Supercharger (ROOTS) Controller

ULTRATECH CHRONO SC

CAUTION

1. This product may be used **solely** on vehicles used in sanctioned competition which may never be used upon a public road or highway.
2. Installation and tuning should be made by **qualified** personnel ONLY!
3. It is the responsibility of the installer and/or user to ascertain that this product is used in **compliance** with applicable laws and regulations.
4. If you have purchased the product by **error** or have further **questions**, please contact us through **www.ultratech-electronics.com** with any questions.

Connections

Servo motor

Servo motor RED cable to Chrono SC pin No12
Servo motor Orange cable to Chrono SC pin No20
Servo motor Brown cable to a good ground point

*** Some servo motors might have different color coding. Please check the instructions included in the servo motor.
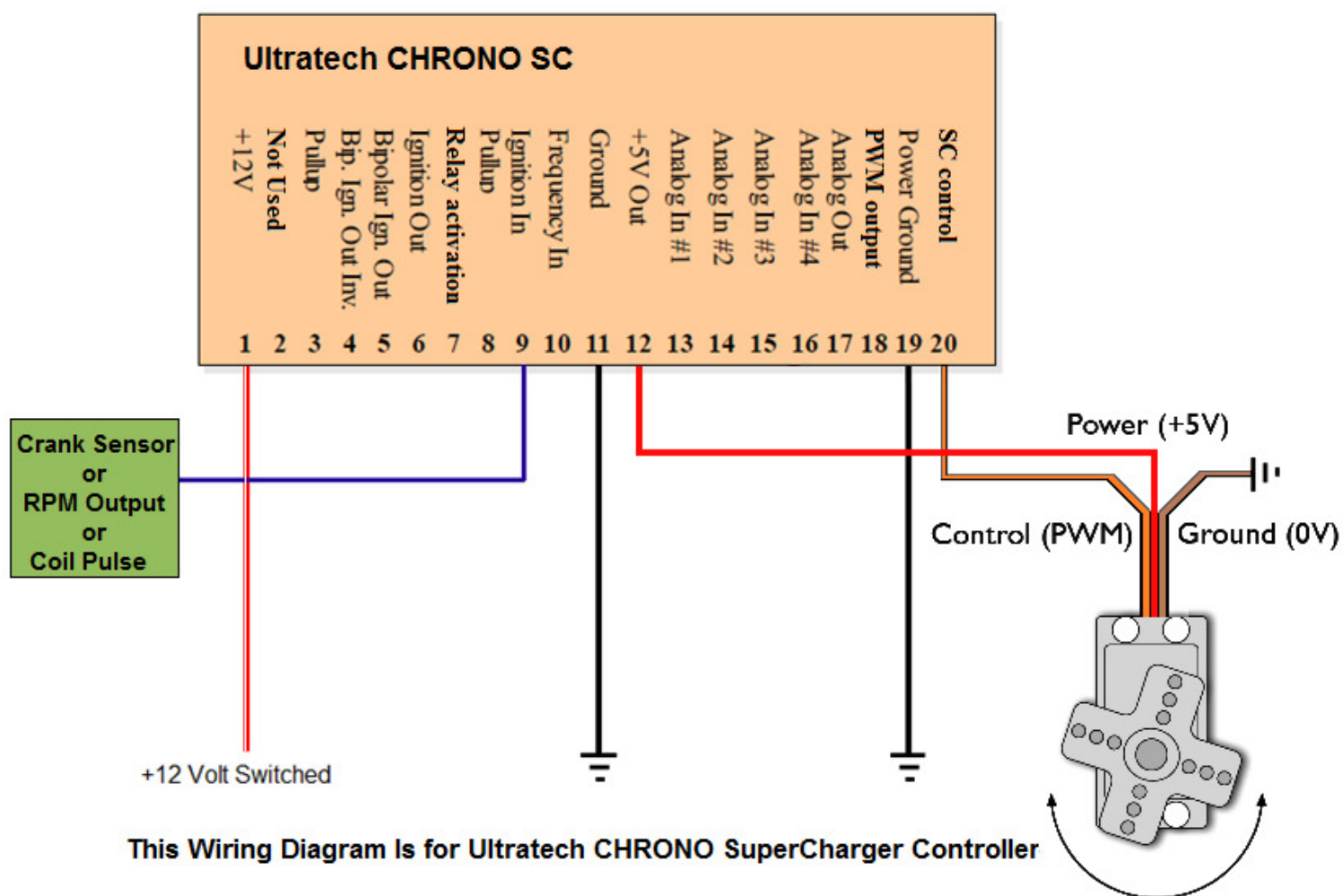
Grounds – Wires

