Fault finding

Most problems are caused by misunderstandings and by faults in the wiring, but there are a few points which may help.

System Dead

If the system is dead, check the ignition circuitry. If a switch is not fitted, the link must be made or the system will not power up. To check if it is powered up, you should be able to measure 9v across either potentiometer.

When using with the Pro-120 controllers, the HPLO on the controllers is likely to be engaged at first - it's unusual to get the joysticks at dead centre (zero speed) before switching on. It's probably easiest to disconnect the HPLO as described in the Pro instructions.

Powering

Be aware also that the DCI draws its power only from controller 1 only. If you have controller 1 cable unplugged, nothing will work.

Speed Compensation

With the system set up as instructed, it should work properly. However it is possible to use some of the adjustments to compensate, for instance, for slightly different motor speeds. It the left motor is slightly faster, then the machine will tend to steer always to the right. In this case use the gain preset to slightly reduce the output from the left motor.

Fuse Tracks

There are two fuse tracks: these are this 'waists' of track and are present to limit the damage in the event of a wiring fault.

If one blows, solder a thin piece of copper wire across it: a single strand from 7/0.2 wire is suitable.

Ignition Fuse

This fuse is in the connection between pin A on the ignition connector and pin A of controller 1 connection.

Earth fuse

This fuse track connects pin F of controller 1 to the peripheral earth track and is marked 'F' in the copper of the circuit board. It is present so that faults in your battery connections will not cause major burn-outs.

If all else fails

contact 4QD by email, fax or letter with details of the problem. If you have internet access, service information for some controllers is available at http://www.4qd.co.uk/serv/index.html not all controllers are covered as standard faults are uncommon, so this area is added to as customers ask for information.

"We're in Control"

4QD Office Stores

30 Reach Road
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Cambridgeshire, CB5 0AH
Fax: 01638 744 080

Unit 6A
Heath Road Industrial Estate
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See us via the Internet: http://www.4QD.co.uk Email to: esupport@4QD.co.uk

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Instruction Manual

Dual Channel Interface board.

Introduction

The Pro and VTX (or NCC) series of controllers have a 'single ended' speed input: the standard speed control alters the speed only. Direction is controlled by a separate switch.

The Dual Channel Interface (DCI) Board interfaces two controllers to two separate potentiometers (or to a standard dual-axis joystick) such that zero speed is with the stick at the centre.

The boards are primarily intended for use with the VTX Series but can also be used with Pro-120 when it is recommended that the Pro's High Pedal Lock-Out function be disabled.

The board can be switched between two modes:-

1 Dual independent (tank style)
2 Sum & Difference (Speed and Steer)

Independent (tank style)

Here each axis of the stick controls a different motor.

This system might be used in a tank style robot where one stick controls the right track and a second stick controls the left.

Another use might be in a pan and tilt mechanism on a camera, using a standard dual axis joystick: move the stick forward from centre to tilt forwards. Move the control back from the centre and the controller will automatically reverse to tilt backwards. Moving the stick from side-to-side will control the second motor (for pan) without affecting the first.

Differential (Speed and Steer)

Here moving one speed pot (or the stick front to back) affects both motors equally so that the machine moves straight backwards or forwards.

Moving the second pot (the steer pot) or the stick to the side will cause one motor to increase in speed whilst the other decreases thus altering the steering.

If there is no common speed selected (that is to say the stick has no displacement front to back) the machine will be stationary and the steering pot will cause one motor to rotate forward and the other will reverse so the machine will spin on the spot. at a speed proportional to the pot displacement.

Suitable pots

Any pot around the suggested 10K value will work. With standard 10K pots full speed will be given for about 40° rotation of the pot, which suits the average radio controller servo so that you will get full speed at slightly less than full servo deflection.

