



POWERTRAIN CONTROL SOLUTIONS
Engineering the future of driveline control.

SFT-5100 "GM CAN-TO-RELAY INTERFACE KIT" USER GUIDE

The purpose of this setup guide is to assist in proper kit installation to successfully convert transmitted 6L/8L/10L GMLAN Protocol messages to the advertised Relay-Control signals. 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.



Neutral Safety Interlock (Relay Included)

Reverse Light Control (Relay Included)

Engine Radiator Fan Control (Relay Required)

Transmission Cooler Fan Control (Relay Required)

Section 1: Introduction

The PCS SFT-5100 "GM CAN-to-Relay Interface Kit" is only setup for the GMLAN CANBUS Protocol found on many General Motors on-highway vehicles and Chevy Performance engine / transmission packages. More specifically, these are used to add required *Neutral-Safety* and *Reverse-Light* features that GM 6L / 8L / 10L transmission systems may not typically provide when transplanted into custom applications. The SFT-2000 *Utility Module* will enter Scanning Mode every time the vehicle is keyed-on, and continue to monitor the CANBUS for the transmissions Range-State as long as it is powered up. The *Utility Module* reads the transmitted Range Position messages for Park / Neutral and Reverse to activate (grounding) these two included relays. Additionally, there are two provided low-current-grounding control wires triggered by system temperatures for the activation of *Engine-Radiator-Fan* and *Transmission-Cooler-Fan* relays. These two optional "85-Series" Relays (and associated Fuses) are not provided in this kit and may be sourced separately. Other CANBUS protocols or custom variations of GMLAN are not supported by this kit, contact your local PCS Dealer for inquiries about support for other systems.

Section 2: Required Input Specifications

At minimum for any functionality the SFT-5100 Kit requires solid electrical connections to +12V *Switched-Power*, Ground, CAN-Hi, and CAN-Lo. *Switched-Power* must provide this +12V (fused at 5A Max) while the vehicle is keyed-on, cranking, and running. This source is often confused or miswired to +12v *Accessory-Power*, which cuts power to the circuit during the Crank / Start phase of vehicle operation (not allowing SFT-5100 to function properly). The CAN-Hi and CAN-Lo connections are to be a 20-AWG twisted pair, spliced into the same HIGH-SPEED GMLAN circuit connected to the 6L internal controller or T87 / T87A / T93 (etc.) external transmission controllers that the powertrain may have. Found next in *Section 3* are three common plug-and-play options that are recommended for purchase in conjunction with our SFT-5100 kit.

COLOR	FUNCTION	NOTES
YELLOW	SWT 12VDC PWR	FUSE ACCORDINGLY UP TO 5A, RATED FOR 8-32VDC *
BLACK	GROUND	BATTERY OR CHASSIS GROUND
WHT/RED	CAN-HI	HIGH-SPEED GMLAN CANBUS, 20AWG TWISTED PAIR **
WHT/BLK	CAN-LO	HIGH-SPEED GMLAN CANBUS, 20AWG TWISTED PAIR **

***NOTE-1A:** The 3-5A @ 12V Fuse for YELLOW 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.

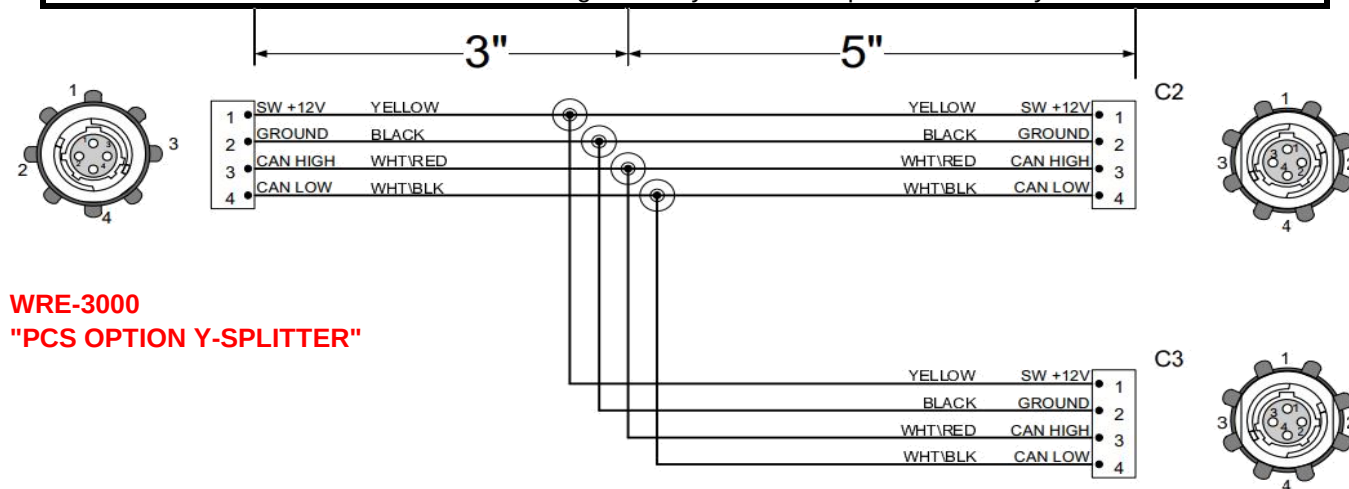
***NOTE-1B:** While the PCS Utility Module is rated at +8-32VDC for 12V and 24V systems, any related GM transmissions and controllers only operate on 12V electrical systems.

