Wheel decoder triggers spreadsheet

newtopic postreply MegaSquirt EFI Forum Index -> MS1/Extra (MegaSquirtnSpark-Extra)

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Author	Message

jsmcortina
MegaSquirt Guru

Joined: 03 May 2004
Posts: 3370
Location: Birmingham, UK

Posted: Tue May 09, 2006 8:43 am Post subject: quote

Trigger **angle** is the crankshaft **angle** BTDC when the trigger A tooth passes the VR sensor.

I've created a simple Excel sheet that may help with trigger settings. It is a bit rough at present and needs refinement and checking.

James

_____
My Success story http://www.msefi.com/viewtopic.php?t=8008
MS1/Extra at: http://megasquirt.sourcef[illegible].net/extra

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MegaSquirt EFI
from Bowling and Grippo

Can someone confirm what # for wheel decode?

Author **Message**

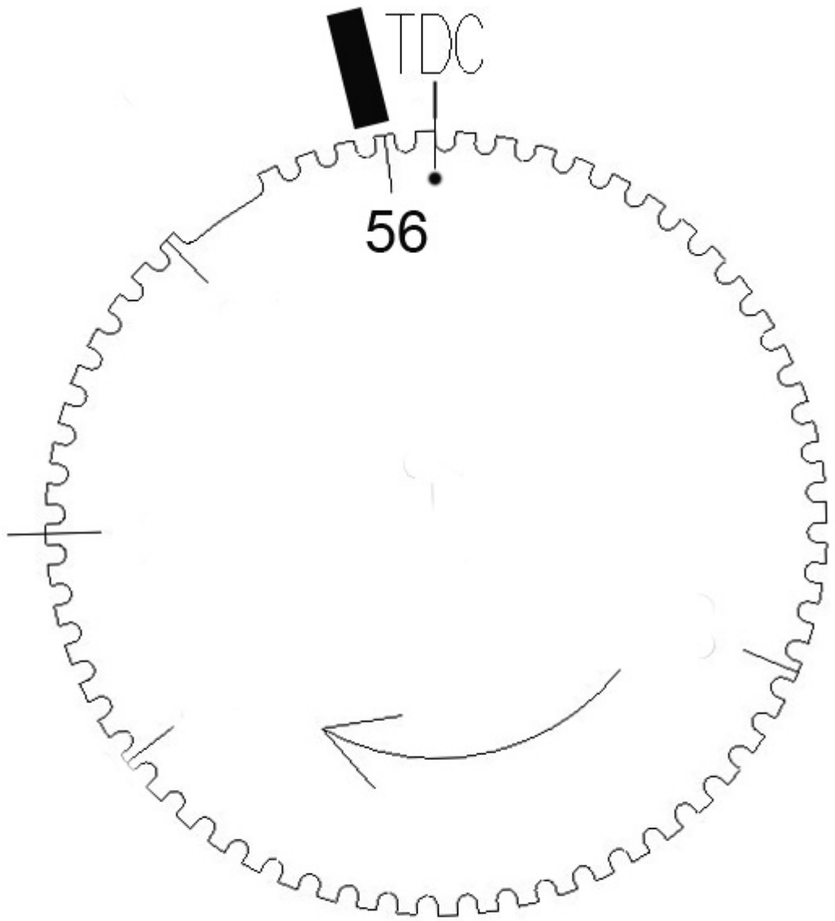
Jon k
Master Squirter

Joined: 14 Oct 2005
Posts: 439

Posted: Sun May 07, 2006 9:53 pm Post subject: Can someone confirm what # for wheel decode?

quote

BMW 60-2... i have been receiving conflicting replies.



BMW M50 2.5L

James gave me:

Try this:
Trigger **angle** = 60 BTDC
Cranking advance = 12
Trigger A = 46
Trigger A return = 54
Trigger B = 6
Trigger B return = 14
Trigger C = 26

MegaSquirt EFI
from Bowling and Grippo

Getting ready to start my car this week!
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newtopic postreply MegaSquirt EFI Forum Index -> MS1/Extra (MegaSquirtnSpark-Extra)

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Author	Message
Jon k Master Squirter Joined: 14 Oct 2005 Posts: 439 Back to top	Posted: Sat May 27, 2006 7:26 am Post subject: Getting ready to start my car this week! quote Or try! Let me double check if anyone thinks of anything please speak up. MS-1 V3 setup with 6 VB921s to fire my coils wasted. No PWM Idle yet Spark inverted, dwell time real low to start (2.0ms crank and run). I have a seperate harness for the spark outs on a 9 pin molex connector, 3 of those 9 pins are grounds for the VB921s specifically. 18 gauge wiring so the 6 VB921s meet the 3 grounds in pairs. 029q2 with a generic spark map made base on the VE Calculator in the Spark Page. Generic fuel map made from the VE Calculator in the Fuel Map page. Constants are setup. MAP line is run. Am I forgetting anything? profile pm email
jsmcortina MegaSquirt Guru Joined: 03 May 2004 Posts: 3370 Location: Birmingham, UK Back to top	Posted: Sat May 27, 2006 9:22 am Post subject: quote Do not use the VE generator to create a spark map. It is ONLY for VE. That's why it says "VE specific". James _____ My Success story http://www.msefi.com/viewtopic.php?t=8008 MS1/Extra at: http://megasquirt.sourcef[illegible].net/extra profile pm email www
Jon k Master Squirter Joined: 14 Oct 2005 Posts: 439 Back to top	Posted: Sat May 27, 2006 9:34 am Post subject: quote **jsmcortina wrote:** Do not use the VE generator to create a spark map. It is ONLY for VE. That's why it says "VE specific". James Crap. Good thing we caught th[illegible] am having a ton of difficulty creating a spark map for this motor. profile pm email

evolotion
Helpful Squirter

Joined: 02 May 2005
Posts: 103
Location: glasgow, scotland

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Posted: Sat May 27, 2006 9:36 am Post subject:

quote

there is a rules of thum guide for setting up a basic spark map to get you running, whihc for my engine turned out to be very near perfect. Tis in the megamanuel somewhere

_____
14.5@97 in a fully loaded daily driven classic mini

profile pm

Jon k
Master Squirter

Joined: 14 Oct 2005
Posts: 439

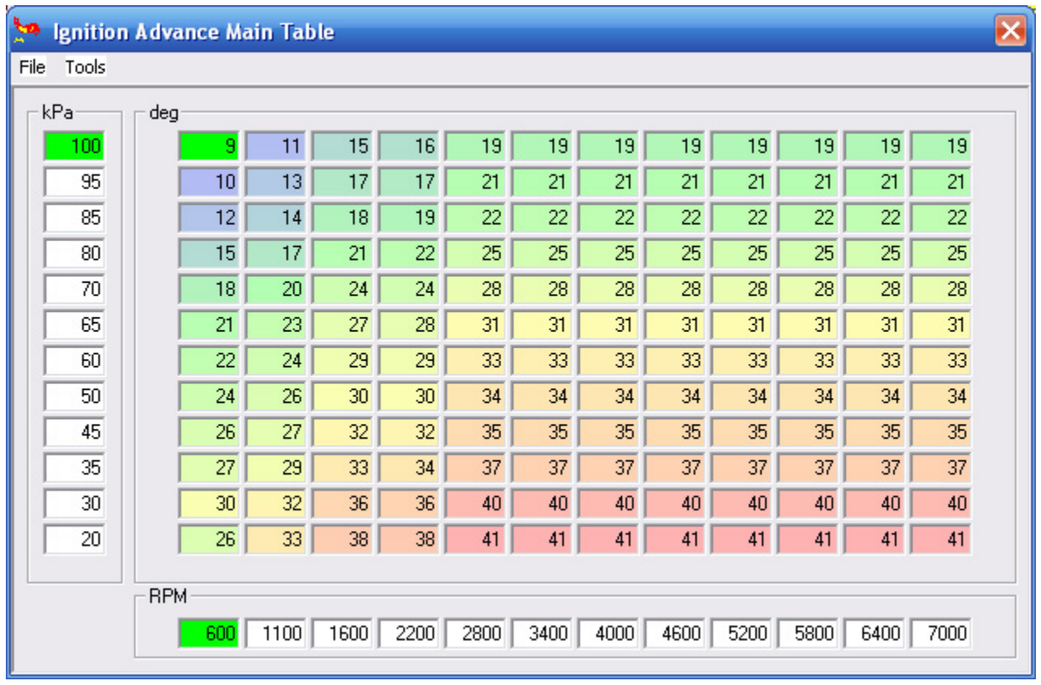
Posted: Sat May 27, 2006 9:47 am Post subject:

quote

evolotion wrote:

there is a rules of thum guide for setting up a basic spark map to get you running, whihc for my engine turned out to be very near perfect. Tis in the megamanuel somewhere

I am trying to use the excel spreadsheet that someone posted under Spark tuning - it seems like its making a flipped map? My engine used to idle around 37 kPa which this spreadsheet says will idle with 27 degrees of advance!?



Edit - I am not seeing anything about Spark table in Megamanual? Link?

If anyone is feeling gracious to guide me on, this is a 6 cyl 2.5L motor:

2494cc / 152cu in
189hp @ 5900 rpm
184ft tq @ 4200 rpm
6500 rpm redline

4 valves per cyl, dual overhead cam, 10.0:1 CR

Last edited by Jon k on Sat M[illegible]7, 2006 9:54 am; edited 1 time in total

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evolotion
Helpful Squirter

Joined: 02 May 2005
Posts: 103
Location: glasgow, scotland

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Posted: Sat May 27, 2006 9:52 am Post subject:

quote

that looks right tbo, just scale the advance down at idle.

_____
14.5@97 in a fully loaded daily driven classic mini

profile pm

Jon k
Master Squirter

Joined: 14 Oct 2005
Posts: 439

Posted: Sat May 27, 2006 10:00 am Post subject:

quote

> **evolotion wrote:**
> that looks right tbo, just scale the advance down at idle.

How? The ignition map, in 3D mode, looks nothing like the ones people post

advTable1_200605221636.vex		
Description:		Download
Filename:	advTable1_200605221636.vex	
Filesize:	1.33 KB	
Downloaded:	5 Time(s)	

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jsmcortina
MegaSquirt Guru

Joined: 03 May 2004
Posts: 3370
Location: Birmingham, UK

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Posted: Sat May 27, 2006 10:00 am Post subject:

quote

Nothing wrong with that table you posted. Rather conservative (lame) if anything. The default MS1/Extra table has more advance at high load/high rpm.

James

_____
My Success story http://www.msefi.com/viewtopic.php?t=8008
MS1/Extra at: http://megasquirt.sourcef[illegible].net/extra

profile pm email www

Jon k
Master Squirter

Joined: 14 Oct 2005
Posts: 439

Posted: Sat May 27, 2006 10:22 am Post subject:

quote

> **jsmcortina wrote:**
> Nothing wrong with that table you posted. Rather conservative (lame) if anything. The default MS1/Extra table has more advance at high load/high rpm.
>
> James

I see... so is it ok to just load t able and go. Or should I bring down the advance at idle?

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evolotion
Helpful Squirter

Joined: 02 May 2005
Posts: 103
Location: glasgow, scotland

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Posted: Sat May 27, 2006 10:29 am Post subject:

quote

will probably be ok to just go, my car can take pretty silly advance at idle only a 1600cc but still 4 valve/cylider etc so rougly the same burn characteristics.

if your concerned just bump the bottom left 4 cells down a bit. cant hurt. once its running you wil lknow for sure whats what.

_____
14.5@97 in a fully loaded daily driven classic mini

profile pm

Getting ready to start my car this week!
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Author **Message**

Jon k
Master Squirter

Joined: 14 Oct 2005
Posts: 439

Posted: Sat May 27, 2006 11:28 am Post subject: quote

evolotion wrote:
will probably be ok to just go, my car can take pretty silly advance at idle only a 1600cc but still 4 valve/cylider etc so rougly the same burn characteristics.

if your concerned just bump the bottom left 4 cells down a bit. cant hurt. once its running you wil lknow for sure whats what.

My first time doing timing on ANYTHING. No risk of blowing the motor up at an idle speed right?

This map is from my stock ecu - should I try and mimic it?

