Club-Sport Shift Kit
Installation Manual

Thank you for purchasing a Shiftec Club-Sport Shift Kit. This manual provides installation and integration information to assist in the fitment of the kit to a wide range of vehicles. This manual is arranged in the order that components of the kit should be fitted to the vehicle, however please read this manual before commencing installation of the kit.

Pneumatic systems • Paddle shift • Clutch control • DRS • Boost control

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Kit Contents:

The Club-Sport Shift Kit includes the following components:

- Gear Shift Servo
- Integrated Accumulator
- Compact Compressor
- 2 X Single Shift Paddles
- 2 X Integrated Accumulator Mounts
- Motorsport specification wiring loom with DTM connectors.
- 2 X -4 90 degree hose fitting
- 2 X -4 straight hose fitting
- 4 metres -4 air hose.
- 40amp Automotive Relay.

Installing the Gear Shift Servo

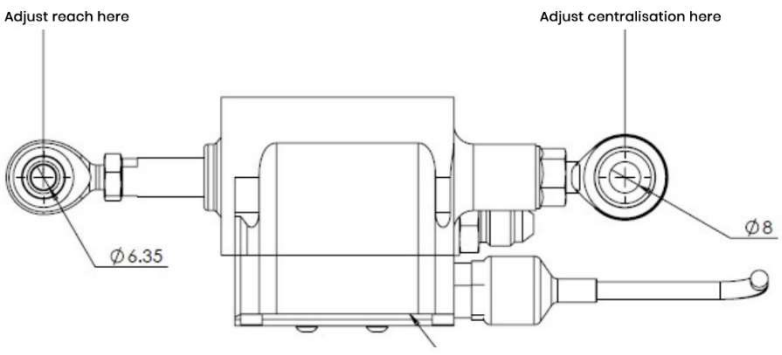
The Gear Shift Servo (GSS) provides mechanical effort to the gearbox selector to change gears. The GSS integrates the pneumatic control valves with the actuator creating an almost zero length air path between valves and actuator piston which results in a light weight, compact solution with excellent system response times.

The GSS mounts via two rose joints/spherical bearings and floats on these bearings during operation. The body of the GSS is mounted via an 8mm rose joint whilst the actuating rod of the GSS mounts via a 1/4" rose joint. This allows the GSS to directly replace most shift cables.

Some gearboxes will require a bracket/clevis to carry the 8mm rose joint/body of the GSS. If your gearbox is not already fitted with a suitable bracket please contact your gearbox manufacturer who will be able to supply a suitable component.

Installation Steps:

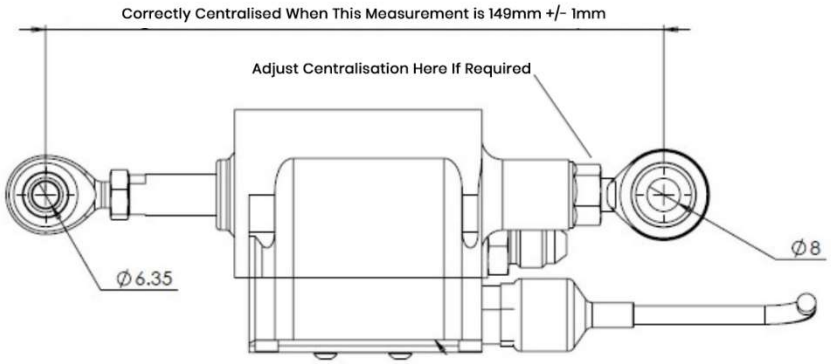
1. Ensure the gearbox is fully in a gear or in neutral and that the gearbox ratchet assembly has released to the centre position of its movement. Loosen the locking nuts on the GSS rose joints.
2. Loosely bolt the GSS body rose joint to the gearbox bracket/clevis using a suitable 8mm fastener.
3. The GSS has a maximum stroke of +/- 17mm, ensure the shaft is in its central position when fitting the servo. Adjust the overall reach of the servo using the rods rose joint assembly. Adjust the centralisation of the GSS using the body of the GSS rose joint assembly as per the diagram.



4. Adjust the length of the GSS rod rose joint to reach the selector. Loosely bolt the GSS rod rose joint to the gearbox selector using a suitable ¼" fastener. If the GSS rod rose joint

does not offer enough reach adjustment the body rose joint can be used to further increase reach at the expense of adjustability of centralisation.