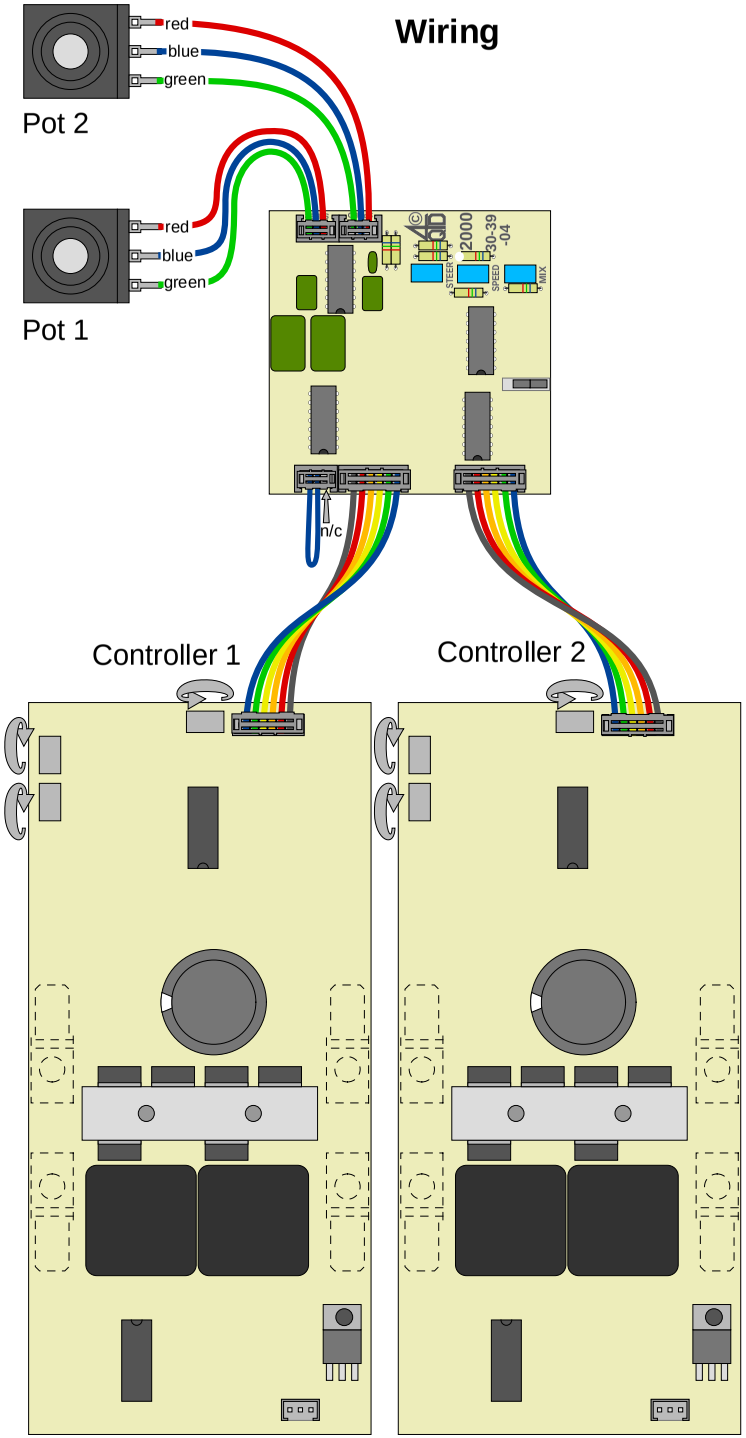
Radio Control Receiver

The DCI-111 **does not** directly accept the signal from a radio control receiver. The usual scheme is to operate the DCI pots with the standard radio control servos: this has the added advantage of giving a superb interference isolation barrier.

Operating Voltage

The DCI-111 will operate from any voltage from 12v through to 36v. It can easily be modified to operate off higher voltages, see also page 4.

Wiring



The diagram shows the wiring between interface and controllers.

Note the gain controls on the VTXs should be turned clockwise as shown.

Accel and decel presets should be turned anticlockwise as shown.

All performance adjustments are then done on the interface.

Note also the 'ignition' link in the 3 pin connector: the system will not work without this.

Note that, if using Pro or 4QD series controllers you ***must*** fit a switch here and not a link.

Battery and motor wiring should be done as shown in the VTX manuals.

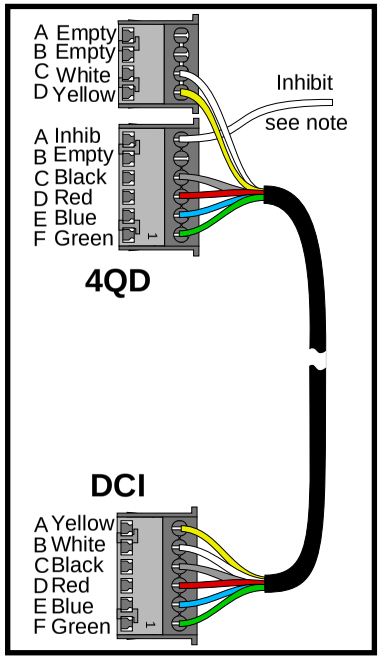
You should only use 7/0.2 cable into the IDCs. This is supplied in the kit but is commonly available either as ribbon cable or as multicore.

