POWERTRAIN CONTROL SOLUTIONS
Engineering the future of driveline control.

PADDLE SHIFTER USER GUIDE

v5.2

The purpose of this setup guide is to assist in proper kit installation to successfully integrate transmission paddle shifters into a vehicles steering column and dash. The intended integrators for the provided materials are authorized PCS Dealers and trained automotive technicians. For further information or assistance please contact the PCS Authorized Dealer your kit was purchased through, as well as any errors or additional tips / tricks that may be beneficial to the accuracy and effectiveness of this document.

Section 1: Overview & Configurations

The Powertrain Control Solutions (PCS) *Paddle Shifters* are used to shift automatic transmissions in one of the configurations listed below. Our paddles are precisely engineered and built to provide a positive detent feel the moment a paddle is pulled; this eliminates any guessing about when the transmission was commanded to shift. Included with these kits are the *Paddle Shifters* (with multi-functional display, optional block-off included), a *Receiver Module*, and the necessary harnesses and hardware to install. Shift commands and the horn signal are wirelessly communicated between the *Paddles* and *Receiver Module*. This wireless communication helps drastically simplify the wiring, requiring only electrical power being supplied up to the *Paddles* via the old horn wire as described on page 4. The kits below can be configured for both 5/6 or 9-bolt steering wheels, as well as having a black or polished aluminum coating.

PATTERN	COLOR	PCS P/N	OLD HARNESS	DISPLAY	OLD P/N
5 / 6 BOLT	BLACK	**PS-8001**	QUICK CONNECT	NO	A-PS2000
			UNTERMINATED	NO	A-PS2002
			QUICK CONNECT	YES	A-PS2001
			UNTERMINATED	YES	A-PS2003
5 / 6 BOLT	POLISHED	**PS-8002**	QUICK CONNECT	NO	A-PS2050
			UNTERMINATED	NO	A-PS2052
			QUICK CONNECT	YES	A-PS2051
			UNTERMINATED	YES	A-PS2053
9 BOLT	BLACK	**PS-8003**	QUICK CONNECT	NO	A-PS2005
			UNTERMINATED	NO	A-PS2007
			QUICK CONNECT	YES	A-PS2006
			UNTERMINATED	YES	A-PS2008
9 BOLT	POLISHED	**PS-8004**	QUICK CONNECT	NO	A-PS2055
			UNTERMINATED	NO	A-PS2057
			QUICK CONNECT	YES	A-PS2056
			UNTERMINATED	YES	A-PS2058

NOTE-1: *As shown above our new 8000 Series Paddle Shifter harnesses are combined & commonized so any "Quick Connect / Unterminated" duplicates have been eliminated.*

NOTE-2: *As shown above all 8000 Series Paddle Shifters come with Displays & Block Offs.*

NOTE-3: *All PCS Paddles (5 / 6 / 9-BOLTS) have a bolt at 12-O-CLOCK. We do not produce any other offset variations.*

NOTE-4: *This product is not designed for vehicles with a steering wheel mounted airbag.*

Section 2: Included Components

A (1x) Receiver Module	**F** (1x) 1/2" Spacer & (2x) 1/4" Spacer
B (1x) Receiver Harness	**G** (1x) 9-Bolt Adaption Lip
C (1x) Paddle Shifter Module	**H** (6x) #10-32 x 2.0" FHCS Screws (5/6 Bolt Only)
D (1x) Paddle Shifter Harness	**I** (1x) Multi-Function Display (Pre-installed)
E (1x) User Manual	**J** (1x) Display Block-Off Option

Section 3: Required Additional Tools & Information

J Vehicle / Powertrain Wiring Diagram
K Steering Wheel Removal Tools
L Wiring Tools or Optional Plug-and-Play Adaption Harnesses
M Steering Wheel Adapters (as necessary)

Section 4: Mounting the Paddle Shifters

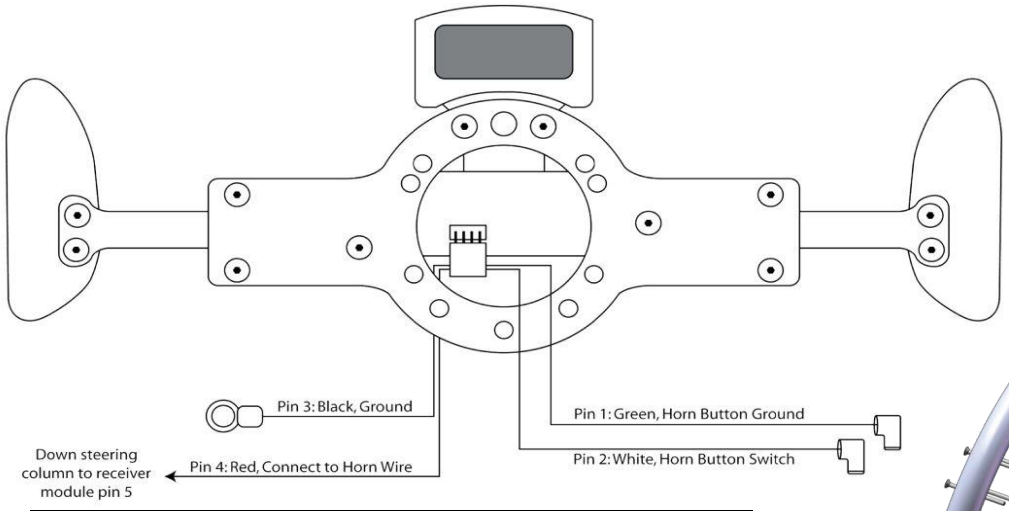
The *Paddle Shifter* is capable of bolting to standard aftermarket 5-bolt, 6-bolt, or 9-bolt steering wheel patterns. The purchase of an adapter to convert from the stock steering column to the appropriate bolt pattern may be required. These adapters are not included in this kit.

NOTE-5: *9-Bolt kits do not include mounting hardware as this varies between hub manufacturers.*

Our paddle shifter kit includes one ½" spacer and two ¼" spacers for depth adjustments of the steering assembly. The ½" spacer should be sandwiched between the wheel and paddle as necessary for best comfort and functionality. Additionally the ¼" spacers can be inserted on the front or back of the *Paddle Shifter* to set the distances between the steering column, paddle shifter, and steering wheel. To accommodate variances in steering wheel dish, column controls, and other factors; different spacer combinations may be required.

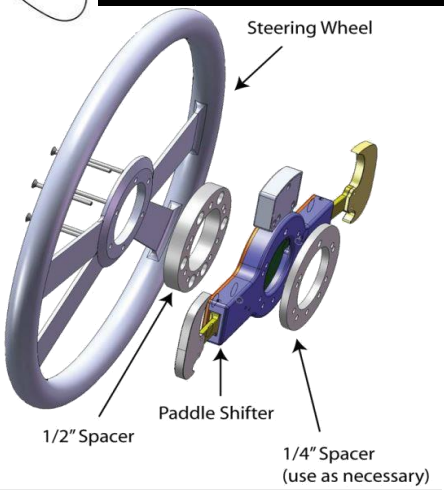
After choosing the appropriate combination of spacers; align the installation holes of the spacers, *Paddle Shifter*, and steering wheel. Fasteners are not included for the 9-bolt kits (to be sourced separately) as the thread types aren't standardized by the hub manufacturers. Insert the steering wheel installation bolts through the holes and tighten them appropriately into the steering column. The horn button should be removed during this installation process to provide access to the wiring and paddle shifter connector.

To install the *Paddle Shifter Harness* begin by connecting the Green wire (Pin-1) to the ground on the horn button. Next connect the White wire (Pin-2) to the horn button switch. To simplify this installation we have provided standard *90° spade terminals* on these horn wires. Install the 4-way *Red Connector* to the *Paddle Shifter* circuit board. This *Red Connector* has pin numbers marked, when installed the pin numbers should face the steering wheel (Pin-1 visible on the right) with all wires directed downwards to the steering column.



