Motronic 1.7

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Thanks to Midas
For more info: **www.ecuconnections.com**
Revision:1

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Introduction

The motronic ECU's are used in a lot of cars. This document may cover information that is the same for other motronic series. The motronic 1.7 has one 27C256 UV EPROM inside. It has a DIL28 package and is mounted in a socket, so removing it is easy.

The rev limiter:

The rev limiter works by cutting the fuel off. When the rpm has dropped below the rev limit there will be applied fuel again to the engine. How much fuel is injected after a cut-off is regulated by the "deceleration injection after cut-off" map.

So we want to change rev limiter to 7100RPM. Open WinOLS and search for value 01 01 54. When you found it deselect it. Skip one value and select next two and create map.

042B0	9A	0B	BC	03	B7	0C	02	01	01	14	01	0A	01
042BD	08	01	01	01	04	00	00	F6	F9	F6	F9	FF	FF
042CA	FE	FB	F7	FD	FF	FF	02	01	01	54	50	90	03
042D7	34	0F	04	10	0A	33	10	40	08	01	05	02	1E
042E4	01	00	00	00	00	80	80	00	00	00	9A	0B	BC
042F1	03	B7	0C	02	01	01	14	01	0A	01	08	01	01

Pic1. Rev limit in WinOLS
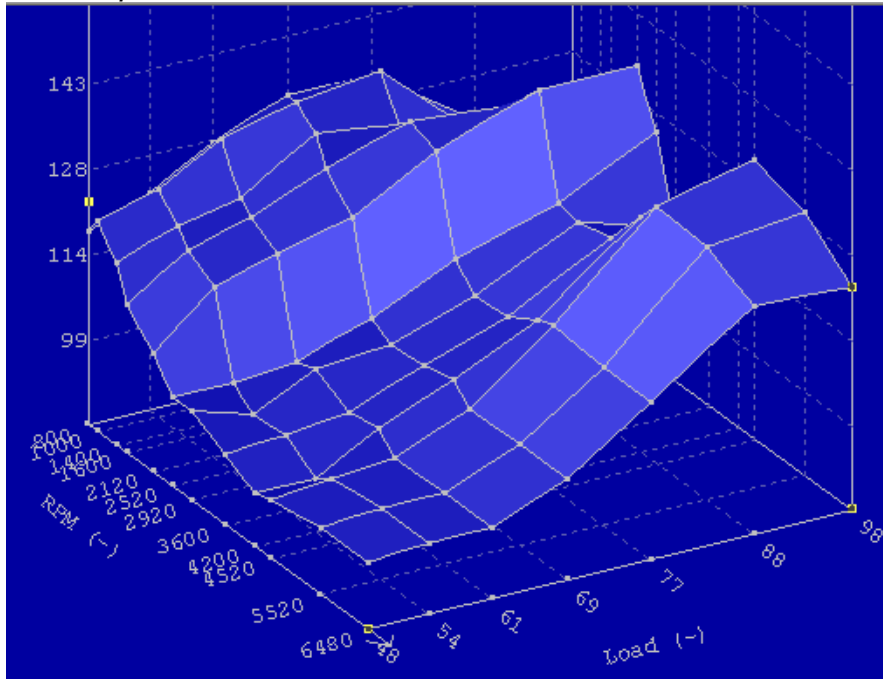
Calculation steps:
1) 90 03
2) 03 90
3) Convert to DEC = 912
4) 52200 – (912*50) = 6600