****Note-2:** The addition / removal of any 120-Ohm (or other) terminating resistors is not necessary or recommended when splicing into existing GMLAN CANBUS circuits, they should function properly at 60-Ohms before the addition of our kit with the existing QTY-2 internal or external 120-Ohm terminating resistors.

Section 3: Recommended Input Interfaces

CONFIRM THE RECOMMENDED INTERFACE BELOW WITH YOUR PCS AUTHORIZED DEALER FOR THE BEST PLUG-AND-PLAY EXPERIENCE ON YOUR APPLICATION

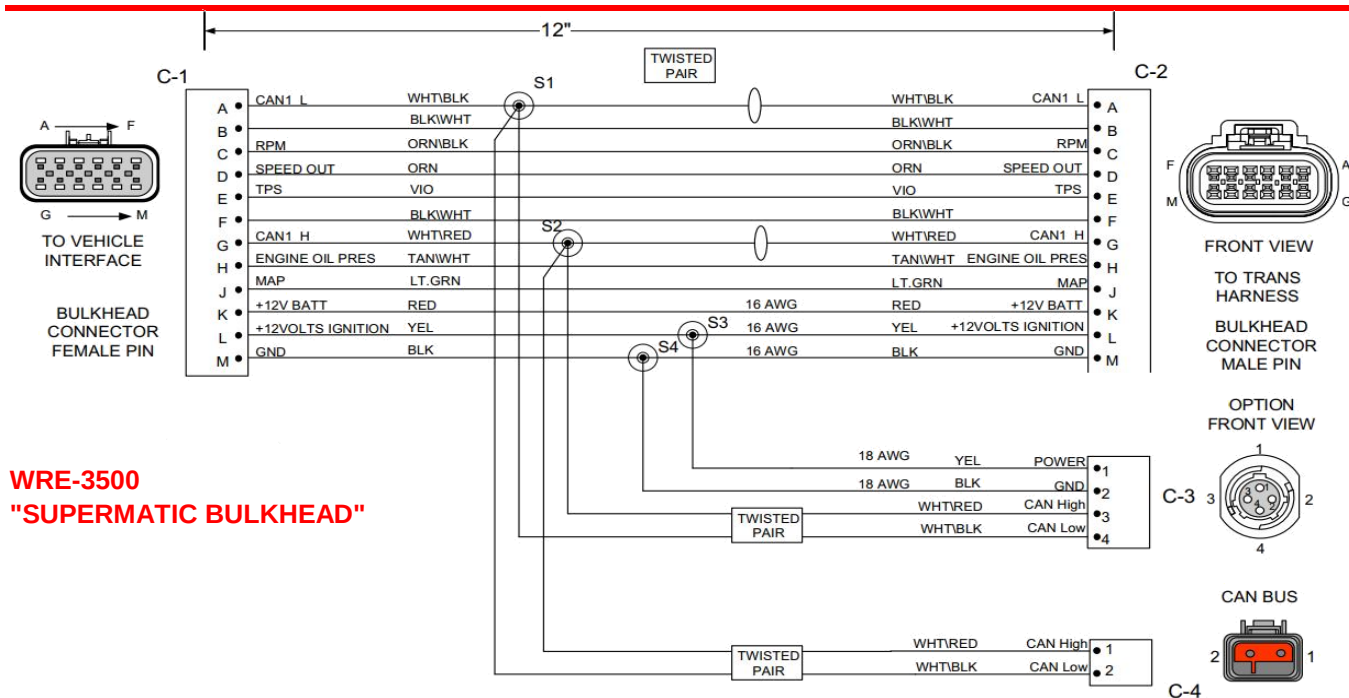
PCS P/N	DESCRIPTION	TYPICAL USAGE
WRE-3000	PCS OPTION Y-SPLIT	Plug-and-Play with other PCS TCM2600 / TCM2800 controllers
WRE-3002	4-WIRE PIGTAIL	Allows direct hardwiring Power, Ground, & CANBUS with pigtails
WRE-3500	SUPERMATIC BULKHEAD	Plug-and-Play with GM Supermatic / Chevy Performance kits