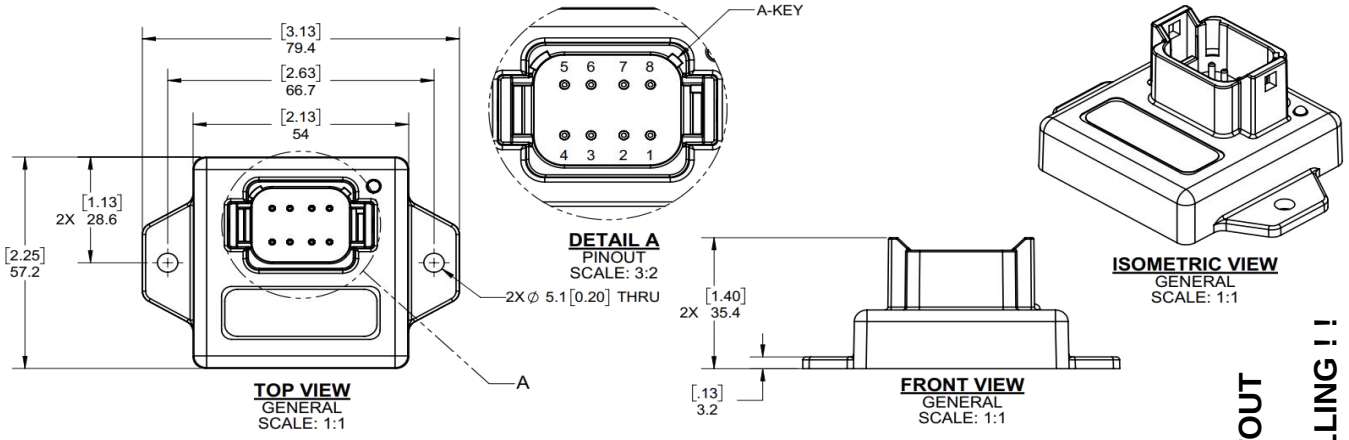
NOTE-6: *If there are existing clock-springs or slip-rings in the steering wheel or column it is highly recommended to clean / repair them during this process. Connection issues with the original horn-circuit through the steering column is the #1 cause of paddle performance complaints.*

NOTE-7: *Follow the manufacturer's installation instructions of any adapter(s) installed on the steering column. Our paddle shifter must be grounded with a solid connection to chassis. The black (Pin 3) ground wire has a circular terminal installed on it for installation through a fastener. This fastener should bolt directly into the steering column to provide a clean ground.*

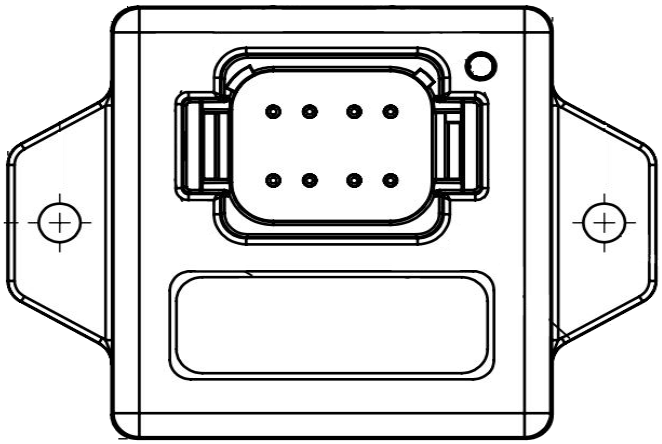


Section 5: Mounting the Receiver Module

While our new *Receiver Module* is both weatherproof and has significant range improvements from earlier models; we recommend mounting the unit as close to the *Paddle Shifter* / "*bottom of the steering column*" as possible for best wireless performance. Before permanently mounting the *Receiver Module* it is advised to verify full functionality of the complete *Transmission Control* and *Paddle Shifter* system(s).



RECEIVER MODULE SPECIFICATIONS
The *Receiver Module* is to be securely installed in a location free of severe vibration and heat sources.
Do not install product that exhibits manufacturing defects or shipping / handling damages.
Electrical Supply Requirements: 8-18 Volts DC. Current draw 3A or less. Fuse accordingly.
Operating Temperature: -40 to 125°C (-40 to 257°F).
This module adheres to an IP6K7 rating per ISO-20653 (with the proper Deutsch mating connector installed).
Damage caused by mis-wiring of the horn or improper welding procedures is not covered under warranty.



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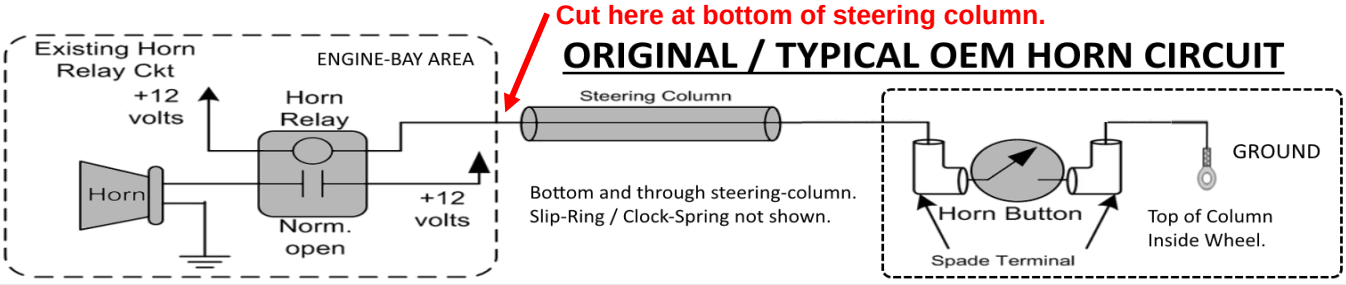
VERIFY SCALE BEFORE DRILLING ! !

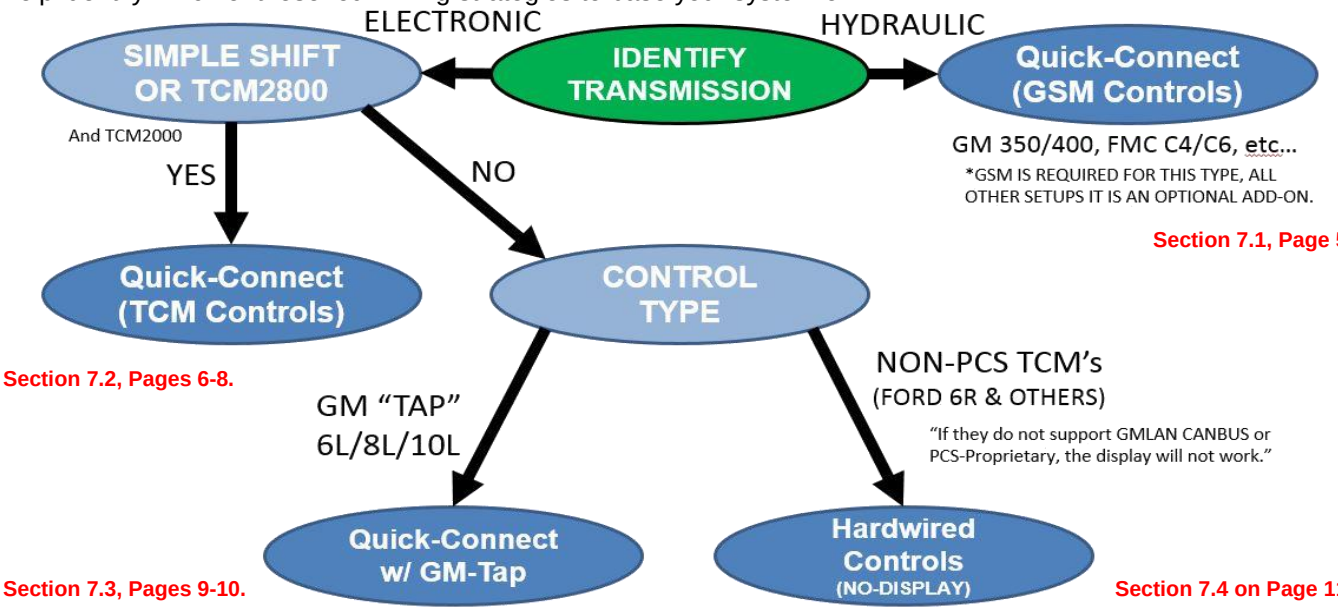
Section 6: Repurposing the Horn Circuit

Our *Paddle Shifter* kit is cleverly designed to reuse the existing single wire *Horn Circuit* passing through the steering-column. One Orange wire provides power from the *Receiver Module* to *Paddle Shifters*. By implementing wireless communication we eliminate additional necessary circuits through the steering column for Upshift, Downshift, Horn Relay Grounding, and live Display Data. Finally, that wireless signal also commands the original horn-circuit to function via a White wire "grounding" output on the *Receiver Module*. Shown below is an example of a typical OEM Horn Circuit, for reference while comparing to the appropriate "Installed Paddles" circuit diagrams in Section-7.