BMW E36 (Original), 20890753762, Ignition Advance Part throtel *

lmin / l\min	1.00	1.50	2.00	2.60	3.20	3.90	4.60	5.30	6.00	6.60	7.40	8.20
800	9.75	9.75	23.25	23.25	15.00	11.25	9.00	3.00	2.25	1.50	0.75	0.00
1000	9.75	9.75	23.25	23.25	18.75	14.25	12.75	9.00	5.25	4.50	3.00	3.00
1320	9.75	9.75	23.25	24.00	21.00	15.75	15.00	12.75	10.50	8.25	6.75	6.00
1720	15.00	19.50	24.75	24.75	21.75	21.00	19.50	17.25	13.50	11.25	9.75	9.00
2200	18.75	25.50	25.50	27.00	24.75	22.50	21.00	20.25	18.75	18.00	16.50	15.75
2520	18.75	25.50	25.50	27.75	25.50	24.75	24.00	22.50	20.25	19.50	18.75	18.00
2960	22.50	31.50	31.50	30.00	29.25	27.00	26.25	25.50	24.00	22.50	21.75	21.00
3360	26.25	35.25	35.25	33.75	31.50	29.25	28.50	27.75	27.00	26.25	24.75	24.00
3760	35.25	42.75	39.00	36.75	33.00	32.25	30.75	28.50	27.00	26.25	24.75	24.00
4120	35.25	43.50	39.00	36.75	35.25	32.25	31.50	28.50	26.25	22.50	21.00	20.25
4400	35.25	42.00	39.00	36.75	34.50	31.50	30.00	27.75	24.75	21.75	19.50	17.25
5000	35.25	42.00	38.25	35.25	33.75	31.50	30.00	27.75	24.75	22.50	20.25	18.00
5400	42.75	42.75	38.25	36.00	33.75	31.50	30.00	27.75	24.75	22.50	20.25	18.00
5760	42.00	42.00	38.25	36.00	33.75	32.25	30.00	27.00	24.00	21.75	19.50	17.25
6080	40.50	40.50	38.25	36.00	33.75	32.25	30.00	26.25	24.00	21.00	18.75	17.25
6400	40.50	40.50	40.50	38.25	36.00	33.00	31.50	28.50	26.25	24.00	23.25	22.50

Text 2d 3d

BMW E36 (Original), 20890753762, Ignition Full throt...

lmin / l\min	Full load firing angle characteristic diagram(Load,RP 5.00	5.80	6.60	7.40	8.20	9.00
800	6.00	2.25	1.50	0.75	0.00	0.00
1000	10.50	6.00	4.50	3.00	3.00	3.00
1520	19.50	14.25	12.00	9.75	9.00	9.00
2040	21.75	20.25	16.50	13.50	12.00	12.00
2480	25.50	22.50	19.50	18.75	18.00	18.00
3000	28.50	24.75	22.50	21.75	21.00	21.00
3240	30.00	27.75	26.25	24.75	24.00	24.00
3760	30.00	27.00	24.75	23.25	22.50	22.50
4040	29.25	27.00	22.50	21.75	19.50	19.50
4400	28.50	25.50	21.00	18.00	16.50	16.50
4720	28.50	25.50	22.50	18.75	16.50	16.50
5080	28.50	26.25	23.25	19.50	17.25	17.25
5400	28.50	26.25	22.50	19.50	17.25	17.25
5760	28.50	25.50	22.50	19.50	17.25	17.25
6040	28.50	25.50	22.50	18.75	18.00	17.25
6480	30.00	27.00	24.00	21.00	21.00	21.00

Trigger angle issues (not Code bug in 029!!!!)

newtopic postreply MegaSquirt EFI Forum Index -> MS1/Extra (MegaSquirtnSpark-Extra)

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Author	Message

volvorod85
MegaSquirt Newbie

Joined: 19 Jun 2005
Posts: 5

Posted: Wed Jun 21, 2006 5:44 pm Post subject: Trigger angle issues (not Code bug in 029!!!!)

quote

Heres my setup 1990 765 turbo.
B230FT IPD Turbo cam
MSnS extra on a V2.2 board with spark output to Fidle
megatune 2.25 and i was running 029l as of yesterday i updated to 029q.
Ive got the volvo LH 2.2 dizzy for my rpm signal

The problem happened, after my cam change. Ive got the IPD cam with the notch in the back off 20 degrees.

My idle is set to about 1200 for cold start reasons and i have A/C. So warmed up the idle is 1200, ive got no hesitation or miss problems. If i turn the A/C on, or just turn the idle down to anything below, oh id say starting at 1000 or so, or lower, you hit the gas slowly it will rev no problem, hit it hard, or moderatly, or like your gonna take off in 1st gear it misses, stumbles and revvs, like ive got my accel enrich off, but its on, and working. If you watch the timing gun when you rev it, the light goes away, im loosing my spark signal.

Before the cam change I had the trigger **angle** set to 0. It has run fine like this for near 2 years with the T cam (stock cam). If i set the trigger **angle** to 20 and anything close to that, the timing map does not work properly, it will advance 10 more degrees and stay at 21. then after like 2500 rpm the timing will advance. I had to set the trigger **angle** to 40, turn the dizzy to the stop, and i could time it properly, follows the map perfectly, and ive now got my stumble from idle.

Ok, now, with the trigger **angle** at 40, i had my max point in the timing map at 39. Its 39 from about 3000 to 6000 and 5 bins up from the bottom. At 3500 RPM at right around 100kpa, the ignition would cut out completly. The tach on the dash would drop to zero. Every time id pass that point in the map it would just cut out, and only at that point. I changed a few bins in the effected area to 38, and the problem went away. my stumble is still there.

Yesterday i had the poi come over (chris) and we went through my issue. We got the trigger **angle** set to 90 on trigger return cranking (before i was using time base when i had it at 40 and also at 0) It runs at 90 and follows the map fine, I also had to put -10 in the trim **angle** cause the dizzy is maxed to one side and i was 10 degrees off. now i should be able to bring the trigger **angle** back 10 degrees, BUT HERE IS THE BIG PROBLEM....

If i have the trigger **angle** at 90 it runs, the hesitation is nearly gone, but if i bring the idle down to 600 it comes back sometimes. If i set the trigger **angle** to 89 the car wont run, if i set it to 91 using the trigger addition it wont run, 85 it wont run 80 it wont run etc etc, it sounds like the timing went way advanced, and was really cranking oddly. Now 1 degree of change shouldnt do that.

So my 3 problems are, the stumble at low RPM's, the inability to set the trigger **angle** to anything but 40 on time based, and 90 on trigger return and have the car run. and if i set it to 20 the timing advance goes all wacky. whats the dillio?

Mark

NOTE nothing changed except the cam, and beacuse of the offset grind in the dizzy notch, i have to adjust the trigger **angle** and now i cant! This was a problem with 029l and 029q, before that with the stock cam c[illegible]29l it was ok, and before 029l i was running an old version of megatune and i think 024 code.

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jsmcortina
MegaSquirt Guru

Joined: 03 May 2004
Posts: 3370
Location: Birmingham, UK

Posted: Thu Jun 22, 2006 12:41 am Post subject:

quote

Some notes on trigger **angle**.
When using low trigger angles keep it below 15 deg or you will have idle problems as you cannot run less then the trigger **angle**. The code will likely limit you to trigger **angle** + 2 deg.

When using high trigger angles 60-70 deg is preferred but you must allow 5-10 deg between the trigger and the max advance. Setting a trigger **angle** of 40deg and trying for 39deg advance will not work - the code needs time to calculate the delay and set the timers.

The max trigger **angle** that can be entered is really 89.5 deg. Entering 90deg may be allowed in Megatune but might be using some other number (-10?) instead.

While turning your dizzy did you rephase the rotor? If not you may well be getting the spark jumping to the wrong tower.

hope this helps

James

_____
My Success story http://www.msefi.com/viewtopic.php?t=8008
MS1/Extra at: http://megasquirt.sourcef[illegible].net/extra

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the poi
Helpful Squirter

Joined: 04 Jun 2004
Posts: 75

Posted: Thu Jun 22, 2006 9:05 am Post subject:

quote

Thanks James, will try it out. I figured it had something to do with this and next cyl mode with a high or low trigger, but when it worked at 90* and nothing above or below, it kinda threw me for a loop.

profile pm

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volvorod85
MegaSquirt Newbie

Joined: 19 Jun 2005
Posts: 5

Posted: Fri Jun 23, 2006 6:40 pm Post subject:

quote

Ok, well Ive set the trigger **angle** to 10, **fixed** the timing to 12 and retimed it, set it back to follow the map and it all seems to be times properly now. Stll have some starting issues with trigger return, it just doesnt start very well, and ive got some accel issues still with low rpm accel. After some brainstorming with poi we came to the conclusion that im still running the dumb 124 ign module and not using dwell control. And then i realized i didnt have any issues untill the code update. Cause i was running such an old version (024 ish?, then went right to 029 what ever was done to the code messed with the origional setup, so i shall implement dwell controll and/or eventually put in my 139 module and see what happens...
Mark

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MegaSquirt EFI
from Bowling and Grippo

2 Coil Packs 4-cyl VR Ignition Input
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Author	Message
myk MegaSquirt Newbie Joined: 24 Nov 2005 Posts: 23 Back to top	Posted: Thu Nov 24, 2005 6:44 pm Post subject: 2 Coil Packs 4-cyl VR Ignition Input Ok, well I got a 4agze with a cam position sensor using the VR (NE,G-,G1,G2) sensor. I want to have Megasquirt run everything including spark. I have two coil packs (waste spark setup) on the 4-cyl. Will megasquirt allow the use of two coil packs with the VR input? Thanks, Myk profile pm email
jsmcortina MegaSquirt Guru Joined: 03 May 2004 Posts: 3370 Location: Birmingham, UK Back to top	Posted: Fri Nov 25, 2005 12:15 pm Post subject: Yes it can. Have you looked at the wheel decoder page http://megasquirt.sourceforge.net/extra/setup-wheel.html James _____ My Success story http://www.msefi.com/viewtopic.php?t=8008 MS1/Extra at: http://megasquirt.sourcef[illegible].net/extra profile pm email www
lmr052 Experienced Squirter Joined: 11 Dec 2004 Posts: 361 Location: NW Sydney, Australia Back to top	Posted: Fri Nov 25, 2005 12:57 pm Post subject: The only word or caution is you may not be able to use the OEM multiplexed igniter if your set-up has one. Plan to use 2 x VB921s instead. Regards, Richard _____ Successful MS Repl[illegible]ment for OEM Toyota ECU - all stock sensors and 2nd Ignition Input. profile pm
myk MegaSquirt Newbie Joined: 24 Nov 2005 Posts: 23 Back to top	Posted: Thu Jan 05, 2006 8:54 am Post subject: (MSnS-E) Does anyone want to share me their trigger values for the Cam sensor on the 4agze(ae101,ae92) silvertop 4age? Thanks, Myk profile pm email

lmr052
Experienced Squirter

Joined: 11 Dec 2004
Posts: 361
Location: NW Sydney, Australia

Posted: Thu Jan 05, 2006 12:21 pm Post subject:

quote

> **myk wrote:**
> Does anyone want to share me their trigger values for the Cam sensor on the 4agze(ae101,ae92) silvertop 4age?

Assuming you keep the stock static advance of 10BTDC, which aligns with a NE tooth, then you have the options of 40, 70, 100 or 130 degrees trigger angle. If using the second input (G1, G2), these trigger angles equate to trigger teeth pairs or (12, 6), (11, 5), (10, 4), (9,3).

If you grind teeth off theNE wheel, then the teeth numbering depends on the pair chosen.

HTH. Regards, Richard

_____
Successful MS Repl[illegible]ment for OEM Toyota ECU - all stock sensors and 2nd Ignition Input.

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myk
MegaSquirt Newbie

Joined: 24 Nov 2005
Posts: 23

Posted: Fri Jan 06, 2006 7:27 pm Post subject:

quote

Thanks for the help, please pardon my ignorance.

The main wheel (NE) has two teeth and is connected to the normal tachometer input wire on megasquirt.

The other wheel G1,G2 has 12 teeth right?, I read the Dual Wheel/Second trigger info on megasquirt.info and could not understand how to exactly wire in everything and set it up, granted the information was helpful, but it still left alot of loose edges.

Any more information on how you set it up would be very helpful. If you need any parts from a 4age I would gladly swap you them for the help.

Myk

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lmr052
Experienced Squirter

Joined: 11 Dec 2004
Posts: 361
Location: NW Sydney, Australia

Posted: Sat Jan 07, 2006 2:42 am Post subject:

quote

myk wrote:

Thanks for the help, please pardon my ignorance.

The main wheel (NE) has two teeth and is connected to the normal tachometer input wire on megasquirt.

The other wheel G1,G2 has 12 teeth right?,

No.... The NE wheel has 24 teeth but spins at camshaft speed so it appears to be a 12 tooth wheel to MegaSquirt. After being conditioned, it goes to the normal tachometer input on U1.

The G1 and G2 signals are triggerred from the two VR sensors by a single tooth on the shaft under the 24 tooth wheel. The G1/G2 signals provide a reference pulse to MegaSquirt much the same way as a missing or solid tooth does on other wheels. The G1/G2 signals are mixed and conditioned before being fed into the second input on U1.

Thanks for the offer of 4AGE bits - I can't think of any I need plus there is quite a good supply here in Australia.

I can send an MSQ although the ignition timing may be a bit too advanced and it is set up for a NA engine. I can also send the INC files I used for the OEM Nippondenso temp sensors and NA MAP sensor. Drop me a PM with your email address.

Regards, Richard

_____
Successful MS Repl[illegible]ment for OEM Toyota ECU - all stock sensors and 2nd Ignition Input.

profile pm

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max@zl2max.gen.nz
Helpful Squirter

Joined: 03 Aug 2004
Posts: 97
Location: Palmerston North. New Zealand

Posted: Sat Jan 07, 2006 11:52 am Post subject:

quote

Imr052

Ok now I just have to ask.....

The story so far, rover V8 which I want to do wasted spark with. I have looked at 36/1 crankshaft wheels, but these are not looking easy. Happy with the missing tooth position is either TDC or BDC (plus offset ...) and that cause it is wasted spark it dosn't matter wheather it is TDC or BDC we are starting from... so I foud a mazda dizzy the other day with 24 teeth, grind one off and we have 24/1 wheel running at camshaft speed...

Now I get confused, so you say it appears as a 12/1, OK with the 12 but not the 1 .....

Now with every rotation of the crankshaft we now have 2 missing teeth type pules.... how do we figure which is TDC/BDC ????

Or have I missed something ???

