User manual for the BC-box and BCLab software v 3.4.17

About the BC system

The Civinco series of electronic control boxes - The BC - makes it possible to tune your engine without the need to reprogram the stock ECU (engine control-box). Civinco can offer both tuneable and ready-tuned boxes which gives you the possibility to optimise your engine.

The BC-box is available in four versions:

BC250 – Ready tuned box for stock cars with 1-5 cylinder engines. Used as an alternative for chips and serial programming. No PC software is supplied with this box.

BC500 - Tuneable box for cars with 1-5 cylinder engines. Includes PC software enabling full tuning of engine parameters. Tunes fuel, ignition, extra injectors, NOS, shift light, water injection etc.

BC750 – Ready tuned box for stock cars with 6-10 cylinder engines. Used as an alternative for chips and serial programming. No PC software is supplied with this box.

BC1000 - Tuneable box for cars with 6-10 cylinder engines. Includes PC software enabling full tuning of engine parameters. Tunes fuel, ignition, extra injectors, NOS, shift light, water injection etc.

The BC-box is connected between the stock ECU and the main harness, or it can be connected directly to sensors, injectors etc. This makes it possible to alter some in- and output signals which is necessary in all electronic tuning. The basic principle is that the BC-box will increase the boost pressure and add more fuel and at the same time "hide" this information from the ECU. In this way the ECU controls the engine during normal operation such as cold-start and idle etc but the BC-box controls the engine at high power. Common to all versions of the BC-box is that all tuning data is stored on a TuneCard (memory card) which is easily exchanged while driving to give the engine different behaviour such as; imobilizer, rpm-limiter, exotic fuels, max fuel efficiency or maximum power.

Examples of supported functions:

Tuning ignition and fuel as function of rpm and boost

Tuning the boost at the same time as the boost signal is hidden from the ECU

Activation of nitrous, water injection, extra injectors, shiftlight

Mass airflow simulation using auxiliary MAP sensor

Controlling larger than stock fuel injectors

All tuning data is stored on a Tunecard memorycard (3 cards supplied)

All tuning is done using the easy-to-use Windows BCLab program

The BC-box is updated with tuning data using the Tunecards or by directly connecting the BC-box to the PC serial port

Engine data can be logged and later analysed as graphs in BCLab

Auxiliary analog, digital and PWM-signals can be used to control or logg extra devices

Sold as a kit containing; BC-box, wiring, programming cable, bypass connector and an installation CD

BC250 and BC750, pretuned for a specific make and model

The BC250/750 is a new type of tuningbox for turbo engines. It's a plug-in type box which is connected to engine sensors and actuators, such as fuel injectors, camshaft sensor, manifold pressure sensor etc.

Tunecard

The BC250/750 can be loaded with different tuning parameters for different situations. The tuning parameters are stored on a memorycard, "TuneCard". To switch the tuning just insert the card in the Bc-box. The new card is read in 5 seconds and the new tuning is immediately active. The card can then be removed from the BC-box. The cards can be inserted while the engine is running.

Used as an alternative for tuning chips or serial programming

Simple installation, no need to modify the stock equipment

Plug-in connectors for most sensors/actuators

No need to break the seal on the stock ECU

Simple to build back to stock

The BC-box can be used in another car (may need different tuning)

Delivered with 3 TuneCard: Stock (no tuning), Economy (more power and best mileage) and Sport (maximum power)

Special tuning parameters available, such as: Winter, Super Sport, StreetRace, Imobilizer, RPM-limit etc.

Examples supported by the BC250

bildtexter och bilder-----------------

The BC250/750 is supplied with a car specific electrical harness, installation instructions with pictures and 3 TuneCards with different power levels. Extra blank TuneCards are sold separately.

The BC250 is available for most VAG 1.8Turbo engines 1996-2004 (Audi, VW, Seat, Skoda), Volvo S40&V70 Turbo and the Smart Turbo.

The BC750 is available for the Dodge Viper 1996-2002

Please refer to our website www.civinco.com for the latest manuals and tuning examples for the respective model.

BC500 and BC1000, tunable piggyback-box with PC software

The BC500/1000 differs from the BC250/750 in that they are not optimised for a specific engine but can be used on just about any car/engine. This also includes engines with a larger than stock turbo, or natural aspirated engines with installed turbo or supercharger. In these cases you must be able to tune the relevant tuning parameters yourself using the BCLab software. The electrical harness differs in that it is a more general harness. The harness can be supplied with or without certain plugs, such as injector plugs etc.

BC500/1000 features not available in the BC250/750:

- Activation of nitrous, water injection, extra injectors, gearshift indicator
- Mass airflow simulation using an extra MAP-sensor
- Control larger than stock injectors
- Tuned with the BCLab PC software
- Possibility to log data and afterwards view graphs in Windows
- Up to 16 inputs and 16 outputs
- Extra analog/digital and PWM in/outputs to control or log auxiliary equipment

Examples of cars tuned with the BC500/1000

Audi S2 - Larger than stock turbo

Audi S4 - Stock

Arctic Cat (snowmobile) - Stock

Dodge Viper - Supercharger and nitrous

Dodge Viper - Turbo

Honda Civic CRX 1.6 - Supercharger, racing fuel and nitrous

Mazda Miata - Turbo

Mitsubishi 3000 GT - Stock

Nissan 300 ZX - Stock

Skoda Octavia RS - Larger than stock turbo

Subaru Impreza - Larger than stock turbo

Suzuki Hayabusa (MC) - Turbo

Toyota Supra - Single turbo

Toyota Celica - Larger than stock turbo

Toyota MR2 - Stock

Volvo S40 - Turbo

Volvo 740 Turbo - Stock

Volvo 360 - Turbo

VW Golf V6 - Turbo and Mass airflow simulation

Tech specification of the BC500

The box front panel

There are 4 LEDs above the TuneCard slot. These are from the left:

1. Green power - The BC is powered up

2. Red This LED will light up at preselected rpm chosen in BCLab, see section Box settings-"RPM ind"

3. Red Read/Write operation in progress. Also LED for error codes

4. Green steady: TuneCard read/write operation completed. Flashing (two flashes repeatedly): TuneCard read/write operation completed and the slave-PCB data is verified

The button next to the LEDs is used like this:

If the button is held pressed while a TuneCard is inserted the current BC-box data is transferred to the TuneCard, - the TuneCard data is replaced by the data in the BC-box.

In- and outputs

In the BCLab software under section "BC-box settings-Advanced-BC Digital I/O mode" you will enter which main mode to be used and thus also which connector pins to use. You will also under sections Ignition load, Fuel load and PWM load which analog input to use for load measurement and base the tuning on.If the engine has a MAP-sensor you will specify which pin this is connected to. Other engines may be better off basing the tuning on the TP-sensor.

