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CMD Tuner Installation and User Guide

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PARTS LIST

quantity	description
1	CMD Module
1	Dynojet Master Control Center Software
1	Instruction Manual
1	Registration Card
1	CMD Harness
1	Dynojet CAN-Link Cable
1	USB COM Cable
2	CAN Port Seals
1	USB Port Seal
5	Posi-tap
2	Ring Lug
1	Fuse Tap
2	Dual Lock Fasteners
6	Zip Ties
1	Alcohol Swab

TOOLS REQUIRED

- hand tools
- zip tie cutters
- wire strippers
- soldering iron and solder
- electrical tape or heat shrink
- multimeter/voltmeter

CMD TUNER OVERVIEW

The CMD Tuner is designed for factory forced induction vehicles that need a fuel controller but are not on our development list for our plug and play harness. The four types of tuner harnesses are listed below.

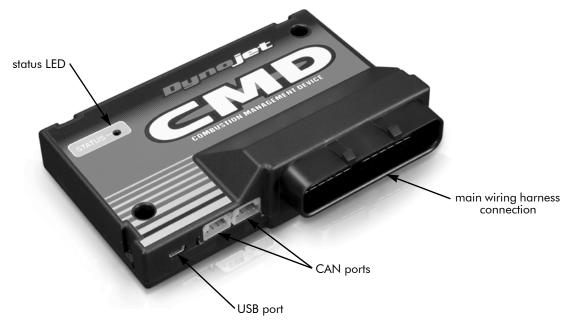


Figure 1: CMD Tuner

CMD Tuner Harness A

CMD Tuner harness A offers pre-installed Bosch D-Jetronic (Ford EVE1) injector connectors.



Figure 2: CMD Tuner Harness A

CMD Tuner Harness B

CMD Tuner harness B offers pre-installed US Car (Ford EVE6) injector connectors.

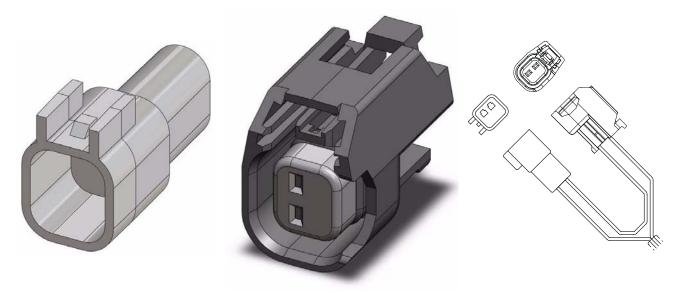


Figure 3: CMD Tuner Harness B

CMD Tuner Harness C



Figure 4: CMD Tuner Harness C

CMD Tuner Harness

This CMD Tuner harness is a cut and splice tuner harness. This is the most universal harness.



Figure 5: CMD Tuner Harness

CMD Tuner Wiring Pin Out

The CMD comes standard with the following inputs and outputs:

- four high impedance injector inputs
- · four high impedance injector outputs
- three analog inputs (for MAF, MAP, and TPS sensors)
- two clampable analog outputs (for MAF and MAP sensors)
- one frequency based MAF input
- one frequency based MAF output
- · one duty cycle based boost control solenoid input
- one duty cycle based boost control solenoid output
- · crank sensor input

Use the following wiring pin out with the CMD Tuner.