Max

profile pm email

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lmr052
Experienced Squirter

Joined: 11 Dec 2004
Posts: 361
Location: NW Sydney, Australia

Posted: Sat Jan 07, 2006 1:50 pm Post subject:

quote

max@zl2max.gen.nz wrote:

..... Happy with the missing tooth position is either TDC or BDC (plus offset ...) and that cause it is wasted spark it dosn't matter wheather it is TDC or BDC we are starting from... so I foud a mazda dizzy the other day with 24 teeth, grind one off and we have 24/1 wheel running at camshaft speed...

Now I get confused, so you say it appears as a 12/1, OK with the 12 but not the 1 .....

Now with every rotation of the crankshaft we now have 2 missing teeth type pules.... how do we figure which is TDC/BDC ????

Or have I missed something ???

Max,
Because the distributor turns at HALF the speed of the crankshaft (for a 4 stroke), when 2 distributor teeth are removed (which are opposite each other), we get 2 missing pulses every distributor revolution or every 2 missing pulses for every 2 crankshaft revolutions - just what we need.

MSnSE isn't overly choosy about where the missing tooth is as long as the missing tooth is not being used as a trigger for your engine.

In the case of a V8 with 4 spark events every revolution, you may need to be careful that with a 12-1 wheel that the missing tooth is not at one of the 4 spark trigger points especially when you add you maximum advance in.

Regards, Richard

Successful MS Repl[illegible]ment for OEM Toyota ECU - all stock sensors and 2nd Ignition Input.

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myk
MegaSquirt Newbie

Joined: 24 Nov 2005
Posts: 23

Posted: Fri Jul 07, 2006 7:05 am Post subject:

quote

So will the NE wheel trigger the RPM gauge without the help of the G1 or G2 signals?

Basically I cannot get my sensor to read on my MS.

Mike

profile pm email

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MegaSquirt EFI
from Bowling and Grippo

2 Coil Packs 4-cyl VR Ignition Input
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Author	Message

jsmcortina
MegaSquirt Guru

Joined: 03 May 2004
Posts: 3370
Location: Birmingham, UK

Posted: Fri Jul 07, 2006 7:36 am Post subject: quote

max@zl2max.gen.nz wrote:

The story so far, rover V8 which I want to do wasted spark with. I have looked at 36/1 crankshaft wheels, but these are not looking easy.

I found the pressed steel Ford wheel very easy to fit as it sandwiches between the balancer and rear belt catcher quite easily. By chance the internal diameter happen to fit almost perfectly around the six through bolts on the damper. This seems to work for a P6 pulley and 3.9 Range Rover pulley.

James

_____
My Success story http://www.msefi.com/viewtopic.php?t=8008
MS1/Extra at: http://megasquirt.sourcef[illegible].net/extra

Back to top

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cng1
Experienced Squirter

Joined: 21 Jul 2004
Posts: 188
Location: Ely, UK

Posted: Fri Jul 07, 2006 7:45 am Post subject:

quote

Quote:

The story so far, rover V8 which I want to do wasted spark with. I have looked at 36/1 crankshaft wheels, but these are not looking easy.

If you want to go with a 36-1 wheel feel free to drop me a line privately and we can talk through the options. On the rover V8 we typically use 6.5 or occasionally 7.25" wheels. As James points out the pressed steel ones should work just fine, you can see the rest of the styles here - www.trigger-wheels.com

Chris

profile pm www

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03-12-2004, 11:27 AM #1

nick951
User

Join Date: Jan 2003
Posts: 109

nick951

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TimingQuestion

IS there anyway to set the timing on our cars???

03-12-2004, 02:33 PM #2

tazman
Addict
Rennlist Member

Join Date: Jul 2001
Location: Reading PA
Posts: 1,673

tazman

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The timing is controlled by the computer so it is not "adjustable" like on some older cars. You can retard the timing some with FQS switch depending on what chips you have. If you do a search for FQS switch you can find some info on the values.

_____
Tom
Porscheless

03-15-2004, 09:54 PM #3

stewardx
Addict
Rennlist Member

Join Date: Mar 2004
Location: oklahoma city
Posts: 126

stewardx

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03-15-2004, 10:56 PM

#4

Adjustabale cam gear will allow you to advance and retard your timing.

_____

·Cross drilled crank·Pauter connecting rods·J&E Pistons w/thermal coating ·LR Stage I head·LR Solid Lifters·LR Solid Lifter Cam·LR Super 75 Turbo Dry·LR Turbo Oil Filter ·LR Stage II MAF Kit·LR Mafterburner w/wide band 02·55# Siemens Fuel Injectors·Weltmeister Chips·LR Adjustable Fuel Pressure Regulator·LR Dual Port Wastegate·LR Boost Controller·LR Stage II Intercooler·LR 4" Inch Exhaust Thermal Coated·LR Billet Replacement Bypass Valve·LR Vacuum Line Kit·LR Stage III Lightened Spec Clutch

RT930turbo
Addict
Rennlist Member

Join Date: Oct 2002
Location: Columbus, OH
Posts: 169

RT930turbo

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The adjustable cam gear would allow adjustment of Camshaft timing. I think Nick is referring to ignition timing, correct??? This has sparked a major late night debate between a friend and I. How does the DME control the ignition timing??? With a fixed distributor, wired directly to a coil, how can this be done??? Can anyone shed some light on this...Danno??? I'm getting very confused, and this is bothering me....I'm on a mission to figure this out...I'm searching everywhere, and I even have the factory manual out (just confusing at the moment!)

_____

Artie

'88 944 Turbo Koni Yellows, 17" Sport classics, GURU MAP kit, T04? Turbo, 3 bar FPR, MBC, Tial wastegate...

'81 SC Coupe, ERP monoballs all the way around, SRP sways, SRP custom valved Bilstiens, Hollow T-bars, Gutted, caged...yadda yadda

'84 944 Parting out

'93 Mercedes-Benz 500E (Sold)
'79 Dodge Maxi van
94 Toyota Carolla 5 speed 202,000 miles. Daily driver

http://www.p-caronline.com/directory/rt930turbo/

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03-15-2004, 11:53 PM #5

Machtig Turbo
Banned

Join Date: Apr 2003
Location: At the dyno
Posts: 12,464

Isnt the trigger off the flywheel the reference for the DME to trigger the injector pulse? I am seriously only guessing here...

Machtig Turbo

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03-16-2004, 12:08 AM #6

RT930turbo
Addict
Rennlist Member

Join Date: Oct 2002
Location: Columbus, OH
Posts: 169

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03-16-2004, 12:15 AM

Yes, the trigger for the injector pulse comes from the reference sensors on the flywheel. I guess by changing when the fuel is injected would be the same as changing when the spark is actually fired....doesn't make ton's of sense. I just think of litterally turning the distributor on the old cars to set timing...def. not the case with a 944.

_____
Artie

'88 944 Turbo Koni Yellows, 17" Sport classics, GURU MAP kit, T04? Turbo, 3 bar FPR, MBC, Tial wastegate...

'81 SC Coupe, ERP monoballs all the way around, SRP sways, SRP custom valved Bilstiens, Hollow T-bars, Gutted, caged...yadda yadda

'84 944 Parting out

'93 Mercedes-Benz 500E (Sold)
'79 Dodge Maxi van
94 Toyota Carolla 5 speed 202,000 miles. Daily driver

http://www.p-caronline.com/directory/rt930turbo/

Machtig Turbo
Banned

Join Date: Apr 2003
Location: At the dyno
Posts: 12,464

#7

On my Link I have an igniter...

Machtig Turbo

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03-16-2004, 02:15 AM

#8

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Yes, the ignition-timing is initiated at the flywheel. There's a hall-effect trigger at 58.4-degrees before TDC. This tells the DME computer that it's coming close to TDC. Once the 58.4-degree mark is triggered by the reference-sensor, the DME can count teeth on the pressure-plate with the speed-sensor. Each tooth that passes the sensor tells the DME how much closer to 0-degree TDC it is. Then it fires of the ignition at the appropriate point as programmed by the chip.

The ignition is initiated by the DME, then sent to the KLR which then passes it back to the DME which then dumps the coil. This pass-through loop allows the KLR to hang onto the ignition signal for a predetermined amount of time to retard the spark if necessary. If there's no knock detected, the KLR passes back the ignition signal with no delay, thus no retard.

The coil when dumped, sends a high-voltage output through the secondary and sends it out to the center electrode of the distributor cap. Since the distributor rotor is over 30-degrees or so wide, it's within range of the spark-plug wire and passes the spark over to the individual plug wire. It is completely irrelevant what the cam-timing is, it has absolutely zero effect on the ignition-timing which is triggered by the flywheel.

The GURU chips allow you to select four different ignition settings through a combination of the FQS-switch and region-coding plugs:

1. standard GURU-optimized timing
2. 4-degree advanced timing map for 100+ octane unleaded race-gas
3. 2-degree advanced timing map for 96 octane 50/50 race-gas/pump-gas blend
4. 2-degree retarded timing map for high-boost usage (18psi+)

Due to the inefficient 2V head and the excessive amount of ignition advance already used in the stock configuration, increasing the ignition advance doesn't yield a whole lot more power, but does put you closer to the edge of detonation. The optimal timing will have the entire air-fuel mixture completely burned by 15-20 degrees after TDC. At this point, the angle of the con-rods and crank-throws allows the chamber pressure to exert a force that will rotate the crank. If you advance the timing too much given sufficient octane, the extra timing just compresses the piston and vertical rods & crank-throws without spinning them at all. In fact, I've found that the 4-degree advanced ignition setting actually doesn't give that much more power than the 2-degree advanced setting. And that only provides about 5-10hp more than the base GURU timing. To really take advantage of high-octane fuels, you want to increase the boost.

Danno

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03-16-2004, 05:52 AM

#9

RT930turbo
Addict
Rennlist Member

Join Date: Oct 2002
Location: Columbus, OH
Posts: 169

Thanks Danno! So it's the width of the rotor that allows the spark to get to the plug when the DME triggers it. Now It all makes sense. My head was starting to hurt after a while! Couldn't figure out how that all worked together.
As always....you're the man!

_____
Artie

'88 944 Turbo Koni Yellows, 17" Sport classics, GURU MAP kit, T04? Turbo, 3 bar FPR, MBC, Tial wastegate...

'81 SC Coupe, ERP monoballs all the way around, SRP sways, SRP custom valved Bilstiens, Hollow T-bars, Gutted, caged...yadda yadda

'84 944 Parting out

'93 Mercedes-Benz 500E (Sold)
'79 Dodge Maxi van
94 Toyota Carolla 5 speed 202,000 miles. Daily driver

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03-17-2004, 05:54 PM

#**10**

TurboTommy
Registered User

Join Date: Oct 2003
Location: Ontario, Canada
Posts: 541

Danno, that's a good explanation on timing issues.

I do have a couple of questions, however. Don't know if this thread is dead, but anybody with info would be great.

1) If the DME is dictating, for example, 20 degrees of total ignition advance, is it at all possible that the spark plugs might not fire at 20 degrees BTDC? Maybe through bad wrenching, slightly incorrect installation of timing related parts, worn parts, something like that? I know the FQS can change timing, but is there anything else that can change timing even though your chip dictates x amount?

2) On the subject of timing and head design. I was under the understanding BECAUSE of slightly poorer head design you will make more power with a good amount of advance (although with high risk of detonation; I understand that). Because of an off centre spark plug or poor turbulence, etc. it takes more time for the flame to travel to get to the position of maximum 'push' on the piston. Consequently, more advance ensures complete combustion in a so- called ineffecient head design (although, you need octane).

TurboTommy

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03-19-2004, 03:25 AM

#11

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

"1) .is it at all possible that the spark plugs might not fire at 20 degrees BTDC?"

No, because electricity travels pretty darn close to the speed of light. Increased resistance through jumping through the air twice and going through resistor wires and plugs barely has any effect on the speed. Once the DME dumps that coil, the spark appears at the plugs pretty much instantaneously. Even with messed up parts like this immaculately-maintained car had zero effect on igntion performance:

I even went to dyno this car after installing a new rotor to see what the difference would be, identical performance!

" 2) On the subject of timing and head design. I was under the understanding BECAUSE of slightly poorer head design you will make more power with a good amount of advance"

Well, it comes down to numbers. One number is constant, that's the flame-front propagation speed. The wider the chambers, the further away from the plug any given spot is, the longer it takes to have all of the air-fuel mixture copmletey ignited. Let's say you had identical advance numbers, say... 10-degrees BTDC. With a good head design, you make say... 100bhp. With a bad 2V, slow-burning off-centre plug design, you make 85bhp. By increasing the advance to say.. 20-degrees, you make 92bhp. So yes, more advance *WILL* give you more power on the same poor design, but not *MORE* than a lower advance number on a better head.

The issue is the combustion time and combustion pressure. With a poor head, the combustion may take 40ms because of the distance from the plug to the farthest reaches of the chamber. So you dial in lots of advance so that the entire mixture will be burnt and at maximum pressure by 15-20 degrees ATDC. However, by the time the furthest reaches of the chamber has been ignited, the initial area around the plug will have finished burning and will actually be cooling and contracting. Wherease with a more centralized plug and more compact chamber, the entire mixture can be fully ignited within 20ms.