5) 52200-7100=45100
6) 45100/50=902
7) Convert to HEX = 03 86
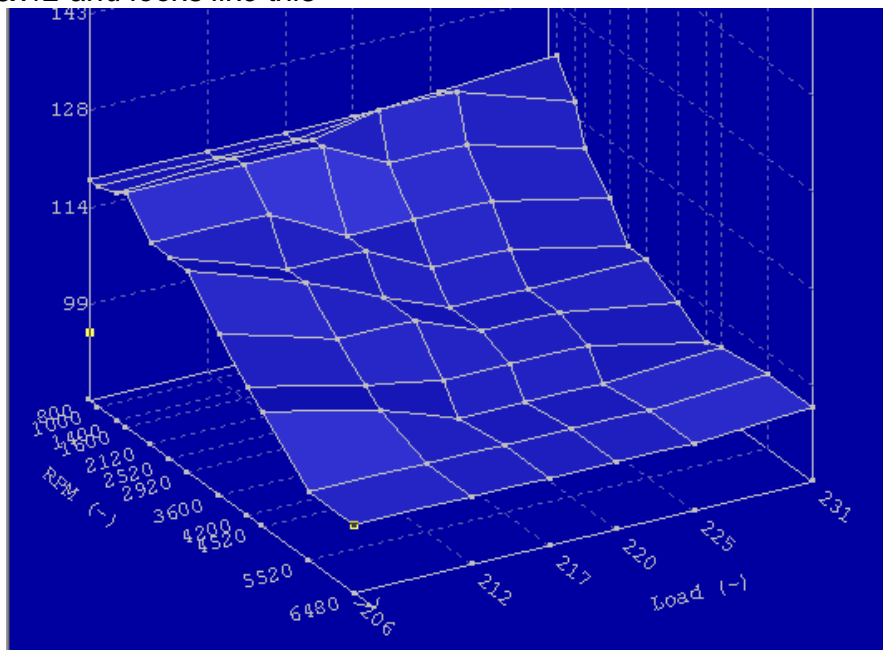8) 86 03

Injection maps

Injection at Part Throttle

In M1.7 are two tipes of maps: High part and low part throttle.
High part throttle is 7x12 map and looks like this

Pic. 2 Injection at high part throttle

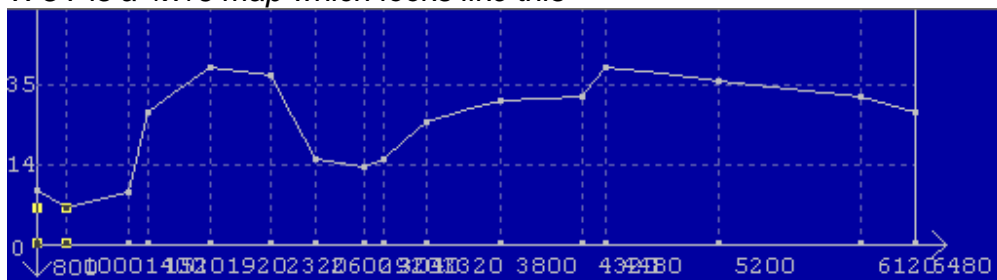*Low part throttle is 6x12 and looks like this*

Pic. 3 Injection at low part throttle

The factor for RPM is 40, and the offset 0. The injection map does not have absolute values in it. The values are the correction-values for the, by the ECU, calculated injection pulse length.