WRE-3002
"4-WIRE PIGTAIL"



WRE-3500
"SUPERMATIC BULKHEAD"



Section 4: Installing Optional Outputs

The SFT-5100 Kit comes with four relay options, Neutral-Safety and Reverse-Lights come with included relays while the Engine-Fan and Transmission-Fan will require pre-existing units in the powertrain or separately purchased relays to control. See below for proper intent of operation and I/O functionality.

NEUTRAL-SAFETY:

A critical function of required vehicle design, the Neutral-Safety circuit prevents an operator from allowing the engine to Start/Crank while the transmission is still in Reverse, Forward, or any of the lower Forward-Gears / Drive-Ranges. Our kit leaves the relay Open-Circuit (no-continuity) when the SFT-5100 Kit is: powered down, not recognizing any proper CAN messages, recognizing Reverse, recognizing Drive, and recognizing Manual/Sport ranges. Only when Park or Neutral transmission ranges are correctly received does the Neutral Safety Relay close and allow a crank signal to the ECM or Starter Circuit. For reference the latest revision SFT-4010 print of the harness is included with this kit.

COLOR	FUNCTION	NOTES
WHITE	START REQUEST	12V FROM IGNITION SWITCH / MODULE "ST" START CIRCUIT
GRAY	CRANK APPROVED	12V TO ECM INPUT OR THE STARTER SOLENOID OR RELAY

NOTE-3: Fuse the Neutral-Safety Circuit accordingly to "30A @ 12V MAX", necessary if feeding a Starter Solenoid or Starter-Relay. Unnecessary if providing a low-current signal direct to an ECM / PCM / BCM.

NOTE-4: The SFT-5100 Kit includes an "Anti-Restart" feature to prevent a Start-Request from being transmitted to the ECM / Starter / Starter Relay while the engine is already running. This is based on the GMLAN "Engine Running" message, thus is automatically disengaged if the engine is shut off or stalled. For odd projects such as PTO's or Pumps that may require some other "Enabled-in-Park/Neutral" signal that must still be active when the engine is running, please contact your PCS Dealer before/during the purchasing process to ensure that "Anti-Restart" is disabled in your SFT-5100 kit.

REVERSE-LIGHTS:

For many modern repairs or restorations a circuit is required to provide 12V-Power to Incandescent Bulbs, LEDs, or Reverse-Camera systems. Similar to the Neutral-Safety relay and circuit, the Reverse-Light circuit leaves a 30A relay in Open-Circuit (no-continuity) until the transmission controller properly reports on the CANBUS that it is in the Reverse lever position. For reference the latest revision SFT-4010 print of the harness is included with this kit.

COLOR	FUNCTION	NOTES
ORANGE	SWT 12VDC PWR	POWER FROM 12V-SWITCHED OR ACCESSORY CIRCUIT
GREEN	REVERSE LIGHTS	12V REV SIGNAL TO REVERSE LIGHTS / ACCESSORIES

NOTE-5: Fuse the Reverse-Light Circuit accordingly to "30A @ 12V MAX", necessary to feed any Reverse Lights or other Reverse related accessories / circuits.

ENGINE-TEMP-FAN:

A new feature added to this kit is a control wire for Engine-Temperature. The intent here is the ability to provide a low current grounding-signal to trigger a Fan-Relay for the main radiator fan(s). This relay is not included with this kit, and will need to be purchased separately if not part of the mentioned radiator assembly / kit. The SFT-5100 leaves this signal wire Open-Circuit (no-continuity) while our control module is powered down, not recognizing any proper CAN messages, and while the GMLAN transmitted engine temperature is less than 210°F. When engine temp is at 210°F or higher our signal wire provides a ground (1 Amp maximum, fuse accordingly). When system 12V power is keyed-off or lost, CAN communications are lost, or engine temperatures have dropped below 190°F then the provided ground signal switches back to become open-circuit to shut the fan / relay off.

COLOR	FUNCTION	NOTES
VIO / GRN	ENGINE FAN SIG	GROUNDING "ON" SIGNAL TO RADIATOR FAN RELAY

NOTE-6: Fuse the Engine-Fan Control Circuit accordingly to "1A @ 12V MAX CONTINUOUS", necessary to feed the relay control circuit.