The difference in combustion time results in a difference in BMEP, or pressure in the chamber that's gonna do work to push down the piston & spin the crank. With the slower-burning chamber, since not all the mixture is fully burnt at the same time, the maximum-pressure in the chamber will be lower than the chamber that has the quicker burn. So, if you juggle ignition-timing, such that both are at maximum-pressurre at 20-degrees ATDC, the faster-burning, lower timing-advance chamber may have 500psi ready to do work. Wherease the slower-burning, higher timing-advance, might only be able to generate 400psi maximum.

Danno

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03-19-2004, 05:32 AM

#12

TurboTommy
Registered User

Join Date: Oct 2003
Location: Ontario, Canada
Posts: 541

Yes, Danno;
However, you stated earlier that there was already an excessive amount of advance in the stock configuration. Isn't that around 20 degrees BTDC or a tad less. I wouldn't consider that an excessive amount with a stock boost of 11 to 12 psi.

Right now, we're not comparing with a more effecient head. So, with our head as is, wouldn't a little more advance be better, octane not withstanding

Sorry to hijack this thread.

TurboTommy

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03-19-2004, 08:49 AM

#13

B951S
Addict
Rennlist Member

Join Date: Jul 2003
Location: Perth, WA
Posts: 776

Quote:

> *Originally posted by TurboTommy*
> **Yes, Danno;**
> **However, you stated earlier that there was already an excessive amount of advance in the stock configuration. Isn't that around 20 degrees BTDC or a tad less. I wouldn't consider that an excessive amount with a stock boost of 11 to 12 psi.**
>
> **Right now, we're not comparing with a more effecient head. So, with our head as is, wouldn't a little more advance be better, octane not withstanding**
>
> **Sorry to hijack this thread.**

I have womdered about this also. my stand alone has a WOT 18psi timing curve that is similar to the stock WOT timing curve and it is just at the knock limit when the boost hits but it ok running to the redline at up to 24 degrees...I would also like to know where the stock timing supposed to be too aggressive and if it is, then just how much retard is being used on the 18psi chips, and wheather it runs up the EGT dangerously if it is backed off much more that 18 degrees in the midrange with the less efficient stock turbo.

_____
My ex 1989 944 Turbo S (running round Houston somewhere)- T04E Vitesse stage II Turbo, Snow Stage II Water Injection, Link 2 stand alone Engine Management with PLX wideband, 55# siemens, 3 bar FPR, Cup clutch, 3" Lindsey with Big Maganaflow muffler (stock quiet), Tial 38mm. Custom 3" J pipe. Forge Bypass valve. Blitz SBC-iD.

B951S

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03-19-2004, 09:33 AM #14

pk951
Addict
Rennlist Member

Join Date: Dec 2002
Location: ottawa
Posts: 858

I would say that running more timing advance is ok as long as you have proper octane to ward away detonation. ON stock car with 20 degress advance i don't see it being a problem running at 11 or 12 psi with 94 octane.
I have seen EGT at highway speeds 80 mph at 1400 on the track 1600 degrees,so if you retard timing EGT's will go up for certain.

pk951

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03-19-2004, #15

10:19 AM

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

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Well, I was referring to 20 degrees under WOT as excessive meaning the slow burn time. With that much advance, you're throwing away a lot of good combustion in the beginning. But that can't be helped due to the wedge-shaped combustion chamber. There are some aftermarket chips that is very popular that's running 28 degrees under WOT, give that a try... heh, heh...

03-22-2004, 08:47 AM

#16

po9rs5che1
Registered User

Join Date: Oct 2003
Location: Tuscaloosa,AL
Posts: 21

po9rs5che1

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Could you use an MSD module?

You could intercept the signal before it goes into the coil and condition it with the advance/retard options that MSD has on the 6AL or Boost Master modules. The MSD should adjust only the already conditioned signal to fire the coil, so essentially you if you left the control at "0" you would get whatever your chip has timed. If you need alittle bit more just add or take timing away as you like with potentiometer AND get better spark.
I have done this on my other fuel injected cars in the past, however I have not tried it on my 951 yet.
Just a question, kind of suggestion.

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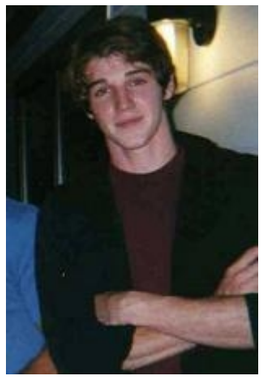
07-23-2003, 03:59 AM #1

BoostGuy951
Addict
Rennlist Member



Join Date: Oct 2002
Location: Gulf Shores, Alabama
Posts: 1,840

07-23-2003, 04:47 AM

Mechanical timing?

Does anyone know the stock mechanical timing in a 951?

If not, does anyone know the procedure for checking it?

TIA

_____
Joe McKerall

AIM: BoostGuy951
1986 House of Kolor Pearl Black 951: Currently Building 2.7L
2003 Black/Black Nissan 350Z
2002 Kawasaki Ninja 500R

"It's either Alcoholism or Insomnia. At least with alcoholism I don't have to think about her."

#2

Chris Prack
Addict
Rennlist Member

Join Date: Nov 2001
Location: Round Hill, Virginia
Posts: 1,114

Chris Prack

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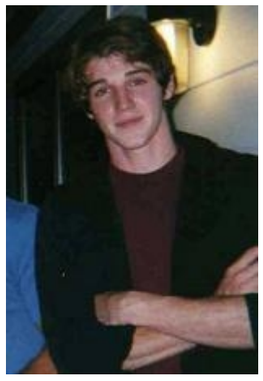
07-23-2003, 05:58 AM

#**3**

For the timing belt? If you mean ignition timing, there is no mechanical timing as there is no distributor. The timing is controlled by the DME.

Chris Prack
89 944 Turbo
84 944

BoostGuy951
Addict
Rennlist Member



Join Date: Oct 2002
Location: Gulf Shores, Alabama
Posts: 1,840

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07-23-2003, 06:25 AM

I know the DME controls timing, but I don't have a DME anymore, and I was wondering if the DME started with a base timing of say 10 degrees mechanical, and then electronically advanced on top of that.

_____
Joe McKerall

AIM: BoostGuy951
1986 House of Kolor Pearl Black 951: Currently Building 2.7L
2003 Black/Black Nissan 350Z
2002 Kawasaki Ninja 500R

"It's either Alcoholism or Insomnia. At least with alcoholism I don't have to think about her."

#4

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

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No, it's all electronically controlled. I'm not sure what base-timing is considered anymore nowadays as the exact timing-advance values are programmed into the maps. The minimum advance is about 4.7-degrees BTDC at idle and goes up from there with a 3D map based upon load X RPM.

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06-12-2003, 10:59 PM #1

TurboTime
Addict
Rennlist Member

Join Date: Sep 2002
Location: Rosamond, CA -Willow Springs RCWY
Posts: 191

Toluene use

Went to the pait store today to buy some Toluene. I get there at 5:00PM and the owner says, sorry we're closed. Frustrated, I walk to Home Depot -they don't carry straight Toluene, but they have every other type of paint thinner...

Then the kid there asks me the stupid question, what are you going to use it on? And I thought to say -oh, I just want to sniff it.
But my conservative side kicked in and I just said, oh, just a project

Guess I'll try the paint store again this weekend.

I guessed that 2 gallons with a 20 gallon tank should give me 93 Octane out of 91 CA premium.

_____
Greg

'89 944 Turbo: GURU Stage II MAP, Guru Racing T04E turbo, 65# injectors, LR blow-off, LR 3" full exhaust, LR dual port wastegate, LR MBC, WF HG, 155K miles strong at 18 psi.

'88 944 n/a auto with 165K miles

Active PCA Card Carrying Member http://www.p-caronline.com/directory/89_turbotime/

threesticks1
Registered User

Join Date: Dec 2002
Location: Phoenix, Arizona
Posts: 156

threesticks1

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06-13-2003, 11:06 AM #3

Have you read RacerX's page on Rocket Fuel? I think that he has a mixing table there.

86944turbo
User

Join Date: Nov 2001
Location: California
Posts: 375

86944turbo

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06-13-2003, 03:29 PM #4

Sunoco tells me that the toluene sold over the counter is not intended for fuel and is of a much lower grade than what should be put into auto fuel.

smkn951
Specialist

Join Date: Feb 2002
Location: Darmstadt, Germany
Posts: 806

smkn951

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SO WHERE DO WE GET THE GOOD STUFF?

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06-13-2003, 04:07 PM #5

RobNL
Addict
Rennlist Member

Join Date: May 2003
Location: The Netherlands
Posts: 253

In Europe maybe? Here in the Netherlands we only have 95 or 98 at the gas station.

_____
Rob N.

'86 951 Turbo Alpine white
'05 407

RobNL

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06-13-2003, 10:31 PM #6

TurboTime
Addict
Rennlist Member

Join Date: Sep 2002
Location: Rosamond, CA
-Willow Springs RCWY
Posts: 191

Lower grade? Guess there aint much hope then.

I was looking for 100% stuff and not worried about a grade quality.

The paint supply store told me today that they don't stock it. Special order at $5/gal and you have to order at least 4 gallons. Also, it would take 8-10 days to get it. So, I balked at that -for the time being anyway.

Must be nice to have 98 octane available at the pump, but I guess you pay through the nose for it.

Greg

'89 944 Turbo: GURU Stage II MAP, Guru Racing T04E turbo, 65# injectors, LR blow-off, LR 3" full exhaust, LR dual port wastegate, LR MBC, WF HG, 155K miles strong at 18 psi.

'88 944 n/a auto with 165K miles

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06-13-2003, 11:19 PM

#7

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

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06-14-2003, 10:56 AM

#8

"In Europe maybe? Here in the Netherlands we only have 95 or 98 at the gas station."

The European octane rating is RON only whereas the US uses (RON+MON)/2. European 95-98 octane comes out to roughly the same 90-92 octane we get here.

"I was looking for 100% stuff and not worried about a grade quality."

Greg, Home Depot also carries xylene (117-octane) for about the same price as toulene. Sherwin Williams also has both in 5-gallon sizes. On the other thread: Question about octane boosters? , there's people talking about 55-gallon drums.

From the smell of 100-octane race-gas, I would say that it's a mixture of toulene and xylene that's been added. The VP stuff above 110 appears to have a much higher concentration of xylene.

RobNL
Addict
Rennlist Member

Join Date: May 2003
Location: The Netherlands
Posts: 253

06-14-2003, 10:56 AM

#8

<blockquote>quote:<hr />The European octane rating is RON only whereas the US uses (RON+MON)/2. European 95-98 octane comes out to roughly the same 90-92 octane we get here.<hr /></blockquote><font size="2" face="Verdana,Tahoma,Helvetica">Thanks for explaining the difference. I wasn't aware that there are different ratings and thought they were always referring to RON.

_____
Rob N.

'86 951 Turbo Alpine white
'05 407

RobNL

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TurboTime
Addict
Rennlist Member

Join Date: Sep 2002
Location: Rosamond, CA
-Willow Springs RCWY
Posts: 191

Thanks Danno. I did try Home Depot in Lancaster, they had the xylene but no toulene. Maybe they were just out for the moment?
I'll try the Palmdale store too, or just give the xylene a try in smaller quantities.

Greg

_____
Greg

'89 944 Turbo: GURU Stage II MAP, Guru Racing T04E turbo, 65# injectors, LR blow-off, LR 3" full exhaust, LR dual port wastegate, LR MBC, WF HG, 155K miles strong at 18 psi.

'88 944 n/a auto with 165K miles

Active PCA Card Carrying Member http://www.p-caronline.com/directory/89_turbotime/

06-26-2003,
01:20 AM

#**10**

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

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Go for the xylene! It's about the same price as toluene and gives you 117-octane! Three gallons in 1/2 a tank would give you 97-octane.

That's just above the 96-octane miminum needed to use the intermediate ignition setting for race-gas/street-gas blend. I doubt you'd notice much from the hotter ignition though, because we're already on the edge of diminishing returns. More advance would just compress the pistons and con-rods rather than spinning the crank.

Better way to get more power is to use the 2-degree ignition retard setting and run 18-20psi of boost!

06-26-2003, 09:08 AM

#**11**

Alpine951
Addict
Rennlist Member

Join Date: Sep 2001
Location: Massachusetts
Posts: 1,571

Alpine951

What is the 2 degree ignition retard setting??

My car is an 86 with the barn door at the moment. I have some chips with a manual boost controller bypassing the cycling valve, 3.0 bar fpr, and slightly shimmed wastegat. I was running 18-19psi for the last year until my car starting hesitating at the track. People here thought it was the computer sensing some knock and the fuel cutoff kicking in. I have turned the boost down to 15 and it seems OK now.

How do I retard the ignition 2 degrees and what would i expect from the car aside from the ability to increase my boost?

_____
1986 951, K27/6, 65# Delphis, stock afm, 3 bar fpr, Profec Spec BII, Evolution Motor Sports diverter valve, 2.5" cat pipe.

65# delphi injectors will be for sale soon!

New winter ride - 1994 Audi 90S. 130k black on black leather. $2,500!
Old winter ride - 86 toyota PU. $500. rusts. leaks gas. finally drove it to the junk yard. got my moneys worth!

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06-26-2003, 10:19 AM

#12

crazyracer
User

Join Date: Feb 2003
Location: somewhere nice
Posts: 267

I have used xylene and I found a mix of 10 % to the 94 I can buy here just perfect. I am considering aviation gas as I have a good source for it. Any disadvantages to it?

crazyracer

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06-26-2003, 10:36 AM

#13

Big Lanky Texan
New User

Join Date: May 2003
Location: Sunny Buck WV
Posts: 3

yeah, AvGas is really expensive and has lead in it. It tends to clog spark plugs (which is why we do a leaned runup before takeoff on some of the old cessnas) and it'll be really bad for your cat... if you still use it. if you don't have a cat installed, try 100LL, or even 110LL if you can find it. 110LL is much harder to find these days.

