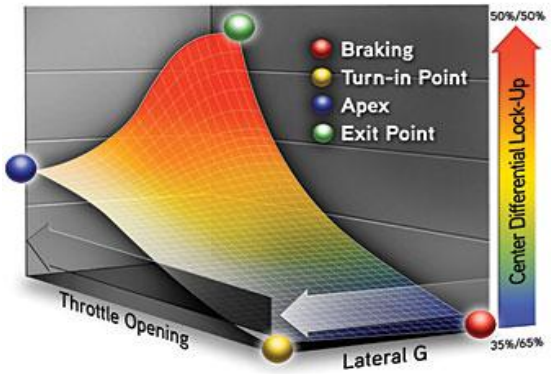
DCCDPro



Aftermarket standalone Automatic DCCD Controller for JDM and USDM 6-Speed Transmissions as well as for the older 5-Speed DCCD transmissions.

What advantages are there in your auto mode controllers vs. manual mode and semi-automatic controllers available on the market?

I believe that my automatic controller is one of the most advanced aftermarket DCCD systems on the market today. It is rivalled only by a few very expensive systems on the market in its ability to persistently try to give you the best traction in any given situation.

What makes the difference?

The use of high resolution g-sensors and the mathematical formula's I developed that are used to convert the measured "data" into usable DCCD locking forces. I utilized a "physics approach" to calculating the locking forces required using **Algorithmic Formulae** instead of the "**Static Mapping**" method usually combined with basic logic trees that are so popular with competitive products.

The auto controllers can calculate and set the DCCD locking force with a 10 bit output range, that's 1024 "steps" of locking percentage and the rate of change is "fluid" in that it doesn't jump in large increments like static mapping tables simply have too.

The formula's were "mapped" to behave exactly the same as the STi system does, and then tweaked using tarmac and rally drivers in "real world" racing conditions as my alpha and beta testers. Their input into the feel of the car was exclusively used to tweak the formula's to shave time in the accelerating, cornering and braking programs.

For example, in the cornering program the diff does an incredible amount of procedural calls and really gets put to the test. During a normal cornering process, the controller "sees" the driver lift off the gas and the car begins to decelerate, at this point the car is still running the "braking" program, as soon as it measures some turning forces it switches into the "cornering" program and begins opening the diff in proportion to the amount of turning forces and deceleration forces measured, the car's handling now

moves towards over-steer bias to enter the corner. As soon as the corner apex is measured and the car begins to straighten out, the controller "watches" for throttle to be applied as well as how aggressively the driver is applying the throttle in order to determine how quickly to move toward under-steer bias again. The controller then ramps up the DCCD locking force in order to give the driver the maximum traction coming out of the corner.

During a wide sweeping corner the process is repeated but in a much different way depending on the sharpness of the corner in concert with the TPS input etc. the result is a lot more subtle with much more traction retained through the entire corner.

The bottom line is that no "static mapped" controller can handle this situation with the same effectiveness.

In auto mode the controller can shave literally seconds off of each lap. Anyone who has driven a fully active center diff can appreciate what it does for them.

I see the OEM system interfaces to the ABS system, why don't you have any interface to the ABS system?

The ABS system is used on the OEM system to provide a method to open the diff in emergency braking situations.

My system already has an emergency braking routine built into the "braking program" that in that situation will allow the diff to go totally open allowing the brakes at each wheel to act independently do what they need to do in relation to the ABS in an emergency.

I thought long and hard about whether or not I wanted customers cutting and splicing into the ABS system in order to integrate the controller into it, and decided that it was more risk than benefit. Also, I wanted to allow this system to be able to be used by the swap crowd with early Subaru's especially GC8's that don't have functioning ABS.