Digital in/outputs

The BC500 has 6 digital in/output-pairs (12 pins), where every input has its associated output. These are called: FuelA-FuelE(5 fuel channels), IgnitionA-IgnitionB (2 Ignition channels) and PWM (1 boost channel). One of the signal-pairs can be used for different functions and cannot be used simultaneously. This is FuelE, IgnitionB and PWM. The reason for organising the in/outputs in pairs is that when connecting a bypass-plug (instead of the BC-box) then all channels will be short-circuited and the signals are unaffected (the engine behaves stock). When the BC-box is connected, the box will modify the signals according to the Tuning parameters and send them to the paired output.

The BC-box can thus be run in different modes where the pins have different functions:

- Mode

4 Fuel in/out, FuelA-FuelD, pins 15-22

2 Ignition in/out, IgnitionA-IgnitionB, pins 11-14

Boost control out, PWM_OUT, pin 5

- Mode2 - no longer activated
- Mode3

5 Fuel in/out, FuelA-FuelE, pins 15-22 & 11-12

1 Ignition in/out, IgnitionA, pins 13-14

Boost control out, PWM_OUT, pin 5

- Mode4 - no longer activated
- Mode5

4 Fuel in/out, FuelA-FuelD, pins 15-22

1 Ignition in/out, IgnitionA, pins 13-14

Boost control in/out, PWM_OUT/IN, pins 11-12

The rpm calculation is always based on IgnitionA, this signal can be taken from several places as long as you know how many pulses per rev it has. Both IgnitionA and IgnitionB can be connected to crank/cam signals or ECU signals to the Ignition module. The signals must be of the type 0V to 5-20V. Sometimes it is necessary to use an amplifier to achieve the correct voltage level.

Digital output

The BC500 has one pure digital output, PWM_OUT which in mode1&3 is used to control the boost, but in mode5 can be used for other purposes.

Analog in/outputs

The BC has two analog in/output pairs where every input has its associated output. These are called: Analog1 and Analog2. The basic idea with this is to limit the analog sensor signal (rpm dependant)l to a value which represents the stock manifold pressure or Mass airflow. In the BCLab software, you will select which analog sensor signal to base the tuning on. This selection is done at pages: Ignition load, Fuel load and PWM load.

Analog input

The BC has one more analog input which is a pure input, thus the total is 3 analog inputs.

Connector specification

BC250/500 pinout on the BC-box

Power connections: Pin 1, 2, 23, 24:

1, 23 Grounding. It's very important to achieve a good solid grounding. Use shortest possible wires and always use both wires.

24 12V power. Connect this to a 12V power source which is switched by the ignition. The current is less than 0.5 Amps.

2 5V output to power auxiliary sensors, max 50mA.

Fuel injectors: Pins 15, 16, 17, 18, 19, 20, 21, 22:

The BC250/500 can connect up to 5 injectors (cylinders A-E). You will connect the BC between the ECU and the injector. The in/outputs must be connected in pairs according to: A(22-21), B(20-19), C(18-17), D(16-15), E(12-11).

(12), 16, 18, 20, 22 Fuel signal inputs to the BC-box from the ECU. The fuel signal shall be connected to the BC-box instead of the injector. Pin 11,12 FI_E_IN/OUT is only used on 5cylinder engines (instead of IgnitionB).

(11), 15, 17, 19, 21 Injector driver output from the BC-box. The injectors are connected here instead of to the ECU.

Ignition : Pin 11, 12, 13, 14:

It's possible to control 2 ignition modules at the same time, IGNITION_A and IGNITION_B with their in- and outputs. If only one ignition channel is required, then IGNITION_B can be used for other purposes such as: a 5th fuel channel or control of the boost valve.

In many cases there is no need to tune the ignition, in such cases it's sufficient to only sense the rpm. This signal can be from the ignition system, the camsensor or the cranksensor. Depending on the used signal you may have to connect an amplifier to achieve the correct voltage level.

12, 14 Ignition signal inputs to the BC-box from the ECU. The ignition signal shall be connected to the BC-box instead of the ignition module.

11, 13 Ignition outputs from the BC-box to the ignition modules (The BC-box cannot drive ignition coils directly without an ignition module). The ignition modules are connected here instead of to the ECU.

Analog signals: pins 6, 8, 10, 7, 9:

10, 8, 6 0-5V analog signals Analog1-3. Normally used for measuring Manifold absolute pressure, Mass airflow, knocksensor, throttle position or temperature.The BC-box can use all these signals to tune fuel, boost, ignition etc. in the BCLab software.

9 Analog1-output, an analog output signal which can be voltage limited. It can be used to hide the high MAP or Mass airflow value from the ECU. The output voltage is the same as the input voltage at pin8(analog1) up to a certain maximum value. Any input above this maximum value will only produce that maximum output value. The maximum value is selected in BCLab at page Analog out-Analog1 out.

7 Analog2-output. This output can be controlled in three ways:

The output can be a function of the Analog2 input value. For every input there will be a certain output according to how you have tuned this function in BCLab.

The output can be voltage limited in the same manner as analog1.

When controlling the boost via PWM_IN/OUT (pins 11,12) this signal can be voltage limited in a smarter way called limit trim.

Driver outputs: pins 5,11:

The boost valve is controlled by a PWM output. Which pin you use for this is selected in the BCLab-Configurations. The PWM output can also be used to control other devices compatible with the PWM-type output (lamps, valves, motors etc.) The outputs can handle 3 Amps.

11 PWM output. Normally used to control the boostvalve when the ECU boost control signal is connected to the PWM_IN BC-box input.

5 PWM output. Can be used to control the boostvalve.

PWM input: pin 12:

12 PWM input. Can be used to connect the ECU boost control signal to the BC-box. This is used for logging purposes or when you wish to use the Analog2-out "limit trim" function.

Installation

The BC-box can be installed in three different ways.

Example1: ECU

The BC-box is connected directly to injectors, sensors and boost control valve in the engine bay. In this type of installation the BC-box does not tune the ignition. The camsensor signal is used to calculate the rpm. This installation is used with the VAG 1.8T engines, Smart, Volvo and most custom projects.

Example2: ECU

The BC-box is connected to the ECU connector or an other suitable connector in the stock electrical harness. This installation is used in the Dodge Viper generation 2.

Example3:

In those cases where there are no suitable connectors to use we use a general harness without connectors. At suitable places in the stock electrical harness, the stock wires are cut and soldered to the BC harness. This installation is used with the Honda CRX and Mazda Miata.

Installing the BC250 in an Audi TT

Installation of BC in an Audi TT 1.8 Turbo.

Installation time 1.5 hrs.

