12-14-2003, 11:10 AM #41

Machtig Turbo
Banned

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

I will use the knock control for sure. I am going to set it up tomorrow. I dont have a **timing light**, so will do it with my mechanic when we install my cat back tomorrow.

Andrew

12-14-2003, 11:36 AM #42

Machtig Turbo
Banned

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

Ok. The **timing** values in the Link represent degrees additional to what the stock **timing** is set to. Lets say the current stock is 10 degrees, then adding a Link **timing** value of 15 into a cell will give you 25 degrees. Anyone know what the stock **timing** is?

12-15-2003, 06:16 AM #43

Russ Murphy
User

Here ya go. Courtesy of Rob M.

Join Date: Dec 2001
Location: St. Louis
Posts: 1,672

Attached Images

```
944-24 Pin Ign Map:                                          dme.bin
                                                    Revlimit:  6480


Part Throttle( 0 )
19.2 19.2 19.2 16.6 16.6 13.9 13.9 16.6 16.6 16.6 17.9 17.2                55%
19.2 19.2 19.2 16.6 16.6 13.9 13.9 17.2 17.9 17.9 19.2 18.5                47%
19.2 19.2 19.2 16.6 16.6 16.6 16.6 19.2 22.5 22.5 23.8 23.1                39%
19.2 19.2 19.2 16.6 17.2 21.2 21.2 24.5 27.1 27.1 29.1 28.4                35%
19.2 19.2 19.2 19.2 20.5 22.5 23.1 29.1 32.3 32.3 32.3 32.3                31%
19.2 19.2 20.5 21.2 24.5 25.8 26.4 32.3 34.3 34.3 34.3 34.3                24%
19.2 19.2 29.1 29.7 26.4 29.7 30.4 34.3 34.3 34.3 34.3 34.3                20%
19.2 19.2 29.1 29.1 31.7 31.7 33.7 38.9 38.9 38.9 38.9 38.9                18%
17.9 17.9 24.5 29.1 31.7 31.0 33.7 38.9 38.9 38.9 38.9 38.9                16%
15.9 15.9 19.2 29.1 29.1 29.1 33.7 38.9 38.9 38.9 38.9 38.9                14%
12.0 12.0 14.6 24.5 29.1 29.1 33.7 36.3 36.3 36.3 36.3 36.3                10%
10.0 10.0 10.0 19.9 23.1 26.4 29.1 33.0 33.0 33.0 33.0 33.0                 8%
 800  960 1120 1440 1760 2080 2400 3360 4000 4640 5600 6240

Idle( 0 )
 600  760  880 1440 1760 2400 3360
28.4  4.7  4.7  5.4 14.6 14.6 33.7

Full Throttle( 0 )
1000 1480 2000 2120 2240 2520 3000 3280 3520 4000 4520 5000 5520 5800 6000 6240
19.9 19.9 16.6 12.6 12.6 12.6 12.6 14.6 15.9 15.9 15.9 16.6 17.9 17.2 16.6 16.6



(A)lter, (L)ive Alter or (S)ave:
```

12-15-2003, 06:26 AM #44

Russ Murphy
User

Join Date: Dec 2001
Location: St. Louis
Posts: 1,672

Originally posted by NZ951
I just tried the plot that B951S modeled. I got a lot of audible knock... Have reverted back to the stock Link values, nice and safe at the moment. Anyone got a Link computer with decent **timing** values that would be somewhat suitable for my setup?

Yoww! 18 degrees (B951S's map) plus 16 degree on the stock chip = 34 degrees advance @ 1.2 bar!
Danger Will Robinson, Danger.

12-15-2003, 08:00 AM #45

B951S
Addict
Rennlist Member

Russ
The link **timing** values are not additive to the stock. The stock computer is gone as the link is a stand alone. The values I rolled out are absolute and I think needed the static or mechanical advance of the engine subtracted.

The link has a static advnce variable. I believe that why NZ got knock as he put abosolute values in the link and then the static advance was being added to them. Somthing like that anyway....My map is as close as I could model the absolute stock S **timing** into a Link template. The actual transaltion / conversion needs some though to ensure the resulting absolute values are right. Danno....Superjet...chime in guys..

