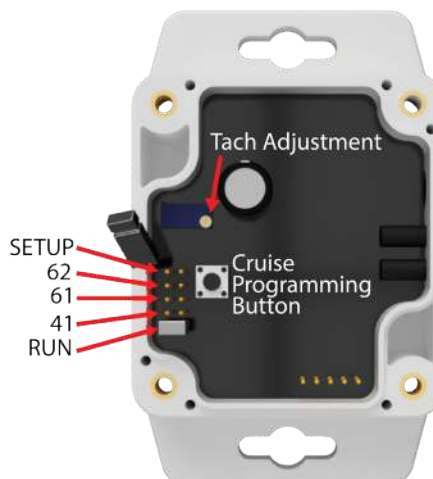
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Run Modes

TJ/JK from 2005 - 2018 will use 62 mode

XJ/TJ from 1996-2004 with the 4.0L 6 cylinder option will use 61 mode

XJ/TJ from 1996-2004 with the 2.5L 4 cylinder option will use 41 mode



Green LED: Flashes to the Engine speed if receiving a tach input.

Red LED: Solid on means powered and working correctly. Flashing means there is an error. Refer to troubleshooting.

(DO NOT PLACE A JUMPER ACROSS THE SINGLE ROW OF 5 HEADERS. THIS WILL FRY THE TACH AND VOID THE WARRANTY)

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Cruise quick start guide

Wire identification - Run wires from your Novak Tach/ Cruise Emulator to the following locations.

Yellow - GM Cruise ON/OFF Signal

Blue - GM SET/COAST Signal

Brown - GM Cruise RES/ACC Signal

Purple - Jeep Speed Control Signal Input

**Be sure this wire does not connect to 12v*

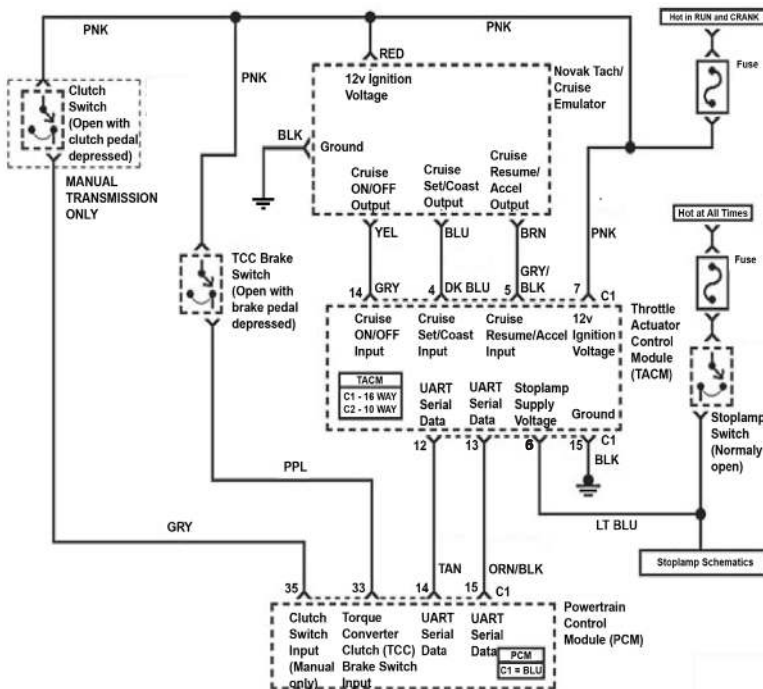
Jeep Speed control wire - (disconnect this wire from the Jeep PCM) - The Jeep Speed control wire can be found at the PCM or directly from the steering column.

- **Jeep TJ 03-04** RD/LG wire on pin 32 in the C3 GRAY PCM connector.
- **Jeep TJ 97-02** RD/LB wire on pin 32 in the C3 GRAY PCM connector.
- **Jeep TJ, LJ 05-06** VT wire on pin 34 in the C3 NATURAL PCM connector.
- **Jeep XJ 1997** RD/LG wire on pin 36 in the C1 PCM connector.
- **Jeep XJ 2000** RD/LG wire on pin 32 in the C3 PCM connector.
- **Jeep ZJ 1996** PNK wire on pin 32 in the C (gray) PCM connector.