Injection at Wide Open Throttle

The Injection at WOT is a 1x16 map which looks like this


Pic. 4 Injection at wide open throttle

The factor for RPM is 40, and the offset 0. The injection map does not have absolute values in it. The values are the correction-values for the, by the ECU, calculated injection pulse length. Just like the closed and part throttle maps. To change this map in a good way you need a wideband lambda sensor (or a dyno) to achieve the proper Air Fuel Ratio (AFR).
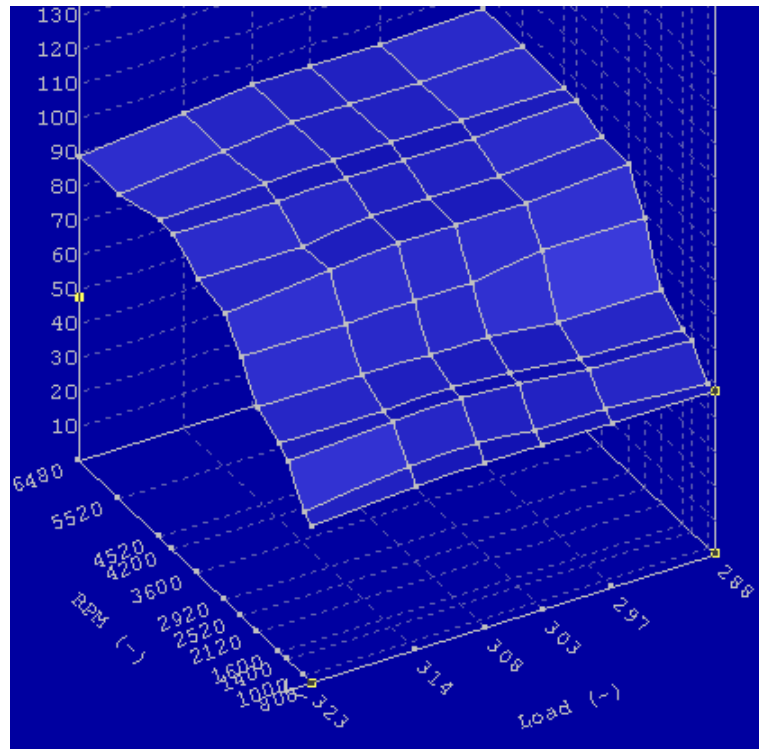
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Ignition maps

Ignition at part throttle

Ignition at part throttle just like in injection at part throttle, is two maps: high part and low part throttle. High part throttle is 7x12 and looks like this
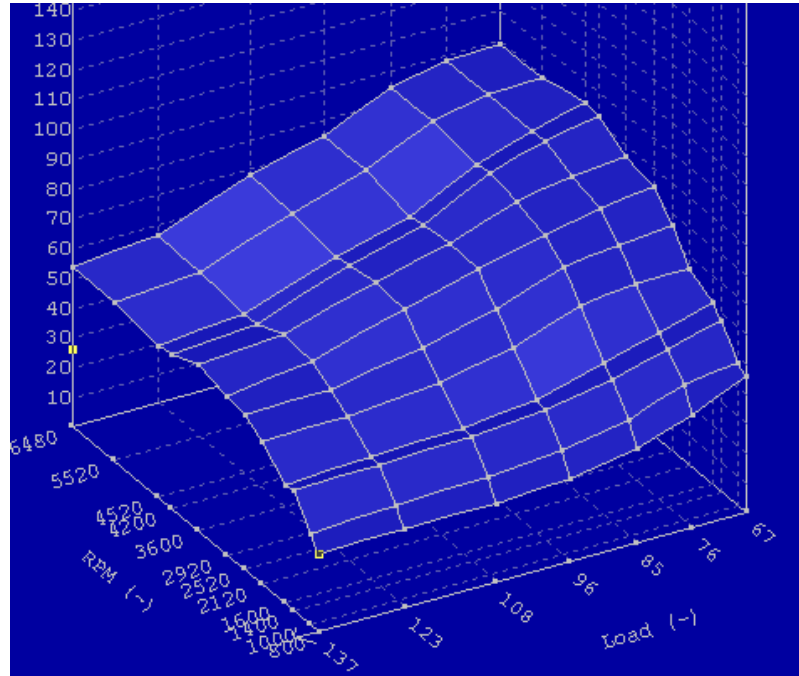
Pic. 5 Ignition at high part throttle

Low part throttle map is 6x12 and looks like this
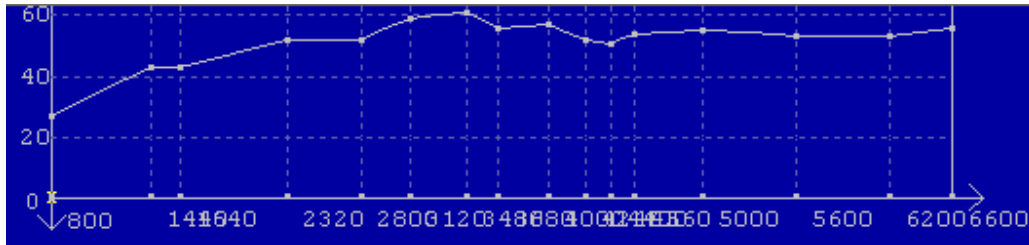

Pic. 6 Ignition at low part throttle

The factor for RPM is 40, and the offset 0. If you change this map I suggest adding not more than 10% ignition advantage. Also in that case using fuel with the highest possible octane number is recommended (95-101). When you "over tune" this map it will result in damage to the engine.
For proper tuning knock-detection equipment is needed.