5. Using a steel rule measure the distance between the centres of the GSS rose joints, with the gearbox selector at its central position this measurement should be 149MM +/- 1MM. It is **critical** to system operation that the actuator is correctly centralised. If it is not adjust the centralisation of the actuator by adjusting the GSS body rose joint length as per the diagram.



6. Tighten the rod and body rose joints mounting hardware. The GSS is now installed.

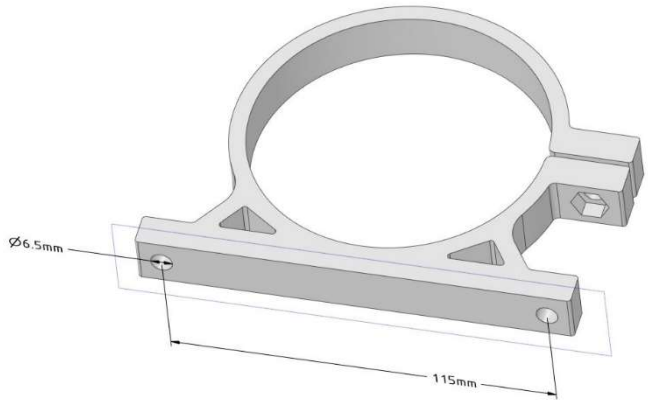
Mounting The Accumulator

The Integrated Accumulator acts as a store of pneumatic energy for the paddle shift system. It also carries the air filter and system pressure sensor. The accumulator can be installed in any orientation, but it is recommended that it is not installed with the air exit pointing downwards to avoid water ingress into the valves. If it is installed with the air exit pointing downwards the system should be drained after each event.

The accumulator should be mounted to a hard surface e.g bulkhead, chassis, floor but not to bodywork or other lightweight material.

Installation Steps

1. Choose a location for the accumulator away from high levels of radiated heat and with enough space around the accumulator to fit the air in and air out fittings and provide sufficient space for the pressure sensor wiring loom.
2. Slide the accumulator mounting brackets onto the accumulator from the bottom of the accumulator up. Loosely tighten the bracket clamping bolts.
3. With the accumulator placed on a flat surface align the mounting brackets so the accumulator sits flat and the air in/out fittings are side by side at an equal height. Tighten the bracket clamping bolts so the brackets nip the accumulator.
4. The accumulator bracket hole centres are 115mm and the brackets are designed to mount with two 6mm fasteners each. Do not over tighten the mounting hardware when securing the brackets to the vehicle.

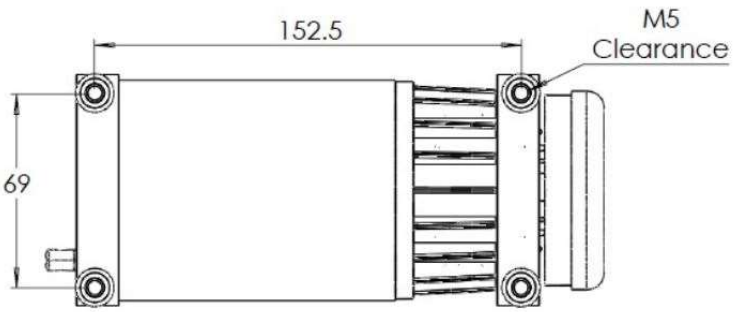


Mounting The Compressor

The compressor provides pneumatic power to the paddle shift system which is stored in the accumulator until required. The compressor should be installed upright with the air filter facing away from the normal direction of travel.

Installation Steps:

1. Choose a location for the compressor away from high levels of radiated head and with good ambient air flow. The compressor should be mounted with the air filter away from the normal direction of travel to minimise water ingress during operation in the wet. Ensure there is enough space around the compressor for the air outlet and electrical supply connector.
2. The compressor is provided with rubber AV mounts, these mounts should be retained, and the compressor should not be rigidly mounted to structures or floors.
3. The compressor mounts via four M5 fasteners. The hole centres for mounting are 152.5mm across the length of the compressor and 69mm across the width of the compressor.

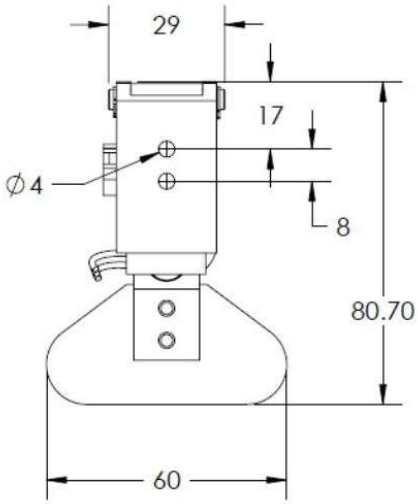


Mounting The Shift Paddles

The shift paddles are designed to fit the majority of steering wheels as a bolt on component. Paddle electrical output is via closing a normally open switch. In some cases it may be necessary to mount the paddles on a separate bracket bolted between the steering wheel and steering boss, however this is normally not necessary.

