

Introduction:

This document is provided as a guide to integrating the Club-Sport shift kit with Pectel ECUs. Specifically SQ6, SQ6M and MQ12 using the Pi CalTool ECU Calibration and configuration software. If you are using a different Pectel ECU it is likely this process is very similar and this guide can still be used as a reference.

An example MQ12 Calibration and matching metafile are included in the “Pectel.zip” available from www.shiftec.com/shop/downloads

Getting Started:

Ensure you can communicate with the ECU and have a working copy of CalTool with the correct metafile for your ECU.

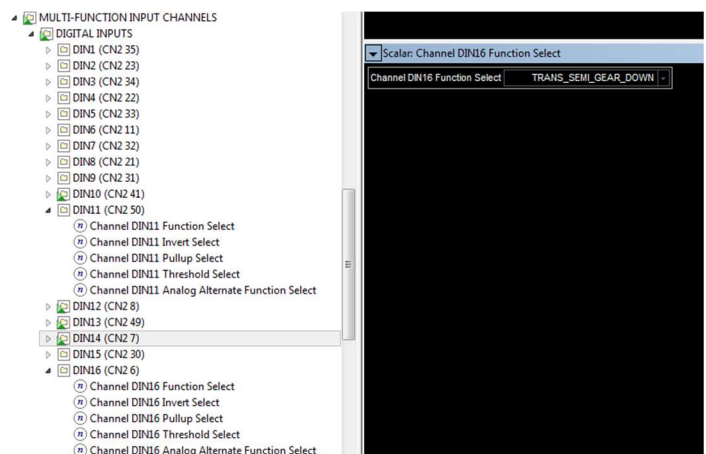
Check that the shift-kit is installed correctly inline with the Shiftec Installation Manual.

This guide is split into two parts – Integrating with ECU transmission control strategies and integrating with Shiftec GCU 800 gear controller.

Integrating with ECU transmission control strategies:

Pectel ECUs provide gear control functionality either as standard or as part of the “Transmission Control” software upgrade. Please follow the steps below to configure your ECU.

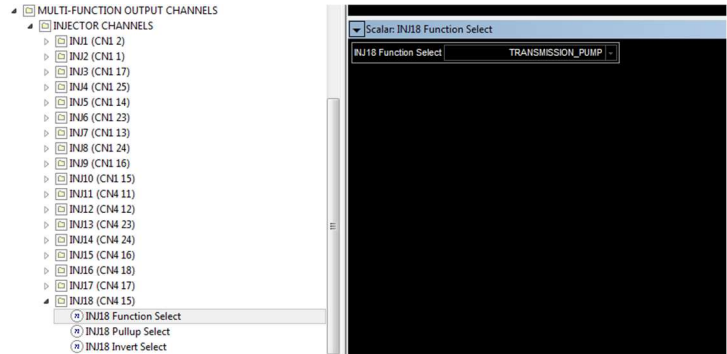
1. Define the inputs which will be used for shift paddle inputs and detent switch. These are configured on digital inputs (HARDWARE SETUP>MULTI-FUNCTION INPUT CHANNELS>DIGITAL INPUTS) using the options “TRANS_SEMI_GEAR_UP”, “TRANS_SEMI_GEAR_DOWN” and “TRANS_DETENT_SWITCH”. In the example calibration they are configured on DIG11 and DIG16 respectively.
2. Define the inputs which will be used for Gear Position and System Pressure. These are configured on analogue inputs (HARDWARE SETUP>MULTI-



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FUNCTION INPUT CHANNELS>ANALOG INPUTS) using the options “GEAR_POS” and “P_SYS”. In the example calibration they are configured on AIN4 and AIN28 respectively.

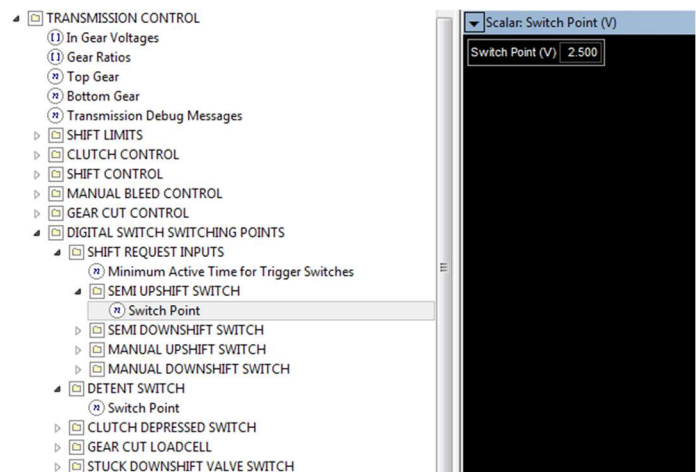
- Configure the output which will be used for Compressor control. This is configured on a PWM output or Switched Digital Output (HARDWARE SETUP>MULTI-FUNCTION OUTPUT CHANNELS>INJECTOR CHANNELS), depending on ECU Version. In the example calibration this is configured on INJ18.