Ignition at wide open throttle
The Ignition at WOT is 1x16 and looks like this

Pic. 7 Ignition at WOT

The factor for RPM is 40, and the offset 0. If you change this map I suggest adding not more than 10% ignition advantage. Also in that case using fuel with the highest possible octane number is recommended (95-101). When you "over tune" this map it will result in damage to the engine.
For proper tuning knock-detection equipment is needed.

Goodies for the 175 computer owner

| Descriptor	Name	Factor	Offset
3B	RPM	40	0
40	Load		
38	Coolant		

Since I wrote this file using the 175 computer from a BMW e30 318is with software 214 I found almost all usefull maps. Here they are:

| Address	Name	Size
42D5	Rev limiter	1X1
4313	Rev limiter	1X1
49DB	Fuel wot map	1x16
4A2B	Fuel wot map 2	1x16
4B17	Fuel wot map 3	1x116
4B3E	High part throttle fuel map 1	7x12
4BA8	Low part throttle fuel map 1	6x12
4CD0	High part throttle fuel map 2	7x12
4D3A	Low part throttle fuel map 2	6x12
4E62	High part throttle fuel map 3	7x12
4ECC	Low part throttle fuel map 3	6x12
4FC3	Ignition wot 1	1X16
5161	Ignition wot 2	1X16
51B2	Ignition wot 3	1X16
52BE	High part throttle ignition map1	7X12
5328	Low part throttle ignition map1	6X12
5387	High part throttle ignition map2	7X12
53F1	Low part throttle ignition map2	6X12
5450	High part throttle ignition map3	7X12
54BA	Low part throttle ignition map3	6X12
5519	High part throttle ignition map4	7X12
5583	Low part throttle ignition map4	6X12
55E2	High part throttle ignition map5	7X12
564C	Low part throttle ignition map5	6X12

Checksum correction

Before writing the bin file into the chip you need to correct the checksum. For this procedure you need hex editor. You can download one from http://mh-nexus.de/en/hxd/
Open HxD and load your original bin file.
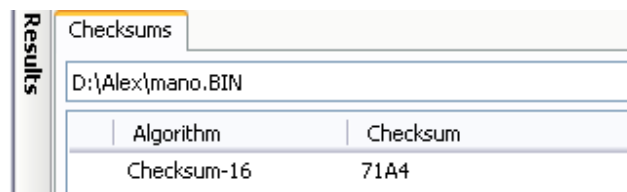
Now press Analysis> Checksums...
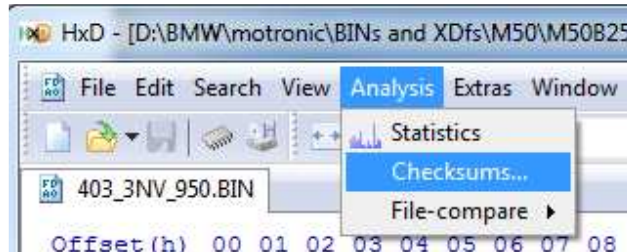
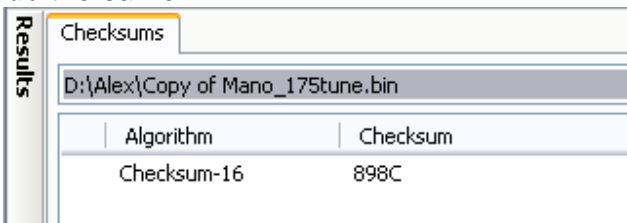*Pic. 8 Hxd menu*