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.

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

12-15-2003, 11:52 AM #46

B951S
Addict
Rennlist Member

After talking with Link USA, it waould apprear that the static **timing** on a 944 is about 10 degrees. Link 2 users should be putting this value into the static **timing** variables to ensure the correct absolute **timing** is being used by the computer. This explains why NZ got a boat load of knock using my numbers without a 10degree static advance.

The way to check static **timing** on a Link is to zero out the advance limit function which temporarily clamps the advance to zero, then check the **timing** with a dia back **timing light**. The amount of dial back id the

static advance. Now put this number into the static advance variable and your good to go.....

_____
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.

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

12-15-2003, 10:49 PM #47

Machtig Turbo
Banned

So does that mean you enter the values you gave me, without taking 10 off as the link does this when you enter the static value?

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

12-16-2003, 01:36 AM #48

Machtig Turbo
Banned

I am not sure if I made myself clear here. Can I enter the 10 degrees in the computer, and then enter the values you gave me in the table exactly? Also, what do you have for the ign retard value?

Join Date: Apr 2003
Location: At the dyno

Posts: 12,464

12-16-2003, 03:53 PM #49

B951S
Addict
Rennlist Member

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

NZ
You are right on. If you enter a 10 as the static **timing** value, just go right ahead and enter the absolute values I gave you and you should be good. If you have a dial back **timing light**, please check what the static **timing** is as I don't have one. So far I, Link seem to remember the last 944 they did "was about 10".....

When the car is runnig you can actually increase the static **timing** value and nothing happens as all the computer does is add whaterver is in the static to the table values. The actual **timing** does not change. If you put a static **timing** value of 10 into the map supplied with the Link2, you start to see what that map gives you in absolute values. Its about right on, with upper 30's in the **light** cruise and 20-21 on boost.

_____
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.

12-23-2003, 12:45 PM #50

Machtig Turbo
Banned

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

So, why have a static value at all if you just enter the **timing** values you want in the table? I think there is still some confusion about what the **timing** values are. I talked to some tuners of Link here, and they said the values in the table are on top of the static **timing** entered. What is the deal anyone?

12-23-2003, 02:01 PM #51

rage2
Addict
Rennlist Member

Join Date: Sep 2001
Location: Calgary, Alberta, Canada
Posts: 1,527

Quote:

> *Originally posted by NZ951*
> **So, why have a static value at all if you just enter the timing values you want in the table?**

It's to undo any mechanical advance that's set on your distributor. Without this value, LINK will have no clue how much **timing** to dial in because your distributor might be advancing by 0 degrees, 10 degrees, etc. By entering the mechanical advance into the system, it makes it so you can enter ACTUAL ADVANCE on the LINK map, and LINK will calculate out the mechanical advance to fire the injectors at the proper time.

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

12-23-2003, 11:27 PM #52

Machtig Turbo
Banned

Ok, I have sorted my **timing** issues. So, at what rev range should the **timing** advance be increased as it reaches the rev limit? I have it set at 18-19 degrees from around 3000-3500, when should I increase it

to 24-25 and in what kind of increments? My knock settings are 2500RPM, 40 base and 21 increments if anyone is interested.

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

12-23-2003, 11:57 PM #53

rage2
Addict
Rennlist Member

It depends where your peak torque is. Usually, you want the most retard (least **timing**) at peak torque.

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

Join Date: Sep 2001
Location: Calgary, Alberta, Canada
Posts: 1,527

12-24-2003, 12:08 AM #54

Machtig Turbo
Banned

So, lets say we cant get the nearest 500rpm, whats a ball park range and increments?

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

12-24-2003, 12:41 AM #55

Danno
Super User

"According to Danno, the stock timing isn't agressive at all."

This is actually in the partial-throttle/mid-range part of the map. Under full-throttle under boost, like the upper 1/3rd of the Link's 3D map, I agree with Travis, in that the stock maps will have too much advance. On the GURU chips, I run less advance than Autothority or SuperChips on the entire map.