Example for Reference

ACCESSORY OR SWITCHED +12V		85	ENGINE FAN RELAY	86	FROM SFT-5100 KIT: VIO / GRN, CONTROL WIRE
BATT / SWT / ACC +12V		30		87	POWER TO FAN / RADIATOR
ASSOCIATED FUSES NOT SHOWN				87A	N/C, DO NOT CONNECT

TRANS-TEMP-FAN:

A new feature added to this kit is a control wire for Transmission Temperature. The intent here is the ability to provide a low current grounding-signal to trigger a Fan-Relay for the secondary radiator fan(s) or a separate transmission cooler. This relay is not included with this kit, and will need to be purchased separately if not part of the mentioned transmission cooler assembly / kit. The SFT-5100 leaves this signal wire Open-Circuit (no-continuity) while our control module is powered down, not recognizing any proper CAN messages, and while the GMLAN transmitted transmission temperature is less than 210°F. When transmission temp is at 210°F or higher our signal wire provides a ground (1 Amp maximum, fuse accordingly). When system 12V power is keyed-off or lost, CAN communications are lost, or transmission temperatures have dropped below 190°F then the provided ground signal switches back to become open-circuit to shut the fan / relay off.

COLOR	FUNCTION	NOTES
VIO / BLU	TRANS. FAN SIG	GROUNDING "ON" SIGNAL TO TRANSMISSION FAN RELAY

NOTE-7: Fuse the Transmission-Fan Control Circuit accordingly to "1A @ 12V MAX CONTINUOUS", necessary to feed the relay control circuit.

Example for Reference

ACCESSORY OR SWITCHED +12V	85	TRANS FAN RELAY	86	FROM SFT-5100 KIT: VIO / BLU, CONTROL WIRE
BATT / SWT / ACC +12V	30		87	POWER TO FAN / COOLER
ASSOCIATED FUSES NOT SHOWN			87A	N/C, DO NOT CONNECT

Section 5: Diagnostics

For improved diagnostics there is a dual-color diagnostic LED built into the PCS Utility Module. Listed below are the various modes / codes set up for this SFT-5100 kit.

STATE	NOTES
NO LED	Utility Module has no power / ground, miswired, or damaged internally.
SLOW RED BLINK	Powered up, no module faults, searching for but no current CANBUS communication.
FAST RED BLINK	Powered up, no module faults, acquired but lost CANBUS communication.
SOLID GREEN	Good GMLAN CANBUS connection, no relay (N/S or REV) activation.
SLOW GREEN BLINK	Good GMLAN CANBUS connection, N/S Relay Activation commanded.
FAST GREEN BLINK	Good GMLAN CANBUS connection, REV Relay Activation commanded.

NOTE-8: If the Diagnostic LED "goes dark" and is not illuminating (any colors and patterns) when the operator is attempting to Crank / Start the engine, it is very likely that the +12V Power supply to the Utility Module is Accessory-Power and not Switched-Power from the vehicle. Verify with a multimeter (red-probe on our yellow wire, black-probe on chassis ground) that the following VEHICLE-POWER-LOGIC is true for +12V Switched Power.

NOTE-9: If the Diagnostic LED stays-on and is always illuminating (any colors and patterns) even when the vehicle is keyed-off, it is very likely that the +12V Power supply to the Utility Module is Battery-Power and not Switched-Power from the vehicle. Verify with a multimeter (red-probe on our yellow wire, black-probe on chassis ground) that the following VEHICLE-POWER-LOGIC is true for +12V Switched Power.