Installation Steps:

1. Select a location on the steering wheel which is suitable for the reach of the driver/s. Generally, the paddles will be mounted on the horizontal line of the steering wheel formed by the middle spokes of the steering wheel.
2. Ensure there is sufficient room for the paddle electrical exits to clear the centre boss of the steering wheel.
3. The paddles mount via 4mm fasteners through the centre of the paddle housing. The steering wheel can either be drilled and tapped to allow for installation or the fasteners can be bolted directly through the steering wheel with a nut on the rear of the fastener. It is suggested a K-Nut or similar self locking nut is used if the paddle is mounted via this method and that careful attention is paid to the fastener length to avoid excess protrusion on the rear of the wheel. Once mounted the paddle wiring loom should be secured in a suitable position on the lower of the steering wheel vertical spoke. A TC105 or similar can be bonded to the wheel to allow this, it is important the loom is secured to avoid excess strain during rapid steering wheel movements.



4. It is suggested the steering wheel curly cable is also mounted to a suitable position on the dash/column via a TC105 or similar to avoid strain on the electrical connector.

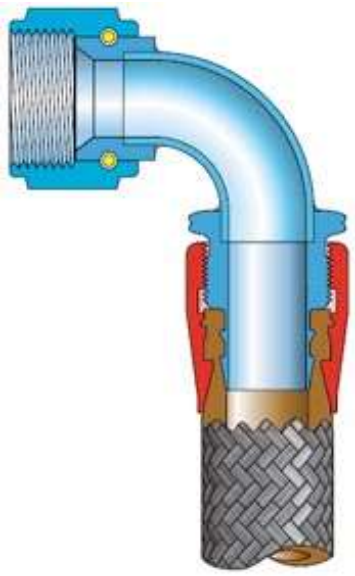
5. Once the loom is secured the wheel should be carefully moved through its full rotation to ensure there is sufficient extension in the curly cable and that the driver is easily able to reach the paddles under various hand positions.

Building And Fitting The Air Lines

An air line is required between compressor and accumulator, and accumulator and gear shift servo. The kit is supplied with 4M of -4 air line and suitable fittings to construct the lines. No special tools are required to construct the lines, however a set of aluminium dash spanners are recommended to avoid scratching the fittings. If these are not available the fittings can be protected with a cloth or masking tape.

Measure the required hose lengths between the compressor and accumulator and accumulator and gear shift servo. Cut the supplied hose to the required lengths, when cutting the hose it is suggested that a radiac wheel or share 32TPI hacksaw blade is used with the hose wrapped tightly with electrical or masking tape to avoid fraying.

Building The Air Lines:



1. The design of the fittings does not rely on olives or other sealing devices, instead the internal shape of the fitting forms the seal. The fitting is constructed of two components, socket and body. Remove the socket from the fitting you wish to fit.
2. Insert the end of the hose into the socket until the hose butts against the bottom of the threads then back the hose out until there is approx. 1mm gap between the hose end and the threads.
3. Lubricate the threads of the body and inside of the hose with light air tool oil or similar.
4. Holding the hose rather than the socket push the hose and socket onto the body of the fitting until the socket threads can be started on the threads of the body.
5. Once the threads are started using a suitable spanner/s or vice and spanner tighten the socket onto the fitting body
6. Repeat until all hose fittings are installed on the air lines.

Fitting The Air Lines:

1. The air lines should not be installed on or against high temperature components. It is good practice to follow other hose runs or wiring loom runs on the vehicle where ever possible.
2. Secure the air lines with cable ties or P clips as appropriate.
3. When attaching hose fittings to the Compressor, Accumulator or GSS use copperslip if required, not Loctite or PTFE tape.
4. Fittings should not be over tightened onto the Compressor, Accumulator or GSS.

Installing The Gear Position Sensor

The Shiftec gear position sensor is of a dual track, none contacting hall effect design and provides accurate and reliable gear barrel position information in a compact and durable package. The gear position sensor is of a standard mounting design with a blade type sensor drive which is compatible with the vast majority of gearboxes. If there is already a gear position sensor fitted to the gearbox this should be removed and replaced with the gear position sensor supplied in this kit.