No Connection Type

1-4	Fuel injectors	Plug-in
5	Throttle position sensor	Split connector
6	Boost control	Plug-in
7	Mass airflow sensor	Cable connector
8	Camsensor	Plug-in
9	Pressure sensor	Cable connector

Check our website www.civinco.com for the latest installation manuals and tuning examples.

BCLab v 3.4

BCLab functions in general

The PC software BCLab is used to tune the BC500/1000. This software is also available as an upgrade to the BC250/750 which is delivered with ready tuned TuneCards for those users who wish to do their own tuning. In the below simplified example we will assume that we want to increase power by adjusting the maximum boost. The BC500/1000 can just as well be used to tune a car with an aftermarket turbo/supercharger installation. The tuning principles are the same but more tuning parameters may need adjustment.

The basic working principles for the BC-box is to measure the engine rpm, boost pressure, Mass airflow and/or manifold pressure. Depending on the amount of air entering the engine the ECU will supply the correct amount of fuel. When opening the throttle more air will enter the engine and thus the ECU will calculate a higher amount of fuel. Depending on the rpm and airflow the ECU will also calculate the ignition advance.The difference between boost pressure and manifold pressure is that the throttle is between them. When opening the throttle more of the boost pressure will reach the manifold (and engine).

The turbo is capable of generating boost depending on rpm, which in turn determines the airflow into the engine. In order to regulate the boost, the ECU uses a boost control valve to adjust the boost pressure. Close to the turbo there is a boost pressure sensor that sends a feedback signal to the ECU of the actual boost pressure. The ECU "knows" which boost to expect with a given boost control valve position (signal) and also knows the maximum allowable boost.

That's why we must "hide" the real (higher) boost from the ECU.

The BC-box now increases the signal to the boostcontrol valve in order to increase the boost pressure above the stock maximum level. In order to keep the ECU happy we must limit the boost sensor signal to the ECU so that it cannot "see" a higher boost level than stock. The Mass airflow signal to the ECU is limited in the same manner. If the ECU would be allowed to "see" the higher airflow into the engine it would detect an abnormal situation and set a fault light and shut down the engine. Since the engine with the higher boost pressure will see a higher airflow, the BC-box must supply more fuel, adjust the ignition and completely take control of the boost valve.

The amount of fuel is determined by engine rpm and manifold pressure (or Mass airflow). You will tune the fuel for every rpm and every manifold pressure. It's like a grid where the number of cells equals (number of rpm positions)x(number of manifold pressure positions).

For example: we only measure 3 rpm positions: 0-2000, 2001-4000 and 4001-6000. At the same time we only measure 3 manifold pressure positions. This means we must tune 9 different cells in the grid. But the BC actually measures 256x256=65536 cells. Luckily we don't have to tune all of these 65536 cells, the BC will automatically do the calculation for us. Instead we will tune the rpm and airflow separately and the BC-box will calculate all other combinations.

Tuning of enrichment fuel

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Enrichment fuel

The enrichment fuel is specified as how many ms (1/1000 of a second) the injector pulse is to be extended. A typical injector pulse is 1-20 ms long from idle to full power. This means that 2ms enrichment fuel equals about 10% fuel enrichment at full power.

The first step in fuel tuning is based on manifold pressure. Normally the engine runs well without enrichment fuel up to the manifold pressure the stock engine had. Above this pressure the BC-box must add enrichment fuel.

The next step is to further tune the enrichment fuel depending on rpm. This is tuned as a % value to be multiplied with the prior tuned enrichment fuel. The value 110% will result in 1.10xenrichment fuel(manifold pressure).

See page Fuel.

Ignition retard

The ignition is also tuned in the same manner as the fuel enrichment. The normal method is to retard the ignition at certain rpms when the manifold pressure is higher than stock. This is done to reduce the risk of detonation.

The first step is to tune the ignition retard in degrees as a function of manifold pressure.

The next step is to further adjust the ignition retard as a % value depending on rpm. The two tuning values are then multiplied for a final ignition retard value. The value 110% will result in 1.10xignition retard(manifold pressure).

See page Ignition.

Boost control

Tuning of the boost pressure is also done in BCLab, as a function of rpm and a selectable analog input. Usually it's enough to only tune the boost as a function of rpm. In some cases you might want to also tune the boost as a function of throttle position. In this case the boost is reduced when driving at part throttle thus increasing "driveability" without sacrificing top power. The signal to the boostvalve is of the PWM type which can have a value of 0-100%. Every % value will result in a specific boost pressure depending on the enginetype, rpm, turbosize etc. To achieve a more stable boost pressure the pressure sensor sends a feedback signal to the BC-box which can regulate the desired boost.

The first step in tuning boost is to set all tuning as a function of manifold pressure to 100%. Then you will tune the boost as a function of rpm, this tuning is also done as a % value. The two % values are then multiplied to form a final value sent to the boost valve.

Examples:

50% x 50% = 25%

50% x 150% = 75%

200% x 50% = 100%

150% x 100% = 100% (The result can never exceed 100%)

See page PWM/Boost

Signal limiting

In order to make the ECU accept the increased boost pressure, the BC-box will limit the pressure sensor signal so that the ECU will never "see" more than stock boost. The Mass airflow is limited in the same manner.

See page Analog out

Page - General

Data protection

The BC-box can be delivered locked or unlocked. The BC500/1000 are delivered unlocked while the BC250/750 are delivered locked. In order to use the BCLab software with your BC-box it must be unlocked or that you have access to the correct code. All boxes with their associated TuneCards have a unique serialno and a unique code.With access to the correct code you can unlock your box and adjust the tuning. The code is also required when reading a locked TuneCard into the BCLab software.

A locked box means that you can only use a TuneCard which is encrypted for this specific BC-box or that the box is unlocked via the serial port with the correct code.

An unlocked box will read all non-encrypted TuneCards with the correct Dataset-ID and also all TuneCards that are encrypted for that specific box.

Lock/Unlock the Bc-box or TuneCard

Before unlocking the BC-box you must enter the correct box serialno and the correct 10-digit code. If you have received your code in a codefile you can use this by klicking "Open code file".

If you chose "Unlock after upload" the box will be left unlocked after updating the tuning in the box or on the TuneCard.

If you chose "Lock after upload" then the box/TuneCard will be left locked.

Why lock or unlock the BC-box?

If you wish to share your tuning with friends you must work with unlocked box and TuneCards.

If you wish to keep your tuning to yourself, then you must lock the box. Thus you will never risk anyone else to see or use your tuning. You can also be safe that nobody can insert a TuneCard in your box and alter the tuning or start the car (Antitheft).

Chipdrive status / RS232 status / BC-box as a tunecard reader status

There are three ways to communicate with your box or TuneCards. In the upper left corner you will see the chosen communication mode. You may switch between these in the menu Edit-Toggle Interface or by pressing Ctrl+T.