Choose Checksum-16 and press OK
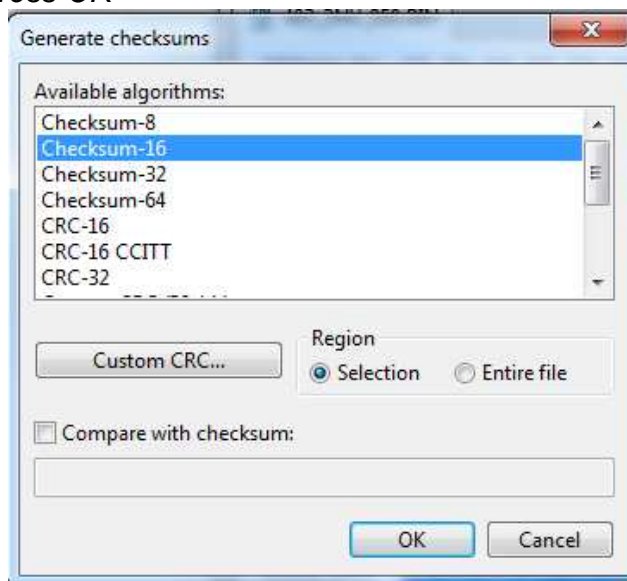
Pic. 9 HxD checksum menu
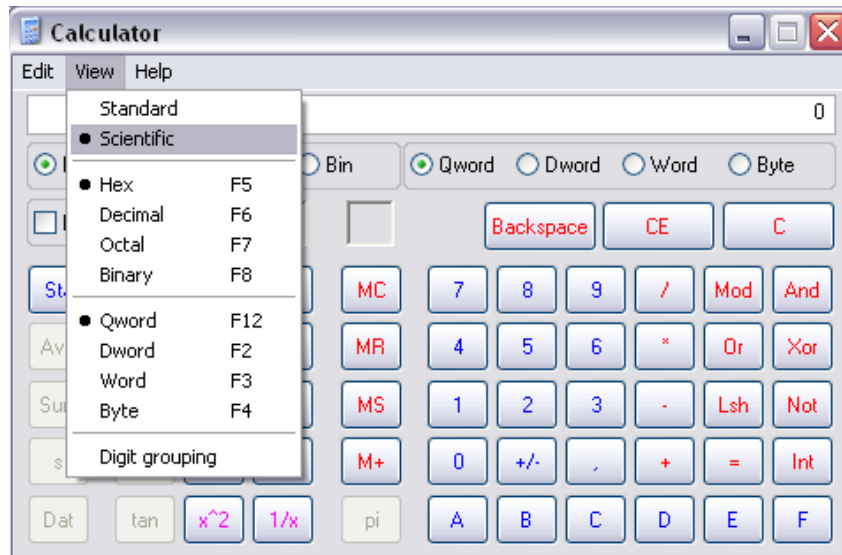
Check out the result

Pic. 7 HxD checksum result

Now load your tuned file and do the same

Pic. 10 HxD checksum result

My original file has 71A4 checksum and my tuned file has 898C checksum. Tuned file's checksum must mach to original file's checksum. So we need correct it. Open your calculator and set on scientific and on hex
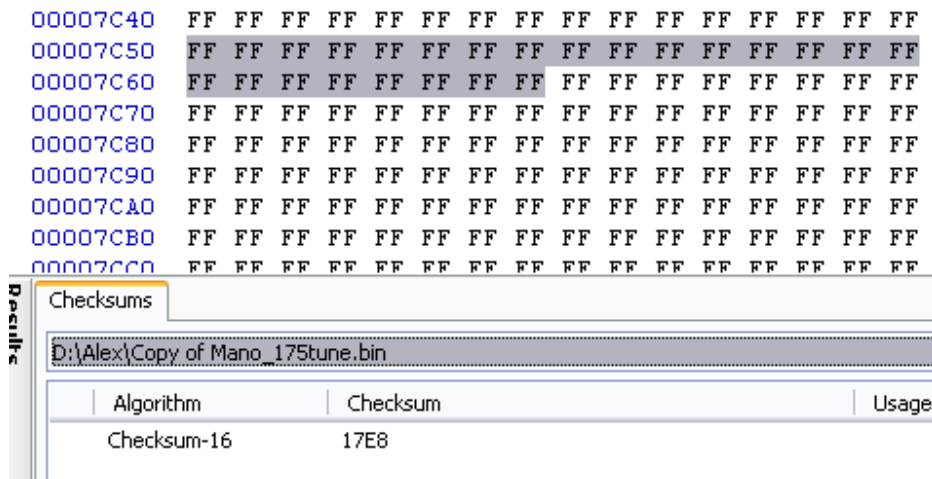
Pic. 11 Win calculator