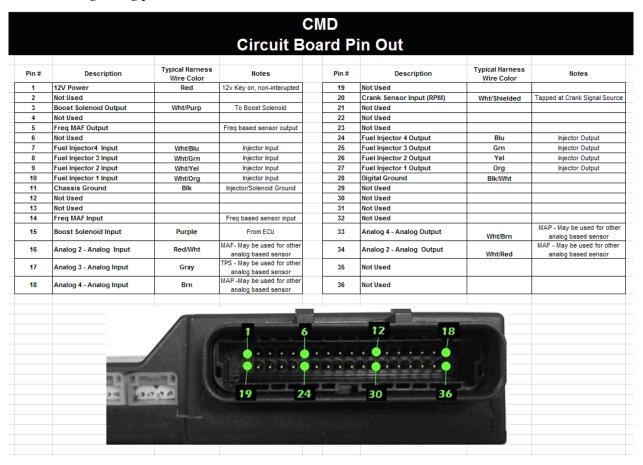


Figure 6: CMD Tuner Wiring Pin Out

INTRODUCTION

The Dynojet CMD comes standard with a universal harness. This universal harness has a total of 23 non-terminated wires used to intercept fuel injectors, mass air meters, map sensors, crank sensors, and throttle position sensors. Each one of these sensors is imperative to the CMD's control state. There are two ways the CMD can use these important sensors: intercepting and tapping.

Intercepting a Signal

An intercepted signal is one which the CMD can change or control. An example of an intercepted signal includes fuel injectors, MAF sensor, MAP sensor, and boost control solenoid.

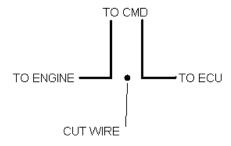


Figure 7: Intercepting a Signal

Tapping a Signal

A tapped signal is one which the CMD can monitor. An example of a tapped signal includes throttle position and crank sensor.

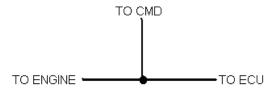


Figure 8: Tapping a Signal

HARNESS INSTALLATION

- 1 Loosen the negative battery post nut and remove the negative battery cable from the negative post of the battery.
- 2 Lay out the CMD Tuner harness the way you will want it installed in the engine compartment.Note: Verify the harness does not contact any moving or hot components or exhaust systems.
- 3 Break out all the wires you will use for the installation. Refer to the wiring diagram on page 4 to identify the wiring in the harness.
- 4 Measure the distance between the fuel injectors, MAF (Mass Air Flow), MAP (Manifold Absolute Pressure), and TPS (Throttle Position Sensor) sensors and cut the harness to fit.

WIRING INJECTORS

In order for the CMD to control fuel properly, the CMD must be wired in between the ECU and the fuel injectors. Before cutting and splicing the vehicles injector wiring, determine which wire is the injector signal wire. Use the instructions below to measure the fuel injector, find the signal wire, and wire the CMD inputs and outputs.

Measuring the Fuel Injector

Before wiring the CMD Turner harness, verify the vehicle is using high impedance injectors. The CMD will only work on vehicles using high impedance injectors.

- 1 Remove the connector from any of the fuel injectors on the vehicle.
- 2 Select the resistance (Ohms) measurement setting on your voltmeter or multimeter.
- 3 Connect the red (positive) probe of the voltmeter/multimeter to one of the pins on the fuel injector.
- 4 Connect the black (negative) probe of the voltmeter/multimeter to the other pin of the fuel injector. The resistance should be approximately 12-16 ohms.

Finding the Fuel Injector Signal Wire

- 1 Remove the stock connector from one of the fuel injectors.
- 2 Turn the car to key-on power.
- 3 Select the DC voltage measurement setting on your voltmeter/multimeter.
- 4 Connect the red (positive) probe to one of the sockets in the stock wiring harness.
- 5 Connect the black (negative) probe to the negative side of the vehicle's battery or a chassis ground.

If the reading on the voltmeter/multimeter measures 12 volts then that is your fuel injector power wire.

If the voltmeter/multimeter reads 0 volts then that is your fuel injector signal wire. The signal wire is the one that will be used by the CMD. Verify readings on both wires before continuing.

Note: Make sure that the fuel injectors are getting powered up with the key-on power while taking these measurements.

Note: You may also be able to consult the vehicles wiring diagram to find the fuel injector signal wire.

