

Ferrari Challenge Stradale “Bespoke Series ECU Software” : Product Documentation – Revision 1.3



360^{trev}

Hone to perfection...



BACKGROUND

Welcome, I hope you find this guide a valuable source of inspiration on your quest to make your Ferrari the car it always deserved to be. Enzo would approve!

The novel technical solutions presented here encompass thousands of man hours worth of painstaking work in both tireless research and development spanning multiple years of engine software calibration and tweaking.

All the work has been dynometer and road tested (and sometimes even race tested) by professional drivers (some ex-Ferrari!) and customers alike across multiple countries and climates. Work passionately carried out in the pursuit of absolute driving perfection.

They combine to make the experience of driving your car absolutely transformed, **completely re-imaged**. The focus has therefore been very much on playful character and perfect balance, banishing all numbness and delay, optimizing feel and response, giving you absolute control. You'll instantly notice within seconds of getting behind the wheel how much it has been transformed.

You literally won't find anything else out there that comes even close to what these upgrades can offer.

As such I am very proud, delighted and excited to share with you what it possible and how much of a difference it will make to the pleasure and enjoyment of your car.

360trev



Non-Endorsement: This product is not endorsed in any way by Ferrari SpA or Ferrari North America.

BACKGROUND II



"Not all Stradale's run the same software, and revisions impacting the way they drive and sound"

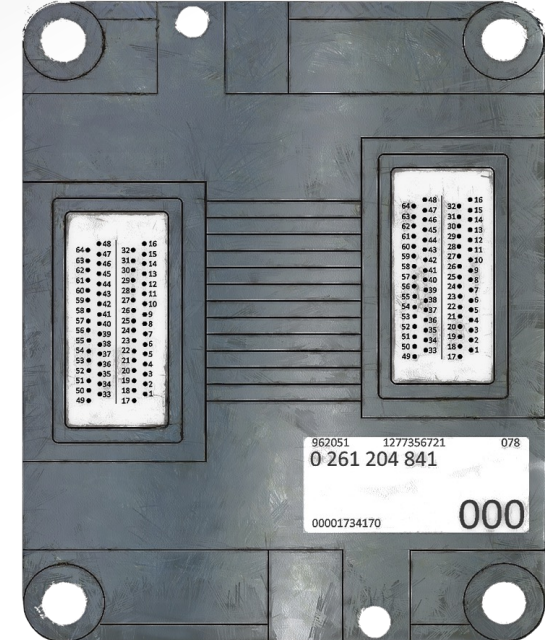
The base engine management software is important to have an awareness of as this determines ultimately your overall baseline of performance and step of engine refinement.

The Challenge Stradale's bespoke model software was revised by Bosch and Ferrari multiple times before they finally got it right, with changes being made right up to the very last cars off the production line.

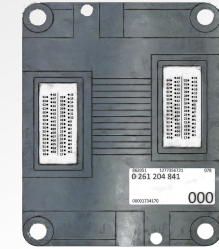
Unfortunately Bosch never supplied Ferrari dealers with the capability to do in field "software upgrades", like you take for granted on modern devices. This means the Engine Management software was stuck with 'whatever it left the factory with'. That is it could never benefit from the later revisions, tweaks and improvements made as they went along, as almost all software does today. In fairness this was probably more related to the older more rigid way that government bodies used to work than a technical issue related to ability to offer upgrades. The organizations who approved car emissions would sign off a specific version of an engine (at great cost to the manufacturer) so any new changes required a full re-certification and re-testing (and all of the costs that incurred).

Whatever the reasons, no retrospective upgrades where possible, at least not from Ferrari or the main dealer network "officially" anyhow.

In practice it would have been pretty complicated for the factory to support this too as at this point in history of Ferrari there where still a lot of technical differences between markets, different specifications of car including different emissions hardware (EU cars never got Air Injection for example in any year at all, that only arrived on the F430 for Europe) while US cars had it in all years of CS production. Even the cats where different on a US destined vehicle vs other markets.



