JTElectronics
Capacitor Discharge Unit Board
Model: JTECDU

This CDU will allow switching a Point/Turnout motor without fear of burning out the motor coils if a control switch gets stuck in the “ON” position – most commonly when the switch contacts get welded together.

The CDU will send a large but short pulse of power to the point motor which will operate it normally, and if the control switch is kept operated the current to the point motor is then limited to a very small safe level of around 50mA. Once the control switch is released, the CDU charges again and is ready for operation in less than 1 second.

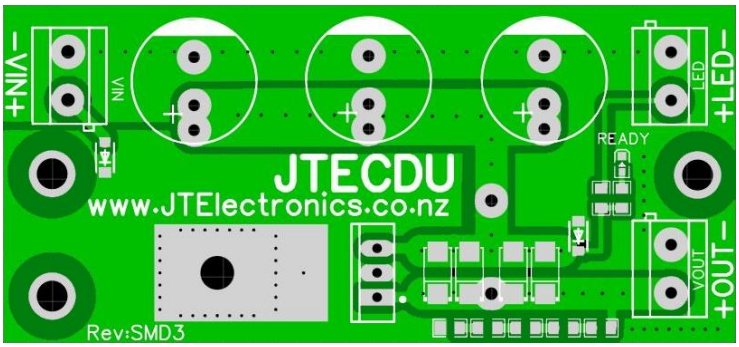
Ideally you should power the CDU from 18 to 24V DC to ensure enough power gets to your point motors, especially if attaching accessory switches to the point motors.

An orange “READY” LED is lit when the capacitors are charged and ready to switch the point motor, and “OFF” when there is a problem (like output is shorted or a control switch is stuck in the ON position.

The new model JTECDU shown in the pictures is functionally identical to previous versions, and wiring is the same, but it uses some surface mount components to assist in assembly and keeping costs down. The orange “READY” LED is now fitted on the circuit board (next to the LED terminals) but you can still connect another external LED if you require a remote “READY” indicator. We no longer include the external LED.

I sometimes get asked “How many point motors can you hook up to this thing?”. The answer is as many as you like! Since only one point motor will be switched at a time you can basically wire up as many as you like. On extremely large layouts it may help to install a second (or possibly a third) CDU at another location around your layout to minimise wire length and therefore wire resistive losses and wire cost.

CAPACITOR DISCHARGE UNIT PCB



JTECDU BOARD SPECIFICATIONS:

Nominal Supply Voltage	15 – 30 volts DC or AC – whatever suits your point motors (18 to 24VDC is ideal)
Capacitance	2x 2200uF/35V with space to fit a third capacitor eg. Jaycar RE-6241
Board Dimensions	approx. 72mm x 36mm

CONTROL SWITCHES:

You can use “Stud and Probe” connections to manually switch the points by touching the probe onto the required stud that is wires to the point motor coil. Crude but effective.

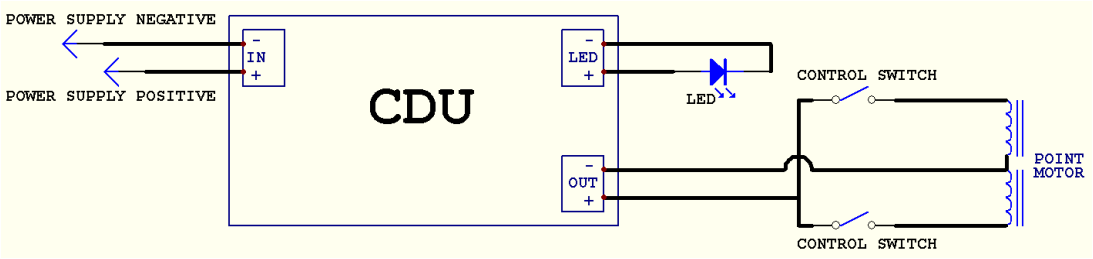
Switches must be “Momentary ON” type that are either manually or automatically returned to the “OFF” position after you have moved the points. You need to use either “Momentary ON” push-button switches with one push button switch for each direction/coil, or toggle switches with a centre-off position like Jaycar ST0336 and you must return the toggle switch to the centre position after operating the points.