Wiring the CMD Inputs

The orange, yellow, green, and blue colored wires on the CMD Tuner harness are designated to be used for the fuel injector signal input to the CMD. The fuel injector signals will come from the ECU.

- 1 Cut the signal wire on the fuel injector for cylinder #1.
- 2 Cut the orange wire on the CMD Turner harness to the desired length.
- 3 Solder the orange wire on the CMD Tuner harness to the wire coming from the ECU for the fuel injector of cylinder #1.
- 4 Repeat steps 1-3 for the yellow, green, and blue wires using the following coloring scheme:
 - yellow—cylinder #2
 - green—cylinder #3
 - blue—cylinder #4

Wiring the CMD Outputs

The white/orange, white/yellow, white/green, and white/blue wires on the CMD Tuner harness are designated for the outputs to the fuel injectors.

- 1 Cut the white/orange wire on the CMD Tuner harness to the desired length.
- 2 Solder the white/orange wire on the CMD Tuner harness to the wire going to the signal wire of the fuel injector for cylinder #1.
- 3 Repeat steps 1-2 using the following color scheme:
 - white/yellow—cylinder #2
 - white/green—cylinder #3
 - white/blue—cylinder #4

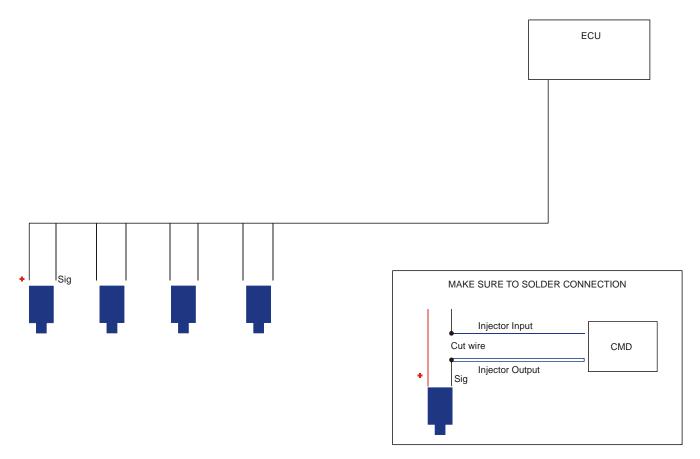


Figure 9: Wiring Injectors

ANALOG INPUTS

The CMD includes three analog inputs and two analog outputs that can be wired to any 5v sensor (voltage based). These inputs and outputs are labeled as Analog 2, Analog 3, and Analog 4.

Analog 2 and Analog 4 utilize the sensor clamping feature of the CMD. They have an input to the CMD, as well as an output from the CMD to the ECU. These are most commonly used for the MAF and MAP sensors on the car.

Analog 3 is used to reference the Sensor Clamp and Boost Table. It has only an input to the CMD. Refer to "Boost Table" on page 13 and "Clamp Tables" on page 14 for more information on Sensor Clamp and Boost Table usage.

Finding the Sensor Signal Wire

It is important to find the correct sensor signal wire when connecting the CMD. Most common MAF, MAP, and TPS sensors have three to four wires:

- 5v power
- signal
- · digital ground
- IAT (used on MAF sensors)

The best way to locate the signal wire of a sensor is to consult your vehicle's manual. You can also use a voltmeter/multimeter to find the signal wire. The signal wire will fluctuate from 0-5v during different driving conditions of the vehicle.

Connecting Analog 3 (TPS)

Most applications will use the throttle position sensor (TPS) for Analog 3. The throttle position sensor (TPS) is used to reference the boost and sensor clamping tables of the CMD. Tap the gray wire (pin 17) of the CMD Tuner harness to the TPS signal wire.