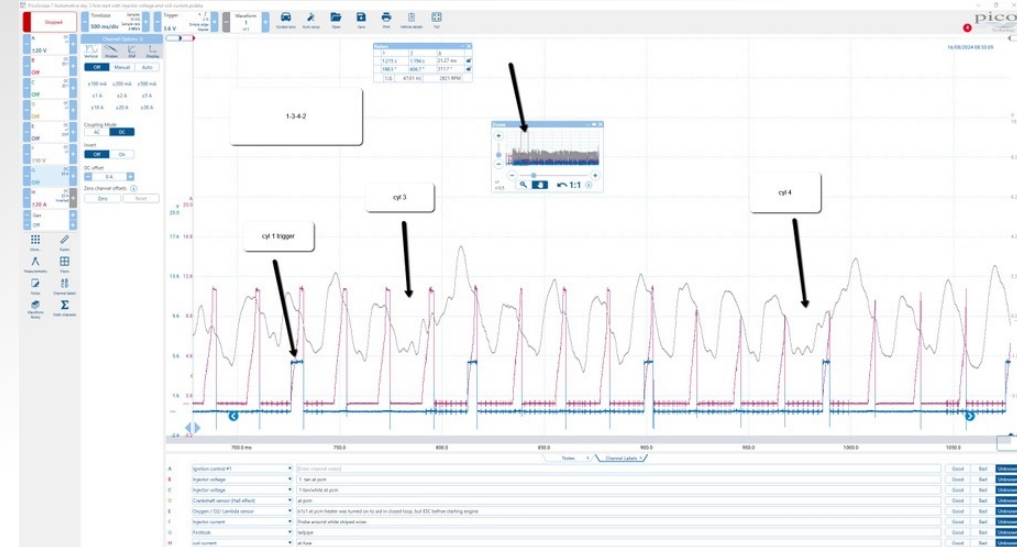
WHY DO UPDATES MATTER?



The lack of dealer software update capability means that the bug fixes and learnings from later production batches were not applied to earlier cars, even for serious bugs. For instance some early 2004 MY cars suffered from only starting occasionally on one bank from cold and this was never rectified unless the vehicle's ECU's were replaced. In this case the superseded part numbers would be swapped out for the later part numbers but this was a very rare occurrence and only happened in the case of ECU problems or customer complaints to the supplying dealer.

This in part explains why not all Challenge Stradale's drive the same (indeed all 360's had the same issues too). There are many differences attributed to the software which make them drive very differently and behave uniquely quirky. Worse still, unlike what you would expect, the very late examples suffered noticeable degraded performance, not better, due to having to pass ever stricter global noise and tailpipe emissions testing strategies, so clearly there was a 'sweet spot'.

Nevertheless the early 2004 software update was still a big improvement over 360 Modena's base software, rolling up all of the factory engine management improvements and recalls (not just the calibration maps) to an improved later Bosch Motronic release. This was a worthy improvement in itself as it fixed many minor and major bugs on earlier 360s and added significant refinements including additional detailed calibrations previously left on default settings on its lesser sibling.



Diagnosis of Cold Start Misfires using an automotive oscilloscope

01: STRADALE – STAGE 1 (*GT3)



“Upgrading CS firmware is a great improvement over a stock Bosch software, it takes what was already great about the Stradale and turns it up to 11..”

The ‘Challenge Stradale’ base firmware is a fantastic starting point for improvements.

Stage 1 calibration is for Standard specification cars with owners who would like a bit more response and aggression, particularly on torque response.

- **Exhaust Valve Strategy:** We introduce differences in exhaust valve control strategy with different step calibrations for Sport and Race, which are fully bespoke for each owner – they can be personally tailored to suit your exacting requirements, negating the need for an aftermarket exhaust valve controller or forcing the valves to be always.
- **Increased Power & Torque:** The update also brings with it gains to torque ramp and horsepower gains across entire rev range (even on a stock CS), improves drivability and also fuel economy is better too.
- **Fuel Grade Optimisation:** If you are using specific Ethanol blended fuels which didn’t exist when the CS was produced we can optimize fueling for these blends (E5, E10, etc.) or if you exclusively use 98 Octane+ RON fuel for example let us know and we can optimize ignition timing and fueling to boost performance accordingly.
- **Instant Torque:** Not only do we increase torque but just as importantly we re-calibrate and apply increased torque response which transforms the man-machine interaction as throttle actuations apply much faster reacting giving you much more precise control. This results in real world performance gains as you get access to the rich torque curve quicker with every on and off throttle application.
- **Reliability Improvements:** You can also expect improvements in reliability of the vehicle by switching over to internal ecu temperature modelling (removing the need to use temperature probes and cat ecu’s which are a known common weak spot).
- **Gated Conversion Option:** Unlike factory offering, the upgrade works on **BOTH** F1-Paddleshift and 6-Speed gated shift conversions too.