Big Lanky Texan

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06-26-2003, 10:47 AM

#14

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

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"What is the 2 degree ignition retard setting??"

"How do I retard the ignition 2 degrees and what would i expect from the car aside from the ability to increase my boost?"

It's part of the FQS-Fuel Quality Switch settings. Check the "944/951-Repair:FQS Settings" section on 951 RacerX website. Avoid the FQS settings table found in the 944FAQ because it's really for a 911 and you can potentially damage your car if you use the wrong table.

The combustion-chamber on these cars are very inefficient with 2-valve/cylinder, wedge-shaped with spark-plug off to one side. Combustion is extremely show as evidenced by the need to have twice as much igntion-advance as just about any other car out there. Thus, igntion-tuning doesn't make that much of a difference. However, knock & detonation does come into the equation when you try to tweak ignition too much. So... it's best to retard the ignition when you're running more boost; it won't affect power that much, but it will ward off knock & detonation.

"I am considering aviation gas as I have a good source for it. Any disadvantages to it? "

It won't help that much. AvGas typically have lower specific-gravity than street gas, so you'll run lean at the same injector duty-cycles. They are also designed for steady-state engines that run at a constant RPM. Lastly the lead and other deposits they leave will damage your engine. Best to use unleaded race-gas designed for cars which is boosted with pure hydrocarbons rather than organometallics. Or mix your own.

06-26-2003, 01:19 PM #15

toddk911
Guru

Join Date: Apr 2002
Location: Orlando, FL
Posts: 4,553

toddk911

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Tim, just use the Xylene. More bang for the buck. ABout same price, easier to find asnd 117 octane vs. toulene is 114. Both are aromatic hydrocarbons and not dangerous like leaded race or aviation fuels.

Add toddk911 to Your Buddy List

06-26-2003, 02:32 PM #16

Alpine951
Addict
Rennlist Member

Join Date: Sep 2001
Location: Massachusetts
Posts: 1,571

In the FQS on Racer X's sit, it shows that the timing won't be retarded until 3 to 4 clicks on the DME. It also shows % changes to the fuel. What are the % changes to fuel?

_____
1986 951, K27/6, 65# Delphis, stock afm, 3 bar fpr, Profec Spec BII, Evolution Motor Sports diverter valve, 2.5" cat pipe.

65# delphi injectors will be for sale soon!

New winter ride - 1994 Audi 90S. 130k black on black leather. $2,500!
Old winter ride - 86 toyota PU. $500. rusts. leaks gas. finally drove it to the junk yard. got my moneys worth!

Alpine951

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06-26-2003, 03:04 PM #17

IceShark
Addict
Co-Sponsor & Rennlist Member

Join Date: Jun 2001
Location: Minneapolis, USA
Posts: 5,157

Oh boy, As Danno says, don't use AvGas. I had a girlfriend chemist at Amoco in Chicago lecture me about this over lunch when I first went to different chips and increased boost.

I found out when hunting in Alaska they use AvGas for about everything out in the bush. The planes come in and offload some gas out of the wing tanks for future use when they are dry. Everyone runs their motors off it in ATVs, snow machines and Outboard boat motors. The motors don't last long.

IceShark

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06-26-2003, 03:10 PM #18

fast951
Addict
Rennlist Member

Rennlist Site Sponsor

Join Date: Mar 2002
Location: Atlanta
Posts: 3,537

fast951

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Except for the Low Lead, if your car is TUNED to run on AvGas, there is nothig wrong with it. However, the density of AvGas is about 15% or so lower than Pump gas. So your car will run LEAN.
Results, not good at all, especially with forced induction.
Don't ask me how I found out!

_____
John
www.vitesseracing.com

06-27-2003, 08:47 AM

#19

Jeff Lamb
Addict
Rennlist Member

Join Date: Nov 2001
Location: Formerly Cincinnati / Now Charlotte
Posts: 197

Jeff Lamb

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Regarding lower specific gravity fuels (such as AvGas), I am thinking that this means the fuel will burn faster once it has reached its point of ignition (i.e. overcome octane's resistance to ignition or pre-ignition). Therefore, I am thinking that this really is not an issue with air / fuel ratio (i.e. running lean). I think it is more of an issue of too much ignition advance. In other words, when you run a lower specific gravity fuel, you would use less ignition advance than you would running a higher specific gravity fuel. Does this make sense?

I suppose the initial thought would be to add more fuel to try to counteract the "knock" created by the low specific gravity fuel combusting too fast, however, I think this might be the wrong approach. The better approach would be to properly recalibrate the ignition advance curve.

These are just my rational thoughts and observations. Somebody please correct me if I am wrong.

Jeff

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06-27-2003, 09:39 AM #20

threesticks1
Registered User

Join Date: Dec 2002
Location: Phoenix, Arizona
Posts: 156

AvGas is formulated to run in large diameter cylinders with slow moving pistons at high altitudes. It is formulated to burn at a slower rate that Motor gas.

I don't think that specific gravity has a lot to do with the anti Knock quality of fuel. It has more to do with the chemical composition.

threesticks1

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06-27-2003, 10:51 AM #21

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

"In the FQS on Racer X's sit, it shows that the timing won't be retarded until 3 to 4 clicks on the DME. It also shows % changes to the fuel. What are the % changes to fuel? "

The fuel% adjustments are just duty-cycle changes to the final calculated amount based upon air-flow, load, air-temp, RPM, etc. So with the stock chips, you can adjust the fuel amount by +/- 3.1% and +6.3%. Be aware though that increasing duty-cycle will cause an earlier onset of the 100% duty-cycle limit where your fuel-injectors are maxed out.

"I am thinking that this means the fuel will burn faster once it has reached its point of ignition (i.e. overcome octane's resistance to ignition or pre-ignition). Therefore, I am thinking that this really is not an issue with air / fuel ratio (i.e. running lean). I think it is more of an issue of too much ignition advance. In other words, when you run a lower specific gravity fuel, you would use less ignition advance than you would running a higher specific gravity fuel. Does this make sense?"

Not really, I agree with Steve and will expand on that. First on the specific-gravity issue and then on the ignition/knock idea. Also fuel and ignition are completely different and independent factors that can be programmed separately. Fuel must be correlated with the amount of air that's ingested at any given time by the engine and ignition has to do with the engine-speed and load.

Specific-gravity is density, **gm/cc**. Combine that with flow-rates of an injector **cc/min** and you end up with a mass-injected per unit time unit of **gm/min**. The EFI computers managing the engine have a built-in assumption on the density of fuel and times the injector pulse-widths to a certain amount of opening time to inject a specific mass of fuel to match the ingested air. Let's take a theoretical amount, say 14.7gm of air is sucked in, then the injectors would open an X amount of milliseconds to dispense 1.0gm of fuel to match. If you put in AvGas with a 15% lower density, you'll only be injecting 0.85gm of fuel for the same amount of opening time on the injector. This is **definitely** a change in air-fuel ratio, thus you'll have too little fuel to match the same amount of air.

In both these cases, the amount of fuel is minimal in the combustion-chamber compared to the amount of air. With the fuel completely vaporized and well-mixed, the air-fuel mixture will occupy the entire combustion-chamber volume at full-compression. With the street gas, you may have an air-fuel ratio of 14.7:1 and the same volume of AvGas would result in 17.3:1. The lower amount of fuel in the AvGas mixture will result in lots of extra oxygen that doesn't have a C-arbon or H-ydrogen atom to combine with. The extra oxygen will result in much, much hotter combustion, meaning a higher likelihood of knock & detonation and pre-ignition (the extra heat is retained in the plugs and chamber walls).

There are many, many factors in formulating gasoline. It is blended from as many as 15-20 refinery streams to meet a set of target specifications. Specs like a D86-distillation curve, RVP-Reid vapor pressure, octane, and a host of others. Some of these factors, like RVP, change with the season. The gasoline blend changes to meet those different targets. RVP could be as high as 11-13 psi in summer, and as low as 5-6 in winter, while most racing fuels are around 4-5. So it would a fallacy to think of "91 Octane gasoline" as a specific thing- it, and every other level of gasoline, change all the time. AvGas is formulated for a specific application, air-cooled plane engines running at high-altitude. So the fuel needs to be light (fewer molecules per gallon), resistant to detonation because of the wide temp-variations in an air-cooled engine and it needs to be very stable with a slow flame-front.

Why does this matter? Because it leads into the next great myth that needs to be debunked. Here's the real truth- **OCTANE AND "ENERGY CONTENT" DO NOT CORRELATE**. They just don't. That doesn't mean that if you have one gallon of 87 (R+M/2) and one gallon of 93 that the heat of combustion won't be different between them. It just won't vary the same way the next time you try the test. Maybe in the winter the 93 octane will have a higher energy content, and maybe in the summer the 87 will be higher. I always see all these internet generalizations regarding octane and energy- how higher octane fuel burns slower and thus makes less power if you don't need it. SOME significantly higher octane fuels are blended in such a fashion as the heat of combustion of the mixture ends up being lower, but its not because of the higher octane. Some non-leaded racing fuel blends fit this bill- their reliance on aromatics and a few other components over branched chain paraffins caused the heat of combustion of the total mixture to be lower vs. a standard gasoline fuel. Because of some data they've seen with very high octane unleaded race fuel, people tend to get this idea that higher octane equals less energy. The octane, energy-content, and flame-front speeds are all specific properties that can be custom-tailored for the application.

Next myth- **OCTANE DOES NOT CORRELATE WITH FLAME FRONT SPEED**. This is another convenient explanation for some people, but it doesn't fly either. I'll offer an example. Two chemicals were originally used to define the octane standard back in the day. Normal heptane (octane 0) and 2,2,4-trimethylpentane (also called iso-octane, with a definition of octane 100). These two chemicals are similarly sized, and also have nearly identical flame front speeds, but one has an octane of 0 and the other an octane of 100. Heptane is so sensitive, you can practically set it off by clapping nearby.

However, **FLAME-FRONT SPEED** *DOES* have a relationship to **MIXTURE-DENSITY** and **POWER**. Given that you have a fixed volume in the cylinders before compression, the more air (and matching fuel) you put in, the faster the combustion will be. For example, if you have the throttle half-open, you'll be stretching and lowering the air-pressure of the mixture going in. Only a small amount will make it into the chamber and combust. If you have the throttle-fully open, more air (and matching fuel) will be sucked into the **same** volume of cylinders, resulting in higher density. This mixture will burn faster and yield higher pressures than the previous one at half-throttle. Same idea with increaing compression or turning up the boost, this gives you higher mixture densities and power. Typically, the higher the flame speed, the more the power because you can have more of the combustion pushing on the pistons at the top simultaneously, rather than a little at first, which isn't helped by the little later since the initial push has already given its all by the time the tail end of the combustion takes palce. Too rapid of combustion though, can lead to simultaneous igntion somewhere else and you end up with knock & detonation which generates pressure-points 30-50x higher than normal.

So what is octane, and why does it confuse so many people? The simple reason for the confusion is that octane is really a chemical property, and people have a hard time understanding that. So they try to equate it with some physical property that they can understand, and are inevitably wrong in doing so. Octane has a lot more to do with the bonds of a particular molecule, and how prone they are generating radical alkyl

Danno

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06-27-2003, 11:42 AM

#22

threesticks1
Registered User

Join Date: Dec 2002
Location: Phoenix, Arizona
Posts: 156

Exactly. Wow Danno.

threesticks1

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06-27-2003, 01:12 PM

#23

Alpine951
Addict
Rennlist Member

Join Date: Sep 2001
Location: Massachusetts
Posts: 1,571

What if you don't have stock chips when adusting the FQS?

_____
1986 951, K27/6, 65# Delphis, stock afm, 3 bar fpr, Profec Spec BII, Evolution Motor Sports diverter valve, 2.5" cat pipe.

65# delphi injectors will be for sale soon!

New winter ride - 1994 Audi 90S. 130k black on black leather. $2,500!
Old winter ride - 86 toyota PU. $500. rusts. leaks gas. finally drove it to the junk yard. got my moneys worth!

Alpine951

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06-27-2003, 03:29 PM

#24

Jeff Lamb
Addict
Rennlist Member

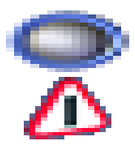
Join Date: Nov 2001
Location: Formerly Cincinnati / Now Charlotte
Posts: 197

Danno, thanks for your awesome post!! It is very informative!! I am going to study this stuff a bit more closely and I will report back with additional info (should I come across anything useful).

One thing I was wondering -> does a lower specific gravity fuel flow any faster through a specified orifice (fuel injector) over a fixed period of time (when compared to a higher specific gravity fuel)? Probably not, but I want to look into it.

Regarding burning speed: If you have two identical engines running two different fuels with different specific gravities and you tune each engine to maintain the proper air / fuel ratio, which compressed air / fuel mixture will combust with the highest burning speed? The lower specific gravity fuel or the higher one? I am guessing the fuel with the lower specific gravity will combust faster but I don't know for sure. This is the issue I was trying to address in the context of ignition timing.