You need to calculate the difernce between those two checksums. 898C-71A4=17E8
Go in WinOLS. Correction must be done in darker places with FF's
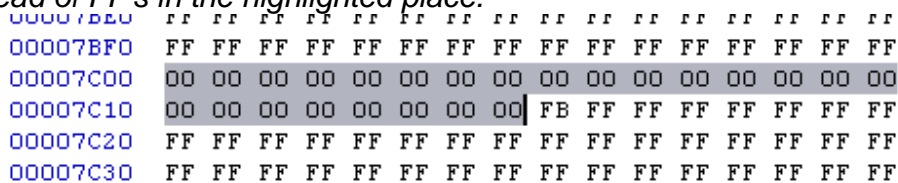

Pic. 12 WinOLS hexdump

Now when you know where correction must be done, go into HxD. Highlight FF's and do the checksum till you get right value 17E8
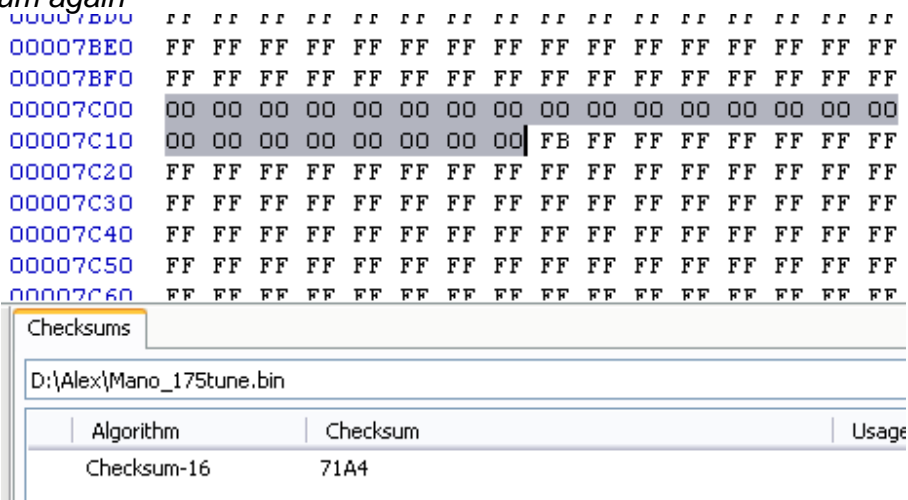
```
00007C40   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C50   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C60   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C70   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C80   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C90   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007CA0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007CB0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007CC0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
```

Checksums

D:\Alex\Copy of Mano_175tune.bin

Algorithm	Checksum	Usage
Checksum-16	17E8	

Pic. 13 Checksum in HxD

Now write 00's instead of FF's in the highlighted place.

```
00007BD0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007BF0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C00   00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00
00007C10   00 00 00 00 00 00 00 00  FB FF FF FF FF FF FF FF
00007C20   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C30   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
```

Pic. 14 Checksum correction in Hxd

Now do the checksum again

```
00007BD0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007BE0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007BF0   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C00   00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00
00007C10   00 00 00 00 00 00 00 00  FB FF FF FF FF FF FF FF
00007C20   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C30   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C40   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C50   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
00007C60   FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF
```