- RS-232 serial communication between PC and BC-box
- Chipdrive connected to the PC that read/writes TuneCards
- Use of the BC-box as a TuneCard reader when BC-box is connected via RS232

Chipdrive Status

Handles the TuneCard reader if it is connected to the PC. The currently supported reader is the Chipdrive.

Find Reader - The program tests the connection with the Chipdrive reader

Write Card - Saves the BCLab current tuning to the TuneCard

Read Card - Reads the TuneCard tuning and displays them in BCLab

RS-232 Status

Handles the RS-232 communication with the BC500/1000.

Write - Saves the BCLab current tuning to the BC-box

Verify - Verifies that the BC-box tuning is the same as the BCLab tuning

Read - Reads the BC-box tuning and displays them in BCLab

Info - Reads some general information from the BC-box

BC-box as TuneCard Reader Status

Used when you want to use your PC-connected BC-box to read a TuneCard. This makes it possible to write TuneCards without the Chipdrive.

Check - The program tests that the BC-box works as a TuneCard reader

Write - Saves the BCLab current tuning to the TuneCard inserted in the BC-box

Use of all pages with tables

All BCLab pages that have tuning tables also have a "Table Control" box. This is used to easily adjust the tuning values in the table. You can also use this to edit several tuning values at the same time by marking the desired values. (to mark all table values klick on "Deg", "ms" or "%" in the table upper right corner).

- "+" Increases value
- "-" Decreases value
- "/" Increases slope
- "\" Decreases slope
- "Scale%" Scales the marked values with the selected % value
- "Set to" Sets the marked values to the selected value
- "min", "max" Informs the user of the possible values in this table

Page - Ignition

For a better understanding of the tuning principles see chapter Ignition retard

Ignition load

Base ignition calc on:

This setting determines which analog input is used to base the ignition tuning on. "AnalogX in minus AnalogX in" is used to make it possible to base the tuning on the difference between two inputs.

The table shows, left to right:

- The voltage of the selected input
- The physical value of the above voltage (Depends on the sensor type selected in "Used Analog Sensor"
- Tuning value in Degrees or % (that is % of the rpm table)

The Ignition Load table can only be tuned with positive numbers (degrees or %). The ignition load tuning table can be made to show degrees or % by altering the setting in BC-box settings.

Ignition RPM

The right column is for the tuning values. Depending on the BC-box mode this value will be in degrees or in % of the ignition load table.

The ignition rpm can be tuned with both positive and negative numbers (both degrees and%). The selection of degrees or % is made in the BC-box settings.

Negative values equals retarded ignition (delayed ignition)

Positive values equals advanced ignition. The BC-box can only advance ignition under certain circumstances.

Civinco can to date advance the ignition in the following cases:

- Dodge Viper, all three generations. This is due to the crank and camsignals are of the digital type (non inductive) and have a special pattern. Inductive sensors will need a special amplifier.

Civinco can to date retard the ignition in the following cases:

- When the ECU ignition signal is low voltage (0-12V or 0-5V and does not drive the ignition coil directly). The BC-box can retard two ignition channels simultaneously (4 channels with the BC1000).

- When the crank and camsignals are of the digital type, max 0-15V (non inductive), with a dutycycle between 40-60% and max 2.5kHz at max rpm (equals 24 teeth at 6000rpm). Shortest pulselength is 100us. Inductive sensors will need a special amplifier.

The ignition functions are continuously improved, call for the latest info.

Page - Fuel

For a better understanding of the tuning principles see chapter Enrichment fuel

Fuel load

Base fuel calc on:

This setting determines which analog input is used to base the fuel enrichment on. "AnalogX in minus AnalogX in" is used to make it possible to base the tuning on the difference between two inputs.

Data in tables

The table shows, left to right:

- The voltage of the selected input (usually the MAP sensor)
- The physical value of the above voltage (Depends on the sensor type selected in "Used Analog Sensor"
- Tuning value of extended fuel pulse in ms.

Fuel RPM

Data in tables

The right column is for the tuning values. This is specified as a % value of the fuel load table enrichment fuel.

Fuel options

Boost fuel enrichment method

Extended stock pulse

Enriches the fuel by extending the stock fuelpulse

Synchronised extra injector

When you use extra injectors to supply the enrichment fuel

105Hz PWM

Used when you don't want to synchronise the enrichment fuel with the rpm, but only "spray" enrichment fuel. This is not a method we normally recommend, it's normally better to use the synchronised extra injector method.

Base fuel calibration

Injector calibration, % and offset. Klick "Trim individual" if you need to adjust individual cylinders fuel supply. You must calculate the stock injector size in relation to the new injector size. If you have doubled the size of the new injector the % value is 50%. The offset value is a measure how fast the new injector will open and close in relation to the stock one. This is most noticeable at low load (idle) when the injectors have a short pulse. If you know the exact specs of the stock and new injectors it's possible to calculate the offset but this is seldom the case. You are left to test this at idle to find the correct value. You can start by selecting 0 ms.

Acceleration fuel enrichment

The BC-box can also add acceleration fuel when performing a quick acceleration. This function is based on an analog input, usually the throttle position. The BC-box measures the throttle position 20 times per second and can then compare the current position with the last one and thus detect a rapid throttle movement. Which sensor to use and which strategy to use is selected in Box-settings, Enrichment.

The acceleration fuel enrichment is controlled by three parameters, Gain, Threshold and Sustain. The actual result will be extended fuelpulse in ms or a voltage increase for the Mass airflow simulation, depending on the chosen strategy.

Gain determines the fuelpulse at a certain throttle movement according to : Acc pulse=Gain*[currentTPS-lastTPS]. This means that a larger Gain will result in a longer acc pulse.

Threshold determines the minimum throttle change to result in any acc pulse. If you select this value to 255 there will never be any acc pulses.

Sustain determines for how long the acc pulse will remain. If the BC-box detected an acceleration situation and calculated the first acc pulse to be 1 ms, then the next acc pulse will be 1 ms multiplied by the sustain value. So if Sustain is 50% the next acc pulse will be 0.5 ms, then 0.25 ms and so on. The Sustain value 255 equals 100% and 0 equals 0%. The value 0 means that only one acc pulse per event is generated.

Rev Limit

Fuel Cut

Selects an rpm when all fuel is cut off.

RPM to allow open injectors & Boost level to open injectors

It's possible to force the injectors fully open when reaching a certain boost and at the same time be above a certain rpm. This is used to supply the maximum possible fuel.

Fuel pulse

Not implemented yet

Page - PWM/Boost

For a better understanding of the tuning principles see chapter Boost control

PWM signals

PWM is short for Pulse Width Modulation. This method can be considered equivalent to an analog output voltage and is used for controlling devices (valves, motors etc.) that require somewhat higher power. In real life the signal is actually a switched on/off type 12V signal. The switching occurs very quickly and is thus "smoothened out". If the signal is on and off the same amount of time then the result will be equivalent of a 6V output. The PWM output is specified in % where the equal on - equal off means 50%.