Installation Steps.

1. If there is already a gear position sensor fitted remove it from the gearbox retaining the mounting hardware.
2. Ensure the gearbox is in Neutral.
3. Align the reference on the gear position sensor body with the reference on the shaft.
4. Fit the gear position sensor taking care to ensure the blade of the sensor drive engages with the slot in the gear barrel.
5. Tighten the two mounting bolts.

If you have removed an existing gear position sensor and require this to drive a dash display or similar a second gear position sensor output is supplied on the included wiring loom for this purpose.

Installing The Wiring Loom

The wiring loom provided with the shift kit is of a motorsport specification construction using DR25 heat shrink and Type 44 wire with Deutsch DTM connectors for all components and the interface to the vehicle.

Installing The Wiring Loom.

1. Starting from the vehicle interface (12 way DTM connector) end of the loom place this connector in your desired position and secure with tape or similar as a temporary measure whilst the rest of the loom is fitted. It is always good practice to follow other existing loom runs where possible to produce a neat installation which is away from areas of high temperature.
2. Install the relay holder in a suitable position on the vehicle and fit the relay to the holder. Excess length can be coiled and secured with cable ties as required.
3. Connect the red ring terminal, 12V Power to an ignition or master switched source that is capable of supplying a peak of 30amps. Generally this will be connected to the master switch output.
4. Connect the yellow ring terminal, Ground, to a suitable ground. This should either be a bolted joint to the chassis of the vehicle, assuming the chassis is conductive, that is free of paint, debris or contamination or connected directly to the battery ground.
5. Run the compressor power loom to the compressor and connect the connector. Excess length can be coiled and secured with cable ties as required.
6. Run the pressure sensor loom to the integrated accumulator and connect the connector. Excess length can be coiled and secured with cable ties as required.
7. Run the GSS loom to the GSS and connect the connector. Excess length can be coiled and secured with cable ties as required.
8. Run the Gear Pos Loom to the Gear Position Sensor and connect the connector. Excess length can be coiled and secured with cable ties as required.
9. If required a second gear position sensor output is provided on the loom marked “Gear Pos Sec”, if you have removed an existing gear position sensor as part of the kit install this connector can be used to supply gear position information to an existing gear display, dash display or ECU. Please note it is likely you will have to recalibrate the sensor input to suit the new sensor.

10. Check that all loom runs are away from rotating or high temperature components, that all system components are connected correctly and that there is charge in the vehicle battery.

Interfacing With Your ECU

The Club-Sport Shift Kit is designed for use with an existing ECU that supports transmission control. These are generally produced by Pectel, Motec, Life Racing/Syvecs etc. The below provides installation details for connecting the Shift Kit loom to these ECUs, for support on configuring the transmission control strategies please contact your ECU manufacturer.

The Shift Kit loom provides a 12 way DTM connector for connection from the Shift Loom to an existing ECU. The pin out of this connector and its associated ECU connection is provided below:

Pin	Function	ECU Connection
1	Power GND Supply	Not Connected
2	Power + 12V Supply	Not Connected
3	Ana GND	Connect To The Analogue Sensor Ground.
4	Gear Position Sensor Signal	Connect To The Input Designated As Gear Position
5	5V Output	Connect To the 5V Sensor Power Supply Output
6	Up Shift Paddle	Connect To The Input Designated As Shift Up Signal
7	Down Shift Paddle	Connect To The Input Designated As Shift Down Signal
8	Detent Button	Connect To The Input Designated As Neutral Or Detent Signal
9	GSS Up Valve	Connect To The Output Designated As Shift Up Valve
10	GSS Down Valve	Connect To The Output Designated As Shift Down Valve
11	Pressure Sensor Signal	Connect To The Input Designated As Shift System Pressure
12	Compressor Relay Drive	Connect To The Output Designated As Shift System Compressor

You will need to configure the I/O on your ECU to suit the sensors and actuators provided in the Shift Kit. These calibrations are listed in the below table.

Type	Function	Calibration
Input	System Pressure Sensor	0.5V = 0bar 4.5V = 10bar
Input	Shift Up Paddle	Pull To Analogue Ground
Input	Shift Down Paddle	Pull To Analogue Ground
Input	Detent Button	Pull To Analogue Ground
Input	Gear Position Sensor	0.5V – 0 degrees 4.5V – 300 degrees
Output	Compressor Ground	Pull To Ground To Activate Compressor
Output	GSS Up Valve	Pull To Ground To Activate Up Valve
Output	GSS Down Valve	Pull To Ground To Activate Down Valve
Input	Secondary Gear Position Sensor Output	0.5V – 300 degrees 4.5V – 0 degrees

Configuration of the ECUs transmission control strategies will depend on the design and version of the ECU. You should contact the ECU manufacturer for help on configuring these strategies, however some best practice is provided below for reference:

- All switch inputs should have debounce applied, this should be a minimum of 100ms
- No sensor input smoothing should be applied to the gear position sensor unless this is specifically instructed by the ECU manufacturer.