- Configure the outputs which will be used for Gear Up and Gear Down valves. This is configured on a PWM Output or Switched Digital Output (HARDWARE SETUP>MULTI-FUNCTION OUTPUT CHANNELS>INJECTOR CHANNELS), depending on the ECU version. In the example calibration it is configured on INJ19 and INJ20.

- Within the Transmission Control menu configure the digital input switch points to suit your installation of the shift paddles and shift detent (TRANSMISSION CONTROL>DIGITAL SWITCH SWITCHING POINTS>SHIFT REQUEST INPUTS).

- Within the Transmission Control menu configure the pump control to suit your installation (TRANSMISSION CONTROL>PUMP CONTROL). The example calibration contains sensible values, for reference these should be Pump On Pressure= 7.5bar, Pump Off Pressure = 9bar, Pump Max On Time = 35 seconds, Pump Valve Frequency = 1000hz, Pump Valve Initial PWM value = 100%.



Configure the Minimum RPM Pump Enable to suit your installation, if set to 0 the pump will run with ignition on. Configure the Pump On Min Voltage to suit your installation, this value provides a cut off to disable the pump on low battery.

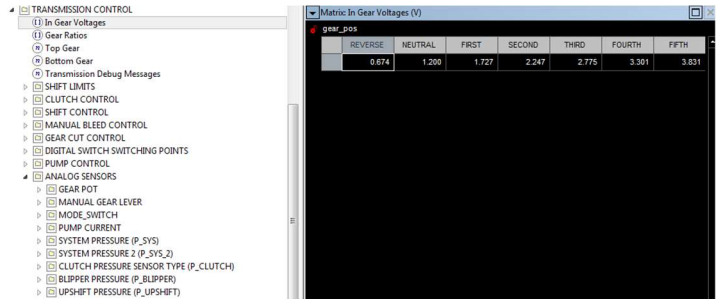
- Within the Transmission Control menu configure the System Pressure sensor (TRANSMISSION CONTROL>ANALOG SENSORS>SYSTEM PRESSURE (P_SYS)). System pressure type should be set to user defined and the sensor curve configured in “SYSTEM PRESSURE SENSOR CURVE”. The calibration for the Shiftec sensor is 0.5V=0bar – 4.5V=10bar. The example calibration contains this sensor calibration. Set MINIMUM SYSTEM PRESSURE to 0bar and MAXIMUM SYSTEM PRESSURE to 10bar.

8. Within the Transmission Control menu configure the Top and Bottom gears (TRANSMISSION

CONTROL>TOP GEAR and TRANSMISSION CONTROL>BOTTOM GEAR) to suit your installation, configure the in gear voltages (TRANSMISSION CONTROL>IN GEAR VOTAGES).

The Gear_Pos table provides a column for each gear with the voltage defined below it. The live gear pot voltage can be viewed in the numeric display on the right hand

side of the CalTool window. Manually move the gearbox into each gear and enter the voltage into the correct column. Configure the gear ratios to suit those fitted to your gearbox (TRANSMISSION CONTROL>GEAR RATIOS).



9. You should now have all required IO configured and the gearbox should change gear from the steering wheel paddle when requested. You will need to configure the Pectel Transmission Control strategy to suit your installation/engine and gearbox characteristics (TRANSMISSION CONTROL>SHIFT LIMITS and TRANSMISSION CONTROL > SHIFT CONTROL), the example calibration contains populated values BUT THESE SHOULD NOT BE USED BY DEFAULT. This strategy configuration is vehicle specific and Pectel software level specific and as such please refer to the Pectel technical documentation or technical support for details of these strategy options and how they will affect your vehicle.

Integrating with Shiftec GCU 800 gear controller

The Shiftec GCU 800 is an extremely compact, lightweight, stand alone gear control unit which provides advanced Shiftec gear control strategies. Integrating the Shiftec GCU 800 with a Pectel ECU is performed via CANBus and the Pectel ECU required no Transmission Control options or functionality. No analogue connections are required. Please follow the steps below to configure your ECU.

1. Ensure the GCU CANBus is wired to the desired ECU CANBus (usually CAN2) correctly with CANH and CANL the correct orientations at both the ECU and GCU and 120ohm termination resistors fitted where required.