The BC-box output will ground the output when active. This means that the controlled device must be 12V supplied by other means. The value 100% means that the device is grounded all the time (active all the time) and 0% means no grounding (non active). The BC-box PWM output has a frequency of 38.6 Hz.

The BC-box can use the PWM output to control:

- Boost valve
- VTEC (variable camshaft)
- Nitrous
- Water injection
- Gearshift indication

Normally the PWM uses pin 11 for boost control

PWM load

Base PWM load on:

Determines which analog input to base the calculation of PWM output. The table values (0-199%) determines the PWM output value as a function of the selected analog input. The PWM output is also controlled by the "PWM RPM" table. The "PWM Load" value is multiplied by the "PWM RPM" value to form the final PWM output value.

Examples:

50% x 50% = 25%

50% x 150% = 75%

199% x 50% = 100%

199% x 100% = 100% (The result can never exceed 100%)

Run PWM as on/off switch

By selecting this option the PWM output is forced active (0V, grounded) as soon as the calculated PWM value is above 50%. The function of the output then resembles an on/off switch. It can be used to turn on/off lamps, relays etc.

Example:

Set the entire PWM Load table to 100% (no load influence)

Set the PWM RPM table at 0% up to 6500 rpm and at 100% above this rpm.

This results in PWM_Out is off up to 6500 rpm, and on above 6500rpm. If you connect a lamp between 12V and PWM_Out you now have an rpm-indicator lamp.

PWM RPM

The values in this table (0-199%) determines the PWM output signal duty cycle in % as a function of rpm. The PWM output is also determined by the PWM Load table values. Also refer to Run PWM as on/off switch.

PWM RPM with Boost control

If you chose PID-regulation of boost, you will specify desired boost at every rpm.

Boost control

Sometimes you may want to use feedback information to regulate the boost pressure. This is done with an advanced PID-regulation algorithm that controls the boostvalve output signal depending on the boost pressure feedback signal.

The BC-box measures the current boost feedback signal and compares this with the desired (tuned) boost level. If they are not the same there is an error present. If you open the throttle and the desired boostlevel rises then the regulating algorithm controls in which way that boost level is reached. If the boost level is to small the signal to the boostvalve will increase a bit and vice versa at too high boost (called Gain or P-factor). If there has been an error for a longer time the boostvalve output will increase a bit faster (Integration or I-factor). If the boost level changes rapidly the signal must be dampened in order for the boost not to pass the desired level. (Derivation or D-factor).

PWM output=Error*P + Longtime error*I + Rate of change*D

The use of this function calls for knowledge in regulation theory and is not further addressed in this manual. More information and a manual is available from Civinco.

See page PWM RPM for more info on how how to enter values in the PWM_RPM table when using PID-regulation.

Page - Analog out

For a better understanding of the tuning principles see chapter Signal limiting

Analog1 out

The table values(0-5V) determine the maximum analog1 output signal voltage depending on rpm. Below this maximum value the output is the same as the input voltage.

Analog1 out with Airmass simulation

When using mass airflow simulation the Analog1 table is used to specify the Mass airflow simulation. For every individual engine you must specify/tune which output signal to be generated based on rpm and manifold pressure. The BC-box automatically calculates the product of rpm*(A/D-conversion of MAP sensor)*32. Depending on this product the BC-box reads the table and finds the correct voltage to be used as Mass airflow simulation signal.

Example:

Rpm: 3500 (3.5krpm)

MAP: 125 (2.44 volt at MAP sensor/5*256=125)

Product: 3.5*125*32=14000

Mass airflow sim signal: 3.80V (Closest table value is 12288 which gives a 3.80V signal)

Analog2/ Switch2 out

Analog2 out settings

The analog2 output can be run in three modes

Mode1, Analog2 limit

Sensor limiting in the same manner as Analog 1.

Mode2, Function of Analog2 input

Analog2 output is calculated as a function of Analog2 input. The relevant output values are specified in this table.

The values in the table can quickly be entered using the Gain and Offset function. The values in the table will be automatically calculated as:

Table value=Offset+[Input]*Gain

Mode3, Analog2 limit trim

Same function as Mode1, but with the addition of "limit trim". This function varies the limited signal to the ECU in a special fashion. This is necessary with the VAG 1.8T engines as the ECU will detect a fault condition if it tries to regulate the boost but nothing happens (due to sensor limiting). In this mode the BC-box will detect the ECU trying to regulate boost and adjust the limited signal enough to make the ECU think it is actually regulating boost. This only works when connecting the boost pressure feedback signal to the IGB_IN pin.

Main menu - File

Open

Opens a TuneCard tuning file which is previously saved on disk. The files are denoted .cbc files.

Save

Saves the current BCLab settings to the presently open TuneCard file

Save as

Saves the current BCLab settings to a TuneCard file with a new name

Exit

Exits BCLab

Main menu - Edit

Undo

Undoes the latest pressed button

Redo

Redoes the latest "Undo"

Main menu - Communication

For more details, see page General/Chipdrive status

Toggle BC Reader

Toggles between communication options, TuneCard reader and RS-232

Smartcard read (Chipdrive)

Reads the content of the TuneCard (if inserted in the Chipdrive) and displays it in BCLab

Smartcard write (Chipdrive)

Copies the current tuning data from BCLab to the TuneCard(if inserted in the Chipdrive)

Smartcard read (BC-box)

Reads the content of the TuneCard (if inserted in the BC-box) and displays it in BCLab

Smartcard write (BC-box)

Copies the current tuning data from BCLab to the TuneCard(if inserted in the BC-box)

BC Read (RS232)

Reads the tuning data in the BC-box(if connected via RS232) and displays it in BCLab

BC Verify (RS232)

Reads the tuning data in the BC-box(if connected via RS232) and verifies that it is the same as the current tuning data in BCLab

BC Write (RS232)

Copies the current tuning data from BCLab to the BC-box(if connected via RS232)

Main menu - View

Log Window

The BCLab software can log all signals connected to the BC-box in realtime with 20Hz sampling frequency. BCLab can also use these signals to calculate secondary values such as:

- Engine power
- Engine torque
- Speed
- Acceleration
- Duty cycle of stock fuel pulse and BC-box fuel pulse (used to detect 100% fuel situation)

BCLab shows all data in the logging graph. You may also save the data to disk for later viewing. Some of the possible settings: Name all signals, many typical sensors to choose from, metric or US units, gearing at all gears, etc.

Select log file to open

Doubleklick on a saved logfile to open it. Same function in File/Open. If singleklicking on the file you will see a preview on the comments on this logfile, date and size. This will not open the file.

