

Everything you wanted to know about Aftermarket Chips, but were afraid to ask

Let's first discuss what is chipping?

Chipping is the reprogramming of the cars main computer (ECU). This chip is usually soldered in place of the OEM chip. When a car manufacturer creates the stock programming, that programming is designed for reliability, drivability, and finally performance. The main goal of OEM programming is to make sure that the car is programmed to perform within parameters that the car is designed.

OEM ECU programming is usually a little more conservative than necessary and there are usually significant gains to be had on most cars with aftermarket programming. For a normally aspirated (NA) engine, the programming usually adjusts timing, ignition, fuel consumption, etc. For a Turbo or supercharged engine, there's another factor to programming: *boost*. When the boost request is adjusted to higher amounts, the result is usually much more HP and torque. For some vehicles that gain is pretty significant. For example, most chips for the 2000 S4 will gain 50-60 HP JUST FROM THE CHIP. Obviously, this significantly, changes the behavior of the car.

There are four major things that you want to take into consideration:

- Warranty
- Maintenance
- Programming
- The Dealership

First, there's the Warranty.

When your car is stock, obviously you have no concerns about voiding your warranty. Now, if you do "chip" the car, you are reprogramming the car to perform outside normal operating parameters. If you have problems with your "modified" car, then the dealer can take the easy way out and void your warranty with out proving that it was the chip that caused the problem. This is not to say that they will void it, but it's something that all "chippers" need to be aware of. Audi has had a very high cost of warranty claims on the S4 from 1999-2002, and consequently has been voiding many warranties to reduce their costs, and deter "chipping".

[Read attachment on Aftermarket modifications and your factory new car warranty.](#)

Basically, when you chip, you are taking some risk by putting more strain on the car and voiding the warranty. This risk can be reduced by

- 1) properly maintaining your car
- 2) being aware of issues that may occur
- 3) being aware of the limitations of your engine
- 4) preventing your dealer from knowing about ANY car modifications.

So, what can we do to prevent any confrontations about "chipping" with the dealer?

Maintain your car.

The Easiest thing that you can do is to properly maintain your car. This is important even without chipping, but proper maintenance is especially crucial when you push the engine a little further than for what it was originally designed.

What can you do? Keep all fluids clean [Read attachment on Life at 200k](#)

Oil changes are crucial. The turbos are cooled by the engine oil, so the oil plays an even more important roll than just engine lubrication. I suggest changing the oil&oil filter every 3-5k with a GOOD synthetic oil like Mobil One, Amsoil, or Redline. Personally, I have been using Mobil One 0W30 since my 5k oil change, and the car has been running great

The Quattro club recently printed an article in the Quattro Quarterly with information on it. (see attachment)

Another couple of notes on treating the turbos nicely:

- Let the car warm up before opening the throttle
- Let the engine (oil) cool down before shutting the engine off. This allows the turbos to be cooled before having the same hot oil sitting inside the turbo cooling mechanism.

There are a few other components that have been known to fail (including stock), including the Throttle Bodyf boot (TBB), the BPVs, and the F-Hose.

The TBB is the Y-hose that carries the boost from both turbos to the engine. This hose was updated in the MY 2001, so if you have a 2000, it's recommended that you update the TBB or get the APR Bipipe to prevent a crack – This is a little bit overkill but some people like the piece of mind. (<http://www.goapr.com/products/bipipe.html>). And Samco makes great replacement hoses too <http://www.samcosport.co.uk/index.asp>

The F-hose was only on the MY 2000 and disappeared in the later models. There's an updated version of the hose (pipe) available through MTM dealers like www.hoppenmotorsport.com

The BPVs (Bypass valves) have been prone to failure, and there's a great OEM replacement from the 225 TT that you can get from your local Audi dealer or Bosch retailer. You need TWO of these, as they are a pair. The part numbers are:

- Audi. 06A145710N
- Bosch. 0280142114

These parts should be available at your local Audi or Bosch vender.

There are several other aftermarket BPVs available including Bailey and Forge. Both Bailey and Forge have a great product and are field serviceable....that means you can clean and maintain them, instead of the Audi/Bosch versions, which are disposable.

Special Note for Tiptronic (auto) transmissions:

The Tiptronic (Auto) transmission on the S4 is rated for much less power than the 6-spd transmission. Most chip&cat-back modifications will put it at the upper end of what the tranny can handle. But IF you do chip your S4 with a Tip, I highly suggest getting the Tiptronic Chip (not to be confused with ECU chip).

The Tip chip allows for a change in the way your transmission shifts by reducing the drag in between gears. The result is a MUCH quicker shift. This quicker shift has been described as being similar as to how you'd shift when driving a stick.

The Tip chip has another advantage; by reducing the shift time, you reduce the drag on the clutch, therefore reducing wear on your transmission. GIAC is the only TIP chip dealer and more info can be found at <http://www.giacusa.com/s4motip.htm>.

Programming

There are several Chip manufacturers for the S4 including, but not limited to, GIAC, APR, MTM, Abt, TAP, Neuspeed and Autothority.

What's one programming over another? There are four things to consider:

- 1) Performance
- 2) Reliability
- 3) Smoothness
- 4) Experience of the chip tuner

Which chip should you pick?

I can only tell you what I based my selection on. I choose GIAC programming.

(www.giacusa.com). GIAC has a long standing reputation for great programming and significant performance gains. Presently, GIAC has two different revisions of software that allow you have a choice of more conservative or more aggressive programming.