Best regards,
Jeff



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06-27-2003, 07:18 PM

#25

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

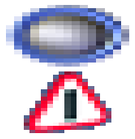
"What if you don't have stock chips when adusting the FQS? "

Find out from the chip-manufacturer, everyone is different. Most follow the stock chip convention, but some do not, such as AutoThority. Which makes significant +/- 12.5% changes. I suspect this may be a way of calibrating to different MAF sensors.

"If you have two identical engines running two different fuels with different specific gravities and you tune each engine to maintain the proper air / fuel ratio, which compressed air / fuel mixture will combust with the highest burning speed?"

Fuel density shouldn't matter at that point because the fuel molecules are no longer in contact with each other like in a liquid. A bigger factor here would probably have to be partial vapor-pressures.

But flame-front propagation and combustion speed has less to do with the density of the fuel in liquid phase than to do with the chemical make-up of the fuel. That is, the specific cocktail of hydrocarbons in the fuel. Good example is comparing AvGas, auto race-gas and pump-gas. Both the AvGas and race-gas tends to burn slower than pump-gas. Yet one is 15% lower density than pump gas, while the other one is 7% higher density than pump gas. The factor that probably makes the biggest difference in combustion-speed is probably the ratio of straight-chain vs. branched chain vs. aromatic hydrocarbons.



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05-12-2003, 11:10 AM #1

Corleone
Registered User

Join Date: Apr 2003
Location: Sweden - Norrkoping
Posts: 272

Corleone

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05-12-2003, 01:00 PM

Danno! When do you ship the Link/Motronic replacement?

I´m waiting! It´s the only thing left now before I can drive and map the car!

Is the doublecoil ignition thing ready at the same time? Is the J-pipe and KN included? Do I need to buy separatly the Link Engine Management modul or is all thing included for to use a Lap Top?
Danno please tell us more. I know many of us out here is waiting for this!

#2

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

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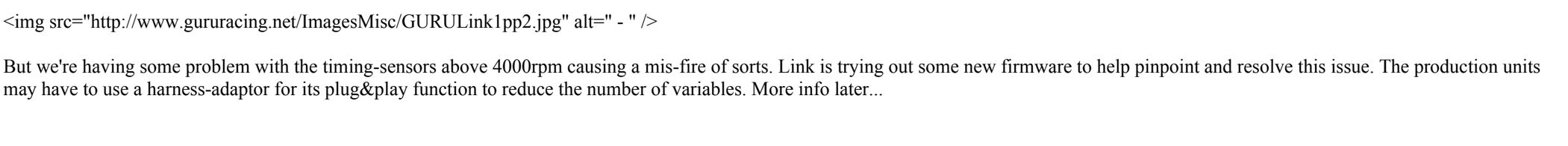
Hello Corleone

I've got two of these units with beta-testers right now:



But we're having some problem with the timing-sensors above 4000rpm causing a mis-fire of sorts. Link is trying out some new firmware to help pinpoint and resolve this issue. The production units may have to use a harness-adaptor for its plug&play function to reduce the number of variables. More info later...

Visit Danno's homepage!

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05-12-2003, 01:14 PM #3

Corleone
Registered User

Join Date: Apr 2003
Location: Sweden - Norrkoping
Posts: 272

Corleone

How many weeks to delivery?

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05-12-2003, 03:08 PM #4

Matt Sheppard
Addict
Rennlist Member

Join Date: Aug 2002
Location: Healdsburg, CA
Posts: 1,092

Ohh, the heat is ON! . . That's OK, Danno, you take as long as it takes to make it right.

Corleone: Have you ever tried a beta-version of an opperating system software (microsoft XP, mac OSX)? Do you want to go through THAT with the setup of your engine mangement?

I dont think you want it "yesterday" if he isnt finshed with it yet.

_____
Matt Sheppard

'87 951 Guards Red on Black (Spencer) -parting
'87 951 "SteinGrau" on Linen (Crush) - reviving
'86 951 Graphite Metalic on Linen (Gayrod) - driving
_ _ _ ___ _ _ _

Matt Sheppard

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05-12-2003, 06:46 PM #**5**

David Floyd
Addict
Rennlist Member

Join Date: May 2001
Location: Tennessee
Posts: 4,998

Corleone,

We know how you feel, but Danno will only ship when he feels things are perfect, which is how it should be and because I for one do not want to blow up an engine that I have a ton of money invested.

I've got dibs on the first production unit, as I made a deposit last September.

Hang in there

_____
David Floyd
87 951 106mm bore, 2.785 Ltr

Powered by Vitesse Racing
Paragon Products - Porsche Parts & Accessories
HWFM Racing, Team "go fer"
My P-Car Online Profile

David Floyd

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05-12-2003, 06:50 PM #6

Bill
Addict
Rennlist Member

Join Date: May 2001
Location: Gilroy, CA
Posts: 1,588

I am willing to risk blowing my engine, but with Danno I think it unlikely.

Danno I have not gotten mine yet, wasss up?

_____
Bill
86 951 (used to be anyway)
Damn I love this car!

Bill

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05-12-2003, 09:27 PM

#7

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Sorry Bill, I was gonna ship yours out last week, but realized I was out of stock on the serial-adaptors to hook it up to your laptop. They should be in tomorrow and I'll get it right out.

I suspect the mis-firing can be from improperly-adjusted speed & reference sensors. Link's new firmware partially solved the mis-fire, but moved it up to 5000rpm now instead of 4000. Bill's the meticulous SAE-tech kinda guy, so I'm hoping he can get a scope-reading of his speed & reference sensors so we can correlate this to the mis-firing.

Danno

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05-13-2003, 11:28 AM

#8

Corleone
Registered User

Join Date: Apr 2003
Location: Sweden - Norrkoping
Posts: 272

Corleone

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05-13-2003, 05:55 PM

I don´t want to push Danno at all. Of course it has to be perfect before it goes to the customers. For myself I just wonder if I should wait (a couple of weeks or months)or put back the original AFM so I can drive my car. I have changed turbo to a GT 3035, build a 3" exhasut all the way and changed to a Lindsey intercooler stage II. The only missing thing is just the Link!

#**9**

Bill
Addict
Rennlist Member

Join Date: May 2001
Location: Gilroy, CA
Posts: 1,588

Danno,

No problem. My only urgency, is to get my hands on some more "Pushing the Envelope" Guru Racing cool stuff!

It will not be a problem scoping the speed & reference sensors. When I do, I will shoot a digital photo of the patterns and post them here for your use.

Hopefully my car will not develope the same mis-fire as test vehicle #1 (tv#1).

If the sensors are not within the specified distance to the flywheel or are failing, then a weak, eratic or non-existant signal pattern will be seen. If the car ran fine prior to the Guru-Link, and you suspect the sensors, I would say that the Guru-Link system would have to be more sensative to a weak signal than the Motronic. Or it is something else.

Possibly a non-Link related issue, specific to tv#1. We shall see.

I can't wait to install, and get some resemblance of control over my 65lb Guru injectors. My ARC II just can't cope.

Not to mention a quality dyno print-out!

Bill
86 951 (used to be anyway)
Damn I love this car!

Bill
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05-22-2003, 02:09 PM #10

Corleone
Registered User

Join Date: Apr 2003
Location: Sweden - Norrkoping
Posts: 272

Any news? Is it "near"?

Corleone

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05-22-2003, 02:31 PM #11

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Let me call them and see if they've got the ignition/high-RPM drop-outs taken care of. I'm going to have to send back all the boxes we have to get updated as well...

Danno

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05-22-2003, 05:38 PM #12

turbite
Specialist

Join Date: Apr 2003
Location: SF Bay Area
Posts: 956

turbite

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05-22-2003, 07:52 PM

A few quick questions about the Link-1.

Can I run closed-loop at WOT with a target AFR of 12.5? This seems a lot easier than trying to tune open-loop such that it creates a perfect flat curve at 12.5.

Can I control the timing advance too?
Can I just advance it till its close to knock, or is this automatic?

I'm having a hard time finding a good generic source fo info on the link-1.
There's all I've found
(the manuals arent bad)

#13

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

Yes, yes and yes/no.

Knock-detection is at best a safety measure, not performance. One should not ever use it to tune a car. Look at how effective the stock knock-detection mechanism is at preventing blown headgaskets. Optimum way to tune ignition timing is to use steady-state dyno and test each zone individually. Gradually advance ignition until best torque is achieved, it will start to drop off with the onset of detonation/knock (still unaudible at this point). Then back off **several** degrees for safety. Also once knock starts, you have to back off igntion significantly to stop it, rendering active knock-detection at the edge an ineffective way of getting optimum timing.

"Can I run closed-loop at WOT with a target AFR of 12.5?"

Yes, you can actually set individual lambda-targets in various operating zones. At idle you want 14.7:1 to get stable idle and pass smog tests. Steady-state cruising in the mid-range can be 15-16:1 for fuel-economy and good throttle-response. Higher load zones (+80%) can start getting richer for power and safety. There are some conditions that must be met in order to use the lambda-autotune feature though, but I'll make sure the entire procedure is well documented.

More info on the Link-1 unit on our GURU New Products Forums: GURU Link-1 Plug & Play EFI system

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05-22-2003, 07:56 PM #14

Dave E
Specialist

Join Date: Jan 2002
Posts: 697

Danno, I have an issue with my order from you...could you check your email at the vine...Thanks

Dave E

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05-22-2003, 08:59 PM #15

PerformanceDevelopments
User

Join Date: Jul 2002
Posts: 32

To update who ever is waiting for the Link EFI systems, we are presently testing several versions of software along with the necessary hardware. We are experiencing some issuses with the very high tooth count of the 944 triggering. The triggering is 132 teeth, so @ 6000 RPM the count is something above 13K per sec, and about 800K per min. Any slight engine harmonic throws our count off, and an error occurs. In looking how Porsche did it, has required us to dummy down our software and hardware, so that as Porsche does, we must exclude the variations of count when any harmonics occur. This is probably the reason they went to the lower count on the Motronic system. We expect everything to be tested and worked out by the 2nd week in June. In the meantime, for those who cannot wait, if you install a simple trigger wheel on the crank, 2 teeth only 180 degrees apart, you may use our standard D42V4 software. Link USA can supply the wheel and pickup and the mount if required. We have not made these as yet, but this should be very simple and take a couple of days to have available. If required you may also trigger the Link EFI by the 60-2 wheels (motronic). Any questions regarding this and the stock triggering, please call Link USA @ 949 646 7461.

Link USA

PerformanceDevelopments

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05-22-2003, 09:47 #16

PM

TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

<blockquote>quote:<hr /> experiencing some issuses with the very high tooth count of the 944 triggering.<hr /></blockquote> <blockquote>quote:<hr /> This is probably the reason they (Porsche) went to the lower count on the Motronic system <hr /></blockquote>Which is it? High count or low count?

<blockquote>quote:<hr /> The triggering is 132 teeth, so @ 6000 RPM the count is something above 13K per sec, and about 800K per min <hr /></blockquote><font size="2" face="Verdana,Tahoma,Helvetica">All counted by a processor running at 500 KIPS while doing all the other housekeeping. Sounds like Bosch did a hell of a job 20+ years ago. BTW Motronic timing is also accurate to the half tooth (now you're up to 1.6M/min).

TT

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05-22-2003, 10:19 PM

#17

m42racer
Specialist

Join Date: Feb 2003
Posts: 1,003

TT,

I think what they are saying is that the 944 counts the ring gear teeth, 132, and the 968 uses 58 teeth with 2 missing as the sync. I'm not sure but I think all 944's use the ring gear for the triggering, with the sync as a single pin. The other pickup is for the diagnostics I think. Danno knows this stuff, not me.

I'm interested in the Motronic timing you mentioned. Please explain. Do they count 1 tooth and have a multiplier. Usually, the count goes thro some sort of electronic piece and is processed and the count divided down to the number of Ignition firing points per RPM per number of cylinders, I thought. I'm no expert here. Link or Danno chime in here and tell us how. Seems to me that the high tooth count is only a result of using the ring gear teeth. Sort of, hey why fit a trigger wheel when we can use this. It makes no sense to me why they would want such a high count. You mention how accurate the motronic timing is. Lets face it, the Ignition timing, 944 or 968 all happens via a rubber drive belt.

m42racer

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05-22-2003, 11:34 PM

#18

TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

m42racer,

There are two parts to doing ignition timing the Motronic way, a complete accurate positioning signal (flywheel teeth) and a reference mark (flywheel stud for 944/951; missing or extra tooth 944S/S2/968). Since this Link system is a drop in for the 951, it is using the flywheel teeth/stud AKA speed sensor/reference sensor.

Motronic uses a processor to keep track of the speed and position of the flywheel for timing purposes so there is no rubber belt involved. The Motronic systems that use coil packs require a sensor on the cam to gate the ignition signal to the appropriate pack, but extreme accuracy is not required for that sensor.

There is no multiplier involved, each tooth transition is an accurate triggering point to fire the coil (951: 264 points/360 degrees, 944: 260 points/360 degrees, 911: 258 points/360 degrees, E30 M3 and most later BMWs: 228 points/360 degrees).

Does the 968 only have 58 teeth? That seems like a low number for a Motronic system.

And yes, Link is trying to use the existing speed/reference sensors, but their reply was confusing in the high count/low count references along with the dummy down statement. I've looked at the massaged reference and speed sensor signals inside Motronic on a scope and they look beautifully squared with no harmonics.

TT

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05-23-2003, 04:41 AM

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

"I'm interested in the Motronic timing you mentioned. Please explain. Do they count 1 tooth and have a multiplier."