Section 7: Transmission Wiring Configurations

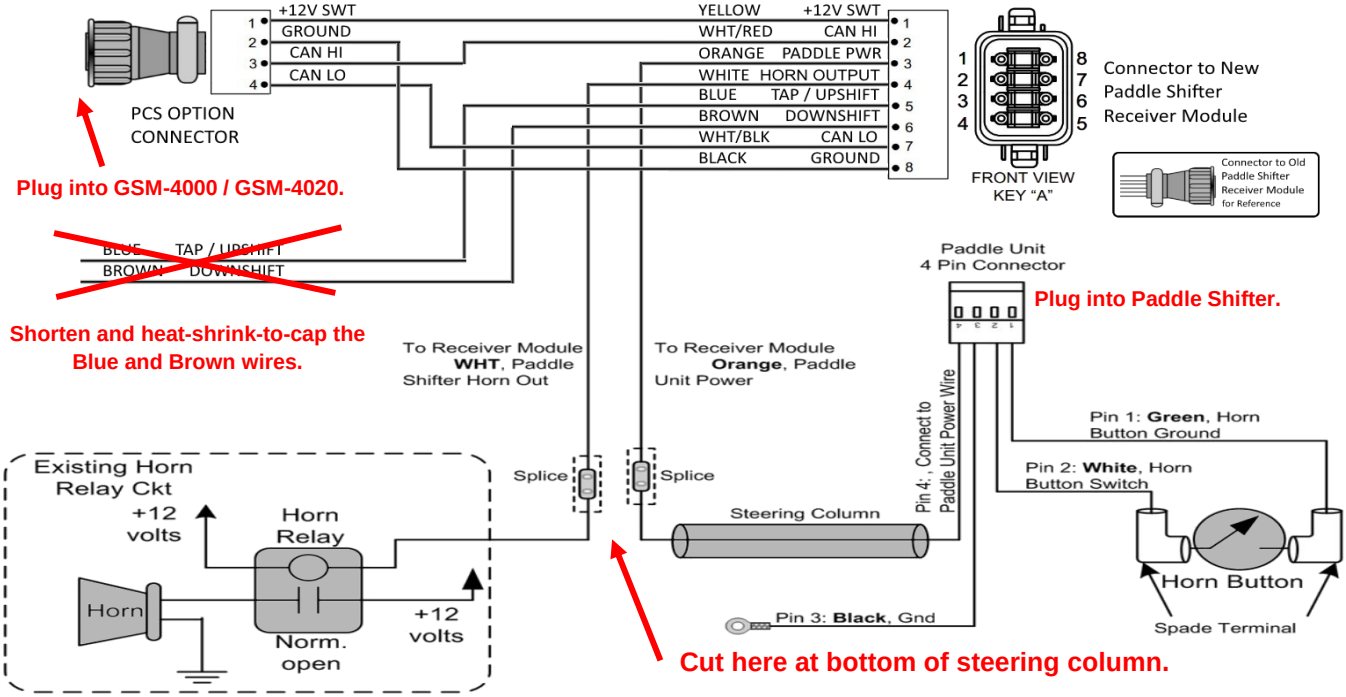
For the best installation and operational experience with your *Paddle Shifter* it is critical to first identify what transmission is being worked with to understand the best wiring strategy to implement. Below is a flow chart to help identify which of these four wiring strategies to base your system on.



Section 7.1, Page 5.
Section 7.2, Pages 6-8.
Section 7.3, Pages 9-10.
Section 7.4 on Page 11.

Section 7.1: Quick-Connect for GSM Controls

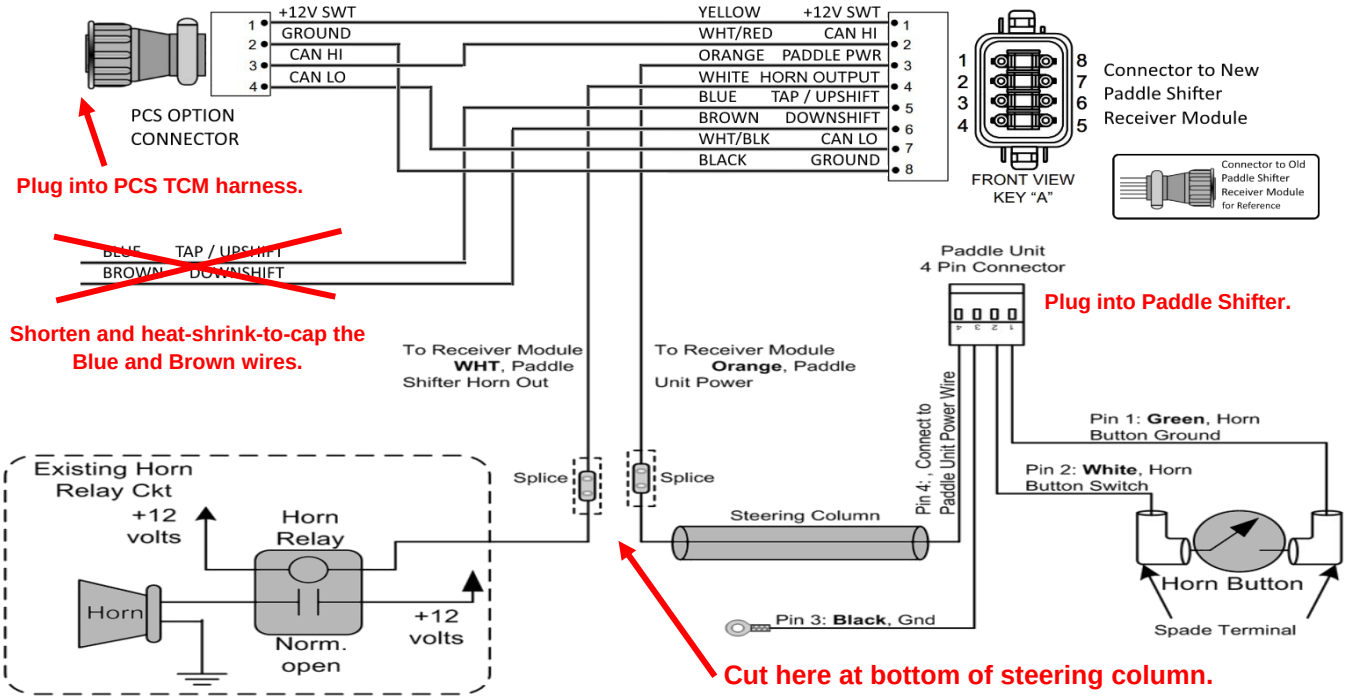
This wiring configuration enables plug-and-play compatibility with our PCS GSM "*Gear Select Module*" Push-Button series kits. The GSM is essential for mechanically shifting older hydraulically-controlled transmissions. One *Option Connector* links the kits to provide both 12V Power and CANBUS. The *Display* is only able to show "*Lever Position*" with the GSM. Our *Paddles* only move the D-3-2-1 detents on the GSM (not P-R-N).