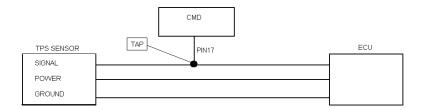


Figure 10: TPS Sensor Wiring

Connecting Analog 2 (MAF)

Most applications will use the MAF sensor for Analog 2. Analog 2 is used to reference the fuel table. Refer to Figure 11 to wire up the CMD to use the sensor clamping feature. If you do not need the sensor clamping feature you can simply tap the MAF sensor signal wire.

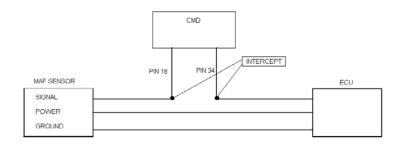


Figure 11: MAF Sensor Wiring

Connecting Analog 4 (MAP)

Most applications will use the MAP sensor for Analog 4. Analog 4 is only used for the sensor clamping feature. Refer to Figure 12 to wire up the CMD to use the sensor clamping feature. If you do not need the sensor clamping feature you can simply tap the MAP sensor signal wire.

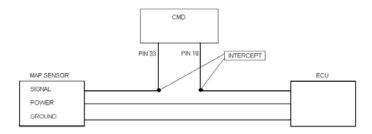


Figure 12: MAP Sensor Wiring

BOOST SOLENOID

The Boost solenoid input can be wired into any factory wastegate control solenoid. The CMD will use the solenoid's input from the ECU to get a duty cycle percentage (%DC). The CMD can be used to drive the factory solenoid at a higher or lower %DC. The CMD can also switch the control state to open loop.

Open Loop—allows the CMD to ignore the input from the PCM allowing full stand alone boost control.

Offset—allows the CMD to give the control solenoid +/- 100% DC from stock.

Connecting the Boost Solenoid

- 1 Identify the signal wire on the boost solenoid of the car. Consult the wiring diagram in your vehicle manual to determine the boost solenoid signal wire.
- 2 Cut the CMD Tuner harness to the desired length.
 - The purple wire (pin 15) and purple/white wire (pin 3) on the CMD Tuner harness are used for the boost solenoid control.
- 3 Wire the CMD as shown in Figure 13.
- 4 Solder the connections and use electrical tape or heat shrink to protect the connection.

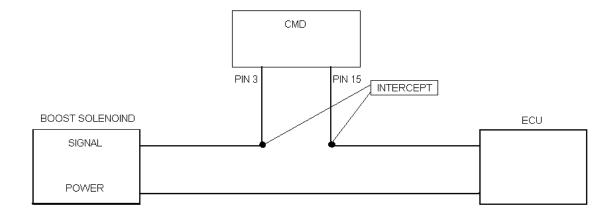


Figure 13: Boost Solenoid Wiring

CRANK SENSOR

The CMD measures RPM from MAG or HALL Effect crank position sensors.

Connecting to the Crank Sensor

- 1 Identify the signal wire on the vehicle's crank sensor. Consult the wiring diagram in you vehicle's manual to determine the crank sensor signal wire.
- 2 Cut the CMD Tuner harness to the desired length.
 - The white wire (pin 20) is used for the crank sensor signal input.
- 3 Tap the crank sensor signal wire using the supplied posi-tap.

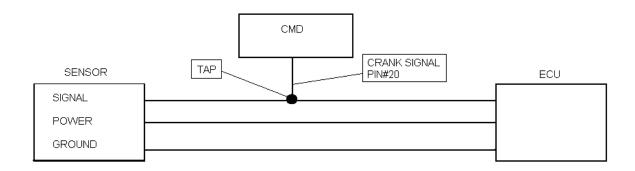


Figure 14: Crank Sensor Wiring

POWERING THE CMD

The CMD will require one key on power, one chassis ground, and one digital ground.