02: STRADALE SPEC – STAGE 2 (*GT3 RS)

The 'Challenge Stradale' base is taken to the next level. If you think of the Challenge Stradale as the 'GT3', this takes its spec and moves it further towards 'track'. Its akin of the 'GT3 RS' vs 'GT3'. Everything is even more focused towards driver involvement and excitement with dialed out delays.

From here on in things really start to get interesting for the keen enthusiastic driver. At this stage is strongly encouraged to fit 200 CEL sports cats (stock are 600 CEL so much more restrictive) which can reduce back pressure and gain significant torque and power (up to 10% more power when optimized for it).

This calibration step continues where the factory left off its remit of 80% road use and moves the calibration closer toward track bias / fast road fun (more like 60/40 split). This yields even more performance. Of course it gains all the usual torque and horsepower across entire rev range, improves drivability and throttle responses but it also does much more besides, it makes the car more exhilarating, more fun to drive and more responsive.

One very welcome addition over stock is included "Instant Torque" plus an improved in F1 shifting speed (from the engine ecu side of things). This is possible because of the 2-way communication between the TCU and Engine ECU's. The TCU requests a given torque point and the engine needs to move towards that goal, this improvement helps the engine get to the target quicker improving response and reducing clutch slip. Improved Torque transfer to the road, helps with faster reaction times.

With many delays eliminated or significantly improved on you get Better dialed in Throttle controls (but not compressed), this is not attributed to throttle maps but real reaction time improvements in the code.

You also benefit from better resolved calibration for the exhaust valve openings for Sport and Race. Its totally unique in the market, 8th generation technology!



“Even the CS software itself can be significantly improved upon”

03: TIRE TRACTION VS TORQUE LIMITERS

Since the launch of the Challenge Stradale "tire" or (tyre) technology has advanced significantly, allowing for higher torque thresholds and reduced need for aggressive ECU restricted torque smoothing.

Advanced rubber compounds:

Incorporation of silica and synthetic polymers has increased mechanical grip enabling dry grip exceeding 1.2 g of lateral acceleration and better wet traction (e.g., through hydrophilic properties that disperse water more effectively)

Tread design innovations:

3D sipes (small slits in the tread) and asymmetric patterns provide "locking" under load for summer-like dry grip while maintaining all-season flexibility, reducing hydroplaning and improving snow/mud traction by orders of magnitude compared to early 2000s designs.

Structural enhancements:

Lighter, high-tensile steel belts and reduced rolling resistance minimize heat buildup and flex, allowing sustained high-torque application without degradation. These changes mean modern tires can handle much more torque before slip in comparable conditions, as evidenced by performance cars achieving sub-3-second 0-60 mph times without traction loss.

As a result, modern cars are programmed with raised torque thresholds (e.g., by allowing higher peak torque requests) and reduce smoothing intensity, leading to more responsive acceleration. **And yes we can do the same for your Challenge Stradale...**

“Michelin Pilot Sport Cup 2 or Pirelli P Zero Trofeo RS offer dramatically superior dry grip and cornering as well as better braking capability—versus the original Pirelli P Zero Corsa tires”

If retrofitting a Challenge Stradale today, these modern tires can transform its handling limits and coupled with raised thresholds can transform how a Challenge Stradale drives both in its handling and ability to put the power down to the road.



Modern tires (tyres) are typically;

+8% in dry braking
+2% in dry lap time
+3% in dry longer lap times

03: INSTANT TORQUE I

The Ferrari 360 and Challenge Stradale both adopted strong 'Torque Smoothing'. These were designed to smooth out the electronic throttle pedal signals, in its default software operation its setup is more akin to a Luxury car than a sports car.