NOTE-8: *Ensure in GSM menu "**6-Paddle-Input-->ON**" is selected, and 120Ω Resistor is in GSM Harness.*

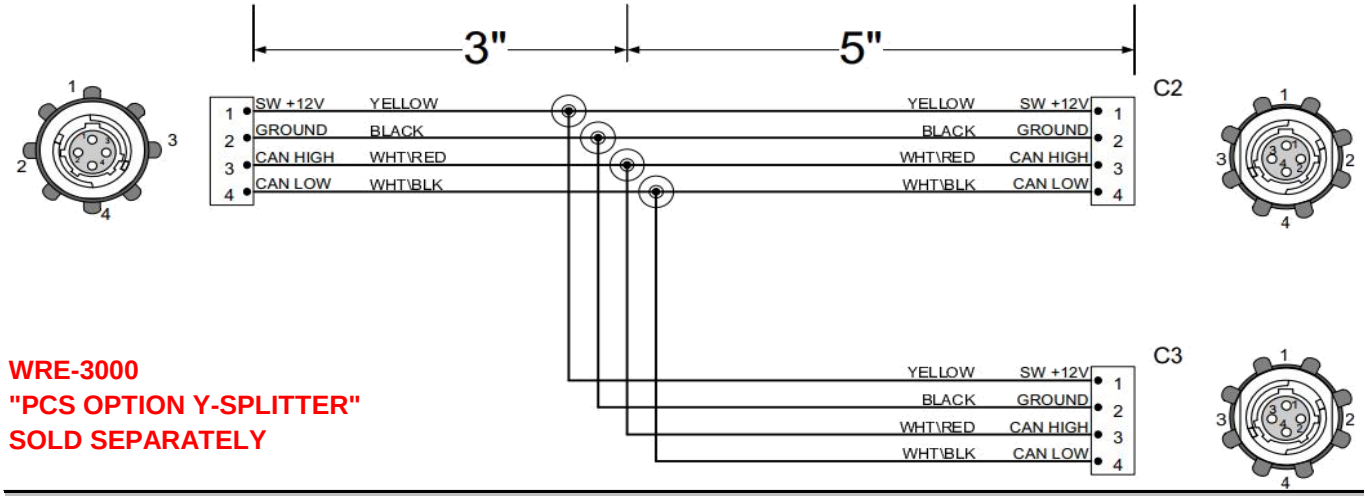
Section 7.2: Quick-Connect for TCM Controls

This wiring configuration enables plug-and-play compatibility with our PCS *TCM-2000*, *Simple Shift*, and *TCM-2800* transmission valvebody controller kits. These are utilized on many common standalone controls for General Motors and Ford four speed transmissions. One *Option Connector* plugs right into our other TCM kit to provide the Paddle Shifters with both 12V Power and CANBUS communications.



NOTE-9: *If your Simple Shift or TCM-2000 does not already have a single 120Ω Terminating Resistor installed on the harness it must be sourced or purchased separately (CON-5500 or CON-5004). This "1 resistor minimum" is ideal but not required in TCM-2800, as it has an internal configurable resistor.*

Shown below is our optional WRE-3000 *"Option Y-Splitter"*, necessary for PCS Trans Control setups where you desire 3-way (or more) communication between this *Paddle Shifter* kit plus combinations of the following: *TCM-2000 / Simple Shift / TCM-2600 / TCM-2800*, *GSM Push Button*, *Gear Indicator*, *Accelerometer/Gyro*, *SFT-5100 GM-Relays*, or *GPS-Module*.



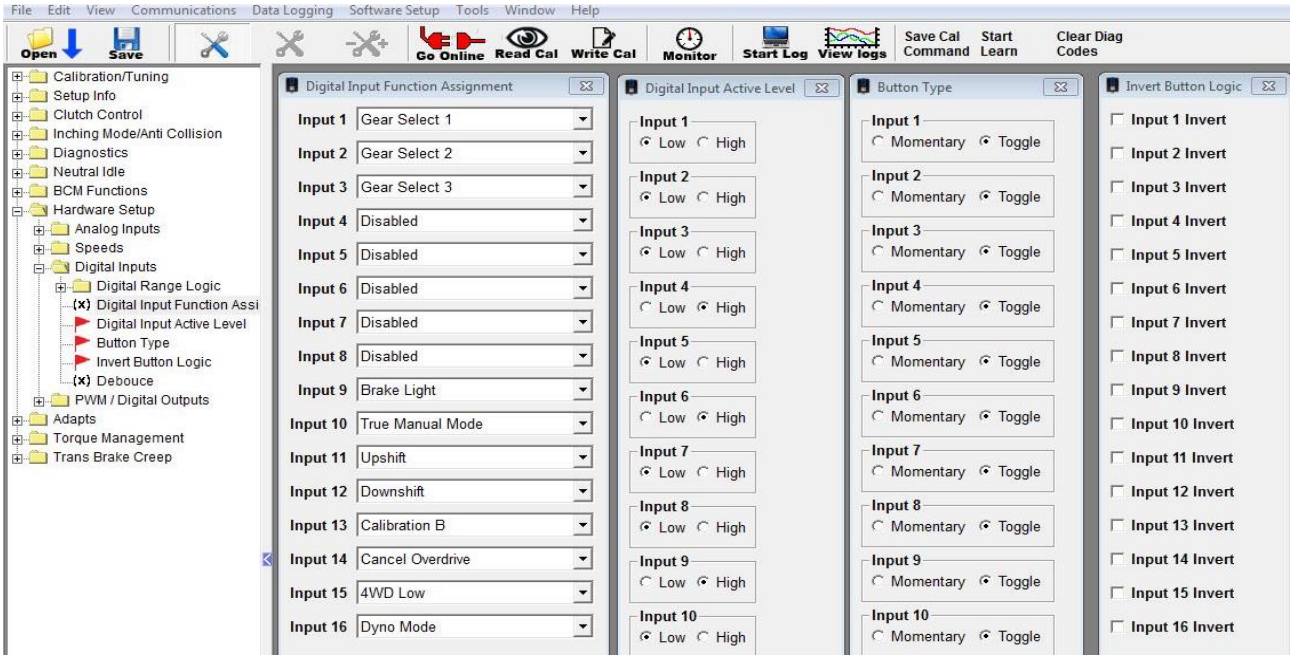
Section 7.2: Quick-Connect for TCM Controls (continued…)

For TCM-2000, TCM-2600, and TCM-2800 configurations there are functions that need to be verified and tuned for the transmission to perform optimally and last as long as possible. We recommend the tuning of these systems be a collaboration between proven base-calibrations from our PCS Authorized Dealer, and an experienced transmission tuner.

Regarding GM 4L60E & 4L80E series transmissions; a PCS *TCM* and this kit will allow "Paddling" through the forward gears (1-4) but without Engine Braking (anti-coast). Engine Braking can be enabled by either putting the transmission shift-lever into D3 / D2 / D1 positions (also limiting top gear) or with a GSM. If a vehicle has a PCS *TCM*, *GSM*, and *Paddle* they can sync the system up to simultaneously hold/control all four upshifts and downshifts (while Engine Braking) by both electronically holding gears in Manual Mode with the *TCM* and moving the shift-shaft for with the *GSM*.

For our Simple-Shift, TCM2000, TCM2600, & TCM2800 valvebody controllers; pulling both paddles simultaneously or wiring a toggle switch puts you in-to and out-of "Manual Mode". Key-Off defaults to Manual-Mode-Off, unless the TCM2800 / TCM2600 / TCM2000 is using a hardwired Toggle Switch (non-momentary). Discuss this preferred configuration with your supporting PCS Authorized Dealer. All Simple-Shifts come with this input configured as Momentary, so a key-cycle will always default the controls back into Automatic Mode.

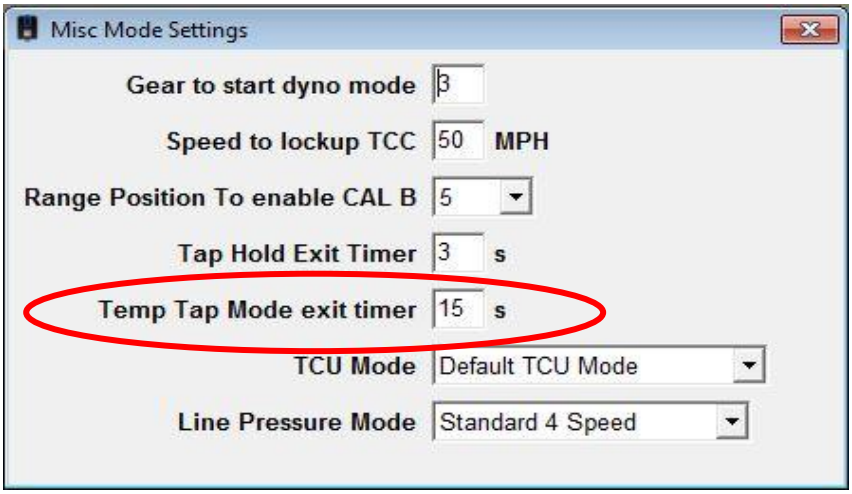
For TCM2800's there are both configurable A/B-Calibration-Switch and a Paddle-Shifter-Enable-Switches, the shift firmness (and all other variables other than shift timing) are determined by which calibration you are set to. Presumably Cal-B shifts with the Paddles will feel firmer and shift quicker. One switch can do both functions.