Checksums

D:\Alex\Mano_175tune.bin

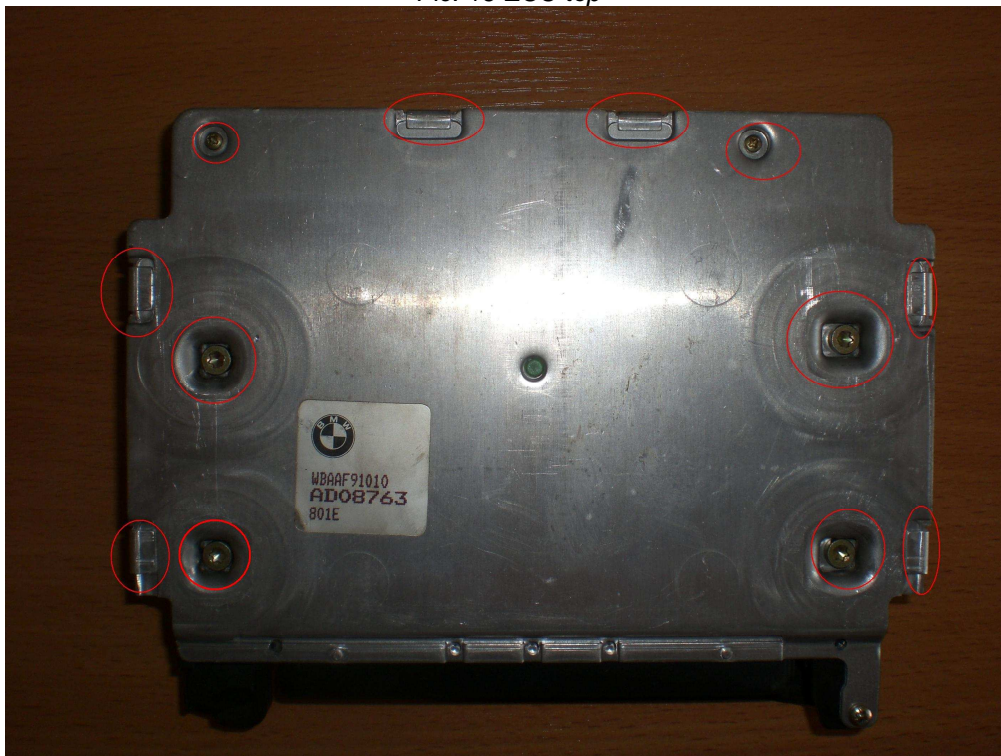| Algorithm	Checksum	Usage
Checksum-16	71A4	

Pic. 15 Checksum in HxD

If it is a match to original the you are done! You can write the file into the chip now.