The DCI draws power via controller 1: if this is unplugged, the DCI will not work.

Additional detail on wiring follows.

Interconnecting lead to 4QD

The interface is primarily intended for use with VTX and Pro series controllers but may be used with 4QD series where the Differential mode is required.



The link lead must be modified as shown above, so that the DCI draws its power off the 24v controller power via the yellow wire. Using the white and yellow wire as above means the DCI ignition must be linked as normal.

Note the inhibit wire. This is optional, but the 4QD series have High Pedal Lock Out fitted. If the system is switched on with the joystick not centred, it will not work until the stick is centred. This can be confusing, certainly in early setting up. Momentarily connecting both inhibits to 0v (battery negative) and then releasing them will reset the HPLO and the system will power up.

You will, of course, need to adjust the gain controls on the 4QD controllers, near to fully clockwise, and the accel and decel presets fully anticlockwise.

The 4QDs should be in single ended mode - not in Joystick mode.

'Span' adjustment

For most applications, you can safely ignore this section.

The DCI is set to give full speed for ±1.2v swing at the input. Standard pots have an electrical track extending over 280°. The DCI has an internal supply of approximately 9v. So full speeds will correspond to approximately ±40°, to suit most servos.

4QD can supply special pots with a 50° electrical angle rather than the common 280°. These will give full output for about ±8° of movement. It is quite possible to alter values to adjust the swing for any required angle.

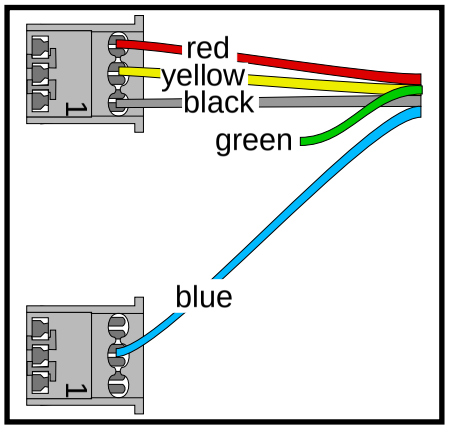
It is also possible to change the Interface's gain by changing two resistors, when the controller can give up to 8v output for any required pot travel. The circuit of the DCI is on www.4QDTEC.com

Contactless Joysticks

Contactless Joysticks are available. Being electronic, these require more current than standard potentiometers. The standard board does not have enough current to feed them - but this current can be increased by changing the current source. The DCI circuit is on on on 4QD's www sites, at

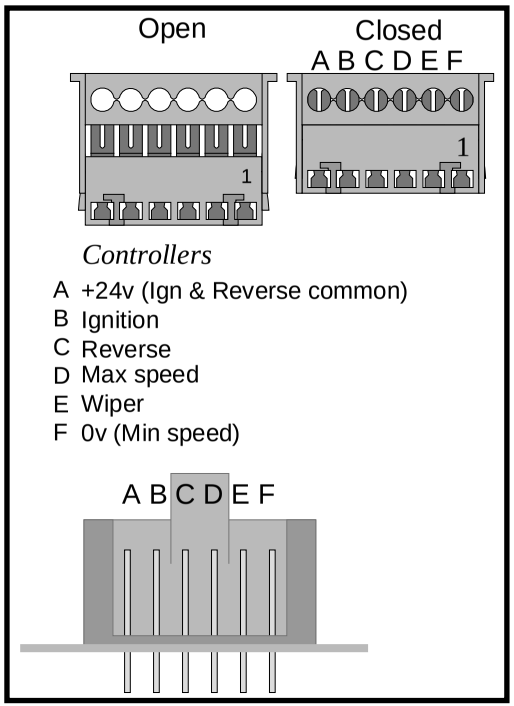
http://www.4qdtec.com/jsi.html

The drawing below shows the connections for the RS Components contactless joystick.

