

Cartronic Perfect-Chip Partner Program



What is Chip Tuning?

In general, Chip Tuning refers to the increase in combustion engine performance as a result of altering the parameters of the ECU (engine control unit). Within the ECU are the processor and the EPROM (Erasable Programmable Read-Only Memory), a ram unit that stores info about the engine's operations: conditions for cold start, idling, partial load and full load. All relevant thermal and mechanical data from the engine's reserves - turbo engines in particular require an adjustment of the boost pressure - are optimized in the process.

Chip Tuning uses the engine's data to set the primary output parameters of point of injection, injection amount, ignition point for each cylinder and boost pressure in turbo engines.

The most effective application of Chip Tuning is realized with a four-stroke diesel engine with turbocharger. Depending on the engine and its injection pattern, a performance boost of up to 40% can result from Chip Tuning.

Where in the ECU are the data saved ?

Data from Chip Tuning are stored in microchips - of which there are different types: EPROM, PROM, EEPROM and Flash EEPROM.

An **EPROM** is a non-volatile, electronic memory chip that has a long history of use in microelectronics. EPROMS have the characteristic of being able to be reused after their data has been erased. With the help of specialized instruments EPROM data is programmed, erased by UV rays and then reprogrammed with new data. The first electronic ECUs contained non-erasable **PROMS**. After 100-200 erasures, an EPROM is usually in need of replacement. The quartz window inside of the EPROM case is quite expensive and though there are designs without windows a.k.a. OTPs, they can only be programmed once.

An advancement on the design of the EPROM, the **EEPROM** (Electrically Erasable PROM or E²PROM), is an electronically erasable chip with the ability to erase individually even the smallest memory units. In contrast to the "standard" EEPROM, **Flash EPROMS** cannot individually delete bytes. EEPROMS and Flash EPROMS are erased through electrical tension.

These chips are used in a variety of applications where information must be stored and is continuously being exchanged (non-volatile) in the smallest of spaces and without a continuous supply of electricity. In the case of ECUs where information must be retained after a drop in voltage or expansion of their data, these chips are the key to increases in engine performance.



The only one for which we don't have data...



EPROM Burner

Programming with removed ECU (tabletop)

... EPROM/Flash unit with the EPROM Burner:

The ram unit must first be unsoldered, erased and then rewritten with the new data by using a EPROM Burner.

... with a specialized, ECU-specific adapter cable:

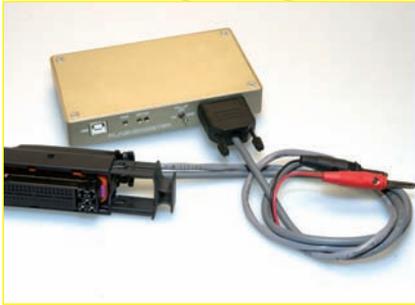
Reprogramming with an adapter cable is performed on models that don't have, for example, a K-line for the transmission of data from the control unit to the diagnostic plug. Using an adapter cable is especially required for control units that don't allow any other type of programming.

The cable is plugged directly in to the main jack of the ECU unit and the adapter jack generally contains contacts for power supply as well as the programming cord (K-Line).

An additional electrode is used to initialize or open the ram unit enabling data to be read or downloaded.

... with the BDM Tool and BDM interface:

Control units with a BDM interface can in most cases be programmed through the diagnostic outlet (OBD socket) as well as through an interface (BDM interface) positioned directly on the circuit board. These specialized interfaces enable not only debugging (troubleshooting) but the testing of software and – most important for chip tuners – direct reading and rewriting (programming) of processors. Programming with these interfaces makes for a truly safe data transmission.



Byteshooter with ECU Adapter Cable

BDM Programming Station



Programming with ECU in the car

... with the OBD or model-specific interface:

Programming occurs by transmitting data through the K-line programming contact of the OBD (On-Board Diagnostic) outlet, or the K-Line, and then transferring/retrieving that information to/from the ECU. Through this process, a connection to the ECU is established through the interface. The original engine data can then be recorded using special software and reprogrammed in the ECU after the parameters have been optimized.

... with the OBD interface and an additional signal cable for the K-Line:

Programming is identical to OBD programming with a model-specific interface (see above). Because there is no K-line in the car's cable loop leading to the OBD outlet, an extra cable must be laid according to manual instructions. For this reason, our interface cables have an adjustable socket suited for these connectors. The cable is led from the main plug of the ECU and led through the interior to the OBD connector socket. After tuning, the cable is removed and replaced.