File information

At all logging the time and date will automatically be added to the file. You may also write your own comments about this logrun in the "Free text note".

Logging

Starts, stops and erases the logging. Make sure your BC-box is connected via RS232.

The log data is also shown in a realtime graph. A red marker shows the currently active tuning cell in the load/rpm tables. This marker will enable you to quickly see where in the table the BC-box is working. This will speed up the tuning process.

Seconds to show while logging

Specifies how many seconds of logging data are to be shown on the screen. If you have a slow computer you can decrease this value for proper function. Normally we set this to 5-10 seconds.

Update interval

This specifies how often the live graph is updated while logging. If you have a slow computer you may need to increase this value. Normally we set this value to 0.1-1 second.

Chart scale options

Sets the min and max displayed values on the Y-axis in the graph. If selected to Auto the program will adjust this as necessary.

Select signals to view

You will select the desired signals to view in the graph.

You can also choose if the signal is to be displayed on the 1st or 2nd Y-axis. This is practical if displaying two signals which differ a lot in magnitude, which might otherwise make them difficult to see in the graph. Normally we set the rpm to be displayed on the 2nd Y-axis while all other signals are displayed on the 1st Y-axis. This is because the rpm value is often much larger than the rest of the signals.

Chart controls

Scroll left

Moves the graph to display earlier values (more to the left)

Scroll right

Moves the graph to display later values (more to the right)

Zoom in

Zooms in on the graph. Doubles the magnification

Zoom out

Zooms out on the graph. Haves the magnification

Zoom all

Zooms out on the graph so the whole graph is displayed

Redraw

Redraws the graph

Export these settings to box

If you have opened an old logfile which has the tuning data saved in the logfile, you can transfer these tuning data to BCLab by klicking this button. This means that you can see the tuning used by the BC-box when the logging was performed. This is useful if you find an old logfile where the engine ran very well and want to use these tuning data again.

Refer to chapter BC Log settings for more info on logging setup.

Main menu File

Open

Opens a logfile containing saved setups. These files are denoted .cbl files.

Save

Saves the current logfile

Save as

Saves the current logfile with a new name

Export log data

Saves the current log data shown in the log window, either as a picture or as a textfile which can be opened in Excel.

BC SETTING SUMMARY VIEWER

Used to see all used settings and make a printout of the same.

View log file settings

Shows all settings associated with the logging

View box file settings

Shows all tuning data and setting associated with the BC-box

Export to file

Saves what is shown in the window (settings and loggings) to a textfile which can be opened by most word processors (Word, Works, Note pad etc.) The file format is called Rich text format

3D-MAP

Normally when tuning the BC-box you work with either load tables or rpm tables. Now there is also the possibility to view the tuning as a 3D-MAP. This is possible for tuning of fuel, ignition and Boost.

It's also possible to view the tuning data as text in the text window.

MAIN MENU - SETTINGS

BCLab SETTINGS

Com-port

Use this to select the PC comport used to connect to the BC-box

Interface

Use this to select one of three ways to communicate with your BC-box and TuneCards.

Also refer to page General/Chipdrive status

BC-BOX SETTINGS

Standard

Model preset

Dataset is a basic setup of the BCLab software in order to determine which functions, controls, menus and tables are to be available. This is to simplify for the user and not show more controls than necessary.

Dataset ID

This is an identification number (103-106) which specifies which type of TuneCard is used. This is also co-ordinated with the BC-box firmware version. It's not possible to use different Dataset ID in the BC-box and on the TuneCard.

Swap degrees and percent in ignition table

This gives you the option of switching the load and rpm-table units (degrees and %). This the individual tuners taste that determines what is best to use. It only has relevance if you intend to tune the ignition.

Fuel RPM Table precision

This gives you the option of increasing the number of fuel rpm cells to tune (every 250rpm). In this case it will not be possible to use the Analog2 output.

RPM ind (LED2)

Use this to select the rpm at which the red LED on the front panel will light up.

Advanced

Enable By Pass mode

Used to let all input signals pass through the BC-box without being altered. This will be the same as using the mechanical bypass plug.

This only works in the following case:

- The boost control must be connected to PWM In/Out pins 11-12 and be run in mode5
- The use of Dataset ID 106 or higher

What actually happens is that all tables are zeroed, the PID regulation is deactivated and the program runs in mode1. This means that all signals will pass through the BC-box without being altered.

BC digital i/o mode

This is where the main mode of operation is determined and which connector pins are used for what. At the pages Ignition load, Fuel load and PWM load you will specify which analog input to be used to measure load or to base the tuning on. If the engine has a MAP sensor, you will specify which pin this is connected to, other engines may want to base the tuning on the throttle position.

Digital in and outputs

The BC500 has 6 digital in/output-pairs (12 pins), where every input has its associated output. These are called: FuelA-FuelE(5 fuel channels), IgnitionA-IgnitionB (2 Ignition channels) and PWM (1 boost channel). One of the signal-pairs can be used for different functions and cannot be used simultaneously. This is FuelE, IgnitionB and PWM. The reason for organising the in/outputs in pairs is that when connecting a bypass-plug (instead of the BC-box) then all channels will be short-circuited and the signals are unaffected (the engine behaves stock). When the BC-box is connected, the box will modify the signals according to the Tuning parameters and send them to the paired output.

BC digital i/o modes

The BC-box can thus be run in different modes where the pins have different functions:

- Mode

4 Fuel in/out, FuelA-FuelD, pins 15-22

2 Ignition in/out, IgnitionA-IgnitionB, pins 11-14

Boost control out, PWM_OUT, pin 5

- Mode2 - no longer activated
- Mode3

5 Fuel in/out, FuelA-FuelE, pins 15-22 & 11-12

1 Ignition in/out, IgnitionA, pins 13-14

Boost control out, PWM_OUT, pin 5

- Mode4 - no longer activated
- Mode5

4 Fuel in/out, FuelA-FuelD, pins 15-22

1 Ignition in/out, IgnitionA, pins 13-14

Boost control in/out, PWM_OUT/IN, pins 11-12

The rpm calculation is always based on IgnitionA, this signal can be taken from several places as long as you know how many pulses per rev it has. Both IgnitionA and IgnitionB can be connected to crank/cam signals or ECU signals to the Ignition module. The signals must be of the type 0V to 5-20V. Sometimes it is necessary to use an amplifier to achieve the correct voltage level.

Digital output

The BC500 has one pure digital output, PWM_OUT which in mode1&3 is used to control the boost, but in mode5 can be used for other purposes.

Analog in/outputs

The BC has two analog in/output pairs where every input has its associated output. These are called: Analog1 and Analog2. The basic idea with this is to limit the analog sensor signal (rpm dependant)l to a value which represents the stock manifold pressure or Mass airflow. In the BCLab software, you will select which analog sensor signal to base the tuning on. This selection is done at pages: Ignition load, Fuel load and PWM load.