NOTE: You cannot use standard SPST ON-ON toggle switches

The best switch for operating points from a CDU is one that automatically returns to the centre “OFF“ position when you release the switch. This switch characteristic is sometimes called **MOM-OFF-MOM** (Momentary) and sometimes stamped on the side of the switch case is (ON) OFF (ON) where the brackets around the ON suggest it’s a momentary on position.

Search TradeMe or Google for the **JTEMOM1** momentary toggle switches!

CDU WIRING EXAMPLE

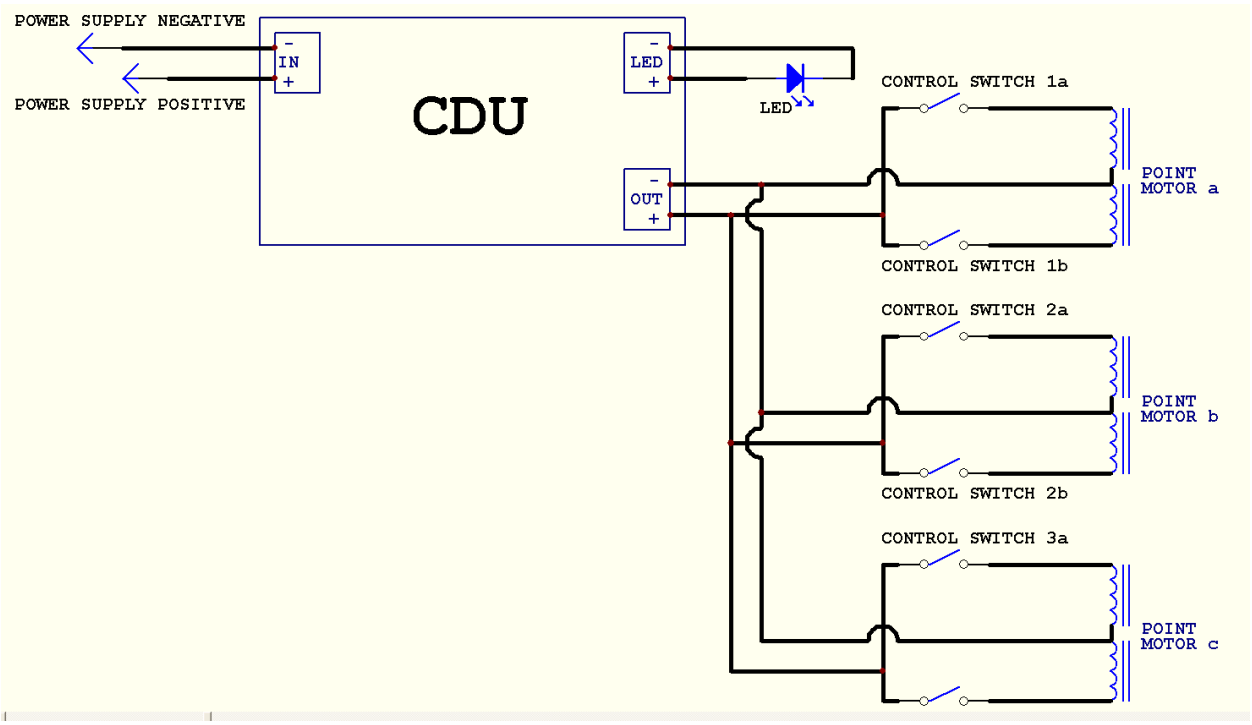


The diagram shows a single point motor being operated but you can connect two point motors in parallel to operate both of them at the same time. You could even connect more point motors in parallel if really required but you will need to test operation and possibly add a third capacitor to the CDU board to supply extra power.

PLEASE NOTE: The CDU is designed to work with 3-wire "solenoid" type point motors. It will NOT work successfully with "DC motor" slow-motion type point motors as they require power to be supplied for a longer time. Some users have the CDU working with tortoise/slow motion "DC motor" type point motors by changing the capacitors to 3x 4700uF types which will supply power for a longer time until the capacitors are discharged.

CDU WITH MULTIPLE POINT MOTORS WIRING EXAMPLE

You can connect as many point motor sections to the CDU as you require as you will only be switching one point motor at a time. Just wire up each individual point motor and control switch section and wire them in parallel to the CDU "OUT" connections.