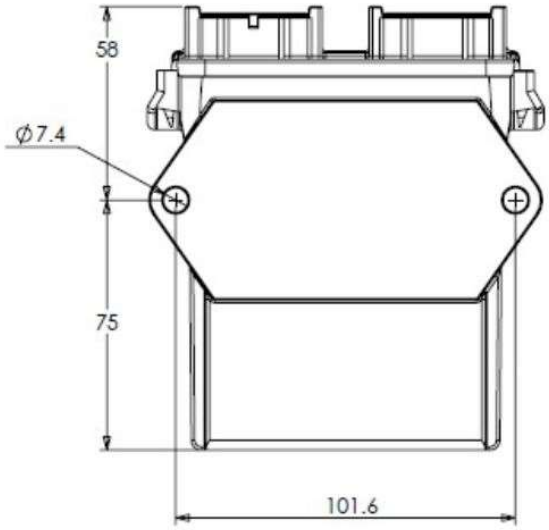
- A compressor run time limit should be enabled and set to 30 seconds or a maximum duty of 50%.
- Transmission control should be closed loop based on gear position input. If this is not possible on your ECU we strongly recommend purchasing the optional GCU-500 upgrade which includes a Gear Control Unit capable of fully closed loop shift control.

Installing and configuring the optional GCU 500 Gear Controller

The optional GCU 500 gear controller is supplied with a GCU interface loom which connects directly to the Shift Kit wiring loom via the 12 way DTM connector marked “Vehicle” on both looms.

Installation Steps:

1. Starting from the vehicle connector on the Shift Kit loom connect the two 12 way DTM connectors.
2. Choose a suitable location for the GCU500, this should be away from sources of high temperature on a flat surface. It is recommended the GCU is installed with the connectors facing downwards or if installed horizontally with the connectors away from the direction of travel. The GCU mounts via two M6 or M7 fasteners with 101.6mm mounting hole centres.



3. Connect the GCU1 and GCU2 connectors on the wiring loom to the GCU. Excess length can be coiled and secured with cable ties as required.
4. Run the USB comms loom to a suitable position that is convenient to connect to during setup and operation of the system. Excess length can be coiled and secured with cable ties as required.
5. If you wish to use throttle position sensor as part of the gear control strategy (recommended) and cannot provide this information via CAN run the TPS loom to a convenient position and connect this to the existing throttle position sensor signal and ground. The input is of a differential type and will not pull up the existing signal. Please see the IO table below for further information on this connection. Excess length can be coiled and secured with cable ties as required.
6. Run the CANBus connector to a suitable position that is convenient for connecting to as required. You do not need to use CANBus but if your ECU supports CANBus it is generally the preferred option due to simplifying the installation. Connect the Pin 1 of this

connector to ECU CAN High and Pin 2 of this connector to ECU CAN LOW. Please see the IO table below for further information on this connection. Excess length can be coiled and secured with cable ties as required.

7. Run the ECU Gear/Blipper loom to a position that is convenient for connecting to as required. This connector provides analogue cut/blip signals to the ECU as well as an analogue RPM input to the GCU if required. Connect Pin 1 of this connector to your ECUs gear cut input, connect Pin 2 of this connector to your ECUs Blip/Downshift input, if you wish to use analogue RPM input connect Pin 5 of this connector to the Tacho Output or a suitable RPM signal source (coil low side, hall effect cam sensor output etc.).
8. Check that all loom runs are away from rotating or high temperature components, that all system components are connected correctly and that there is charge in the vehicle battery.

Once installation is complete turn on the vehicle master switch, the compressor should run until the air system is to pressure and shut off. Install the Shiftec iFace software.

Connecting to the GCU 500.

The GCU 500 uses USB to communicate between the GCU and the iFace software installed on your laptop. There is no port configuration or similar required.