Analog input

The BC has one more analog input which is a pure input, thus the total is 3 analog inputs.

Ign RPM Table Precision

Used to set the precision in the ignition rpm table.

Low equals values from -200 to +198

High equals values from -100 to +99

Ignition Mode master

Setting used to specify if the ignition can only be retarded or both retarded and advanced

Refer to Page Ignition for more info on this subject.

Ignition Mode slave

Setting used to specify if the ignition can only be retarded or both retarded and advanced

The slave setting is only relevant with the BC1000. This BC-box has two PCB cards where one is the master and the other the slave.

Fuel enrichment strategy

Setting to specify how the acceleration enrichment fuel pulse are to be applied; Add acc pulse to all fuel pulses or only to one fuelpulse per engine cycle. If choosing add to all fuel pulses, sometimes this will result in too much fuel as the ECU sometimes generates more than one fuelpulse per engine cycle, typically during acceleration.

Base Acceleration Enrichment on

Selects the analog input to base the BC-box generated acceleration enrichment fuel on(in the case such is used).

Acceleration Enrichment performed by

Selects if the acc fuel pulse are to be generated by quickly increase the MAP sensor signal (and thus tricking the ECU to generate the acc pulses) or by letting the BC-box generate the acc pulses.

Enable MAFSIM

This activates the Mass airflow simulation. When the engine has a stock Mass airflow sensor this can be removed and the signal to the ECU is generated by the BC-box with the help of an internal MAP sensor.

This deactivates all other previous tuning for Analog1/2 output.

MAFSIM analog output

Selects which analog output is to generate the simulated Mass airflow signal. This signal must then be connected to the ECU.

MAF SIM MAP signal

Selects which analog input is used to measure the MAP signal. The internal MAP sensor is always connected to Analog3.

RPM Calculation

The BC-box always uses IgnitionA to calculate the rpm. The signal can be from various sources though as long as we know how many pulses per rev is generated. Both IgnitionA and IgnitionB can be connected to cam and cranksignals or the ECU driver signals to the ignition module. It's important that the signals are of 0V to 5-20V type. Some signals are too weak and must use an amplifier to achieve this voltage level.

To get the correct rpm calculation you must specify how many pulses per engine cycle (not engine revs) are present at IgnitionA. If a slave is connected (BC1000) then the correct value must be entered in the right control as well.

Analog input settings

Specifies if any analog input channel is to be measured synchronised with the engine cycle. Sometimes it's an advantage to synchronise the MAP sensor as this can otherwise be somewhat unstable. This can be a disadvantage for amongst others the ignition adjustment.

Boost options

Here you can select which analog input channel measures the boost. Normally this is the same as the MAP sensor (if installed). "Boost limit" is a safety feature where you can set a voltage level (corresponding to a certain boost level) above which the BC-box tries to reduce the boost to the base level and at the same time releases all sensor limiting to allow the ECU to perform its own safety features.

View cardbyte

Can be used as an advanced debugger tool where you can view all tuning on the TuneCard.

We do recommend that you rather use the Setting viewer for this purpose.

BC LOG SETTINGS

Signal name and selection of log sensor

Normally the BCLab software will log 20 different signals. These signals have different basenames which you can see in the left column. In the second column you can chose your own names for the same signals. If you know the type of sensor the signals are you can specify this and the graphs will present the correct actual values.

Also refer to Sensor specification for more info on this subject

Car setting

Set the vehicle weight. Used in calculation of engine power.

Gearing calculator

If you know all the gearings of your transmission you can enter these in the "Gearing" window. If you don't have this information you can enter the rpm you have on the specific gear and klick "Calculate gearing". The gearing will be shown. The gearing setting is used by the program to calculate speed and engine power. Since the program doesn't know which gear you are using the graph values will only be correct for that specific gear.

If your transmission has a gearsensor the program can use this to know the actual gear.

At the bottom you can specify all gearings. In the log window you can chose which gear to use for speed/power calculation.

Advanced setting

Here you can specify between which power levels to show the graph. This is used to avoid strange power values for example when the rpm decreases (which mathematically equals negative power).

If you know the car air resistance you can use this to compensate the calculated power according to the formula P_air resistance=[air resistance*speed^2]. The unit is Newton/(m/s) or Watt/(m/s)^2.

(The actual formula is F=k*V & P=F*V=>P=k*V^2)

You can approximate your cars air resistance from the top speed and top power according to the formula: Air_resistance=Maxpower/(Maxspeed/3.6)^2. Power in W speed in kmph please! (Reasonable values of air resistance is around 20).

Other settings

Autosave

Selected if you wish the program to automatically save the logfile after a log run. The name will be generated with date, time and the name selected in the lower textbox.

Include settings in logg file

Selecting this will include all the tuning data in the log file. Useful when you want to view the tuning data used in a particular log run. Later versions of BCLab will be able to import this tuning data into the tuning section of BCLab. Useful for updating the BC-box with these settings without having to find the matching .cbc file.

Default settings in logg file

This gives you the possibility to chose the default log settings when starting the BCLab software. It is controlled by the file Default_Logg_Settings.cbl which is located in the same folder as the BCLab program was installed in. This file is opened every time the BCLab is started. You can open this file as any other log file. Do the desired changes and save again.

Engine Power calculation

In order for the power to be exactly calculated you need to know the exact weight of the car, the air resistance, the transmission losses and you must drive on a flat surface. On the other hand if you compare two log runs where you drove on the same road you can see which of the runs that gave the best power. You will also see this from the graph where you can measure the time between two rpms.

BC SENSOR SETTINGS

You will chose sensors two times. First in the tuning section of BCLab (see pages Ignition, Fuel and Boost). Then in the logging part of BCLab where you will chose the sensor definition on the relevant logging channels. (see Log settings)

Sensor specification

You can connect many types of sensors to the BC-box. Usually it will be the stock sensors fitted to your engine. The BC-box doesn't care which the sensors are it simply measures the voltage from the sensors. The voltage will be converted to a numerical value from 0 - 255. 0 equals 0V and 255 equals 5V. The values in-between are calculated in the below table "General analog sensor".

If you know the voltage at various actual sensor values, this can be used in the program to display the actual sensor values(pressure, speed, gear etc) instead of the voltage. Below you will find a sensor specification of the BC-box internal MAP sensor, called MPX 2.5bar.

Used Analog Sensor

In the Analog Sensor Definitions section you will chose which type of sensor is connected to what input channel.The BC-box measures all inputs and sends them to BCLab as a special type of data with values from 0 to 255. For the analog signals this will mean a sensor voltage of 0=0V and 255=5V. Other types of signals can have a different meaning of the transferred data. If you know that you have a MAP sensor connected to the BC-box which has 0V at 0bar and 5V at 3bar pressure you can define this sensor so that you can have the pressure value displayed in BCLab instead of the voltage. This makes it easier to tune the engine.