Byteshooter with OBD/CAN Cable

The Byteshooter:

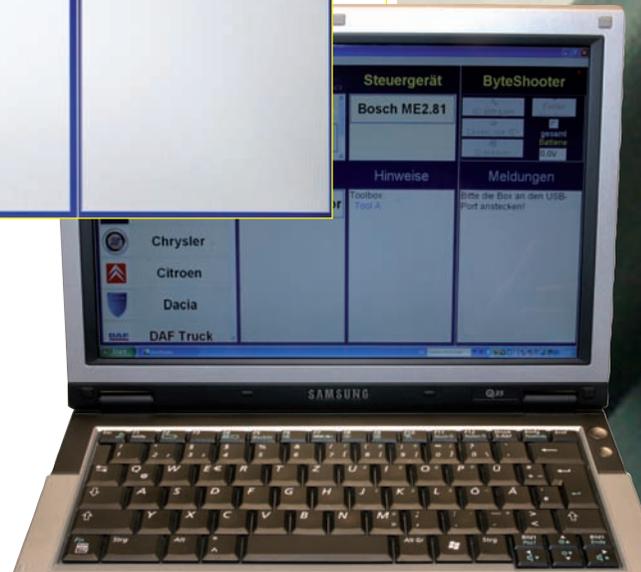
As the interface between the installed ECU unit and computer software, this professional tool permits in-car or table-top programming with the OBD interface or a removed ECU.

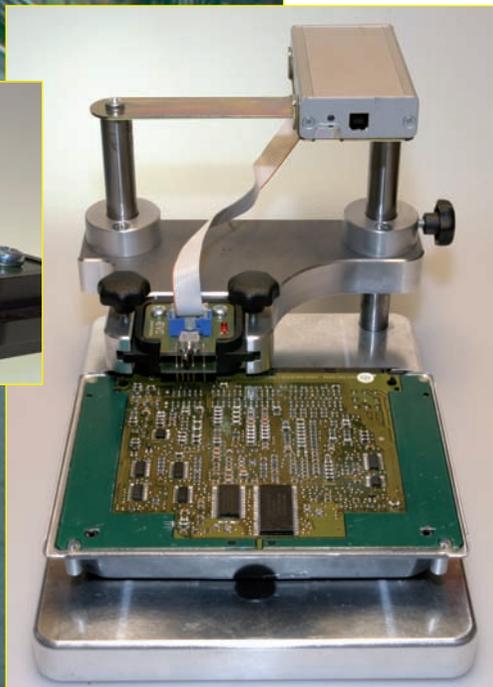
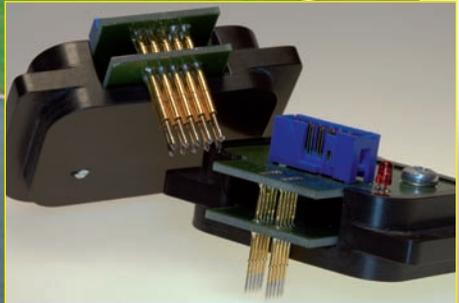
The software is continuously being updated and updates are available almost every week.



The Byteshooter (right) and the program's start screen (below).

Fahrzeug-Hersteller	Modell	Steuergerät	ByteShooter
Alfa Romeo	32	Bosch ME2.81	ID abfragen Lesen (nur ID) Schreiben Fehler löschen gesamt Batterie 0,0V
AMG	55		
Audi	Motortyp	Hinweise	Meldungen
BMW	5.5 Kompressor	Toolbox: Tool A	Bitte die Box an den USB-Port anstecken!
Chevrolet			
Chrysler			
Citroen			
Dacia			





The BDM Tool:

The BDM (Background Debugging Mode) tool has opened the door to a whole new generation of control units.

Ever since security access to OBD2 programming became more complicated, a new possibility for reworking control modules with the special Motorola MPC555-565 processors have come to the market.

These processors can neither be read nor programmed with EPROM devices - only the BDM interface in the ECU can perform these functions. Most of these interfaces are only 10 solder points on the underside of the circuit board.

The BDM tool is a machine-customized rack that stores the opened ECU as well as the reading head and interface. The probes are interchangeable and are installed according to the type of ECU. The needle contacts reach down to the solder points located directly on the board.

Suggested Accessories:



When tuning Volkswagen models, certain software are helpful in providing you access to their electronic units.