1. With the vehicle powered on and iFace open on your laptop connect the USB lead to a Type A port on your laptop.
2. After a few seconds the GCU will be displayed in the available comms link window. Double click the GCU to connect. iFace will download the configuration from the GCU.
3. If you are using a Pectel, Life, Motec or Generic ECU and plan to communicate over CAN open the relevant calibration using the “Open” icon on the toolbar under the Tabs display. This will configure the CANBus on the GCU. If you are using analogue connections to communicate with the ECU open the “Analogue” calibration using the “Open” icon on the toolbar under the Tabs display. This will configure the outputs on the GCU.

Configuring the GCU 500

There is little configuration work to perform on the GCU as it is preconfigured for the majority of applications. At this stage all that is required is calibration of the gear position sensor to suit your gearbox.

1. On the Gear Tab within iFace navigate to gear voltages.

2. Starting with Neutral position enter the in gear value for Neutral into the table, the current gear position sensor voltage is shown in the information window on the right hand side of the iFace display. This voltage should be circa 1V, if it is not you may have the gear position sensor fitted 180 degrees out.
3. Move to first gear, either manually or using the gear up button next to the gear position voltages table. This button will fire the actuator, it is a good idea to have someone move the wheels during this operation to ensure you do not see a false gear engagement from the gearbox going dog on dog. Enter the in gear value for 1st into the table referencing the gear position sensor voltage on the right hand side of iFace display.
4. Repeat this process for all gears.
5. If you have a 5 speed gearbox set the top gear option to 5.
6. Shift down the gearbox and ensure all values are correct for the engaged gear by comparing the table value to the gear position sensor voltage on the right hand side of iFace display
7. Continue to shift down into Reverse if fitted. Set the reverse in gear voltage referencing the gear position sensor voltage on the right hand side of iFace display. If the gearbox cannot select neutral or reverse there may be a neutral/reverse detent fitted. Contact your gearbox manufacturer for information on how to remove this detent.
8. Save your calibration and power cycle the GCU.
9. Whilst pressing the detent button pull the upshift paddle, the gearbox should shift to first. Pressing the detent button again will shift the gearbox to neutral.
10. Initial GCU configuration is now complete.

Configuring Your ECU.

Your vehicles ECU will need to be configured to support an up change gear cut and throttle blip. You should refer to your ECU manufacturers documentation for specific details on configuration of these strategies. If you are using CANBus to communicate between GCU and ECU generic details of configuration of this communication is provided below. For detailed guides on configuring specific ECUs please see www.shiftec.com/shop/support

Generic CAN Configuration.

For ECUs which support Cut/Blip via CAN please refer to the manufacturers documentation regarding configuring the ECU. Generic CAN Transmit and Receive information is provided below.

TX/RX	Name	Message ID	Rate	Start Bit	Length	Scaler	Big Endian
RX	TPS	0x002	2ms	16	16	-	Yes
RX	RPM	0x002	2ms	0	16	-	Yes
TX	SHIFT STAT	0x001	2ms	0	8	1	No
TX	CUT SEVERITY	0x001	2ms	24	8	0.5	No
TX	BARREL POS	0x033	2ms	16	16	0.001	Yes
TX	BLIP ENABLE	0x200	2ms	16	16	1	No
TX	BLIP SEVERITY	0x200	2ms	0	16	0.1	Yes

- TPS provides throttle position information from the ECU to the GCU.
- RPM provides engine speed information from the ECU to the GCU.
- Shift Stat provides shift status information from the GCU to the ECU. This may not be required in generic applications.
- Cut Severity specifies the level of gear up change cut the GCU is requesting.
- Barrel Pos provides gear barrel position information from the GCU to the ECU.
- Blip Enable provides a flag for if the throttle blip should be allowed or disallowed by the ECU.
- Blip Severity specified the level of throttle blip the GCU is requesting.

Configuring Your ECU with Analogue

Analogue communications do not require CANBus for a functional system. Whilst the installation arguable has a little more complexity than a CAN based system is allows for support of a wide variety of ECUs that either do not support CAN or are not capable of controlling gear cut and throttle blip via CANbus. There is no functional difference in operation between CAN and Analogue communication options. For detailed guides on configuring specific ECUs please see www.shiftec.com/shop/support

If you are using analogue signals to communicate between the GCU and ECU details of the required IO for communication is provided below.