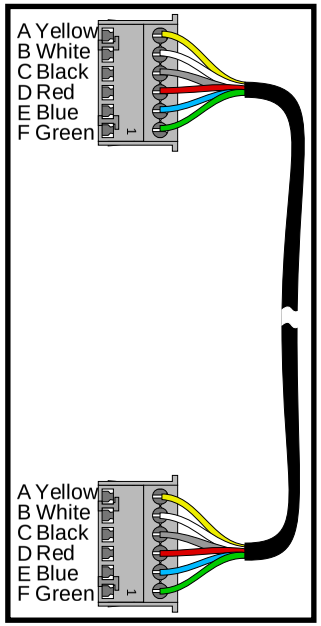


Additional information.

Connections
VTX and PRO series controllers



Interconnecting lead to VTX or Pro



Ignition switch.

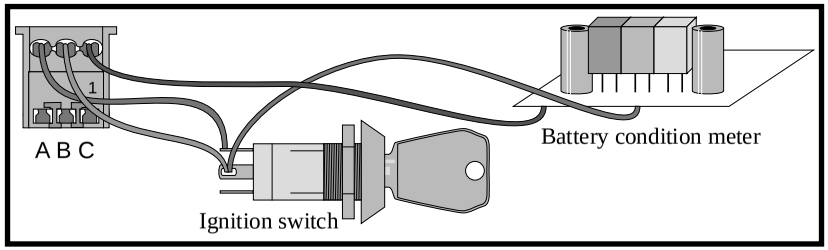
An ignition switch may be fitted as shown between pins A and B of the 3 pin connector. Pin C is 0v (battery negative) and is not used unless you wish to wire a battery condition meter to it.

If you do not fit an ignition switch, pins A and B must be linked together or the system will be off.

You do not need to connect to pin C.

Controllers with reverse polarity protection.

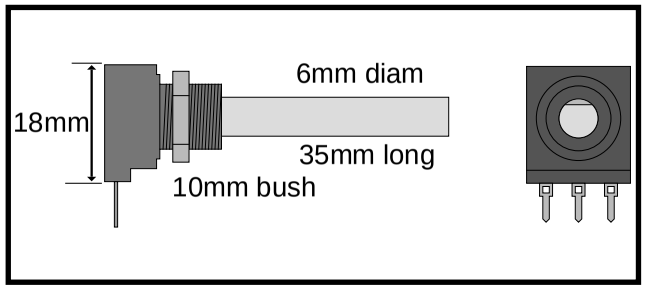
You *will* need an ignition switch. The reverse polarity relays will not power up unless you close the ignition switch a few seconds *after* connecting the battery.



Potentiometers.

You can use almost any potentiometer. A value of 10K is suggested but the value is not critical. Do not do below about 5K (or the 9v internal supply may drop) and values above 50K may cause non-linearity.

4QD can supply a suitable pot, shown right. When soldering to this pot, do not solder to more than the thin portion of the tag : the hole in the fat portion is a heat isolator since if you overheat this part of the tag the plastic of the pot will soften and the connection to the track will be damaged.



Links

Note the pinstrip and links shown in the adjustments diagram. The pinstrip is a 5 way one and the links can link only 4 pins, so there is a spare pin. This spare pin must be at the bottom (pin E) for Differential (Speed and Steer) mode and at the top (pin A) for Dual Independent (Tank style).

Interface Adjustments.

Since the interface has two different modes, we explain the setting up separately for each mode! You should therefore ignore the mode you are not using.

Warning
There are quite a number of *possible* adjustments. If you start tweaking these before you understand them, you will get confused. So use them at their **base position** first and adjust them only if you need to alter the machine's handling.

Correct machine handling is in part a matter of learning to drive and in part a matter of adjusting the performance. The two are not independent!

Base position

VTX

Gain:	fully clockwise
Accel and Decel:	fully anticlockwise.

This is indicated by the arrows on the wiring diagram.

The 'S' link on the VTXs should also be opened as you will require symmetry, i.e. equal speed in forward and reverse. This is explained on page 10 of the VTX manual.

Interface Board

All presets:	central.

Do not adjust from the **base position** until you understand their use.

If an adjustment does not do as you expect, return it to **base position**!

Speed and Steer mode

Speed and Steer
These two adjustments control acceleration and deceleration ramps. At minimum settings (anticlockwise) the controllers will respond too rapidly and quick movements of the servos will probably cause wheelspin.