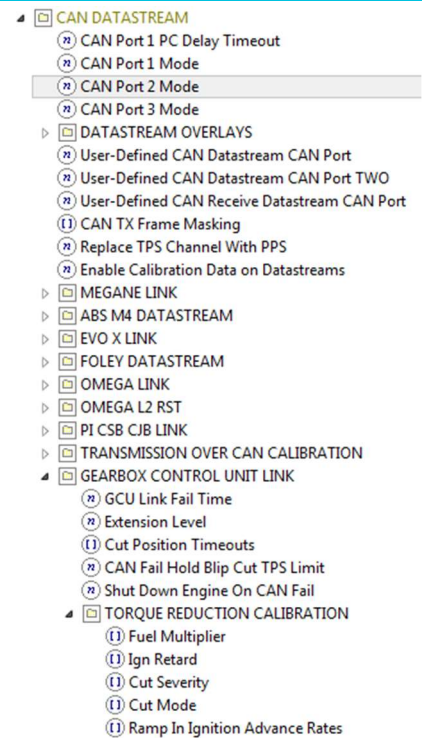
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SHIFT-TEC

- Configure the CANBus for GCU Communications via COMMUNICATIONS SETUP > CAN DATASTREAM>CAN Port 2 Mode (if you are using a different ECU CANBus to CAN Port 2 please select the correct port for your installation), select the GCU_LINK option from the drop down.
- Some versions of Pectel ECU Software, usually on SQ6 ECUs, contain an option for Extension Level. Navigate to COMMUNICATIONS SETUP > GEARBOX CONTROL UNIT LINK, if there is an option for extension please select LEVEL_2 from the drop down menu. If the extension level is not set to LEVEL_2 you WILL NOT have a throttle blip on downchange.
- With the ECU and GCU powered on the Numeric Display on the right hand side of the CalTool window will show the status of the GCU link. This should show a value for “gcuLinkOK” as well as values in the “gcuGEAR” and “gcuShiftStatus” channels. If so the GCU link is active and configured correctly. If no values are displayed or the “gcuLinkOK” is not showing a positive status double check the CANBus wiring and termination and ensure the link is configured on the correct ECU CAN port.
- You will need to configure the Pectel Strategies for torque reduction and down shift blip as required, the example calibration contains populated values BUT THESE SHOULD NOT BE USED BY DEFAULT. This strategy configuration is vehicle specific and Pectel software level specific and as such please refer to the Pectel technical documentation or technical support for details of these strategy options and how they will affect your vehicle.



ECU Connector Pin Out References:

These tables show viable IO pins for Shift Kit functions as well as required CAN, Power and Analogue Ground pins.

Note: Most Pectel ECUs can have these functions configured on any relevant input or output.

SQ6

Pin Number	Function
14, 15, 16,	Analogue Inputs - Shift System Pressure input or Gear Position Sensor Input. Any analogue input can be configured for shift system pressure or gear position if required.
19, 20, 21	Digital Inputs – Gear Paddles and Detent input. Any digital input can be configured for gear paddle or detent input if required.

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2.5	PWM Output – Compressor Control, Gear Up Valve, Gear Down Valve.
35	Analogue Ground – Shift System Wiring Loom Ground
64/65	+5V Sensor Supply (NOTE: only if configured as 5V within the ECU calibration) – Shift system wiring loom +5V supply.
8	CAN 2 Low – Recommended CANBus for GCU 800 communications.
9	CAN 2 High – Recommended CANBus for GCU 800 communications.

SQ6M

Pin Number	Function
CN2 – 8, 23, 9	Analogue Inputs – Shift System Pressure input or Gear Position Sensor Input. Any analogue input can be configured for shift system pressure or gear position if required.
CN2 – 48, 35, 51	Digital Inputs – Gear Paddles and Detent input. Any digital input can be configured for gear paddle or detent input if required.
CN1 – N, S	PWM Output – Compressor Control, Gear Up Valve, Gear Down Valve.
CN2 – 1, 37	Analogue Ground – Shift System Wiring Loom Ground
CN2 – 33, 55, 16, 15	+5V Sensor Supply (NOTE: only if configured as 5V within the ECU calibration) – Shift system wiring loom +5V supply.
CN2 – 26	CAN 2 Low – Recommended CANBus for GCU 800 communications.
CN2 – 32	CAN 2 High – Recommended CANBus for GCU 800 communications.

MQ12

Pin Number	Function
CN3 – 46, 45, 27	Analogue Inputs – Shift System Pressure input or Gear Position Sensor Input. Any analogue input can be configured for shift system pressure or gear position if required.
CN2 – 49, 7, 30	Digital Inputs – Gear Paddles and Detent input. Any digital input can be configured for gear paddle or detent input if required.
CN1 – S, R	PWM Output – Compressor Control, Gear Up Valve, Gear Down Valve.
CN3 – 5, 16, 18, 20, 22	Analogue Ground – Shift System Wiring Loom Ground
CN2 – 3, 20, 18, 16	+5V Sensor Supply (NOTE: only if configured as 5V within the ECU calibration) – Shift system wiring loom +5V supply.
44	CAN 2 Low – Recommended CANBus for GCU 800 communications.
26	CAN 2 High – Recommended CANBus for GCU 800 communications.

Useful Links:

Pectel Support Forum – <https://support.cosworth.com/categories>

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Cosworth CalTool/Pi CalTool download - <https://support.cosworth.com/post/latest-software-release-announcements-and-downloads-for-pi-caltool-9610496>

Example Calibration - www.shiftec.com/shop/downloads

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