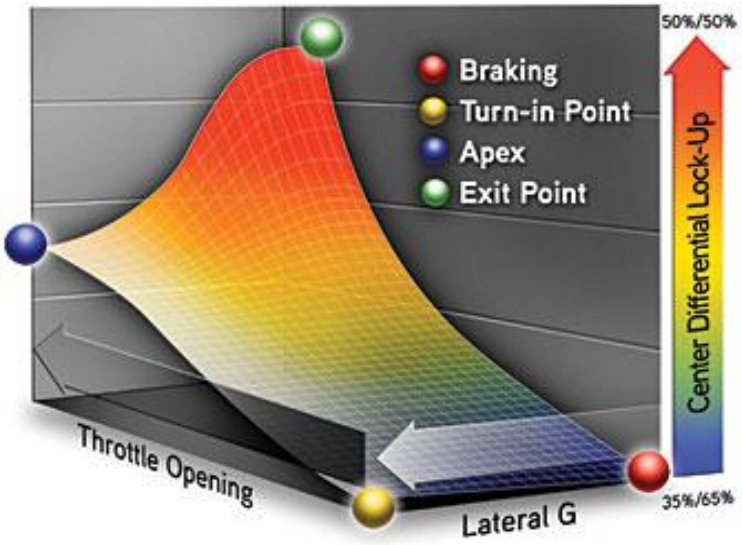
Does your controller have a handbrake input allowing the diff to open when the handbrake is pulled?

All models of my controller's feature an optional handbrake cutout wire, but for the most part it isn't necessary. It is simply a crutch for the lesser semi-auto controllers in order to do low speed driving in parking lots and for handbrake turns. Both of which are not a problem in auto mode with my controllers. If you do not wish to use it please tape it up and isolate it from accidental grounding. Grounding the handbrake wire will simply stop output from the controller temporarily until the wire is not grounded anymore.

If your controller is fully automatic why does it have an adjustment knob?

The adjustment knob is for manually setting the lock percentage when it is set to manual mode. When in auto mode it is used is for setting the "aggressiveness" or magnitude of the internal calculations.

The knob functionality in auto mode changes a set of variables that affect the output scaling to the different internal modes. It allows you to tune the controller bias towards a more open diff or a more locked diff while still calculating and adjusting automatically. Think of it as a volume control for a stereo, it doesn't alter the music it just sets the volume level. You can turn the volume all the way down and the controller will be basically off, or all the way up and have it fighting for the most traction at all times.



Technical Details

- Microchip's PIC 16F887 Microprocessor running at 4mhz
- 2 axis high resolution g-sensor
- custom firmware with driver adaptive capability
- several internal modes based on driver throttle behaviour and g-sensor behaviour that switch on the fly automatically
- DCCD calculations are using advanced formula's instead of unintelligent "static mapping" or "lookup tables"

Operational Details

The hardware and firmware were designed to work together to be as "driver transparent" as possible. My philosophy is that the less you need to adjust or monitor while driving the more you can concentrate on the road / race.

During development I considered various options including a knob to select "modes" and / or different formula as well as an LCD to monitor the DCCD output, but when it came down to it they added greater cost to the final product and had little to offer in terms of real functionality. The control knob for the system is used to scale the DCCD "aggressiveness". Fully CCW turns the unit essentially "off" which will heavily bias the rear wheels, full CW gives it full "aggressiveness" maximizing traction and thusly increasing under-steer. In this setting the system will attempt to give you maximum traction at all times by trying to maximize the amount of DCCD lock at all times. The system is infinitely variable between these two extremes. Start at lower settings (over-steer) and increase the knob setting until you find the car handles the way you would like it to in the corners. You can alter the setting at any time and on the fly as conditions change.

This DCCD controller constantly and frequently monitors the attached sensors, updating the DCCD output based on how the car is behaving in reaction to driver inputs. It features several firmware modes that it switches between on the fly. Without going into a detailed explanation of the firmware formulas, the system automatically switches between formula appropriate for "parking lot / highway cruise", aggressive cornering", "aggressive straight line", and "stuck in snow/mud" based on what information it receives from the sensors.

It monitors the output level as well as the speed at which the various sensors change. For example it can differentiate between slow gradual throttle application vs. rapid throttle acceleration and respond accordingly. The internal firmware formulas try to mimic the behavior of the OEM STi DCCD auto mode.

When the led illuminated switch is pressed, this controller can manually control the output to the dccd from the control knob or STi thumbwheel.

The controller features both auto and direct manual control of the dccd. It can also be interfaced to the STi dccd display in some STi clusters to display the output level of the dccd signal. The display will rise as power levels increase.

Limited warranty

The 90 day warranty is limited to the repair, replacement or refund of the purchase price to be determined upon receipt and analysis of returned product. Shipping and handling, installation and removal fees and/or damage to the vehicle will not be covered under any circumstances.

Warnings: Use at your own risk! For Off-road use only!