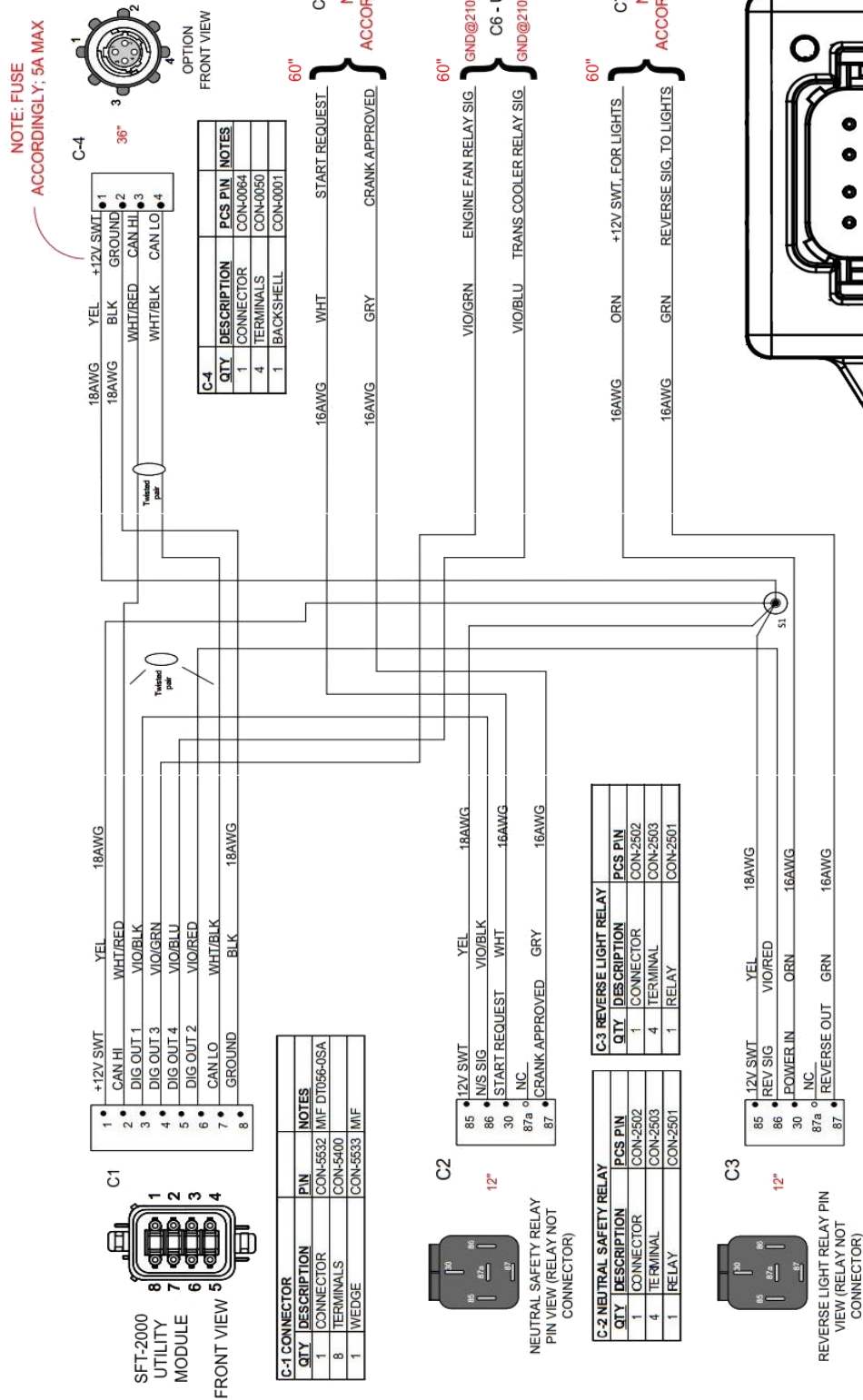
VEHICLE POWER LOGIC

KEY POSITION	BATTERY 12V	SWITCHED 12V	ACCESSORY 12V
OFF	12V / CONTINUITY	OPEN CIRCUIT	OPEN CIRCUIT
ON / RUNNING	12V / CONTINUITY	12V / CONTINUITY	12V / CONTINUITY
START / CRANK	12V / CONTINUITY	12V / CONTINUITY	OPEN CIRCUIT

NOTE-10: All PCS Modules, Harnesses, and Kits (including SFT-5100) 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 brought to the PCS Authorized Dealer that the *Product & Support* was purchased through.



LIMITED WARRANTY STATEMENT: Powertrain Control Solutions, LLC. Warrants all merchandise against defects in factory workmanship and materials for a period of 12 months after purchase. This warranty applies to the first retail purchaser and covers only those products exposed to normal use or service. Provisions of this warranty shall not apply to Powertrain Control Solutions, LLC. Product used for a purpose for which it is not designed, or which has been altered in any way that would be detrimental to the performance or life of the product, or misapplication, misuse, negligence or accident. On any part or product found to be defective after examination by Powertrain Control Solutions, LLC., Powertrain Control Solutions, LLC. will only repair or replace the merchandise through the original selling dealer or on a direct basis. Powertrain Control Solutions, LLC. assumes no responsibility for diagnosis, removal and/or installation labor, loss of vehicle use, loss of time, inconvenience or any other consequential expenses. The warranties herein are in lieu of any other expressed or implied warranties, including any implied warranty of merchantability or fitness, and any other obligation on the part of Powertrain Control Solutions, LLC., or selling dealer.

COMPLETE KIT IS SFT-5100, WIRING HARNESS SHOWN IS SFT-4010**INTENDED FOR 1:1 PRINTOUT****VERIFY SCALE BEFORE DRILLING !**