VAG-COM covers the complete range of functions of an original tester for the diagnosis of modern control units. The software is fully compatible with all current VW models up to the new Audi S3, Q7 or VW EOS.

Cartronic's Perfect-Chip Partner Program

Cartronic Motorsport GmbH in Gummersbach, Germany boasts 25 years of experience in tuning Porsche models and optimizing engine performance through electronic modifications. Cartronic is a market leader in diesel engine tuning: our ECUs are reliable and high-performing. One has sold more than 10,000 modules of Europe's largest auto parts retailers, ATU. Our development team has the most modern hardware and software and has at its disposal two all-wheel test benches from MAHA and CARTEC. That's how we can continue to offer performance solutions for even the newest models. Our know-how is relied upon by notable tuners for whom we perform development work.

Within the Perfect-Chip network you'll recognize some well-known tuners not only from Germany, but also from London, Tokyo, Kuala-Lumpur, Dubai, Abu Dhabi and Miami. The **Perfect-Chip Partner Program** can realize great profits for your business with our experience and technical expertise; the know-how and equipment you acquire from us translate directly into your ability to tune most anything on the road today.

How does it work?

Fast and simple: You select the control unit, read it out and send us the data set per mail and you'll promptly receive from us the new, optimized tuningfile which you can then reenter into the ECU by using your equipment. Finished.

Your Gains

The optimized data sets are charged according to a list of nine different price groupings. Prices are determined by the popularity of the specific engine type as well as the car's class and can range from 250 Euros in the least expensive group and 2,000 Euros in group 9. Advanced sale prices are based on a profit-margin for partners of around 70%. Purchasing one chip tuning per month can alone cover the leasing costs of equipment.

Where can I get the necessary know-how?

Simple: from us. We offer training seminars on a regular basis where you can learn from practical examples how to program "in the vehicle" and "from the tabletop." The various programming methods are fully explained. Programming methods are to be determined in the workshop and depend on the vehicle manufacturer, the model, year of manufacture and the ECU unit.

We recommend the programming method requiring the least amount of cost and effort: if a vehicle can be programmed without problems using the OBD interface, we would suggest this method. Model variations typically require a very complicated programming structure in the hardware and software used in their tuning. These rare models are mostly new on the market and because of their exclusivity, we prefer to program them in our workshop.

The universal concept of our software is not applicable to vehicles used exclusively for commercial purposes. For this reason, requests for farm machinery or truck modules are available at anytime as upgrades at a cost.

What does that know-how cost?

Seminars can be completed at our workshop in Gummersbach, Germany or at a location of your choice.

Tuning Seminar at Cartronic Motorsport's Shop

1-day seminar w/ at least three participants € 350,00

Tuning Seminar on-site

Flat rate per day € 900,00
Plus travel, hospitality and overnight/accommodation expenses



Where can I find more information?

Detailed information is available at our website: **www.perfect-chip.de**. As a registered partner in our password-protected registry, you will have access to further information about Chip Tuning.

The equipment: Hardware/Software Prices

Basic Package

€ 5.200,00

- Byteshooter Slave Programmer Interface with minimum configuration
- OBD / CAN Programming Cable
- Mercedes Benz Programming Cable / Circular Plug
- BMW Programming Cable 20-pin / Circular Plug
- Toolbox Cable Sets
- BDM Programmer Rack incl. Interface and Cable
- TPGR Tool for Power Supply during Tabletop Programming

monthly **Leasing*** (Residual Value 1.500,00)

€ 99,00

Special Package

starting at € 7.900,00

- "Basic" Package features including...
- all essential Byteshooters and free Byteshooter programming modules for trucks and farm equipment available at time of purchase

monthly **Leasing*** (Residual Value 2.000,00)

€ 154,00

Professional Package

starting at € 11.800,00

- "Special" Package features including...
- Professional soldering and desoldering incl. accessories
- EPROM Burner with various programming adapters
- Ram units incl. software

monthly **Leasing*** (Residual Value 2.500,00)

€ 239,00

* Monthly payment amounts are approximated from a four-year maturity with an interest rate of 7.5% and the stated residual value. All prices plus sales tax.



Cartronic Motorsport Ingenieurgesellschaft mbH
Betriebsweg 2b · D-51645 Gummersbach

Phone: ++49 (0) 2261 - 61 901

Fax: ++49 (0) 2261 - 61 921

Web: www.perfect-chip.de

eMail: info@perfect-chip.de