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Drive By Wire Hookup

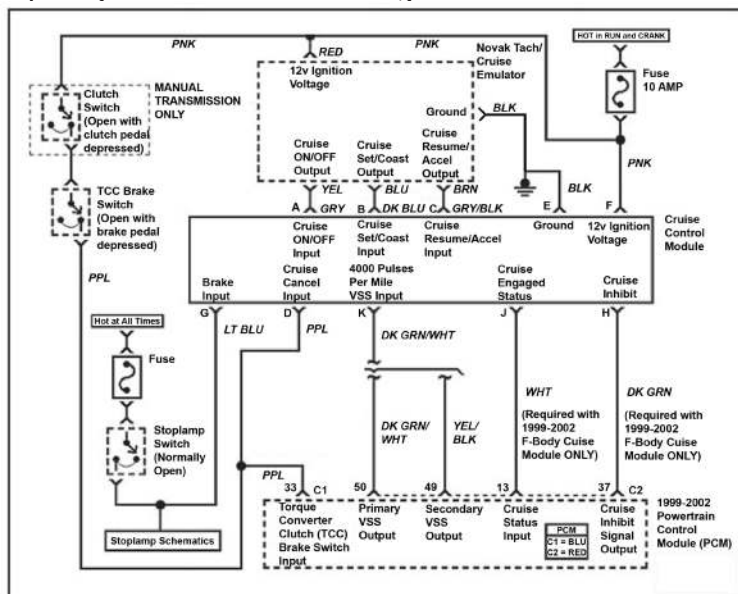
GM's Throttle Actuator Control Module or TACM is the small computer that connects to the GM throttle pedal. Follow the schematic below to wire in the emulator.



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Drive By Cable Hookup

GM's Cruise Control Module or CCM and connector (PN: 12177081) needs to be retained from the donor vehicle. Splice your GM CCM according to the schematic below.

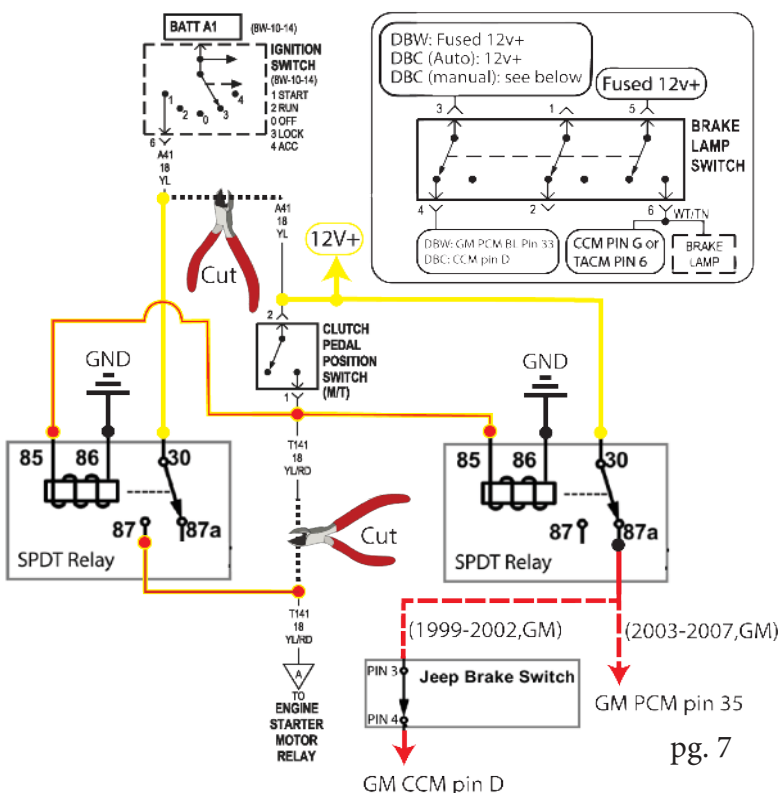


Clutch Switch: If using a manual transmission, a normally closed clutch switch should be wired on the same circuit as the normally closed brake switch. Depressing the clutch switch removes 12V from the cruise control module (pin D) to disengage cruise control.

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Jeep Clutch and brake pedal

For manual trans, wire your Jeep clutch pedal with two standard automotive relays as below. For manual and auto, wire your Brake lamp switch as below.