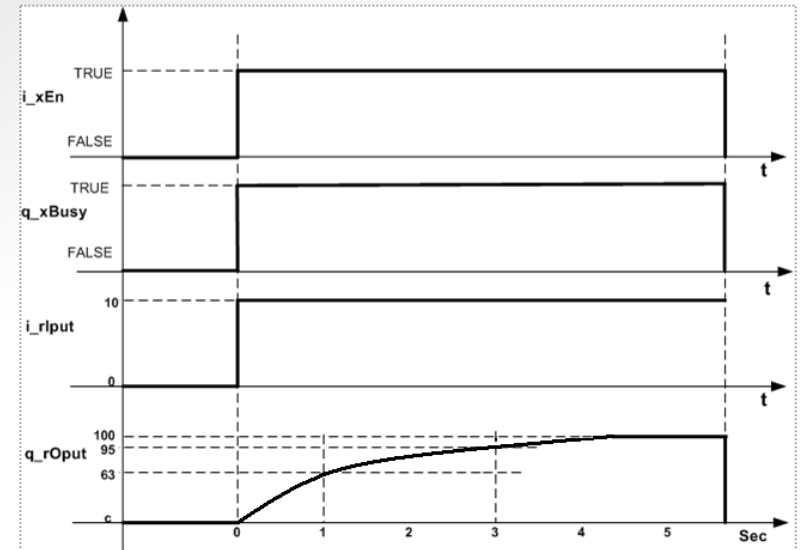
The primary aim of the algorithm was to dampen fluctuations (from uneven road surfaces, bumps, accidental foot movements, vibrations and so forth). That is engine rpm's doesn't move or react quickly to every change in throttle position, they stay 'steady-state'. The result is it feels torque increase is gradual and consistent, meaning torque builds gradually over time. This adds a time lag to reach throttle pedal targeted torque (i.e. the ramp up speed), not the pedal map itself (which determines the level of gain your aiming for) but the time differential to ramping up (or down) to reaching that target.

Q. Is that why Luxury car brand's use long delays and thus big smoothing filters?

Yes, it can help to ignore minor pedal wobbles from rough roads or tired feet. It keeps acceleration even, refined, and gradual. And delivers that plush, isolated "floating" focusing on ride quality

However, this isn't really what you want in your sports car...

The CS used all "defaults", primarily as a result of being an early adopter of drive by wire technology. Later Ferrari went on to refine this but it took them until the 458 Speciale before they actually improved it. We can retrofit this upgrade to all Challenge Stradale's. This actually makes you faster around ANY track because you get access to torque you demand much quicker. The lag is eliminated.



$$G(s) = K_p \frac{1}{1 + T_s s}$$

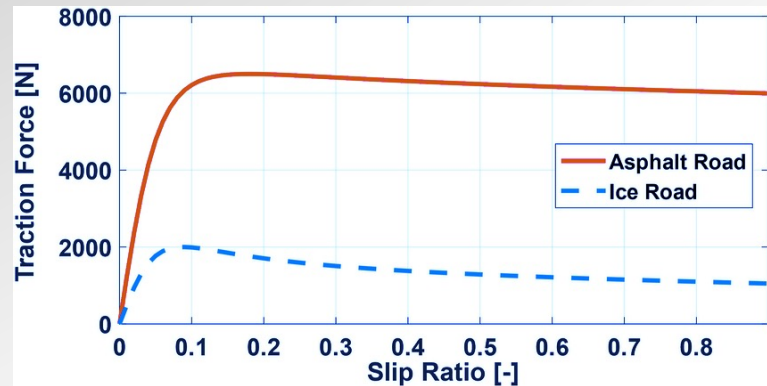
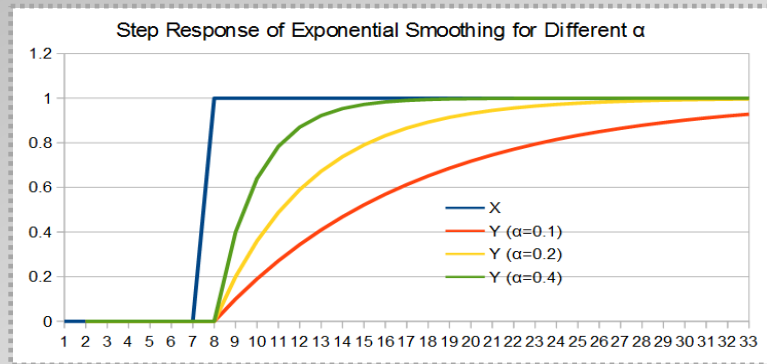
Where:

K_p = Function PT1 gain or amplification

T_s = Function PT1 filter time constant

G(s) = transfer function

03: INSTANT TORQUE II



How the math works (summary):

The ECU updates many times per second with: **New smoothed value = Previous smoothed value + small step toward the actual pedal reading.**

The size of that "small step" is controlled by a time constant which sets the smoothing strength:

- I. Small step / long time constant → strong smoothing, gentle and delay feel (luxury/comfort focus)
- II. Larger step / short time constant → fast catch-up, direct feel (performance focus)

It acts like slowly pulling a heavy object toward a target – steady smooth progress, no sudden snaps.