Type	Name	Connector	Connector Pin	Signal
Input	RPM	ECU Gear/Blipper	5	Square Wave Speed Signal.
Input	Throttle Position	TPS	1 – Signal 2 – Ground	0-5V
Output	Gear Cut Signal	ECU Gear/Blipper	1	Pull To Ground
Output	Blip Signal	ECU Gear/Blipper	2	Pull To Ground

- RPM provides the engine speed signal to the GCU, this speed signal is used to allow or deny down changes as well as controlling when upshifts and downshifts are allowed under certain global conditions. It should be a square wave signal which can be generated by the ECU tacho drive output, the low side of the coil, the output from a hall effect cam position sensor or a crank shaft reference.
- Throttle Position provides the position of the throttle butterfly/butterflies to the GCU, this signal is used as part of the shift strategies and to deny upshifts/downshifts when they would not be sensible. The input is a differential input which allows the existing throttle position sensor signal to be shared without pulling up the signal on the engine ECU.
- Gear Cut Signal provides the engine ECU with a signal to indicate the ECU should reduce torque for gear change. The signal is provided as a pull to ground signal. Cut times, severity and ramp in/out should be configured on the ECU in accordance with the ECU manufacturers instructions.
- Blip Signal provides the engine ECU with a signal to indicate the ECU should increase the throttle position to increase engine speed in order to help synchronise the engine and gearbox input shaft speed and reduce the change of drive wheel locking on downchange. The signal is provided as a pull to ground signal. Cut times, severity and ramp in/out should be configured on the ECU in accordance with the ECU manufacturers instructions.

Trouble Shooting

The below table lists common problems and issues along with sensible checks to perform to resolve these problems.

Problem	Check
When I shift up using the up change paddle the gearbox does not change gear but the up change valve does fire.	- Is the actuator centralised? If it is not you may not have sufficient stroke in one direction to effect the gear change. - Is the gear change ignition cut configured on the ECU correctly? - If you are using CANBus for ECU to GCU communications is the CANBus connector and error free?
When I shift down using the down change paddle the gearbox does not change gear and the throttle doesn't blip, but the down change valve does fire.	- Is the actuator centralised? If it is not you may not have sufficient stroke in one direction to effect the gear change. - Is the gear change blip configured on the ECU correctly? - If you are using CANBus for ECU to GCU communications is the CANBus connector and error free - If you have a Pectel ECU have you enabled Extension Level 2 in the COMMUNICATIONS SETUP>GEAR CONTROL UNIT LINK menu?
When I try to change gear using the steering wheel paddles the gearbox does not change gear and the up or down change valves don't fire.	- If you are in Neutral are you holding the detent button when trying to shift gear? - Are the paddles connected?

	- Is the GCU Powered? Check by trying to establish comms with the GCU via your laptop.
I can change gears but I can't select Neutral or Reverse.	- If you are in 1st Gear are you holding the detent button when trying to change down? - Does the Gearbox have a neutral/reverse detent fitted? If so this will need to be removed, please contact your gearbox manufacturer for instructions on how to remove the detent.
The gears don't engage smoothly or the GCU says I'm in a gear when I'm not or the gearbox will change gear once but not again when trying to shift gears with the steering wheel gear paddles.	- Is the gear position sensor connected? - Is the gear position sensor providing a sensible signal? Check by connecting the GCU to your laptop. - If you have removed the gearpot or replaced it you will need to recalibrate the pot. Please see the information in this manual under GCU Configuration. If you are using the engine ECU transmission control strategies please contact the ECU manufacturer for details on how to calibrate the gear position sensor.
I can't establish communications with the GCU	- Check that the USB cable is connected to a working USB port on your laptop. - Check that the GCU has power and that the loom is correctly earthed. - Check than the FTDI drivers are installed correctly. If required please reinstall iFace.

Maintenance

To keep your shift system in race winning order please follow these basic maintenance guidelines.

- Drain the accumulator every 500KM of intermittent use or after every endurance race in the case of 12hr + races, this removes water from the system which is naturally accumulated during use from the water content in the ambient air. If you have mounted the accumulator with the air in and out fittings at the bottom you must drain the accumulator after each use.
- Wipe debris from the Gear Shift Servo rod after each use. Brake dust and general debris can collect on this rod and shorten the life of the seals.
- Clean the compressor air filter every 500KM of intermittent use or after every endurance race in the case of 12hr + races. Clean the filter by blowing compressed air through it gently in the reverse direction of normal flow.