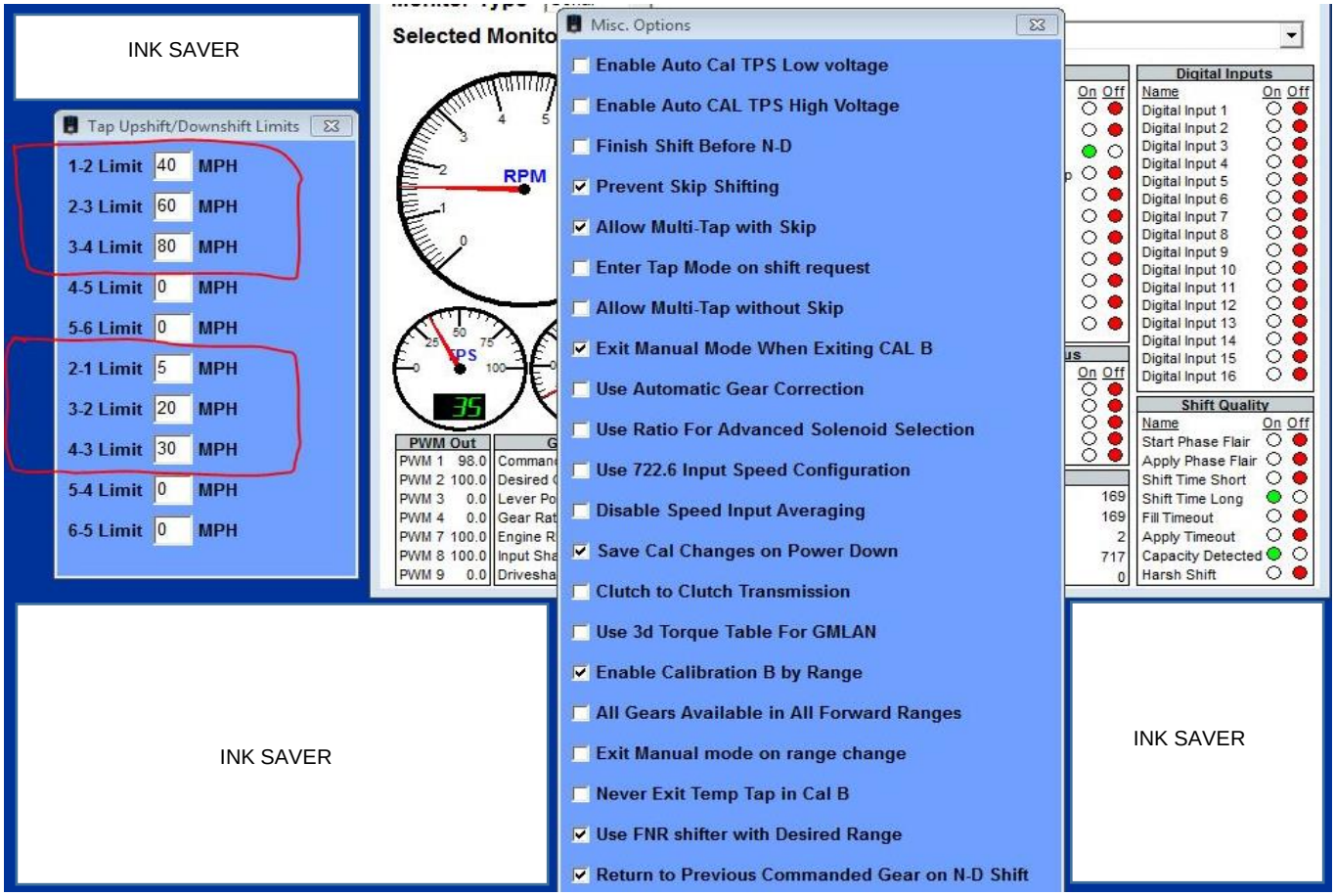
With the key in the on position and the transmission controller in manual mode, pull the right paddle to upshift and the left paddle to downshift. The paddle shifter and transmission controller will begin the shift sequence within milliseconds. Some customers may experience a longer than desired shift delay when using the paddle shifter. The delay in the shift is present when the transmission is shifting automatically, it is just more apparent to the user in manual mode since they are starting and anticipating the shift. Some shifts may feel delayed due to low line pressure, inherent hydraulic delay in the transmission, or shift timers set too long. If the delay is inherent in the transmission, there is nothing electronically that can be done to quicken the shift time. Modification of the valve body or installation of a shift kit may be necessary. In many electronic automatic transmissions, increasing the line pressure during the shift may result in a firmer, faster shift. Shifts that are too firm may damage or wear other driveline components. The programmable shift timers dictate the electronic delay between shifts. These are adjustable in the TCU software. Some transmissions must have a very specific time between shifts for the shift to execute properly.

Section 7.2: Quick-Connect for TCM Controls (continued…)

An additional feature to mention on our newer TCM2600 & TCM2800 controllers is the "Temporary Tap" Mode which is enabled by pulling one paddle, the programmed time to auto-exit is configurable.



For four speed transmission calibrations using the TCM-2600 and TCM-2800; we recommend starting with the base settings shown below. The *Base Calibration* from your dealer should have these *Tap Limits* and *Misc Options* preset unless their transmission control strategy has other optimizations.



Section 7.3: Quick-Connect and GM-Tap Controls

For modern GM Six, Eight, and Ten-speed transmission applications a PCS *Paddle Shifter* kit and the following steps are required for successful *GM Tap Shifting*. While we do produce the paddles and harness, PCS does not directly support six / eight / ten speed transmission applications and installs. **Contact your authorized dealer for installation and technical support questions beyond the notes provided below.**

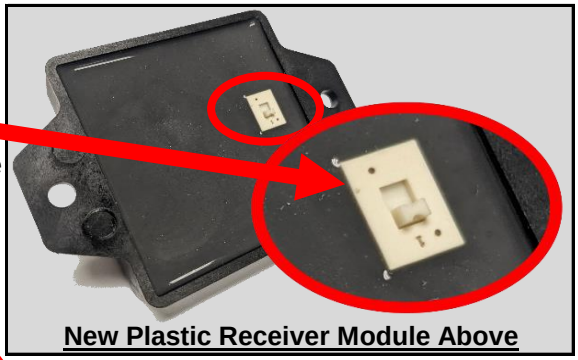
1 Provide +12V Switched Power and Ground (Red and Black circuits). These can be hardwired, provided directly by a PCS Dealer's transmission harness, or through the WRE-3500 adaption harness shown below.

2 Complete the Horn Circuit as shown on Page-10. This is the White wire to the grounding pin of the horn relay, and Orange wire to the bottom of the steering column to provide power up to the Paddle Shifter.

3 Install the Blue wire into the "*GM Tap Shift*" Circuit. Consult your PCS Authorized Dealer or aftermarket harness supplier to confirm where this connection is.

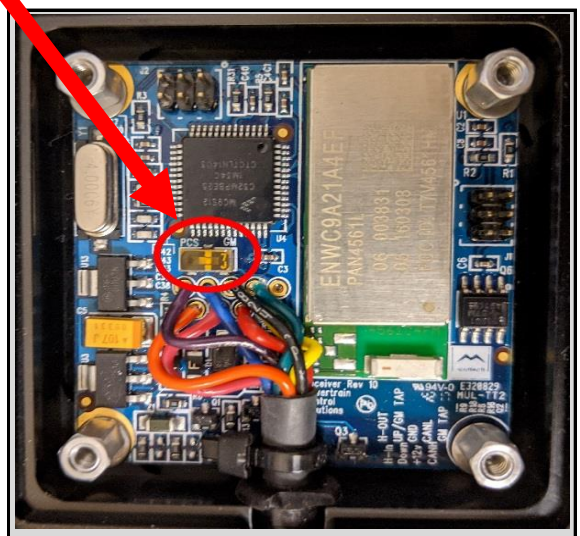
4 For newer plastic case *Receiver Modules*; ensure the white "*dip switch*" located under the unit is clicked to the "*Dot-Only*" position (opposite to the "1") as shown to the right.

For older metal case *Receiver Modules*; peel the corners of the unit's sticker and remove the lid with a Philips head screwdriver. Confirm that the *"dip switch"* is set to the "*GM*" mode and NOT "*PCS*". This is shown below circled in red. Reinstall the lid and reapply the corners of the sticker.