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Cruise Control Programming

Once all wiring has been connected, the Emulator needs to be programmed to learn the Jeep Cruise Control buttons.

Follow these steps to program your modules cruise control feature:

1. Remove the 4 screws from the tach module and remove the cover.
2. Move the jumper pins to "SETUP" and "RUN" positions.
3. Start the Engine
4. **Press** the small black cruise program **button 6 times**. One of the side LED's will flash 6 times to confirm it received the input. This records the signal that is sent to the Tach/Cruise module when no buttons are being pressed. This signal is critical to proper programming and operation of the Tach/Cruise module.
5. Hold the **ON/OFF** button on the Jeep steering wheel. Press the small black button in the Tach/Cruise module **1 time**. The green LED will flash once to confirm it received the input.
6. Hold the **SET** button on the Jeep steering wheel. Press the small black button in the Tach/Cruise module **2 times**. The green LED will flash twice to confirm it received the input.

*IF THE RED LED STARTS FLASHING, GO BACK TO STEP 4. IF THE RED LED KEEPS FLASHING, REFER TO TROUBLESHOOTING PROBLEM 1.

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7. Hold the **RESUME/ACCELERATE** button on the Jeep steering wheel. Press the small black button in the Tach/Cruise module **3 times**. The green LED will flash 3 times to confirm it received the input.
8. Hold the **CANCEL** button on the Jeep steering wheel. Press the small black button in the Tach/Cruise module **4 times**. The green LED will flash 4 times to confirm it received the input.
9. Hold the **COAST** button on the Jeep steering wheel. Press the small black button in the Tach/Cruise module **5 times**. The green LED will flash 5 times to confirm it received the input.
10. Turn off the engine.
11. Return jumpers to "RUN" and the correct model number that refers to your Jeep setup.

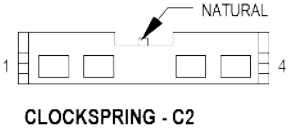
*If you are using the Novak module for cruise functionality and not tachometer emulation, then simply place one jumper on "RUN" and place the other jumper in a safe location.

If you are experiencing difficulties & need help further troubleshooting your Tachometer Emulator Module, refer to troubleshooting. If problems persist, you may call our Technical/Sales Staff at (877)602-1500 9am-5pm MST, Monday-Friday.

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www.novak-adapt.com
support@novak-adapt.com

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Troubleshooting guide

Problem	Cause	Possible Solutions																		
1. RED LED flashes two times when programming cruise buttons. (If the RED LED flashes 3 or 4 times, refer to problem 2)	A. The button being programmed is the same signal as the resting or "NO BUTTON PRESSED" signal. B. The Jeeps cruise button signal is not reaching the module due to broken buttons or broken wires/connection.	1. Check the Jeep PCM ground and "sensor return/sensor ground" has continuity to the emulators ground. If not, then connect this wire to ground.  <table border="1" data-bbox="1031 1375 1494 1528"> <thead> <tr> <th>CAV</th><th>CIRCUIT</th><th>FUNCTION</th></tr> </thead> <tbody> <tr> <td>1</td><td>X3 20RD/YL</td><td>HORN RELAY CONTROL SENSE</td></tr> <tr> <td>2</td><td>V37 20RD/LG</td><td>SPEED CONTROL SWITCH SIGNAL</td></tr> <tr> <td>3</td><td>K167 20BR/YL+</td><td>SENSOR RETURN</td></tr> <tr> <td>3</td><td>K167 20BK/YL</td><td>SENSOR RETURN</td></tr> <tr> <td>4</td><td>-</td><td>-</td></tr> </tbody> </table> 2. Locate the 4 pin clock-spring connector. Pin 2 going into the steering column should have continuity with the emulators purple wire. 3. With power off, check the resistance across the purple and black wires on the emulator while pressing the steering wheel buttons. Each buttons readings should vary drastically from 0 to several thousand ohms. If one button isn't changing, then replace that button. If none of the buttons change the value, then the buttons are not connected to the emulators purple and black wires.	CAV	CIRCUIT	FUNCTION	1	X3 20RD/YL	HORN RELAY CONTROL SENSE	2	V37 20RD/LG	SPEED CONTROL SWITCH SIGNAL	3	K167 20BR/YL+	SENSOR RETURN	3	K167 20BK/YL	SENSOR RETURN	4	-	-
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2. RED LED flashes three or four times.	A. The adjustment screw is too far out of adjustment.	1. 3 short flashes indicate you have tightened (turned to the right) the adjustment screw too far. 4 short flashes indicate you have loosened (turned to the left) the adjustment screw too far. Turn the adjustment screw back until the RED LED stops flashing. Restart the vehicle. The screw has 20 full turns from side to side.																		