At maximum setting (clockwise) response will be slow and sluggish. The correct setting for most machines will be near the middle, but of course depends on the mechanics of your machine.

Speed
Speed will affect left and right motors equally.

Steer
Steer will affect the speed of response to changes of steering. Get the Steer to far clockwise and the steering will respond too slowly.

Mix
This effects the steering sensitivity or 'gear ratio': at one extreme small movements of the steering pot will cause large changes in steering, at the other end large changes in the pot will only cause small changes in actual steering. Do not confuse this with Steer above which controls how fast the steering responds. Mix controls how much it responds

So start at **base position** and only alter this is you find it necessary.

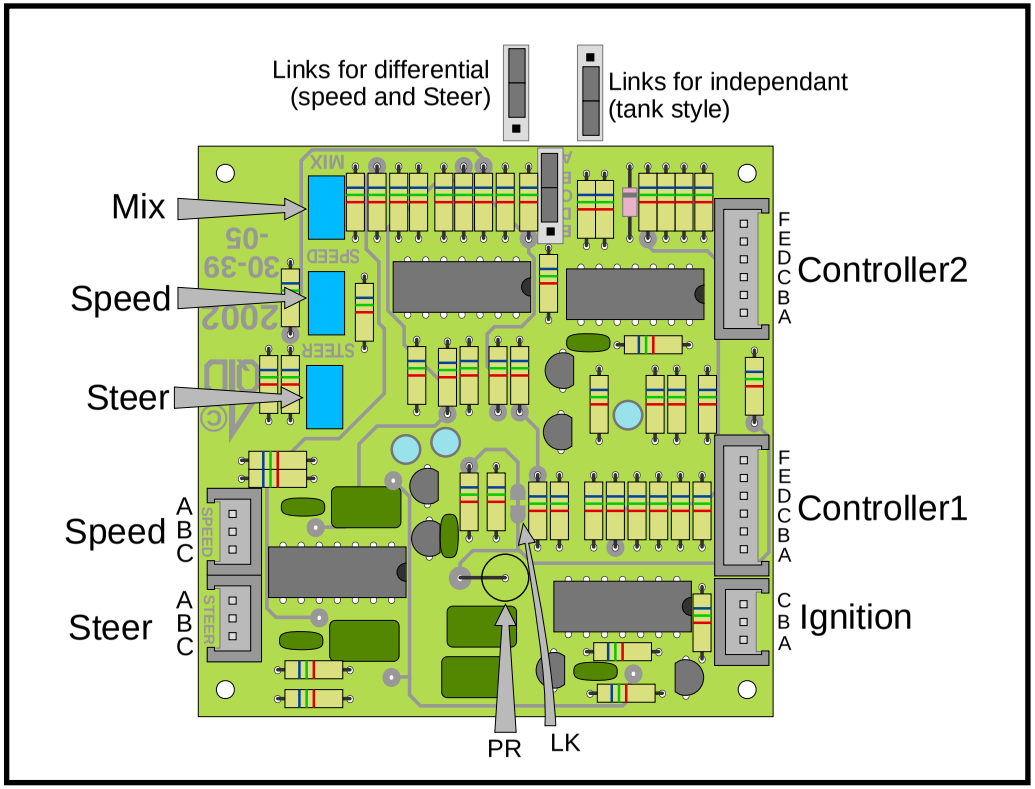
Tank mode

Speed
Steer
These two control acceleration and deceleration ramps.

Speed
affects controller 1.

Steer
affects controller 2.

Mix
Should be left centred: it acts as a gain control on the Speed input only.



Mounting

you can mount the DCI wherever convenient. Four holes are provided, one at each corner, to facilitate mounting.

When mounting, make sure no metal object can touch the board. You will probably need some sort of spacers on the mounts to ensure this.

Operating Voltage

As supplied the DCI-111 will operate from 10v to 36v but at the higher voltages, the transistor that regulated the internal voltage will get hot.

For voltages above 36, an extra power resistor should be added to share the heat dissipation by dropping some of the voltage. You may wish to do this also for 36v.

The DCI draws about 30mA, so for different voltages use the values and powers shown below.

Supply	Resistor	Power
36v	470R	1/2W
48v	1K	1W

The resistor fits in on-end in the position marked PR above. You must also scratch through the links, One is above the resistor, on the component side, indicated LK above. The second link is on the copper side and is between the leads of the resistor.