"Link uses the stock distributor right? Is there any mechanical advance? "

Rage2, the TDC pick-up for ignition is off the reference-sensor. The distributor only comes in after-the-fact when the spark has been initiated by the EFI-box to the ignitor/coil combination. The distributor won't have any effect on ignition **timing** unless you have programmed in *so much* ignition advance that you run off the end of the rotor :(. Imagine if you've got 100-degrees of ignition advance. The spark will be generated by the EFI-box at 100-BTDC to fire the coil and it'll try to jump the gap from the center of the distributor cap to the outer plug wires, but the rotor will still be sitting on the previous plug wire somewhere... heh, heh..:)

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

Hey, that might actually work as a safety mechanism, a narrow rotor that will pass the spark only within a safe range... hmmm....

"THis is from Danno.....I wonder how this translates into an actual offset value that we can put in the static timing variable. "

Again, back to my previous post on how the base-timing is set. The timing-adaptor board is what sets the base-timing mark. It's keyed off the 58.4-degree BTDC magnet on the flywheel that's picked up by the the reference sensor. The **timing** adaptor board on the Link EFI boxes then converts this into a signal that the main board uses. It's got a 4-position jumper switch like on PC motherboards. The binary number coded by this 4-digit DIP switch is then multiplied by 5 and the resulting number is the countdown to the base-timing number.

So if you've got the adaptor board set to binary 11 (1011), then the offset from the trigger is 11x5=55. Delaying that amount from the 58.4-degrees BTDC magnet, gives 58.4-55.0 = **3.4 degrees BTDC is base-timing**. Then the ignition values in the ignition maps is added to that number. So if you have 15-degrees BTDC in your igniton-map, this translates into 15+3.4 degrees = 18.4 degrees BTDC of actual igntion advance in reality.

Now, I prefer to set the **timing** adaptor-board to binary 12 (1100) so that the offset is 12x5=60-degrees from the 58.4-degree reference mark. This results in **base-timing of 1.6 ATDC**. Not only is this closer to 0-degrees, it's also on the safe side of TDC because actual ignition values will be lower than what's programmed into the tables. So 15-degrees in the igniton map translates into 15-1.6=13.4 degrees of actual ignition advance.

In both these cases, the static-advance number is set to zero to illustrate how base-timing works. Once you figure out the actual mechanical layout of the reference-sensor and how the **timing** adaptor-board works, you can then dial in the correction factor into the static-advance to get true 0-degree base-timing.

"After talking with Link USA, it waould apprear that the static timing on a 944 is about 10 degrees."

That's about right. As stated on the very last page of the manual, in the as-delivered configuration, the Link EFI boxes come with the DIP switches on the timing-adaptor board set to binary 9 (1001), which results in a base-timing number of 58.4-(9x5)= 13.4 degrees BTDC. You then have to manually enter that offset value into the static-advance menu to restore base-timing to 0-degrees. Then your **timing** maps will represent actual degrees of advance.

I'm not sure this is the safest way to ship these boxes. Since if you do a MASTER RESET to zero all the settings to default, you'll end up with zero in the static-advance box and end up with the default of 13.4-degrees BTDC of base-timing. Very dangerous IMO, so that's why I set all my boxes to be safe with 1.6 degrees ATDC by default with zero in the static-advance field.

Also a note on using the cam-gear to inspect **timing**. You'll have to multiply your dial-back-to-zero **timing** guns by 2x to account for the gear-reduction in the cam. Also the cam-gear mark may not be exactly at zero either. This is due to belt-stretch and wear. Also if your head has been milled or you're using an adjustable cam-gear, that mark may not line up with the outer mark on the cam-cover. You might want to verify with the mark on the flywheel or make a new mark in front on the crank-pulley to be entirely accurate.

I'll be dyno-tuning a Link EFI system on the dyno on Jan.10th if anyone would like to come and watch.

Last edited by Danno : 12-24-2003 at 01:38 AM.

12-24-2003, 01:04 AM #**56**

Machtig Turbo
Banned

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

That is god damn confusing... I have a 10 static **timing** value in my PCL, and put in some values resembling the stock turbo s ROW map B951S gave me. So you are saying that the **timing** that is returned in my data log is not that, but some function of some potentially random dip switches on my board that I cant easily identify and that I have not been told about by the developers of this box and neither is it in the manual? I am confused by all this. I would love to see your PCL after dyno tuning!!!!!!!!!!!! You get much love.