You can even get 1/4 tooth accuracy through the hardware. Each tooth generates a complete sine-wave with a positive peak, a negative trough, and two zero crossings.

The ignition increments on the chip-maps are in 1/3rd of a degree, which is actually 1/8th of a tooth. So perhaps it's multiplying by two...? I'll have to go crawling through the Motronic code, but I don't recall this step anywhere, so perhaps it's done in hardware some place between the sensors and the software.

"Usually, the count goes thro some sort of electronic piece and is processed and the count divided down to the number of Ignition firing points per RPM per number of cylinders, I thought."

Using two separate sensors makes this task easier to understand. Let's say you've got an engine spinning madly away, how do you determine the position of the crank at any given point in time? Obviously ignition timing is more critical than fuel, so let's figure out how the Motronic DME can figure out where 19.8-degrees BTDC is to fire the plugs (one of the arbitrary ignition values I pulled off the chip's ignition maps).

Obviously, you cannot have a trigger right at TDC because you'll never be able to fire a spark **before** TDC. So the reference-sensor trigger is actually at 58.6-degrees BTDC. Now the DME does a neat multitasking trick where it will actually tracks both the reference-sensor AND the speed-sensor signals simultaneously. So every single one of the 132 tooth on the flywheel is noted when it goes by the sensor. As mentioned before, this signal can be sliced up into quarters for a hardware accuracy of 0.68 degrees.

Then once every crank revolution, the reference-sensor picks up the single trigger at 58.6-degrees BTDC. This signal is used to count down to TDC. Since we've got a resolution of 0.68 degrees, there will be 86 distinct positions (ticks) that can be selected between when the reference signal is triggered and when TDC arrives.

So, to fire off a spark at 19.8-degrees BTDC, the DME starts counting ticks after the reference-trigger goes by. After exactly 57 ticks goes by, it knows the crank is at 19.8-degrees BTDC and it fires the spark. Of course, it needs to fire another spark 180-degrees after this for the next piston, so it counts 264 ticks and fires off another spark at 19.8-degrees before BDC.

BTW, this teeth-counting trick is what the DME spends most of its CPU time doing; it's more than fast enough to keep up. Some people have asked about putting in a faster CPU in the DME or overclocking the existing one to get more performance. But what will happen is the CPU will just spend more clock-cycles waiting for the next tooth to spin under the sensor.

Somewhere on the Motronic DME board, there's a circuit that converts the sine-wave output of the speed-sensor into a square-wave. This might hold the solution to the Link adaptor board. I think I've got a schematic for a 911 Motronic DME somewwhere, but it should be similar if not identical...

"Lets face it, the Ignition timing, 944 or 968 all happens via a rubber drive belt."

Ignition **distribution** is done through the belt-driven distributor rotor. This timing isn't really that big a deal since the actual igntion-coil firing is done by the DME which goes off the crank-triggers. The width of the distributor rotor ensures that the spark makes it across even with variations in the cam-timing. Notice how adjusting cam-timing with an adjustable gear doesn't throw off ignition timing?

However, the cam-sensor used in the 968 for sequential injection and ignition can cause problems when it's not exactly in phase with the crank. This can be the case when the belt stretches to different lengths at various RPMs. This can then cause spark-scatter when half of ignition triggers goes off the cam-sensor. The error may be a degree or two off from the crank. I know the Link-2 when used with sequential ignition has a lot of spark-scatter issues on the Miata due to the large amount of stretch in the belt.

Danno

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05-23-

#**20**

2003, 07:19 AM

TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

<blockquote>quote:<hr /> Obviously, you cannot have a trigger right at TDC because you'll never be able to fire a spark before TDC. So the reference-sensor trigger is actually at 58.6-degrees BTDC. <hr /></blockquote>Doesn't matter where the ref mark is when the teeth count is available. Motronic uses the ref mark at 50-60 degree BTDC on cyl 1 because it also starts the fuel injector batch fire at that time. Ignition table values are stored in 1/4 tooth increments and this affects calculated values when all the different ignition map values are added. But when converted to values used in the counting process, the accuracy drops to the half tooth value.

<blockquote>quote:<hr /> After exactly 57 ticks goes by, it knows the crank is at 19.8-degrees BTDC and it fires the spark. Of course, it needs to fire another spark 180-degrees after this for the next piston, so it counts 264 ticks and fires off another spark at 19.8-degrees before BDC. <hr /></blockquote>Actually Motronic cheats. It only counts whole teeth to get to a specific spot on the flywheel, then if the timing is at a half tooth mark, it polls for the half tooth transition before firing the coil otherwise it fires immediately for the whole tooth. So on the 951, Motronic counts 66 whole teeth transitions (180 degrees) to get around to the coil charge/discharge cycle for cylinders 2 & 3. If you notice, the 911 uses 129 teeth because there are 3 firing events per rev (43 teeth/120 degrees) and BMW uses 114 teeth which allows them to use the same flywheel setup on both 4 and 6 cylinder engines (57 teeth/180 degrees and 38 teeth/120 degrees).

<blockquote>quote:<hr /> Somewhere on the Motronic DME board, there's a circuit that converts the sine-wave output of the speed-sensor into a square-wave. This might hold the solution to the Link adaptor board. I think I've got a schematic for a 911 Motronic DME somewwhere, but it should be similar if not identical...
<hr /></blockquote><font size="2" face="Verdana,Tahoma,Helvetica">Yep. It's in chip S100 on the top board. That's the only chip I haven't been able to cross reference to a commercially available part. If you have the part number, I already have the rest of the circuit. If not, if you can extract the chip off a bad board you have, I have coworkers that could delaminate the thing to find out what it is.

TT

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05-23-2003, 09:07 AM

#21

m42racer
Specialist

Join Date: Feb 2003
Posts: 1,003

I understand all of this, but the timing does happen via a rubber belt. You can have all of this software accuracy all you want, but the final Ignition point is based purly upon the amount of belt stretch etc, driving the distributor rotor. My point, is that Bosch as typical, over engineered the teeth count, and as you point out the degree of timing resolution, but lossed any accuracy by driving the rotor via a rubber belt. If you want to see just how much flex is in a timing belt at 3000 RPM or more, stand in front of one of these engines when its on a dyno and watch it. You would be amazed. Final timing still comes down to all of these factors, and running as close to DET as you wish to.

m42racer

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05-23-2003, 10:29 AM #22

Matt Sheppard
Addict
Rennlist Member

Join Date: Aug 2002
Location: Healdsburg, CA
Posts: 1,092

Well, the ignition timing doesn't seem to be determined by the belt - but the valve timing does. The stock cam is not all that aggressive so I'd consider a degree or 2 at the cam a moot point.

_____
Matt Sheppard

'87 951 Guards Red on Black (Spencer) -parting
'87 951 "SteinGrau" on Linen (Crush) - reviving
'86 951 Graphite Metalic on Linen (Gayrod) - driving

_ _ _ ___ _ _ _

Matt Sheppard

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05-23-2003, 10:38 AM #23

TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

944/951 ignition timing does not depend on the rubber belt. Look at the size of the rotor blade. It is huge. The rotor/distributor setup on a 944/951 is not used for timing purposes, only for directing the coil impulse to the proper spark plug. Motronic controls the timing of the spark event, the rotor/distributor tells it where to go. Don't think of this setup in terms of the normal points type distributor. If you try to turn a 944/951 distributor you will not change the timing and could end up sending the spark to the wrong plug.

Bosch could have easily implemented a wasted spark setup on these DMEs, they just ran out of outputs on the processor.

TT

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beab951
Addict
Rennlist Member

Join Date: Feb 2002
Location: Bloomington
Posts: 2,210

It's in chip S100 on the top board

I did a search and couldn't find a match. The pinout on that IC is also strange. I think it is some sort of PLL but...

Anyone have a bad DME they would be willing to sell for a small price?

_____
Brian Broderick
86 & 87 951

beab951

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05-23-2003, 12:04 PM

#**25**

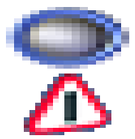
TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

beab951,

Yes, the chip is strange. Power on 14 and ground on 1. It might be some type of dual op amp/comparator with disable or strobing. The inputs are both pairs from the ref and speed sensors (2, 3, 4, 7) and one input (11) from the 8751 (A12 NOR _WR). The outputs are the squared signals from the ref and speed sensors on pins 8 and 10. Pin 12 is capacitively coupled to ground. Pins 5, 6, 9, and 13 are all NC.

What markings are on the chip you have seen, mine has "F" and either a 1 or l, then the date code 8546 and 2438-03.



TT

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05-23-2003, 12:26 PM

#26

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

"I understand all of this, but the timing does happen via a rubber belt. You can have all of this software accuracy all you want, but the final Ignition point is based purly upon the amount of belt stretch etc, driving the distributor rotor."

Uh, no. We do not have the traditional points & condenser type of distributor that sets off the spark. With the old-style distributor, the spark is initiated when the points separate after a predetermined dwell interval to charge the coil. The points are usually driven by a polygon-shaped shaft on the distributor. The distributor is set up so that the rotor is within range of one of the plug-wire posts when the points disconnect. By rotating the entire distributor body in relation to the camshaft, the ignition timing (points trigger) can be changed. Note that rotating the distributor cap in relation to the distributor body has no effect on the timing.

The Motronic DME then, separates the function of spark-creation from spark-distribution to the correct cylinder. The spark-creation is done by dumping the coil (monitor DME line #1). All timing and timing-adjustments for knock is done electronically, there's no physical points or condensers anymore.

That's also how the ignition-retard can occur through the KLR. It can change the ignition timing by up to 64 degrees (depends upon chip-mapping), yet there's no mechanical change in the cam, distributor cap or rotor timing at all.

"944/951 ignition timing does not depend on the rubber belt. Look at the size of the rotor blade. It is huge. "

Yup, take a look at this picture:

This represents a 20-degree range where the distributor rotor is still within contact with the plug-wire post. It doesn't matter what rotation the cam or the rotor is in, intentionally or through belt-stretch, when the DME fires that spark at 19.8-degrees BTDC, it's going to jump across with the exact same ignition timing.

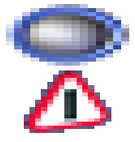
You can test this yourself if you have an adjustable cam-sprocket. Get a dial-back-to-zero timing-light and check out ignition-timing at idle. You'll see that it's 4.8-degrees BTDC (use a mark on the crank-pulley, or notch on flywheel). Stop the car and rotate your cam-sprocket 10-degrees in either direction (don't forget to lock it down again). Start up the car and check ignition-timing again. You'll see that it's still set to 4.8-degrees BTDC even though you have changed the cam-timing.

I think what confuses a lot of people, including professional mechanics, is that they aim the timing-light at the cam-sprocket to line up the TDC mark with the outside housing. Then when they make an adjustment to the cam-timing, lo and behold, the TDC mark moves! Therefore, it changed ignition timing right? Nope, the ignition timing stayed the same, you've just rotated the cam-sprocket that's all.

"If not, if you can extract the chip off a bad board you have, I have coworkers that could delaminate the thing to find out what it is."

TT - I'll send you a couple of dead DME boards along with your injectors.

Beab951 - I'll send you some dead DME boards too along with your chips and Link system.



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05-23-2003, 12:41 PM

#27

TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

<blockquote>quote:<hr /> TT-I'll send you a couple of dead DME boards along with your injectors <hr /></blockquote><font size="2" face="Verdana,Tahoma,Helvetica">Sweet

Thanks. My car thanks you (no more 110% duty cycle runs).

TT

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05-23-2003, 01:21 PM

#28

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Want a dead KLR box too? Maybe your guys can open up the CPU and zap the read-protect bit.

Danno

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05-23-

#29

2003, 01:30 PM

beab951
Addict
Rennlist Member

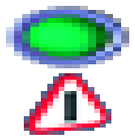
Join Date: Feb 2002
Location: Bloomington
Posts: 2,210

Want a dead KLR box too?
Sure! Of course I would NEVER attempt to unlock a chip.

TT

I don't have my DME open so I can't answer the question on markings. I do remember I didn't get any new information from these markings, might be a custom IC or at least, a custom marking from the vendor. If I get the bad box, I am going to recreate the interface circuit and see what the signal look like on each pin. At least I can get a better guess at it functions.

_____
Brian Broderick
86 & 87 951



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05-23-2003, 02:11 PM

#**30**

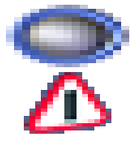
TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

<blockquote>quote:<hr /> Want a dead KLR box too? <hr /></blockquote><font size="2" face="Verdana,Tahoma,Helvetica">Sure.

beab951

Most of the chips were custom marked, but I was able to determine the real parts except for S100, just need to find that old datasheet that will match to some ancient part. I had used those outputs last year to test the feasibility of using coil packs with the stock Motronic on my 944. It worked with a circuit I built and a wasted-spark dual coil from a Subaru. I will revisit that project once I finish with my current one. I will eventually be doing a coil on plug setup.



TT

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05-23-2003, 02:39 PM

#31

beab951
Addict
Rennlist Member

Join Date: Feb 2002
Location: Bloomington
Posts: 2,210

beab951

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TT
Did you get a cross on S400? Most of the other ICs are easy to identify because of their function on the schematic...some even have real P/N on them.