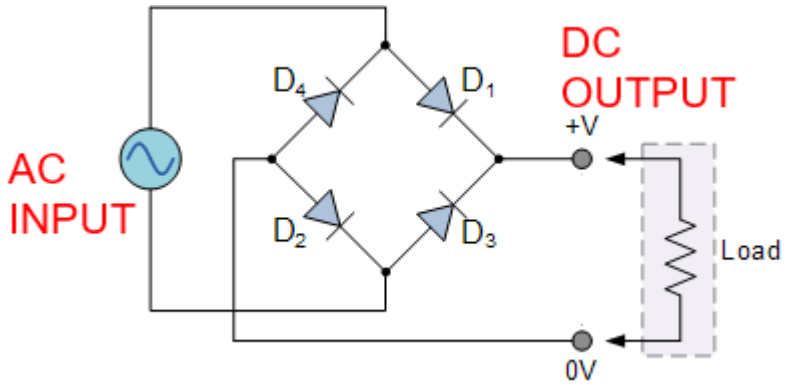
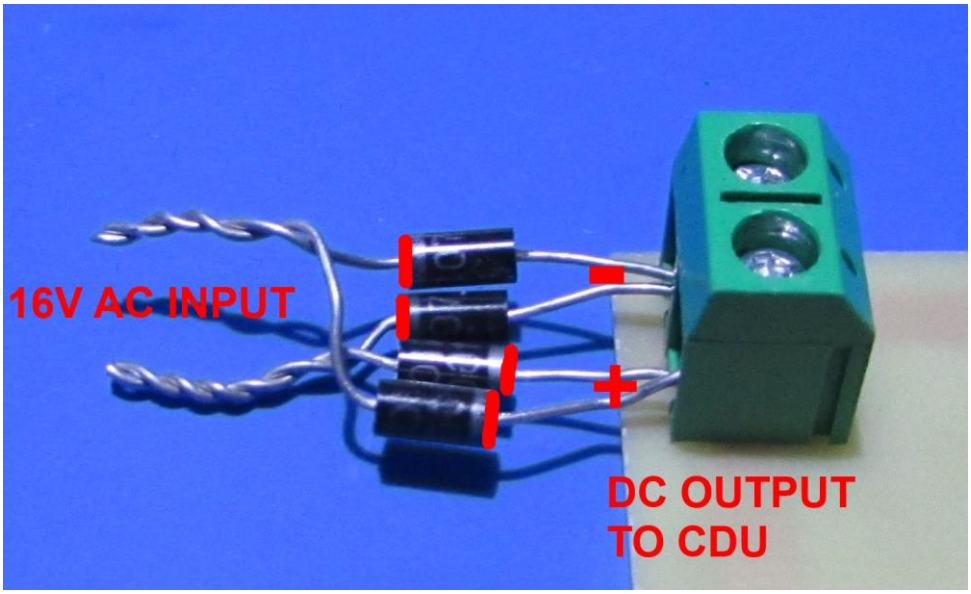
On large track layouts you may need to use heavier gauge wire on long wiring runs between the CDU, control switches, and the point motor. As an alternative, you could install another CDU on the other side of your track layout nearer to the other group of control switches and point motors so you can use shorter wiring to the second group of point motors and control switches.

Powering the CDU from 16VAC

Sometimes you may only have 16V AC available to power the CDU, and it will work OK, but there will only be about 7 or 8 volts available to power the point motors. This will most probably be too low to make them operate correctly, or reliably.

You can easily convert the 16V AC to DC before it enters the CDU by using a “bridge rectifier” circuit. While converting the AC to DC, the bridge rectifier also increases the available DC voltage to about 23V DC which will operate the point motors correctly.

Bridge Rectifier Diagram: The “Load” is the CDU and the DC output voltage is 1.41 x the RMS AC input voltage.



Bridge Rectifier to CDU Wiring Diagram: The four diodes are a standard 400Volt 1Amp IN4004 (eg. JayCar code ZR-1004) but just about and general purpose rectifier diode will do the job just fine. These diodes have a silver band on one end that corresponds to the “bar” end in the Bridge Rectifier diagram above. I have marked these with the red lines to make it more visible as it’s very important to get them connected correctly. The two “bar” ends are connected to the positive input of the CDU.