12-24-2003, 02:07 AM #**57**

Danno
Super User

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

"That is god damn confusing... I have a 10 static timing value in my PCL, and put in some values resembling the stock turbo s ROW map B951S gave me... So you are saying that the timing that is returned in my data log is not that,...I am confused by all this."

You're pretty darn close, hang in there! Just use 13.4-degrees for your static-advance value and that should be closer to 0-degree base-timing. Then when you scale the TurboS 3D partial-throttle maps onto the Link's 3D map, make sure you scale it onto the bottom 3 load rows below 120kPa (everything above 5psi on the stock DME uses the last single-stripe WOT map). So just above the 120kPa load row, you enter the values of the full-load/WOT map from the TurboS + 2 degrees (notice the big jump in values between the last high-load rwo ont he partiel-throttle maps down to the WOT map). That leaves three more rows of data to program that's beyond the resolution of the stock Motronic. You'll want to scale those upper rows downwards similar to B951S's second chart on the 1st page of thread. At full-load 240kPa (20psi), you'll want no more than 17-18-degrees BTDC of ignition advance maximum. The little valley at max-boost around 3500-4000rpm should also drop down to 13-14 degrees or so, then build it back up as RPMs increase.

12-24-2003, 02:22 AM #58

Machtig Turbo
Banned

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

I have a link2 by the way... no DME/motronic etc...

12-24-2003, 07:51 PM #59

m42racer
User

Join Date: Feb 2003
Posts: 1,009

Why don't you ask Link NZ for assistance. They are in your home town.

Your posts seem to reflect a basic misunderstanding of the **timing** issue. As Danno stated you are real close.

12-24-2003, 10:12 PM #60

Machtig Turbo
Banned

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

Link NZ have not mentioned the dip switch issue at all... hence my confusion. So I am not sure whats going on there. There is a misunderstanding as tuners of the Link product here, two that I know of, mentioned that the link values in the table are on top of the static field input. However, this does not seem to be the case. Link were closed when I called them yesterday. I will catch up soon. I think I am right, however confused by the dip switch issue. There is no mention of it in the manual. However, I know there is a new one on the way...

12-25-2003, 03:15 AM #61

Danno
Super User

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

"two that I know of, mentioned that the link values in the table are on top of the static field input. However, this does not seem to be the case."

Actually, it is the case. You're just missing some pieces of the puzzle that you weren't aware was lying even further below the software. Call it firmware.. Rather than looking at it from a top-down approach:

ActualTiming = IgnitionTable + StaticAdvance

Look at it from the bottom up starting at the flywheel sensor:

ActualTiming = FlywheelTrigger + TriggerAdaptorBoardOffset + StaticAdvance + IgnitionTable

There were two extra components at the hardware & firmware level that you weren't aware of. All you've been seeing is the software, which is fine. But you have to understand the underlying hardware on how the software gets its data. In this case, the trigger-adaptor board is the bridge between the hardware and software.

01-16-2004, 04:20 PM #62

B951S
Addict
Rennlist Member

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

Thanks Danno....13.4 degres static **timing** it is then! I am using 10 and getting some good results, I register about 3 knock events on a full load run, just need to log and see where they are and play with it a bit more.
Cheers.

_____
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.

01-16-2004, 08:11 PM #63

superjet.1
User

Join Date: Jan 2002
Location: FILLMORE ca.
Posts: 563

Danno nice to hear from you good information is hard to come by. And i will get those **timing** specs just have to varify my data with Neal and he is really loaded down with work.

03-09-2004, 04:16 PM #64

B951S
Addict
Rennlist Member

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

Been experimenting with **timing** on my set up. I have researched all the previous posts on this and opened threads about it before. Rage2 gave some very good advice on setting up **timing** earlier in this post and I must say, sharing the knowledge gained by tuning on the dyno has helped me out a lot.