When connecting the ULTRATECH CHRONO device, special attention should be paid to the connection of device's grounds and their wiring in the car's electrical system. Wrong connections can create loops, so called *Ground loops.* Bad ground connections can cause many problems, such as noisy readings from analogue sensors or problems with trigger errors.

Device ground (pin 11) is a ground used to power the device and *power ground* (pin 19) is used to supply power outputs (Pin 18 , Pin 20). A sound technical solution is when the device's ground and *power ground* are connected to one ground point on the block / engine's head and are lead through separate wires. Power ground, Power Outputs and +12 Volt supply should be connected using wires of 1mm².

The connection wires should not be longer than 30cm. Power Supply (Pin 1) +12V (switched) should be connected through a 3A fuse. Every unused input should be connected to the Ground. All signals from the variable reluctant sensors should be connected by using shielded cables.

Wiring Diagram:

Ultratech CHRONO SC

Pin	Label
1	+12V
2	Not Used
3	Pullup
4	Bip. Ign. Out Inv.
5	Bipolar Ign. Out
6	Ignition Out
7	Relay activation
8	Pullup
9	Ignition In
10	Frequency In
11	Ground
12	+5V Out
13	Analog In #1
14	Analog In #2
15	Analog In #3
16	Analog In #4
17	Analog Out
18	PWM output
19	Power Ground
20	SC control

Crank Sensor or RPM Output or Coil Pulse

+12 Volt Switched

Power (+5V)

Control (PWM)   Ground (0V)

This Wiring Diagram Is for Ultratech CHRONO SuperCharger Controller

Software Setup

The software you will use is the **Ultratech Chrono SC** and also the **Firmware must be updated to the latest version.** Firmware is the internal software of the device which is responsible for its functioning. Because Firmware is upgradeable, it is possible to update it, which will make the device more functional in the future. Additionally, to use a new firmware, a proper software **(Client)** should be used for Windows.

Firmware's update

Due to the changes in the device's firmware, (for example: improvements, additional functions) it is possible to change the firmware. To do this, the Upgrade firmware... function should be used (in the File menu). To choose a new firmware, press Open. In the Firmware History window there will be displayed a list of conducted changes for a given firmware. To continue, press the Upgrade button.
A window with a warning will be displayed: "All your tables and configuration will be lost."

After accepting, a window informing about the progress of the firmware's change will be displayed. At this time, do not switch off the computer nor the device! If, during the installation, communication with the device is interrupted, please follow the following procedure to recover the unit:

1) Connect the device to a laptop.
2) Power up the device.
3) Start the client for Windows.
4) Choose Upgrade Firmware from the menu and follow the above directions.