New Plastic Receiver Module Above

5 If you intend on using the included *Display* with the *Paddle Shifter* kit, connect the CANBUS twisted pair (Wht/Red is CAN-HI and Wht/Blk is CAN-LO) to the same GMLAN circuit that is wired to the 6L valvebody or T87 / T87A / T93 / etc. external transmission controllers that the powertrain may have. This is only used to read the CANBUS and provide displayed data. These can be hardwired, provided directly by a PCS Dealer's transmission harness, or through the WRE-3500 adaption harness shown below. The addition / removal of any 120Ω (Ohm) terminating resistors is not necessary or recommended when splicing into existing GMLAN CANBUS circuits, they should function properly at 60Ω before the addition of our kit with the existing QTY-2 120Ω terminating resistors.

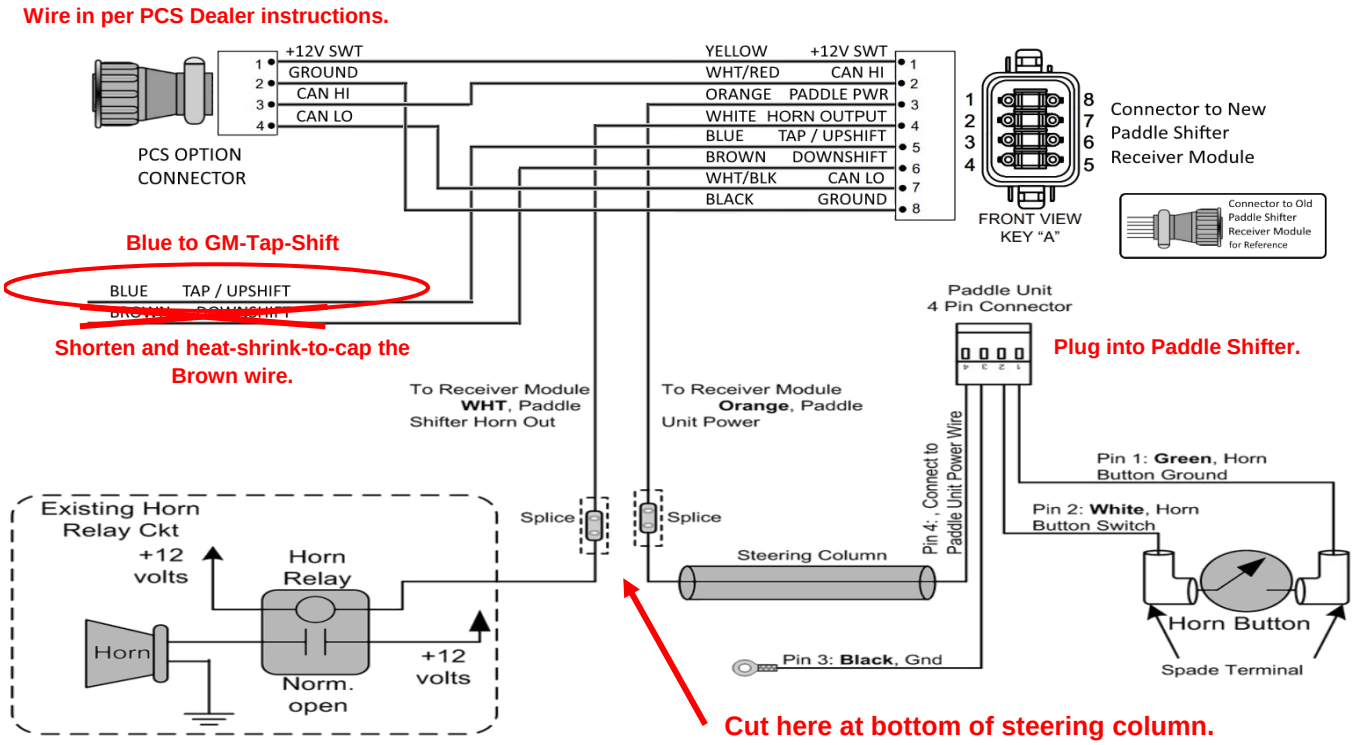


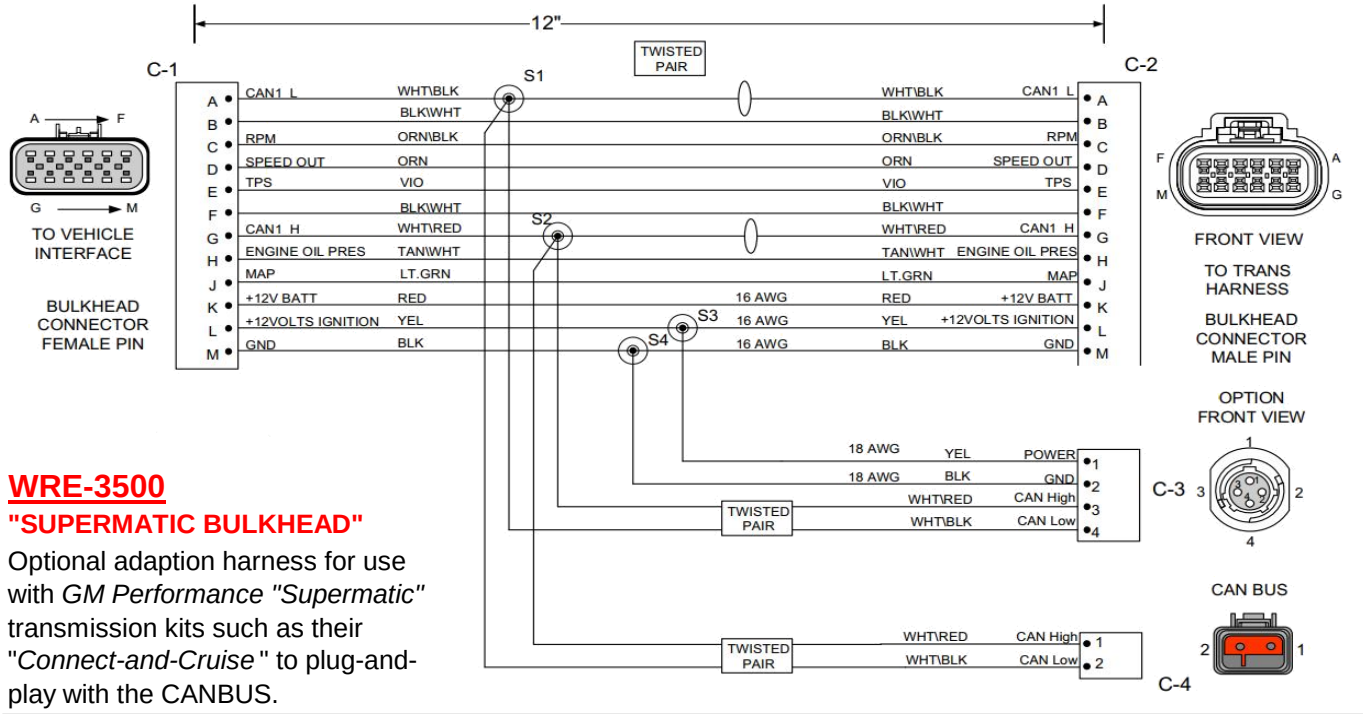
Old Metal Receiver Module Above

6 The transmission controller needs to be programmed to accept this *GM Tap Shift* (Blue wire) input by using a "Camaro" calibration. PCS does not support GM Six / Eight / Ten speed transmission programming, consult with your PCS Dealer (not all dealers support these transmissions) or transmission tuner regarding this calibration and programming.

7 The transmission must be placed in "*Manual Mode / Sport Mode*" which is one lever position below "*D / Drive*" for the Tap Shift function to work with the GM transmission controller.

Section 7.3: Quick-Connect and GM-Tap Controls (continued…)





WRE-3500

"SUPERMATIC BULKHEAD"

Optional adaption harness for use with *GM Performance "Supermatic"* transmission kits such as their "*Connect-and-Cruise*" to plug-and-play with the CANBUS.