Basically, the advice was to set fuel to show about 12.5:1 or maybe a bit less at full boost and keep increasing **timing** until it knocks. This would then be the maximum limit for the octane of fuel used and for a given boost.

With my T04E turbo, I can run 18psi at a ~12.3:1 AFR and hold up to 18 degrees with 93 octane gas. Any more **timing** and the Link backs it off. BTW, the Link 2 closed loop **timing** is awesome. If I try and put in say WOT **timing** of 20 degrees ramping up too quickly to over 24 degrees, the link will knock it down to 18 degrees and usually about 20-23 to red line. It works very well. Anyway the upshot is that I think I have confirmed what has been said before, that about 18 degrees at max torque is about the most **timing** you can go with 18psi on 93 octane holding a good AFR before knocking. I don't want to run below 18 degrees to keep EGTs in check. I could get the link to be less sensitive with the knock sensing but I want to be safe.

Whats also interesting is that I run up to 40 degrees under **light** load and my fuel consumption has increased dramantically.

This is all with a turbo which is bigger than stock, does anyone know what **timing** the guru 18psi kits run with the stock K26's??

_____

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.

03-09-2004, 06:57 PM #**65**

rage2
Addict
Rennlist Member

Join Date: Sep 2001
Location: Calgary, Alberta, Canada
Posts: 1,527

Glad to know I could help .

Regarding **timing** at part throttle, on a few hondas that I've tuned, I have part throttle **timing** up to 43 degrees on 94 octane fuel. Even with a turbo strapped on sapping power at part throttle, fuel economy is BETTER than stock, on a motor making nearly 3x stock power. Best of both worlds!

_____

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

03-09-2004, 08:01 PM #**66**

Machtig Turbo
Banned

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

I think I am around 40 something on cruise... no worries so far.

03-09-2004, 08:34 PM #**67**

Danno
Super User

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

Yeah, 40-degrees BTDC is fine under partial-throttle. I wouldn't use more than 1/2 that under full-throttle though...

07-10-2004, 12:59 PM #**68**

Corleone
User

Join Date: Apr 2003
Location: Sweden - Norrkoping
Posts: 269

Any news on this? I have just started up my car with the Link 2 and I´m just about to start tune. It would be nice to have a ignition map, similar to the Guru ones to start with. What I understand is that the "Static timing" is 13,4 degrees.
Anyone who has come further in this? Danno maybe?

07-10-2004, 02:26 PM **#69**

Machtig Turbo
Banned

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

Static is 10 degrees exactly. Enter that in your MAP and go for it. I have a PCL I can send you set up for 18.5psi.

07-10-2004, 02:27 PM **#70**

Machtig Turbo
Banned

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

PS I will need to ask for your carbon intake and cam as payment

07-10-2004, 03:12 PM **#71**

Corleone
User

NZ951

Thanks! Of course I can tell you more about both cam and intake. I also have som more pictures...

Join Date: Apr 2003
Location: Sweden - Norrkoping
Posts: 269

07-10-2004, 03:24 PM #72

Machtig Turbo
Banned

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

Hmmm translation issue, I want you to send them to me so I can put them on my car

Some info and pics would be great also though.

07-10-2004, 11:38 PM #73

Danno
Super User

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

"Static is 10 degrees exactly."

Are you sure about that?

07-11-2004, 12:52 AM #74

Machtig Turbo
Banned

Yep, have the guys at Link take a reading as I was nervous about setting **timing** values. I think PD found the same thing.

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

08-01-2004, 06:26 PM #75

B951S
Addict
Rennlist Member

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

NZ, I take it you used a dial back **timing light** to confirm the 10 degrees static?? Can anyone else confirm the 10 degrees static? I am using 10 but there seems to be a difference of opinion on this one.....

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.

08-03-2004, 11:34 PM #76

Danno
Super User

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

The trick to measuring the static **timing** is that you **have** to use the flywheel mark underneath the car. The cam-gear is not accurate enough for that due to belt-stretch, wear & tear, etc.

08-04-2004, 11:56 PM #77

Machtig Turbo
Banned

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

Ok, so what did you get Danno? So far Link and PD have 10 degrees...

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