Attention!
Updating the firmware causes the loss of the saved tables and setup parameters! The project should be saved on the hard disc before updating!
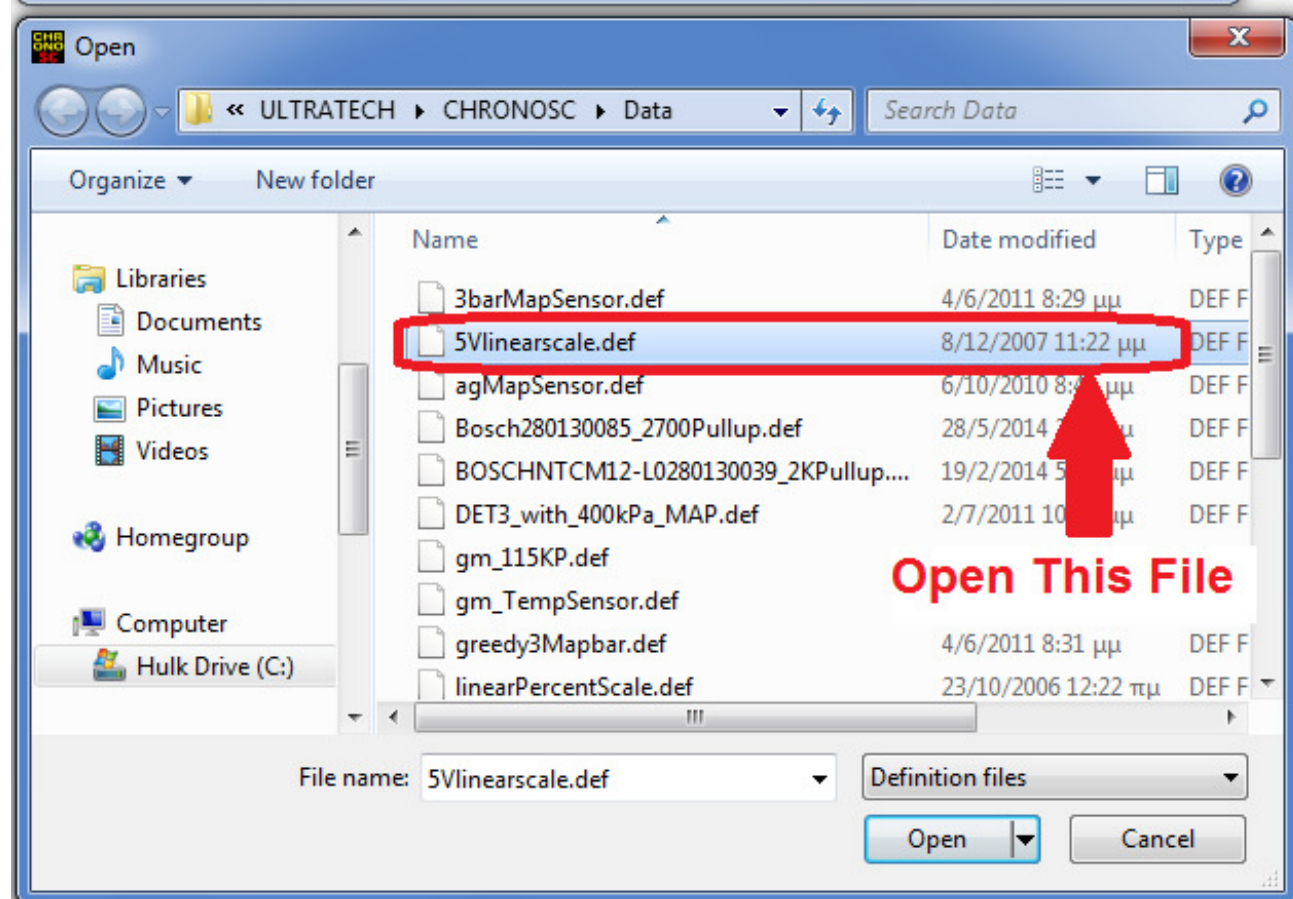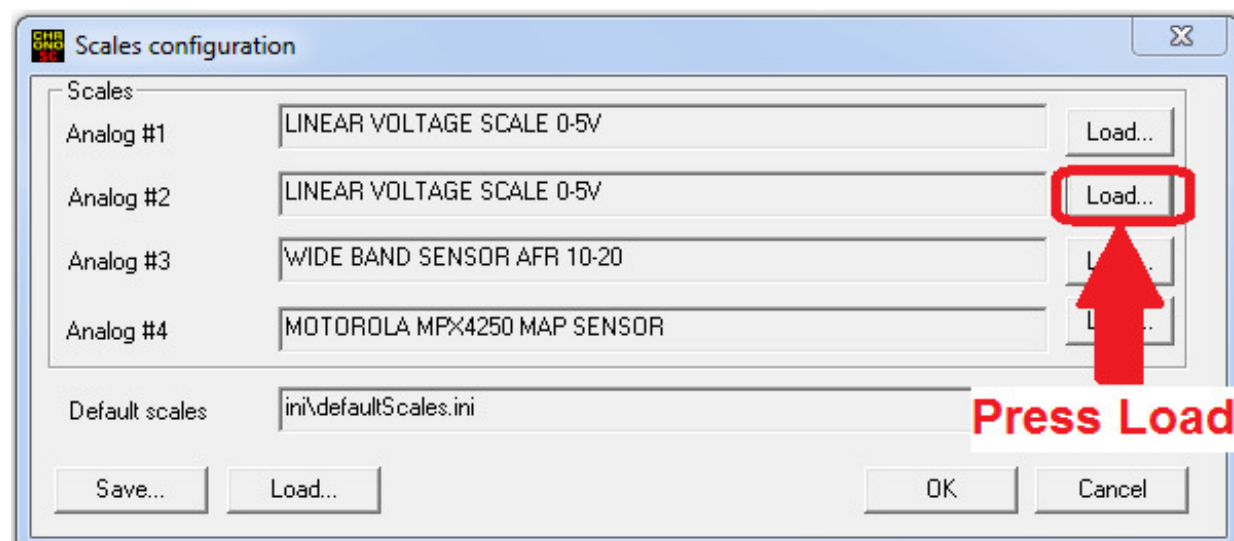
Warning!
Firmware change should not be conducted if there are communication problems between the device and your PC!!!
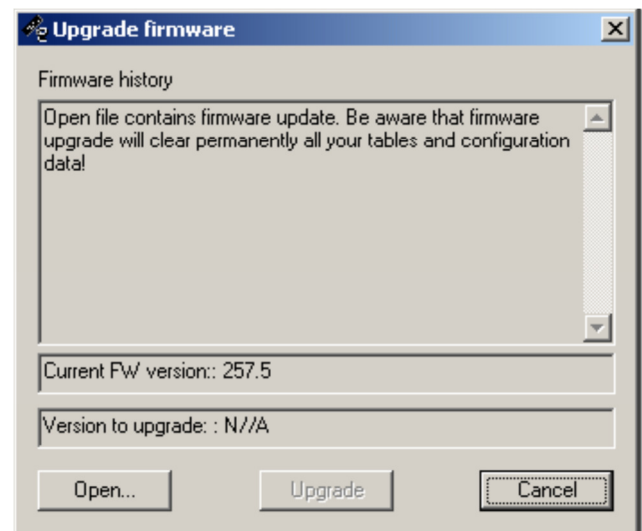
Scale Configuration for TPS Voltage