- red—power
- black—chassis ground
- · black/white tracer—digital ground
- Attach the red power wire to a fused 12v key on/running circuit. Verify the circuit is live during the crank cycle. **Note:** You may also use the supplied fuse tap.
- 2 Attach the black wire to the chassis ground. A clean source on the frame of the vehicle is preferred.
- 3 Attach the black wire with white tracer to a sensor's digital ground.
 - **Note:** The digital ground is a clean source for the sensors to use for a ground. It is very important to connect this wire properly. The most common location for these grounds is on the PCM or directly at the sensor.
 - 3a Disconnect one sensor connector and use a volt meter to check each wire with the red probe.
 - 3b Connect the black probe to a clean chassis ground. Use the continuity setting on your meter. If your meter does not have a continuity setting, use the resistance (Ohms) setting. The digital ground will show a short (very close to 0 ohms) on the meter when you find it.
- 4 Attach the negative battery cable to the negative post on the battery and tighten.

SOFTWARE INSTALLATION

- Insert the Master Control Center CD in your CD-ROM drive. The launch program will run automatically.

 Note: If you are running Windows Vista, the autorun feature is turned off by default. Navigate to the CD and run the SETUP.EXE program.
- 2 Click Next to continue.
- 3 Carefully read the Master Control Center license agreement and click **Next** to continue.
- 4 Select the location where the Master Control Center software will be installed and click **Next** to continue. **Note:** Dynojet recommends that you do not change the default destination folder.
- 5 Review the settings and click **Next** to begin copying files.
- 6 Click **Finish** to complete Setup.

The installation is complete. You may now run Master Control Center by double-clicking the program icon installed on your desktop or on your start menu.

Managing Windows

Active windows (Control Center, Graph, and Gauge windows) can be maximized, minimized, closed, tiled, and cascaded. Tool windows (Tree View, File Manager, Device Manager, Table View, Replay/Log) can be docked or be a flyout.

Refer to the Master Control Center Help for more detailed information.

Using MCC Dialog Boxes

The dialog boxes in Master Control Center consist primarily of tabs, fields, drop-down lists, radio (option) buttons, check boxes, and buttons.

- Page Tabs—many dialog boxes provide multiple functions through tabs. By clicking a tab icon, you can display different sets of controls.
- Fields—a field is a rectangular box for entering a specific value or information.
 - You can use the tab key to highlight the next field in a dialog box and shift+tab to highlight the previous field.
- Drop-down Lists—A drop-down list is a small menu within a dialog box. A drop-down list contains various options for you to choose from. Click on the arrow to reveal the list.
- Radio (Option) Buttons—A radio button lets you select options or turn options on and off. Selecting a radio button may activate other controls and may expand a dialog box to display more controls.
- Check Boxes—A check box allows you to turn options on and off. Selecting a check box may activate other controls and may expand a dialog box to display more controls.
- Buttons—A button performs an action. If a button has a bold outline, you can press **Enter** when in any field of a dialog box to activate the button, rather than clicking the button with your mouse.

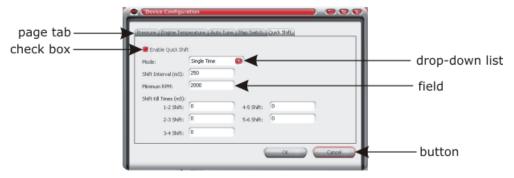


Figure 15: MCC Dialog Boxes

Using Help

To view the Help, select **Help ➤ MCC Help**.

CMD TABLES

The CMD has four tables that can be changed:

- Fuel Table
- Boost Table
- two Sensor Clamping Tables

These tables are shown in the tree view on the left side of the CMD Control Center software. Click on the table in the tree view to view or edit it. Each type of table is described below.

Fuel Table

The values in the fuel table are a percent increase or decrease of the stock fuel pulse.

Fuel can be added or removed from the engine based on RPM and MAF, MAP, or TPS. You can modify the map +/-100% by selecting one or multiple cells and inputting a new value. You can also use the computer keyboard page up/page down keys to add or remove one increment of fuel at a time.