” ... The quicker the torque ramp, the more chance of wheel slip therefore having modern rubber allows this extra torque to be deployed to the road. “

03: INSTANT TORQUE III

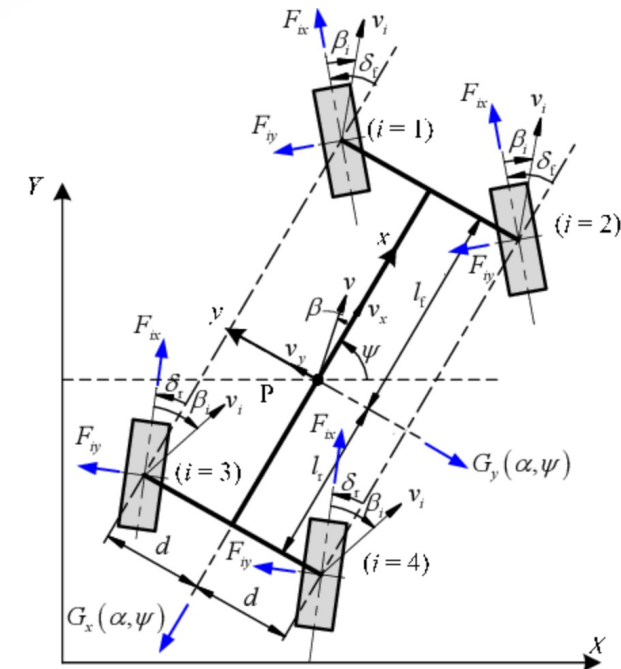
When you're driving with intent (fast roads, track days), reducing torque smoothing does not introduce unwanted throttle twitchiness on modern tires (tyres) – it just removes much of the electronic "numbness" or lag that dulls the driving experience.

On bumpy roads or very rough surfaces it requires a bit more attention to re-learn to drive smoothly but the advantages for enthusiastic drivers are outstanding.

- ✓ Faster everywhere, significant gains in point to point acceleration
- ✓ Near-instant torque delivery
- ✓ Better modulation and confidence in dynamic situations
- ✓ Improved car control (with torque lag removed) steering on throttle is possible
- ✓ That "on-rails" engagement that makes spirited driving addictive

Torque management is a strategy where the ECU actively modulates engine output to prevent abrupt changes in torque delivery with techniques, such as retarding ignition timing, adjusting fuel injection, or limiting throttle opening during gear shifts or sudden acceleration. This was primarily to mitigate torque spikes—sudden surges in rotational force from the engine—that could overwhelm the ability to maintain traction, leading to wheel slip, loss of control, or reduced acceleration efficiency. Just fitting new tires (tyres) is not enough to overcome these hardcoded limits, we need to upgrade the software too.

“ ... Not every gain in torque shows up on a dyno sheet ! This is a clear example of why we don't like to talk just peak gain's. “



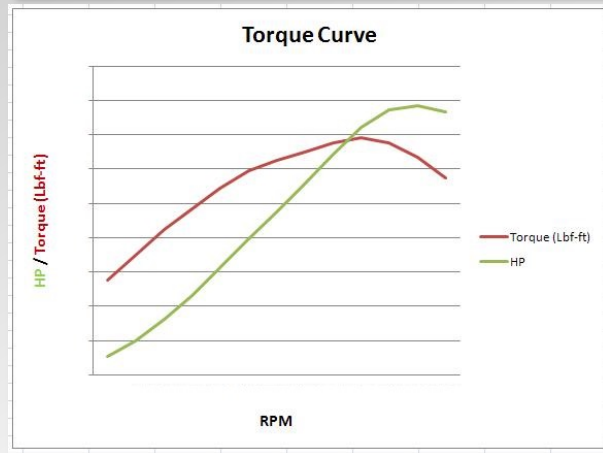
03: INSTANT TORQUE V

$$\text{HP} = \frac{\text{RPM} \times \text{T}}{5252}$$

revolutions per minute torque
horsepower

$$\text{Power (Kw)} = \frac{2\pi \times \text{Speed} \times \text{Torque(nm)}}{60}$$

$$\text{Torque (Nm)} = \frac{60 \times \text{Power (kW)}}{2\pi \times \text{Speed (Rpm)}}$$