Section 7.4: Hardwired Controls

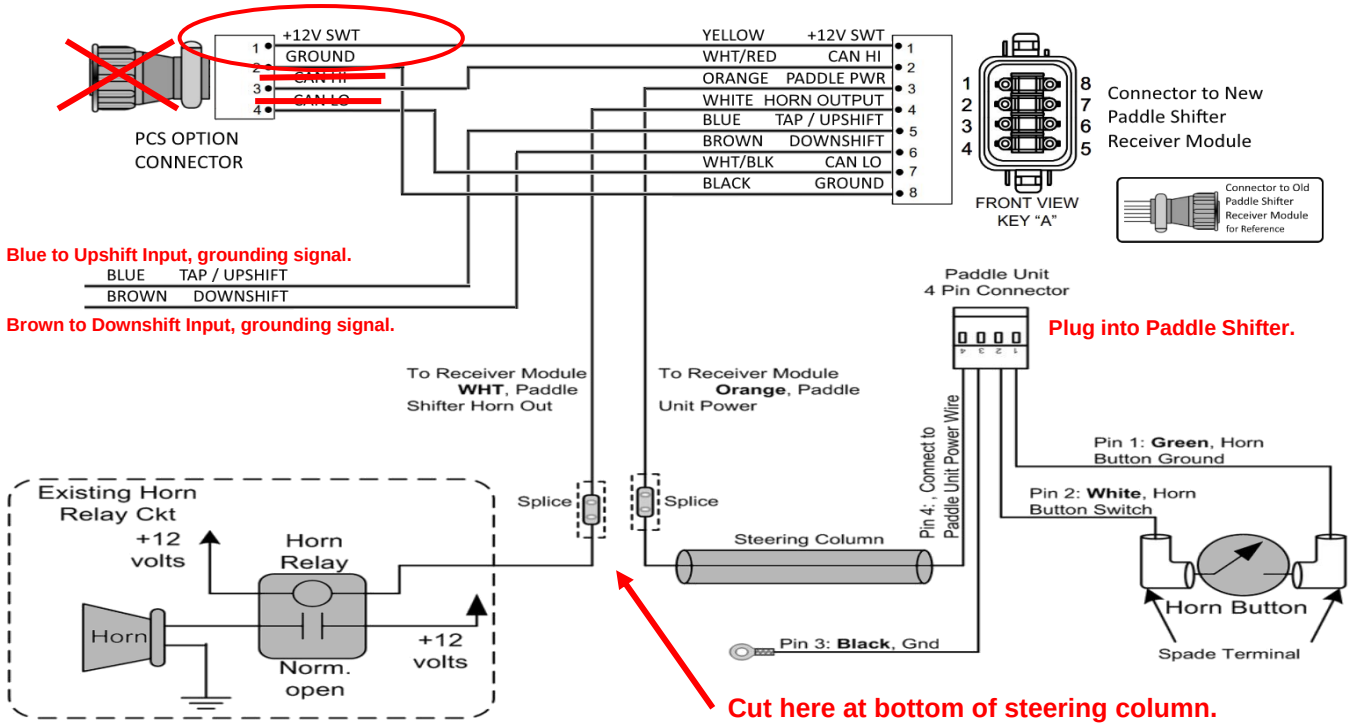
At minimum for any functionality our *Paddle Shifter* Kit requires solid electrical connections to *+12V Switched Power* and *Ground*. *Switched Power* must provide this +12V (fused at 5A Max) while the vehicle is keyed-on and running. Additionally for non-PCS Transmission Controllers the hardwiring of the Blue and Brown (Upshift & Downshift) wires are critical for operation. In this configuration the "*dip switch*" on the bottom of the *Receiver Module* must be clicked to the "*1-and-Dot*" position as shown on Page-9.

While uncommon for this type of build, if our multi-functional *Display* has been purchased the CAN-Hi and CAN-Lo connections are to be a 20-AWG twisted pair, spliced into the same CANBUS circuit connected to the supporting Transmission Controller. For this *Display* to read vehicle data the transmission control module used must support the PCS-Proprietary or GMLAN CANBUS Protocols.

The 3-5A @ 12V Fuse for *+12V Switched* (Yellow wire) is not included in this kit or related WRE3xxx Adaptions, if there is not an appropriate fuse available in the powertrain / engine / transmission harness, this will need to be purchased and installed separately.

Remove PCS Option Connector or use WRE-3002 as shown below (Yellow and Black).

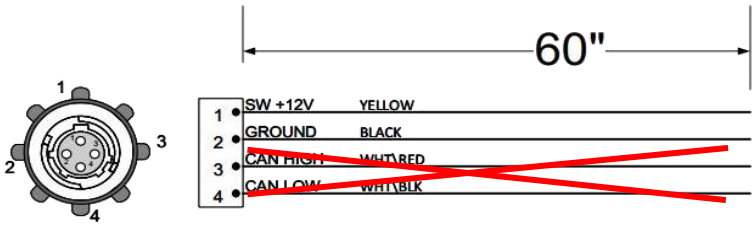
Shorten and heat-shrink-to-cap the White/Red and White/Black wires. Not to be used without GMLAN or PCS-CANBUS.



WRE-3002

"4-WIRE PIGTAIL"

Optional adaption harness to prevent modifying the standard *Paddle Shifter Receiver Module Harness* shown above.



Shorten and heat-shrink-to-cap the White/Red and White/Black wires. Not to be used without GMLAN or PCS-CANBUS.

Section 8: Multi-Function Display Operation

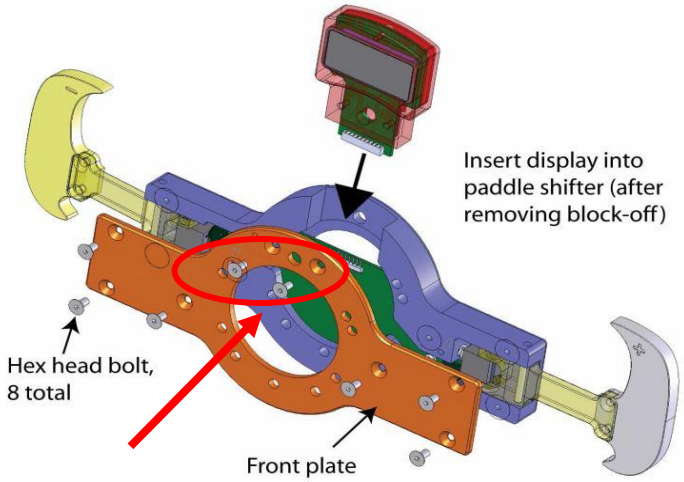
When the *Paddle Shifter* turns on, the *Display* will perform an LED test, and then scroll "*PCS*". It will then scroll "*Current-Gear*" **IF** the CANBUS is a supported protocol and properly transmitting. If a good CANBUS connection is not found, the screen will go blank when resting and scroll "*NO TCU FOUND*" if a paddle is tapped. Additionally if the *Receiver Module* is "not wired properly" or "not paired to paddles", the *Display* will scroll "*WIRELESS ERROR*" either in resting state or if a paddle is pulled. Pressing the button on the rear of the *Display* will indicate the *Function* that is currently shown. Pressing the button (again) while the *Function* is being scrolled across the screen will cycle through the following *Functions*:

Current Gear	Transmission Temperature	Transmission Slip
Throttle Position %	TCC Lockup %	Driveshaft RPM /10
Vehicle Speed	Line Pressure %	Turbine RPM /10
Manifold Pressure	Engine RPM /10	Lever Position
Coolant Temperature	Torque Converter Slip	Display Off

The units for vehicle speed, manifold pressure, and coolant and transmission temperature are selectable from the TCU software. The current unit selected will be displayed at the end of the item name. During a shift, the display will scroll "CURRENT GEAR" for two seconds and then return to the displayed *Function*.

PCS P/N	DESCRIPTION
PS-008	BLOCK-OFF, BLACK
PS-008M	BLOCK-OFF, POLISHED
PS-1050	DISPLAY, BLACK 5/6 BOLT
PS-1051	DISPLAY, BLACK 9 BOLT
PS-1055	DISPLAY, POLISHED 5/6 BOLT
PS-1056	DISPLAY, POLISHED 9 BOLT

To install, remove, or replace a Display / Block-Off please remove the two FHCS allen screws as shown to the right.



Section 9: LED Diagnostics

New to our *Paddle Shifter* kits are LED Status Indicators on both the *Receiver Modules* and *Paddle Shifter*. Review the relevant portions of Sections 7 and 11 for wiring validation if "*Green Solid*" and "*Red Solid*" are not achieved with key-on after 3-seconds.