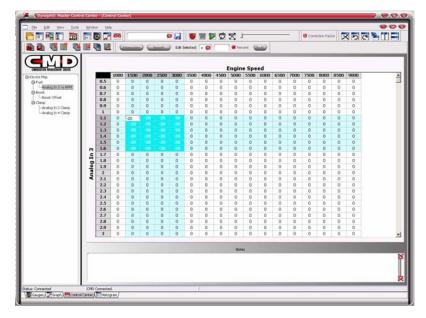


Figure 16: Fuel Table

Boost Table

The values in the boost table are either absolute duty cycle of the boost solenoid (open loop) or the increase or decrease of the stock boost solenoid duty cycle (offset) depending on configuration. The boost table will change in the Tree View when changing from offset to open loop. Refer to the instructions below for more information on changing from offset to open loop.

The Boost table allows you to add or remove \pm 100% offset or drive the solenoid to \pm 100% in open loop boost control. Select one or multiple cells and input a value. You can also use the computer keyboard page up/page down keys to add or remove one percent duty cycle at a time.

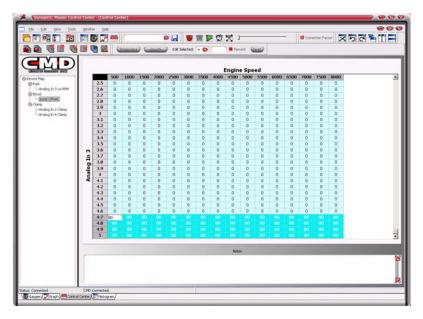


Figure 17: Boost Table

Use the following instructions to change from offset to open loop. Refer to the Help for more detailed information.

- 1 Select Tools ➤ CMD Control Center ➤ CMD Configuration.
- 2 Select the **General tab**.
- 3 Using the drop-down list, select a Boost Control Style.

Open Loop—the values in the cells of the Boost Duty Cycle table represent the actual duty cycle of the boost control solenoid.

Offset—the values in the table are a percent of the boost control solenoid duty cycle. A 10 in a cell will result in a 10% increase in duty cycle. A table of all zeroes will give stock boost solenoid duty cycle.

Note: To run unmodified boost, set the Boost Control Style to Offset and verify the table has all zeroes.

Clamp Tables

The values in the clamp tables are the maximum voltage that will be sent through to the ECU for the channel selected in the Tree View.

Clamp tables allow you to clamp or limit specific sensors outputs at a desired voltage. If you increase power or boost you may need to clamp the MAF or MAP sensors to keep the PCM from going into a fuel/boost cut. Dynojet recommends using Maser Control Center's histogram to populate these values. These tables accept 0-5v values. For more information about histograms, refer to "Using the Histogram" on page 19.

Here we have clamped the output of the Analog 2 (MAP) above 2000 RPM. Based on Analog channel 3's input. Analog 3 is Throttle %, so 4.9v-5.0v represents 95%-100% throttle. At these throttle settings, MAP voltage levels returned to the PCM will be limited to the values in the cells of the table. For example, if at 100% throttle (5.0v on Analog 3) and 2500RPM, the MAP sensor is sending out 2.2v, the CMD would only send 2.0v out to the PCM.

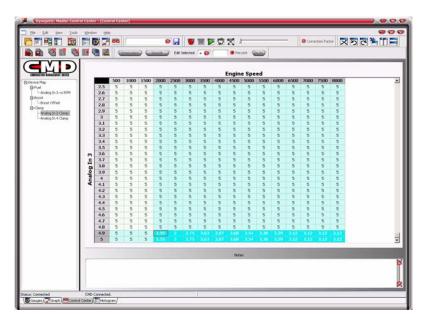


Figure 18: Clamp Table

Configuring the CMD

- 1 Select Tools ➤ CMD Control Center ➤ CMD Configuration.
- 2 Select the Channel Defines tab.
- 3 Using the drop-down arrow, select the appropriate label for each analog channel.
 Once labels are chosen, the CMD will read MAF, MAP, or TPS instead of Analog 2, Analog 3, etc.