Chip installing

When you wrote the bin into the chip you can install it know.
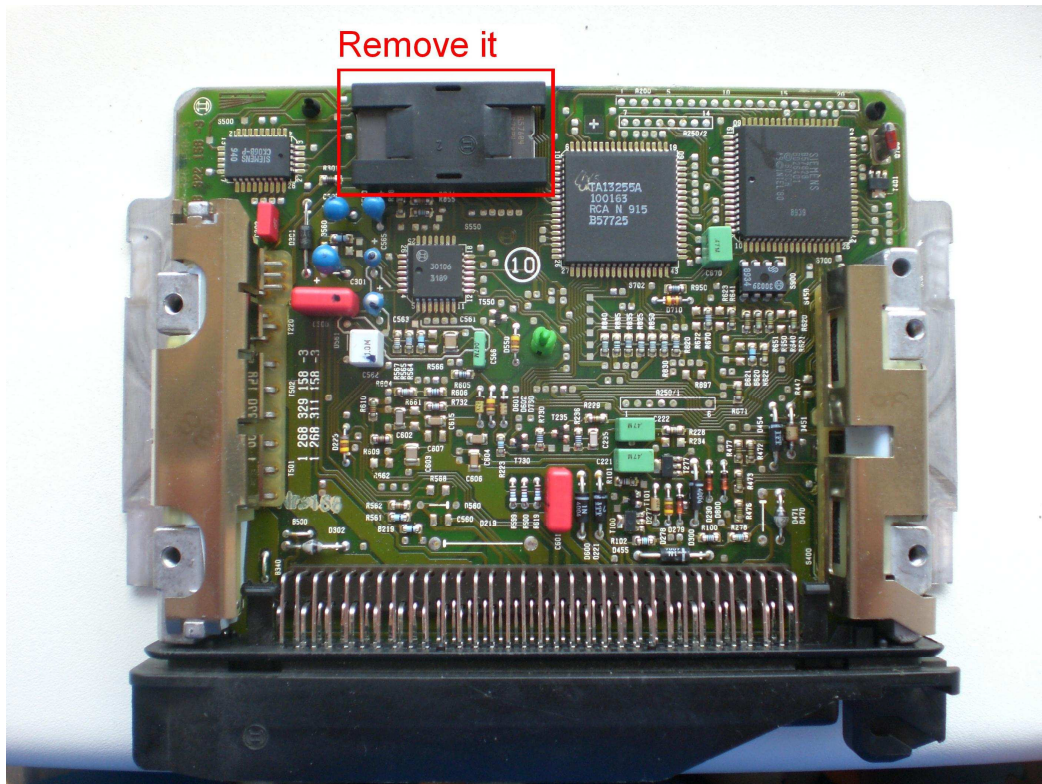*Unscrew the marked screws and bend the marked metal.*
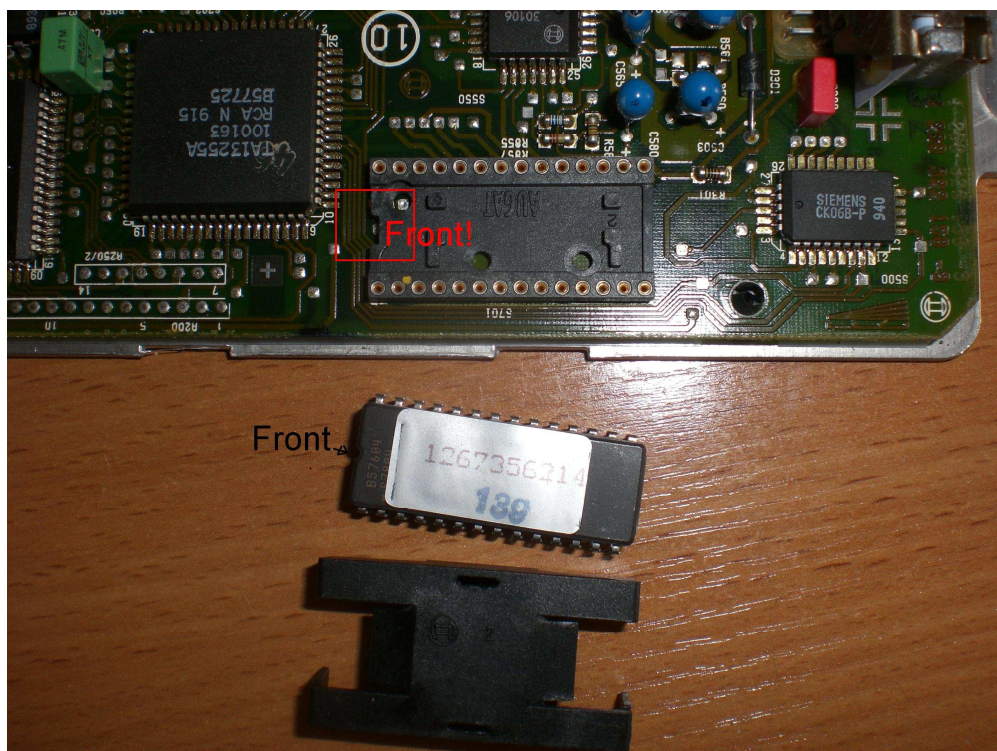

Pic. 16 ECU top

Pic. 17 ECU bottom

Open the case. You will see the black (not always black) plastic cover. Remove it and you will see the chip.

Pic. 18 Ecu inside

Carefully remove it and intall yours.

Pic. 19 Chip and socket

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Conclusion

All information and values given in this document may be used at own risk. I do not stand in for any problems. Thanks to the members from www.ecuconnections.com I hope you enjoy it.