GIACs older rev of code, is a smooth performance chip that has been available for some time now. The new rev of programming is know as the X-Chip, and is much more aggressive running a higher boost level than most manufacturers

I choose the X-chip and I must tell you that it was SIGNIFICANTLY more powerful than my old APR chip and original GIAC programming..

What chip tuners are available? Here's a little description:

- GIAC (www.giacusa.com) – local tuner (USA), been in the business for 20+ years, offers several programming types (new/older tuning,. Stock, Race gas, valet, custom programming (new turbos), etc. GIAC has a feature called the IBE which allows for changing of your programming (<http://www.giacusa.com/ibe.htm>) Another advantage of the IBE, is that it comes with a “kill” program, which allows the ECU to be completely disabled. This can be an additional deterrent to thieves. There are MANY GIAC retailers scattered through out the US that work with GIAC on a regular basis for custom programming. This is also the only TIP-Chip tuner out there for the S4. The TIP Chip has been specifically designed for GIACs ECU programming
- APR (www.goapr.com) – good programming, local tuning (USA), and offers several programming types as well using their version of “chip flip” technology called ECMS which uses the stock cruise controls to change programs.
- MTM (www.hoppenmotorsport.com -US importer) – German tuner that is well known for their programming in Europe. Great reputation, but much more expensive than US tuners. (static programming, limited support)
- Abt – (www.advancedmotorsport.com US Importer) German tuner that is well known for their programming in Europe. Great reputation, but much more expensive than US tuners. (static programming, limited support)

- Autothority – German tuner. I don't know anyone running this chip on their S4.
- Neuspeed – (www.neuspeed.com) US tuner. I don't know anyone running this chip on their S4
- TAP (www.tap1.com) - FLA based tuner. I haven't heard much flattering on these guys, but nothing concrete either.

When to chip?

Before chipping, you want to make sure that you break in the car properly. I suggest waiting for 10k miles before making the move. The initial break-in period is 5k. But, I suggest waiting for the 10k. This extra time allows:

- Extra break-in time
- Work out any warranty issues - most manufacturing defects are resolved at low mileage.
- The engine to have TWO oil changes

What ECU do I need when I chip?

You need to know WHICH version ECU you have. This varies from build date and transmission type. The S4 6-spd has several iterations of programming:

- MY 2000 – “A” ECU
- MY early 2001 “H” ECU
- MY later 2001-early 2002 “M” ECU
- MY Late 2002 “T” ECU
- The Tiptronic ECUs are
- MY 2000 – “B” ECU
- MY early 2001 “J” ECU
- MY later 2001-early 2002 “L” ECU
- MY 2002 “AA” ECU

In order to verify with ECU you have, you can remove the ECU and look at the serial number on the top. Another way to verify with ECU you have is to plug in the VAG tool, and check via software what ECU model is being used.

You can either chip your stock ECU or buy a spare (or borrow a friend's spare, as I do). Because the chip is soldered onto the ECU, all you need to do is swap the ECUs. Swapping the ECUs is no more challenging than changing card ridges on your old Nintendo Game System.

DO NOT bring a chipped vehicle into the dealer for service. Although you may not be in there for a warranty issue, you do not want to poke a stick at the snake.

How do I swap ECUs?

It's a very simple procedure that only requires a small ratchet and metric (8mm) socket.

<http://www.audiworld.com/tech/eng4.shtml>

Do I swap my tip ecu?

Not usually. It's not something they'd really notice. Unless you are trying to have the dealership troubleshoot a transmission problem. <http://www.audiworld.com/tech/eng38.shtml>

Do I need to clear some codes?

Yes, you do need to clear the “low voltage code” when you swap ECUs. This will clean any evidence that you swapped the ECUs.

How do I clear the codes?

Check out www.ross-tech.com and order the VAG tool. The Vag tool allows you to monitor many aspects of the cars electronics and sensors. You can easily connect a laptop to the cars computer using the ODBII connector which can be found below the steering column. Owning a VAG tool isn't always required, but it makes it much easier. You can always find someone local to assist you with the occasional clearing of codes. You can usually purchase one of the cables and software at your local tuner.

Or you can find someone in your area that is willing to help out (as I do)

<http://www.steve-hall.com/cgi-bin/VAG-Locator.pl>

Do I have to drive it a bit before bringing it into the dealer?

Yes, I suggest driving ~50 miles to make sure that there is some log data in the computer

Dealing with the dealerships.

I'm not telling you to deceive the dealerships, but with the way that Audi has been treating warranties lately, it's more like playing a game of cat & mouse. People buy radar detectors to prevent undeserved tickets – Not necessarily to speed. By swapping the ECU, you are preventing your dealer from blaming a faulty ANYTHING on your chip.

My experience (your mileage may vary)

I've had my S4 for almost 40,000 miles. It's been chipped since 11,000 miles. I've changed the oil religiously, brought it in for service when required, and taken care of the car as best I can. I've had my car in for some minor warranty issues, but it's never been in for service on anything engine/turbo related. Personally, I love my chip and once you drive a chipped S4, you won't want to go back =>

My Opinion.

Yes, I am biased towards GIAC. I can't help it. Abt is most powerful. APR is most flexible. GIAC is both powerful and flexible. MTM is just expensive. Personally, I'd discard the others.

Good luck

Matt

Email me with any questions at Chez1850@attbi.com