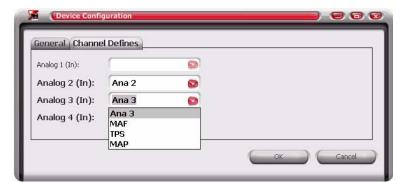


Figure 19: CMD Configuration—Channel Defines Tab

- 4 Select the General tab.
- 5 Enter the number of Crank Teeth.

Crank Teeth is the number of teeth on the crank position wheel. This value is set for vehicle specific CMDs. When using the Tuner Version CMD, this value will need to be entered. Check the vehicle documentation or consult CMD technical support.

- 6 Using the drop-down list, select the desired Boost Control Style.
 - Open Loop—the values in the cells of the Boost Duty Cycle table represent the actual duty cycle of the boost control solenoid.
 - Offset—the values in the table are a offset of the boost control solenoid duty cycle. A 10 in a cell will result in a 10% offset in duty cycle. A table of all zeroes will give stock boost solenoid duty cycle.
 - Note: To run unmodified boost, set the Boost Control Style to Offset and verify the table has all zeroes.
- 7 Click **OK**.



Figure 20: CMD Configuration—General Tab

8 Click the **Send Map** button to send the map file to the CMD.

Note: Do not disconnect the CMD from the PC until the map is finished being written. You will know the write process is complete when you see "finished writing map" in the bottom left hand corner of Master Control Center.



Figure 21: Map Sent Successfully

Verifying the Channel Signals

- 1 Click the **Device Manager** button \blacksquare .
- Verify all channels are selected.

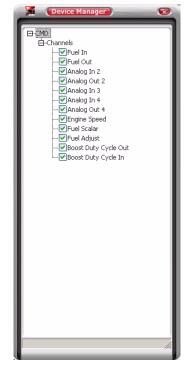


Figure 22: Device Manager Channels

- 3 Click the **Table View** button .
- 4 Start the vehicle.

Note: The vehicle must be running to verify readings.

- 5 Verify the CMD is reading numbers using the Table View.
 - analog—voltages
 - engine speed—RPM
 - boost—will not have a reading unless the vehicle is under boost

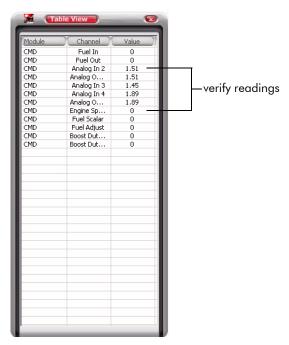


Figure 23: Table View

LOGGING DATA

Replays data from loaded/open log files and logs data from enabled channels to a new log file.

- 1 Verify a device is connected. For example, the CMD.
- 2 Verify the device has channels enabled. Refer to "Verifying the Channel Signals" on page 16.
- 3 Click the **Record** button to record the enabled channels of a connected device to a log file.
- 4 Click the **Stop** button to stop recording.When recording is stopped, the Save Log File As dialog box will appear.
- 5 Enter a file name.
- 6 Choose a location, and click Save.



Figure 24: Save Logged Data

Replaying Data

Replays the loaded log file(s) when set to Logged Channels Enabled. Plays the enabled channels of a connected device when set to Live Channels Enabled.

- 1 Load a log file.
 - 1a Click the File Manager button
 - 1b Right-click on the File Manager window and select **Open**.
 - 1c Choose a file to open.



Figure 25: Load a Log File

- 2 Click the **Play** button to play the log file.
- 3 Click the **Loop** button to loop the playback continuously until **Stop** is pressed
- 4 Click the Interpolate Playback button to smooth replay when the log file has a low sample rate.

USING THE HISTOGRAM

The histogram feature allows you to playback data gathered during a datalogging session. Master Control Center allows you to copy and paste cells out of the histogram directly into the CMD's map.