In this example we use Analog #2 as TPS Voltage (Input Of Load Axis), so you must setup the scale configuration (Setup-> Scales Configuration):

Ignition Configuration

Adjust 'Num Signals Per 720' to match Engine RPM.

For example in Honda early K series Engines (PRA, PRB, PRC ECUs) you tap Pin E26 (OEM ECU) to Pin9 (ignition In) of Chrono SuperCharger Control Device.

Tuning Table
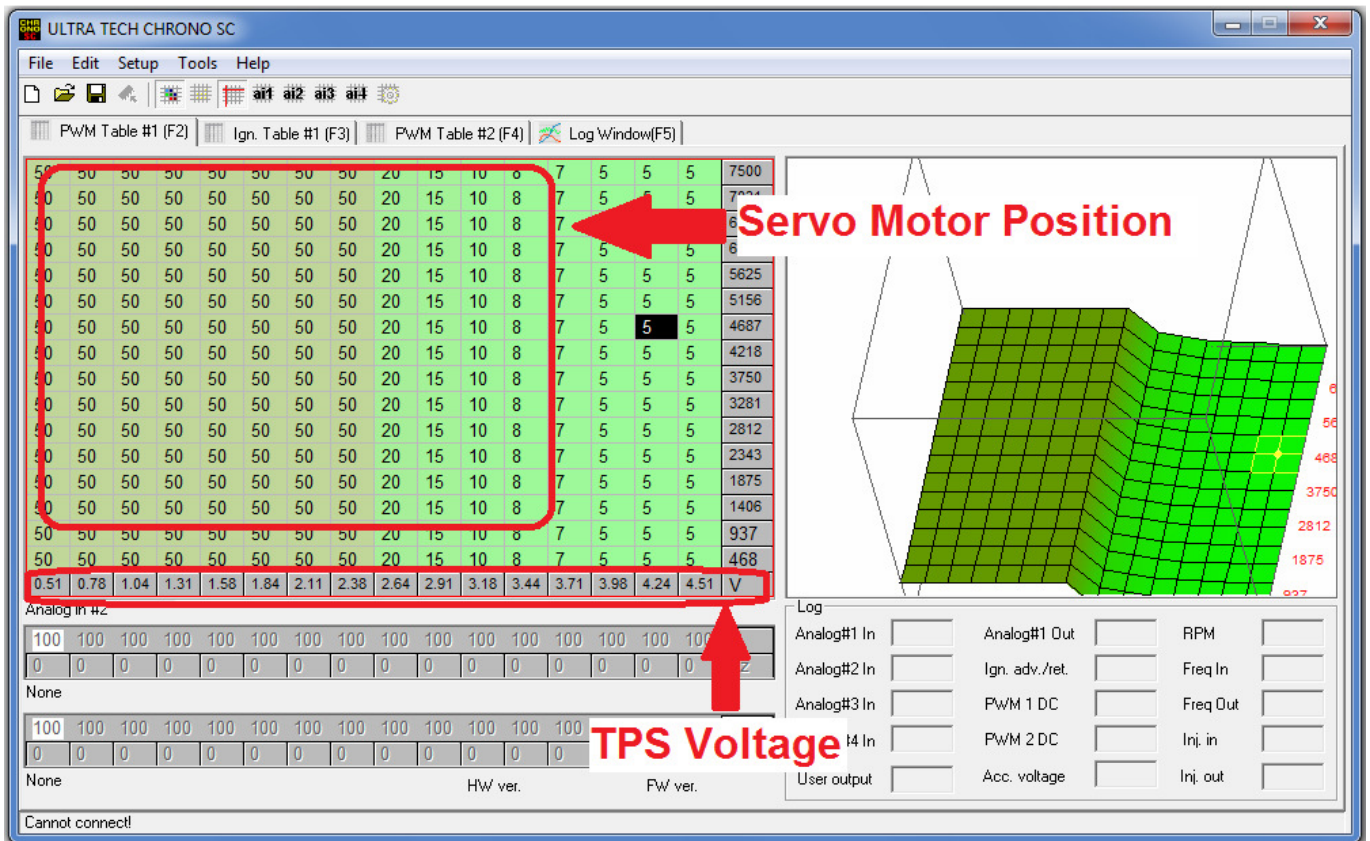
PWM table #1 (Power Out #1) is a 3D table of Servo Motor Position as a function of Engine RPM and TPS Voltage. You have to make some tests BEFORE assembling the servo to a secure position as this might damage the supercharger bypass shaft. For example, in M62 setups it has been tested that the normal range of operation corresponds to table values from 50 (bypass fully open) to about 5 (bypass fully closed -> max boost).

Setting the range:

1. Connect the servo to the controller but do not put on the supercharger yet.
2. Set duty cycle at 50% and check servo position (for low TPS and RPM values, lower left corner of map).
3. Change value at the corresponding cells (say to 10%) to assure proper servo movement.
4. Set again the duty cycle at 50% at the idle region. Servo should go back to the same position it was before.
5. Install the servo (which should be 'locked' at the 50% position) on the supercharger making sure the bypass is at the fully open position.
6. Gradually start decreasing the value of 50% until bypass is fully closed. It is important to ensure that there is a minute amount of 'play' (i.e. try values until you cannot move by hand the bypass.

Then go back 1-2%. This should be the minimum value on the map. Initial tests have shown value of about 5% but it could be different in your application, also depending on the initially assumed fully open bypass position). Bypass shaft could be bent if too low values are input as the servo is a high torque device.

PWM #2 can be used for various other applications, including boost control.

Relay activation pin (pin No7) can be used to activate a solid state relay (**attention: ONLY solid state relays can be used, not common automotive relays due to current limitations. Device can output a max of 25mA which is not sufficient for mechanical relays**) through the parametric output table. The other end of the relay activation circuit should be connected to ground).