Normally you will tune the engine as a function of the measured voltage at the analog input but this can be difficult as you really want to know the actual sensor value such as pressure in bar, throttle in % etc. This will of course depend on which sensor is used.

The settings in "Analog sensor definition" makes the sensor value(such as %, bar, psi etc.) appear in BCLab as well as the voltage.

These settings does not affect the signal itself, only the presentation of the signal in BCLab.

Sensor Viewer

In this section you can view all the sensor settings.

There are two types of sensors; Linear and table entered.

You may build your own sensor tables and store in the BCLab.ini file. This function will shortly be added to the program. Call for latest info.

Main menu - Help

Go to Civinco

Opens the Civinco website, www.civinco.com

Help file

Opens the help file

About

Displays the current BCLab version no.

Special options

This chapter describes some special options which includes several different types of settings.

Mass airflow simulation

This is used when the BC-box calculates a Mass airflow signal based on manifold pressure and rpm. This signal is then fed into the ECU instead of the stock Mass airflow sensor signal. In this way we can completely remove the stock Mass airflow sensor.

This is useful when the Mass airflow sensor becomes a restriction in the intake system or if you want to use an open (non recircuilated) dumpvalve. It's also useful since some types of Mass airflow sensors are fragile and fail quite often.

Info on Mass airflow simulation and BCLab software

Mass airflow simulation is a new feature available with the BC500/1000. The BCLab software does not support this fully yet and sometimes tables display the wrong name etc. Thus it can be confusing to view tuning files if you are not aware that Mass airflow simulation is activated. Below we will try to explain the different settings and which tables to use.

Box-settings

MAF simulation

tick the box to enable the MAF simulation.

Chose which output to use for the generated signal, here it's already chosen as Analog1 out.

The previously connected Mass airflow sensor (now removed) is replaced with a MAP sensor connected to Analog1 input.

The VAG engines must use Mass airflow limitation at the same time as Mass airflow simulation.

Enrichment

When using Mass airflow simulation the box must also calculate the acceleration enrichment fuel. This is done by specify ing which sensor to base the enrichment on. In this case it will be Analog3 input which is the throttle position sensor.

The method used in Skoda is to increase the simulated Mass airflow signal to make the ECU calculate the correct enrichment fuel.

Fuel settings with Mass airflow simulation

Since we must take care of the acc enrich fuel in the BC-box we must tune the Gain, Threshold and Sustain settings. The above settings works well for the Skoda RS.

Tuning of the Mass airflow simulation

For every individual engine you must specify/tune which output signal to be generated based on rpm and manifold pressure. The BC-box automatically calculates the product of rpm*(A/D-conversion of MAP sensor)*32. Depending on this product the BC-box reads the table and finds the correct voltage to be used as Mass airflow simulation signal.

Example:

Rpm: 3500 (3.5krpm)

MAP: 125 (2.44 volt at MAP sensor/5*256=125)

Product: 3.5*125*32=14000

Mass airflow sim signal: 3.80V (Closest table value is 12288 which gives a 3.80V signal)

Mass airflow limitation in the Ignition RPM table

When using both Mass airflow simulation and Mass airflow limitation, the Ignition RPM table is used to store the settings previously in the Analog1 table. It looks a bit strange in the current version of BCLab since you must enter the values as % and not volt. This will be changed.

-200% equals 0V

0% equals 2.5V

+198% equals 5V

When comparing you will find that these are the same values previously stored in the Analog1 table.

Shortcuts

bla bla bla

File format

.cbc File containing tuning data (BC-box settings)

.cbl Logging file containing log data, log settings and sometimes tuning data

.bcc File containing the code to your BC-box

.rtf Rich text format. Used by most word processors. BCLab can export files in this format

.csv File containing exported logging data. Can be opened with Excel

.bmp File containing exported logging data as a picture

BCLab.ini File containing basic settings for BCLab. The program cannot run without this

BCLab_Default_Log_Settings.cbl File containing basic settings for the BCLab logging functions. This file can be opened and edited as any other logfile. This will change the startup settings of the logging part of the BCLab software.

Wordlist and definitions

Load Denotes how much torque the engine is trying to produce. Can be measured in different ways; throttle position, manifold pressure or Mass airflow. This is the signal we use for tuning.

Piggy back A box connected between the ECU and the engine.

Chipping Tuning an engine by replacing the ECU memory or processor.

Serial programming Reprogramming the ECU memory via the PC

2.5D Civinco does not use a full 3D mapping, we call ours 2.5D. This means that the tuning process becomes easier since you don't have to tune all of the grid cells.

MAF Mass Air Flow, the amount of air entering the engine.

MAP Manifold Absolute Pressure, the pressure in the intake manifold.

SmartCard Any plastic memory card, such as: phonecard, bankcard, TuneCard

TuneCardTM The tuning cards used by BCLab to save tuning data

Chipdrive One make of smartcard reader on the market. Presently the only one supported by BCLab

Boost pressure Different denotations. Either the pressure generated by the turbo (measured at the turbo) or the pressure reaching the intake manifold, the same as the manifold pressure.

Manifold pressure The pressure in the intake manifold as measured by the MAP sensor.

RPM Revolutions per minute

ms Millisecond (1/1000th of a second)

FAQ

How is the insurance affected?

When tuning your car you must according to regulations type certify your car and notify your insurance company.

How is the engine affected by the increased power?

Most car manufacturers equip their cars with the exact same engine but with different power levels. The only thing that differs is the ECU software. If you increase the power in your car to the level that the manufacturer already has in another model, you will be well with margins. The factor mostly affecting engine wear is your driving style, and usually anyone interested in engine tuning will usually drive a bit tougher...

What does the manufacturer say about engine guarantee?

Most manufacturers will naturally deny all responsibility when an engine is modified. The engine guarantee is usually only valid a couple of years so this is not a big problem.

Installing the BCLab software

Put the CD in your computer and start the installation by doubleklicking the file setup.exe. Then just follow the instructions.

If you have downloaded the file from www.civinco.com then you must first unzip the downloaded file using winzip. This program is available at www.winzip.com.

Upgrading the BCLab software

Upgrades are available at www,civinco.com Download and follow the instructions.

Updating the BC-box

Civinco will notify if there is an update available for your box. Presently the box must be sent to Civinco to perform the update.

Upgrading the BC-box

You may upgrade your BC250/750 to be tunable i.e. BC500/1000.

You may also upgrade your box to handle Mass airflow simulation.

In both cases the box must be sent to Civinco for upgrading.