- 1 Click the **New Histogram** button
- 2 Click the **File Manager** button to open the file manager tool.

 Note: You may also browse to the file using Tree View. Click the **Tree View** button folder or file to open it.
- 3 Right-click on the File Manager window and select **Open**.
- 4 Browse the directory and select a run file.
- 5 Click Open.



Figure 26: File Manager

- 6 Click the horizontal axis button and choose an option from the list. The horizontal axis label corresponds to the horizontal axis of the histogram.
- 7 Click the vertical axis button and choose an option from the list. The vertical axis label corresponds to the vertical axis of the histogram.
- 8 Click the table data button and choose an option from the list. This is the data to be displayed in the histogram table.
- 9 Enter the desired percent number in the **Percent** field Percent: 90 . This number determines the size of the percent range box in the table. The lower the percent, the smaller the box (range).
 - Click the **Show/Hide Percent Ranges** button to show the percent range box in each cell.
- 10 Click the **Play** button

The values in the histogram may be copied and pasted into your CMD MAF clamp table.

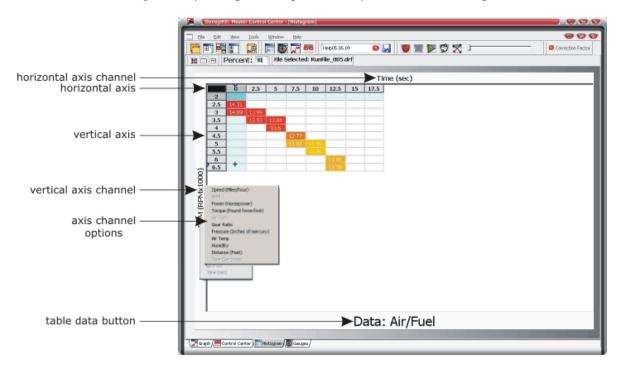


Figure 27: Histogram

TABLE PROPERTIES

The Table Properties dialog box allows you to change the scale of the axis of the table along with changing the channel displayed on the Y-Axis.

1 Click the **Edit Table Properties** button **2** .

The Table Properties dialog box will appear.



Figure 28: Table Properties Dialog Box

- 2 Edit the breakpoint step size.
 - 2a Deselect the Custom box.
 - 2b Type in the breakpoint step size. In this example we entered 800 RPM.
- 3 Edit the Element Count.

Table Properties modifies the breakpoints for the highlighted table only. Element Count changes the number of breakpoints you see.

- 4 Edit the Min and Max values.
 - 4a Deselect the Custom box.
 - 4b Type in the Min and Max values. In this example we entered 1000 in the Min and 9000 in the Max.

Table Properties uses the values in Min, Max, and Step Size to determine the break point numbering. To input custom breakpoint values, select a desired cell then change the value. You can have up to 48 cells.

5 Select a Y-Axis Channel from the drop-down list.

Y-Axis Channel is the highlighted table's reference channel. This is where you can change the fuel control state from one analog reference channel to another. You can use any of the three analog inputs as the primary fuel channel. In this example we changed the fuel channel from Analog2 to Analog3.

- 6 Click **OK** to accept the changes or click **Cancel** to exit.
- 7 Click the **Send Map** button to send the map file to the CMD.

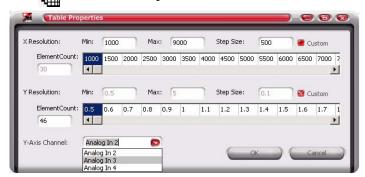


Figure 29: Editing the Table Properties

ADDITIONAL INFORMATION AND TECHNICAL SUPPORT

For additional maps and information, please visit www.powercommander.com.

For assistance, please contact Dynojet Technical Support at 1-800-992-3525, or write to Dynojet at 2191 Mendenhall Drive, North Las Vegas, NV 89081.