Appendix 1 : Wiring Loom Schedules

Wiring loom schedules for the looms included in the Club-Sport shift kit are provided below for your reference:

Club-Sport Shift Kit Wiring Loom:

Connector Number		1	
Label		Vehicle	
Type		DTM04-12PA	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Power GND Out	3-1	
2	Power + 12V Out	4-1	
3	Ana GND	2-1, 5-3, 9-2	
4	Gear Position Sensor Signal	5-2	
5	5V Output	5-1, 9-1	
6	Up Shift Paddle	2-2	
7	Down Shift Paddle	2-3	
8	Detent Button	2-4	
9	GSS Up Valve	6-2	
10	GSS Down Valve	6-3	
11	Pressure Sensor Signal	9-2	
12	Compressor Relay Drive	7-2	

Connector Number		2	
Label		Wheel	
Type		DTM06-4S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Ana GND	1-3	
2	Up Shift	1-6	
3	Dwn Shift	1-7	
4	Detent	1-8	

Connector Number		3	
Label		GND	
Type		M6 Ring Yellow	
Boot			
Pin	**Function**	**Destination**	**Note**

1	GND	1-1, 8-2	

Connector Number		4	
Label		12V VBAT	
Type		M6 Ring RED	
Boot			
Pin	**Function**	**Destination**	**Note**
1	12V +	1-2, 6-1, 7-1	

Connector Number		5	
Label		Gear Pos	
Type		DTM06-6S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	+5V	1-5	
2	Sig 1	1-4	
3	Ana GND	1-3	
4	+5V	10-1	
5	Sig 2	10-2	
6	Ana GND	10-3	

Connector Number		6	
Label		Shift Servo	
Type		DTM06-3S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	+12V	4-1	
2	Up Valve	1-9	
3	Down Valve	1-10	

Connector Number		7	
Label		Compressor Relay	
Type		4 Pin Relay Holder	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	+12V	4-1	
2	Relay Drive - GND	1-12	
3	+12V	7-1	
4	Compressor +12V	8-1	

Connector Number	8

Label		Compressor	
Type		DT06-2S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Compressor +12V	7-4	
2	Compressor GND	3-1	

Connector Number		9	
Label		Pressure Sensor	
Type		DTM06-3S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	+5V	1-5	
2	Signal	1-11	
3	Ana GND	1-3	

Connector Number		10	
Label		Gear Pos Secondary	
Type		DTM06-3S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	+5V	5-4	
2	Signal	5-5	
3	Ana GND	5-6	

Club-Sport Shift Kit GCU 500 Option Loom

Connector Number		1	
Label		Vehicle	
Type		DTM04-12SA	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Power GND Supply	2-8, 7-4	
2	Power + 12V Supply	2-7	
3	Ana GND	2-9	
4	Gear Position Sensor Signal	3-6	
5	5V Output	2-10	
6	Up Shift Paddle	3-4	
7	Down Shift Paddle	2-2	

8	Detent Button	3-5	
9	GSS Up Valve	2-11	
10	GSS Down Valve	2-12	
11	Pressure Sensor Signal	2-1	
12	Compressor Relay Drive	3-3	

Connector Number		2	
Label		GCU 1	
Type		DTM04-12SA	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Analogue 1	1-11	
2	Analogue 4	1-7	
3	Speed	NC	
4	CAN H	5-1	
5	CAN L	5-2	
6	Analogue 6	6-1	
7	12V Vbat	1-2	
8	Bat GND	1-1	
9	Sensor GND	1-3	
10	Sensor +5V	1-5	
11	Low Side Output 1	1-9	
12	Low Side Output 2	1-10	

Connector Number		3	
Label		GCU2	
Type		DTM04-12SB	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Low Side Output 3	7-2	
2	Low Side Output 4	7-1	
3	Low Side Output 5	1-12	
4	Analogue 3	1-6	
5	Analogue 2	1-8	
6	Analogue 5 (+5V Differential)	1-4	
7	Analogue 6 (Gnd Differential)	6-2	
8	Analogue 5 (Gnd Differential)		
9	USB 5V	4-1	
10	USB GND	4-4	
11	USB Data +	4-3	
12	USB Data -	4-2	

Connector Number		4	
Label		USB Comms	
Type		Type A USB	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	USB +5V	3-9	
2	Data -	3-12	
3	Data +	3-11	
4	USB Ground	3-10	

Connector Number		5	
Label		CANBus	
Type		DTM06-2S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	CAN High	2-4	
2	CAN Low	2-5	

Connector Number		6	
Label		TPS	
Type		DTM06-2S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Signal	2-6	
2	Differential GND	3-7	

Connector Number		7	
Label		ECU Gear/Blipper	
Type		DTM06-4S	
Boot		Straight	
Pin	**Function**	**Destination**	**Note**
1	Up Signal	3-2	
2	Down Signal/Blip	3-1	
3	ANA Gnd	2-9	
4	12V VBAT	1-1	