_____
Brian Broderick
86 & 87 951

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05-23-2003, 04:08 PM

#32

TT
Addict
Rennlist Member

Join Date: Jun 2001
Location: Huntingtown, MD
Posts: 306

TT

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beab951,

My spare DME and notes are at work. Is S400 the one near the injector drivers? I have three different DMEs: 86 944, 88 944, and 89 951. Some of the chips in the later models weren't custom marked like the earlier ones. I've got to crack the 89 open this weekend to reprogram something, I'll check then.

Send a private message to TT

Send email to TT

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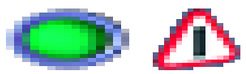
05-23-2003, 04:36 PM

#33

beab951
Addict
Rennlist Member

Join Date: Feb 2002
Location: Bloomington
Posts: 2,210



beab951

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Yup, the S400 is the IC that controls the darlinton NPN transistor T402 that drives the Injectors. I looked at dozens of Injector driver ICs and couldn't find a match.

_____
Brian Broderick
86 & 87 951

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06-23-2003, 09:23 AM

#1

John..
Specialist

Join Date: Nov 2001
Location: Northern Kentucky
Posts: 1,453

Ignition advannce and boost levels

To those of you out there who have tinkered...

What is your total timing advance on the boosted 944 engines, and at what boost level is this happening?

I am getting ready to fine tune my Turbo 928 and I am probably going to go with a total timing of about 18/22 degrees at 14 psig. Right now I run about 26 degrees on 8 psig without issue...I can even run 87 octane there if I want to.

My reason for asking here is the early 928 and 944 2 valve engines share the same combustion chamber design. The 944 setup should work just fine in my car. I will be running sans knock sensor, retard will be done with a pressure line off the manifold.

Any advice would be appreciated. Car has JE forged pistons and stock narrow fire ring Reinz gaskets.

John..

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06-23-2003, 10:24 AM #2

Konstantin
Addict
Lifetime Rennlist Member

Join Date: Jul 2001
Location: germany
Posts: 1,823

sent me an email.

Konstantin

Konstantin

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06-23-2003, 10:27 AM #3

Russ Murphy
Fanatic

Join Date: Dec 2001
Location: St. Louis
Posts: 1,654

Russ Murphy

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You've got mail.

Alan C.
Addict
Rennlist Member

Join Date: Jun 2001
Location: Cincinnati
Posts: 1,743

Alan C.

View Public Profile

Send a private message to Alan C.

Send email to Alan C.

At 20 psi I run 20 degrees with 50/50 110/93 octane. This is with a Tec3 and AF of 12.2

Alan C.

_____
Alan C.

02 996 C2, Black/Black
X74, GT3 Bars w Adj. Links, Adj. Rear Control Links
EVO V-Flow, Sport Cats, Short Shift
MKII Aero Kit on the way

Add Alan C. to Your Buddy List

06-23-2003, 04:03 PM #5

rage2
Addict
Rennlist Member

Join Date: Sep 2001
Location: Calgary, Alberta, Canada
Posts: 1,526

rage2

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At 13psi I run 18 degrees with 91 octane fuel. SDS AF of 12.3.

At 20psi I run 23 degrees with 103 octane fuel. Timing slowly ramps down to 19 degrees at 28psi.

Turbo's a Huntley Stage 3 unit.

_____
rage2
---
99 E55 AMG
87 951 2.8L Broken Big Bore
0whp on any gas .

06-23-2003, 06:38 PM #6

Sean Hall
Registered User

Join Date: Feb 2002
Location: Fullerton, CA
Posts: 281

Sean Hall

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Alan, Rage2, What compression ratio are you guys running?

Sean

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06-24-2003, 09:55 AM #7

John..
Specialist

Join Date: Nov 2001
Location: Northern Kentucky
Posts: 1,453

John..

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Send a private message to John..

Send email to John..

Find More Posts by John..

Add John.. to Your Buddy List

So, I should be safe with 18 to 20 degrees total advance between 12 and 14 psig at the manifold.

Thanks.

06-24-2003, 02:50 PM #8

rage2
Addict
Rennlist Member

Join Date: Sep 2001
Location: Calgary, Alberta, Canada
Posts: 1,526

rage2

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Add rage2 to Your Buddy List

Bone stock compression.

_____
rage2
---
99 E55 AMG
87 951 2.8L Broken Big Bore
0whp on any gas .

06-24-2003, 03:04 PM #9

fast951
Addict
Rennlist Member

Rennlist
Site Sponsor

Join Date: Mar 2002
Location: Atlanta
Posts: 3,537

fast951

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06-24-2003, 06:40 PM

#**10**

John,

Start low on the timing and build up. Most 951 cars do have the knock sensor, and it does help control knock. Since you do not have knock sensor, some of the numbers listed here may not be what you should aim for.

_____
John
www.vitesseracing.com

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

View Public Profile

Rage2's ignition timing looks scary to me...

Send email to Danno

Visit Danno's homepage!

Find More Posts by Danno

Add Danno to Your Buddy List

06-25-2003, 07:48 AM #11

Russ Murphy
Fanatic

Join Date: Dec 2001
Location: St. Louis
Posts: 1,654

Along these lines, Fast 951, what would you charge me to develop an ignition map for my SDS long distance?

Russ Murphy

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Send email to Russ Murphy

Visit Russ Murphy's homepage!

Find More Posts by Russ Murphy

Add Russ Murphy to Your Buddy List

06-25-2003, 08:16 AM #12

fast951
Addict
Rennlist Member

Rennlist Site Sponsor

Join Date: Mar 2002
Location: Atlanta
Posts: 3,537

Russ,

Developing a "good" ignition map is not something you want to do "long distance". Many variations will need to be accounted for. Also it's not financially smart as it ends up shewing up time. Beneficial for me as I bill hourly, but not beneficial for you.

Getting an "Ok" map is not a big deal. Getting a "good" map is more involved.

As much as I would like to assist you, I personally do not care for a just "ok" product, so it's not a project I would want to be involved in "long distance".

My best recommendation is to find a local tuner with a "Load" dyno that already knows SDS, and have them work with you. You'll end up with a good product without spending lots of $$$. I'll be glad to assist you on a limited basis, better to email me directly.

Did I just shoot myself in the foot?

_____
John
www.vitesseracing.com

fast951

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06-25-2003, 08:19 AM #13

crazyracer
User

Join Date: Feb 2003
Location: somewhere nice
Posts: 267

John, I understand why Russ is asking you. Why don't you help him developing an ok map first and then let him decide. Maybe an ok MAP is all what he is after.

crazyracer

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Send a private message to crazyracer

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06-25-2003, 11:53 AM #14

Russ Murphy
Fanatic

Join Date: Dec 2001
Location: St. Louis
Posts: 1,654

Russ Murphy

View Public Profile

Send a private message to Russ Murphy

Send email to Russ Murphy

Visit Russ Murphy's homepage!

Find More Posts by Russ Murphy

Add Russ Murphy to Your Buddy List

<blockquote>quote:<hr />Did I just shoot myself in the foot? <hr /></blockquote><font size="2" face="Verdana,Tahoma,Helvetica">Heck no!
John,
I do have a local SDS tuner with a dyno (my buddy Booger-WRX tuner extrodinare) that has no 951 experience. So what I'm envisioning is paying you to provide a "base" map and then fine tuning it on the dyno and consulting with you about it on an hourly basis. How's that sound to you?
Russ

Alan C.
Addict
Rennlist Member

Join Date: Jun 2001
Location: Cincinnati
Posts: 1,743

Alan C.

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Send a private message to Alan C.

I have stock compression as well. I have gone up to 23 degrees but didn't find any big change. So I backed it off to 20.

I do have a nock sensor but I only moitor the nock. I do not have it set to adjust the advance. The engine is fairly noisey and you can see it on the plots.

I agree with fast951. Start low and work your way up. It's a lot cheaper!

Alan c.

_____
Alan C.

02 996 C2, Black/Black
X74, GT3 Bars w Adj. Links, Adj. Rear Control Links
EVO V-Flow, Sport Cats, Short Shift
MKII Aero Kit on the way

Send email to Alan C.

Find More Posts by Alan C.

Add Alan C. to Your Buddy List

06-25-2003, 06:54 PM

#16

fast951
Addict
Rennlist Member

Rennlist
Site Sponsor

Join Date: Mar 2002
Location: Atlanta
Posts: 3,537

Russ,

Money has nothing to do with it, I'll be glad to help. I would rather take this off-line.

_____
John
www.vitesseracing.com

fast951

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Send email to fast951

Visit fast951's homepage!

Find More Posts by fast951

Add fast951 to Your Buddy List

06-26-2003, 01:49 AM

#17

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

Danno

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Send email to Danno

Visit Danno's homepage!

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I've worked Russ's ignition tables into an pseudo-map for you to see. I'll email it. The SDS doesn't have a real map, but two 2D tables. Place them on two axes of a 3D table and extrude across and you have an igntion 'map' based upon RPM X load(MAP). Only thing I can't figure out how to do is to find a way to change the value of a single cell, and not change the entire column or row that it's in...

I've got John Anderson's old 400rwhp/500-lb•ft monster and I'd like to get it mapped optimally with the SDS as well...

06-26-2003, 08:56 AM #18

Russ Murphy
Fanatic

Join Date: Dec 2001
Location: St. Louis
Posts: 1,654

Russ Murphy

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Hey Danno,
That's awfully nice of you.

Murphy

Send email to Russ Murphy

Visit Russ Murphy's homepage!

Find More Posts by Russ Murphy

Add Russ Murphy to Your Buddy List

06-26-2003, 09:50 AM

#19

John..
Specialist

Join Date: Nov 2001
Location: Northern Kentucky
Posts: 1,453

I can easily dial out 5 degrees with the turn of a wrench...problem is it takes it out across the whole map.

I need to stick a light on the car and see how much pressure activated retard I can actually get. I think I can get 10 degrees pretty easily, but time will tell.

John..

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Send email to John..

Find More Posts by John..

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06-26-2003, 09:57 AM

#20

rage2
Addict
Rennlist Member

Join Date: Sep 2001
Location: Calgary, Alberta, Canada
Posts: 1,526

<blockquote>quote:<hr />Originally posted by Danno:
Rage2's ignition timing looks scary to me... <hr /></blockquote><font size="2" face="Verdana,Tahoma,Helvetica">Too little timing for your tastes?

I used to run down to 12 degrees. That broke stuff. I've found 18 degrees to be safe and make excellent power. One thing I should mention, 18 degrees of timing is only at TQ peak. So within a 250rpm range. Off the TQ peak, it runs about 21 degrees.

And there is no way to change one value without changing the whole row. One of the disadvantages with SDS.

_____
rage2
---
99 E55 AMG
87 951 2.8L Broken Big Bore
0whp on any gas .

rage2

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06-27-2003, 08:58 AM

#21

Jeff Lamb
Addict
Rennlist Member

Join Date: Nov 2001
Location: Formerly Cincinnati / Now Charlotte
Posts: 197

Rage2, I am new to engine tuning and your response to Danno's observation kind of threw me a bit of confusion. As I understand it, ignition advance is shown in terms of degress BEFORE top dead center (BTDC). And, most of us are typically worried about running too much ignition advance. Therefore, I was viewing 12 degrees BTDC as being very conservative and safe. As the ignition advance keeps going farther and farther before TDC, it gets to the point where the explosion tries force force the piston BACKWARDS and this is a bad thing.

So, I think Danno was saying that your ignition advance settings of 22 or 23 degrees BTDC were very aggressive and were causing him some concern. Danno, am I interpretting your observations correctly???

Jeff

Jeff Lamb

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06-27-2003, 09:59 AM

#22

rage2
Addict
Rennlist Member

Join Date: Sep 2001
Location: Calgary, Alberta, Canada
Posts: 1,526

There's one more factor you're forgetting... the less advance you dial in, the higher the EGT's. On the 944 Turbo, in my testing anyways, EGT's start getting out of hand if you go lower than 19 degrees of timing.

_____
rage2
---
99 E55 AMG
87 951 2.8L Broken Big Bore
0whp on any gas .

rage2

Send a private message to rage2

Visit rage2's homepage!

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06-27-2003, 03:46 PM

#23

Jeff Lamb
Addict
Rennlist Member

Join Date: Nov 2001
Location: Formerly Cincinnati / Now Charlotte
Posts: 197

Interesting balance. Too much timing advance can cause detonation or "knock". Too little can cause the combustion to still be occuring during the exhaust stroke (causing high EGTs).

Then, there is the relationship between boost pressure and the burning speed of the air/fuel mixture. From what I understand, higher cylinder pressures result in a higher burning speed and thus less ignition advance is required.

There are further issues with fuel. The octane rating, burning speed, energy value and cooling effect all play into it. Sheesh, tuning a car ain't easy.

Jeff

Jeff Lamb

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06-27-2003, 07:21 PM

#24

Danno
Addict

Join Date: Jul 2001
Location: Santa Barbara, CA
Posts: 14,394

"Then, there is the relationship between boost pressure and the burning speed of the air/fuel mixture. From what I understand, higher cylinder pressures result in a higher burning speed and thus less ignition advance is required."

Yes, but Rage2 is talking about the different EGT at the same boost-level. Combustion speed should be the same here. The problem with less ignition advance is you have less time for the mixture to fully combust before you dump it out the exhaust valves. Lighting off the spark too late in order to ward off knock/detonation will have the mixture still burning when the exhaust valves open.

Danno

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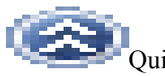
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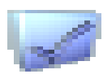
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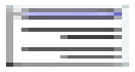
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