RECEIVER-MODULE	SYSTEM-STATUS	PADDLE-SHIFTERS
NO-LED (GRN/RED/ORN)	**NO-POWER / MISWIRED SHORTED / DAMAGED**	NO-LED (BLU/RED)*
RED / ORN, BLINKING	**NO CAN / NO WIRELESS**	RED, 2X BLINKS
ORANGE, SOLID	**YES CAN / NO WIRELESS**	N/A
GREEN, BLINKING	**NO CAN / YES WIRELESS**	RED, 3X BLINKS
GREEN, SOLID	**YES CAN / YES WIRELESS**	RED, SOLID

NOTE-10: *If the LED is always illuminating (any colors / patterns) even when the vehicle is keyed-off, it is likely the +12V Power supply to the Receiver is Battery Power and not Switched Power sourced from the vehicle. Verify with a multimeter (Red probe on our Yellow wire, Black probe on a chassis ground).*

NOTE-11: *The Blue LED on the Paddle Shifter illuminates when there is successful power greater than 6V being supplied to the Paddle Shifter or remaining in the Paddles onboard power storage.*

Section 10: Pairing and Advanced Options

This section is intended only for users who have wireless issues and/or are replacing a Receiver.

Enter Menu Mode	Hold down the rear button on the back of the display and pull the right paddle.
Scroll Left / Up	Tap the Left / Downshift paddle.
Scroll Right / Down	Tap the Right / Upshift paddle.
Enter / Select / Exit	Tap the rear Display button.
Save Modified Setting	Pull both (Left and Right) paddles at the same time.

	MENU ENTRIES	ENTRY DESCRIPTION / OPERATION
1	Normal Operation	Exits *Menu* selections and goes back to *Normal Operation*, as defined previously in the *Paddle Shifter* manual.
2	Show Wireless Channel	As "*Normal Operation*" but with wireless channel number displayed in right-most 5x7 LED panel.
3	View Receiver Number	Displays the serial number of the *Receiver Module* that this *Paddle Shifter* is paired with.
4	Change Receiver Number	Change the serial number of the *Receiver Module* that this *Paddle Shifter* is paired with. This is used when the *Receiver* is not available for auto pairing. Use: After selecting this option, the current number is scrolled from right to left, stopping in digit-selection mode on the least-significant-digit (right-most). Pressing the left paddle selects the next digit to the left, while pressing the right paddle selects the next digit to the right. The selected digit is scrolled to the center of the display. Pressing the rear button allows the selected digit to be edited. When editing, only the selected digit is displayed, the left paddle decreases the digit by 1, and the right paddle increases the digit by 1 (zeros are low, and the value will not wrap around at 0 or 9). Pressing the rear button again will return to the digit-selection mode. After setting all digits to the desired value, pulling both paddles together (hold for over 1 second) will exit the edit menu. If the number was changed, the save query is scrolled, followed by the display of "N Y". Pulling the left paddle selects "N" and discards the new Receiver Module serial number. Pulling the right paddle selects "Y" and saves it.
5	Find Receiver Modules	Changes the serial number of the *Receiver Module* this *Paddle* is paired with by scanning the vicinity for *Receivers* and allowing the selection of the correct *Receiver* to pair with. Used when the *Receiver* is available and transmitting. Use: After selecting this option, scanning begins and will continue until this mode is exited. While scanning, the display scrolls one of the serial numbers found. Pressing the left paddle selects the previous serial number in the list, while pressing the right paddle selects the next serial number. When the appropriate serial number is selected, pulling both paddles together (hold for over 1 second) will exit the edit menu, saving the selection.
6	Broad Spectrum Energy **Only applicable for Pre-LED Paddles & Receivers.**	This option brings up a bar-chart of wireless activity across the 2.4 MHz spectrum as sub-divided for *Wireless* use. Each of the 15 LED columns represents a *Wireless* channel (a 16th channel is not displayed), and the number of LEDs illuminated in a column represent average channel activity during a sample period. Only one channel can be sampled at a time, and channels are sampled sequentially. To improve resolution of a specific set of channels, the channels that are scanned can be reduced. The top channel (right-most) can be set with the right paddle, and the bottom channel (left-most) can be set with the left paddle. The rear button resets the top and bottom channels. Exit / return to menu; hold rear button and pull right paddle.
7	Narrow Spectrum Energy **Only applicable for Pre-LED Paddles & Receivers.**	Same as "Broad Spectrum Energy" but only 1 channel. This mode displays the relative channel number on the left, and illuminates the remaining LEDs to indicated average channel activity during a sample period. As only one channel is sampled, the resolution is higher than on the Broad Spectrum Energy display, and this increased resolution is utilized with 52 LEDs. The 16 available channels are referred to by the values 0-9 and A-F. The paddles select which channel to display. To exit and return to the menu, hold rear button and pull right paddle.

Wireless Interference and Channel Hopping: When interference is detected, the *Receiver* will scan for the least busy channel to connect to. When the *Paddle* loses communication with the *Receiver*, it sequentially scans all channels until it detects the *Receiver*. Cell phones, network routers, and laptops are common sources of interference.

Section 11: Troubleshooting Tips

	SYSTEM SYMPTOM	POSSIBLE ROOT-CAUSE
1	The *Display* resets when the wheel is turned.	This is an indication that the clock-spring / slip-ring in the steering column is losing contact while the steering wheel is turned. This is common in older vehicles. Clean the wiper arm using *Scotch Brite* or a similar material. Also check and possibly adjust the tension of the wiper arm.
2	*Display* turns on, scrolls values most of the time, but will occasionally go blank.	*Display* will go blank or scroll "*WIRELESS ERROR*" when it does not gain a message from the *Receiver Module*. This is most commonly the clock-spring / slip-ring not pulling enough electrical current to the paddles during a wireless transmit.
3	*Display* turns on, scrolls PCS and then goes blank.	See Troubleshooting Tip "*Display* turns on, scrolls values most of the time, but will occasionally go blank".
4	Scrolls "*WIRELESS ERROR*" when paddle pulled.	See Troubleshooting Tip "*Display* turns on, scrolls values most of the time, but will occasionally go blank".
5	Horn sounds when installing the horn button into steering wheel or when keyed-on.	The White wire on the *Paddle Shifter Harness* is connected to the H*orn Button Ground* instead of the H*orn Button Signal*. On the horn button, switch the White and Green wire.
6	Transmission shifts, but *Paddles* display "*NO TCU FOUND*".	The *Display* will scroll "*NO TCU FOUND*" when the *Receiver* does not see a valid PCS Proprietary/GMLAN CAN message from the transmission controller. Verify the CAN wiring as discussed in Section 7. Failure to use termination resistors (QTY 1-2) is a common problem causing this situation.
7	Slow shifts or delayed shifts.	The *Paddle Shifter* and the transmission controller will electronically start the shift in a fraction of a second. In most cases, the delay is associated with low line pressure, inherent hydraulic delay in the transmission, or shift timers set too long. Refer to your PCS Dealer for a discussion about shift delay.
8	Transmission will not shift with the paddles. **This TIP is for PCS TCM's. For GM-Tap-Shift contact your supporting dealer.**	Verify power at the *Paddles*. If the *Paddles* are equipped with a *Display*, verify by the *Display* illuminating with key-on. For *Paddles* without *Displays*, measure the voltage between Pin-1 and Pin-2 (Red and Black) with the key-on. If this is 7-13 Volts then there is power at the *Paddles*. If power is confirmed at the *Paddle Shifter*, check shift communication to the trans-controller with the laptop. First verify the trans-controller is in "*Manual-Mode*". For *TCM-2000 & TCM-2800* this can be seen on the monitor screen in the current modes section as shown in Section 7.2. If the "*Manual Mode*" input has been defined as *"Simple Manual"*, then the *"Simple Manual Mode"* should be turned on instead. Then verify the range of the transmission is Drive or a high gear that will allow upshifting.

All PCS Modules, Harnesses, and Kits (including these PS-8xxx Kits) are proudly produced & full-functionality tested by our Virginia (USA) based team before shipment! Any questions & concerns during installation / operation regarding this kits functionality may be first brought to the PCS Authorized Dealer that the Product & Support was purchased through.