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Problem	Cause	Possible Solutions
3. Tach needle has no response to engine speed and the tach emulators LEDs do not light up.	A. No power to the unit.	1. Turn the key to the on position and double check with a 12v check light or voltmeter that the Tach module is receiving 12v power. 2. Check continuity with the Tach modules ground and the vehicles negative battery terminal. 3. Make sure the jumpers are fully seated and positioned in the correct mode for your vehicle.
4. Tach needle has no response to engine speed. Red LED is solid on and the Green LED is not flashing.	A. Not receiving the correct or any input from GM PCM.	1. If the GM PCM was not programmed by Novak, the Tach output must be adjusted in the PCM programming. Adjust the tach output resolution to "3 HI" and "3 LOW" for 24x crank reluctor rings or "7 HI" and "8 LOW" for 58x crank reluctor rings. If the option is there, set the tach output to "CRANK". (The Gen III engines (LS1/LS6/LQ4, and early LS2) came with a 24x (24 tooth) reluctor wheel while the Gen IV engines (LS7/LS3/LS9, and later LS2) were fitted with a 58x wheel. One easy way to tell which reluctor wheel you have is to look at the crankshaft sensor. If it's black, you have a 24x wheel; if the sensor is gray then you have a 58x wheel. 2. Double check the white wire is connected to the correct GM PCM pin. GEN III use pin 10 on the red/green connector. GEN IV use pin 48 on the Black connector.
5. Tach needle has no response to engine speed. Red LED is lit and the Green LED flashes to the engine speed.	A. Adjustment screw is out of adjustment. B. Signal from Emulator is not reaching the Jeep PCM. C. Jeep dash is not receiving signal from Jeep PCM. D. Jumpers in the wrong position. E. Gauge cluster or Jeep PCM need replacing	1. If the adjustment screw is adjusted too far out of range, the needle will sit at or near 0 RPM or maxed out around 7400 RPM. Follow the standard steps to put the module into setup mode. If the needle is at 0, turn the screw clockwise to see if the needle slowly starts to come up. If the needle is maxed out, turn the screw counter-clockwise till the needle falls into range. Proceed with adjustments to fine tune the tach to the engines actual RPM's. If you reach the limits of the adjustment screw, the RED LED on the tach module will begin flashing. Refer to BLINKING RED LED below. Potentiometer is 20 turns from end to end. 2. Double check that the Green (for all models) and Orange (61 and 41 modes only) wires, are connected to the correct pins in the Jeep PCM and that they haven't backed out of the connector. 3. Be sure the Jumpers are in the correct mode for your year and model of Jeep.
6. None of the gauges are working.	A. Communication error between Jeep PCM and Gauge cluster. B. Missing power or ground to PCM or Gauge cluster.	1. Check with your vehicles specific service manual and find and verify that the "PCI bus" or "CCD Bus+/-" circuit wires are still installed. This circuit carries sensor data from the Jeep PCM to the gauge cluster. Also verify that all 12v+ power and Ground connections are still installed. *The oil pressure gauge will not work until the tachometer gauge is functioning and the stock oil pressure sender is installed.
7. Cruise does not engage.	A. Brake and TCC signals to the GM computers are incorrect. B. Vehicle Speed too low.	1. Verify the brake signal sends 12v when the brake is pressed. 2. Verify the TCC or Clutch signal sends 12v when the brake is released. 3. If LED tail lights are installed, verify that the 0v brake and TCC/clutch signals are actually 0v. LED lights commonly backfeed ~0.8v, preventing the brake signal from fully dropping to 0v. Use a heat sync load resistor to pull the signal to 0v when released, or install stock tail lights. 4. The vehicle must be traveling at least 35 miles per hour to enable cruise. Also check that your GM speed sensor is hooked up.