- Instant Torque *is something we strongly recommend, especially when coupled with modern "tires" (tyres).*
- This upgrade dramatically improves the way you interact with the engine and how the car feels to drive. Driver engagement is greatly improved.
 - The interface between the throttle and engine power is sped up so that unnecessary and annoying delays between your right foot and torque application to wheels are completely eliminated.
 - You feel more in control as it allows you to steer the vehicle on throttle, you gain more precision and better drivability.
 - The only thing you may experience is that traction may prove more challenging in some circumstances so more caution may be needed on poor traction surfaces.
 - It suits keen drivers who have awareness of their actions on the controls.

04: ETHANOL BLEND RECALIBRATION

Ethanol Percentage in Gasoline	Stoichiometric A/F Ratio (Lambda = 1)	Air/Fuel Ratio for Maximum Power at WOT
0	14.7	12.6
10	14.1	12.2
20	13.0	11.2
30	13.0	11.2
40	12.4	10.7
50	11.9	10.2
60	11.3	9.7
70	10.7	9.2
80	10.1	8.7
E-85	9.9	8.5
90	9.6	8.2
100	9.0	7.7

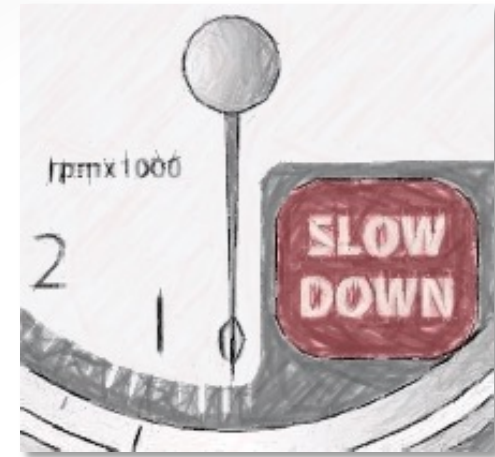
Ethanol blends in recent years have only just started to become common place. When the Challenge Stradale was launched this was not the case.

- Now E5 and E10 blends are being used but standard engine management air air/fuel ratios are calibrated based on 0% ethanol and a 14.7:1 air to fuel ratio calculations with maximum power being achieved at 12.6:1 afr.
- Depending on the percentage of Ethanol present in fuel used the ratio's can become skewed to the point where higher Ethanol content could damage engines and in the best case the fuel efficiency is much worse than expected (or performance reduced).
- The solution is to remap to use a calibration tailored for the % of ethanol present in the fuel.
- Flex fuel sensors can be fitted which sniff the % of Ethanol present and allow the engine management system to adjust its operation to account for the differences 'on the fly'.

05: SLOW DOWN

- This removes the entire troublesome hardware associated with factory catalyst temperature monitoring. Many issues and faults can exist and even replacement parts may not resolve your issues entirely.
 - **Cat Temperature thermistors** probes are deleted.
 - **Cat ECU control stations** are deleted.
 - You can leave everything plugged in or remove them (entirely up to you).
 - The associated SLOW DOWN light monitoring CEL's are deleted.
 - Monitoring can now uses 'Cat Temperature' Estimation modelling exactly like later models (which also don't need cat ecu's or thermistors) or be deleted entirely with no adverse effects.
 - This improves reliability of your 360 considerably. Never get a slow down fault again!

Note: If you remove thermistors you **must** fit bungs to block the holes left.



“Cat Ecu’s are prone to failures and can be software emulated”

06: SPORTS CATS



“CEL's can be triggered by Sports Cats even when they are operating perfectly”

- This removes the CEL's which trigger when higher quality high-flow sports cats are fitted or for track days installation of 'test pipes'.
 - For many years removal of the troublesome catalytic converters in the manifolds/headers of some cars and fitment of sports cats has caused many enthusiasts countless headaches with CEL's.
 - This fix eliminates the control strategy entirely so the Cat Efficiency CEL's will never trigger (even under cold start worst case scenario's) that will always eventually impact any other solution such as 'cat extenders'.
 - This also removes the need to fit or have fitted operational Secondary O2 Sensors. They are normally only used to calculate catalytic efficiency.
 - This improves reliability (less to go wrong..)
 - In some regions this may only be used “Off Road Use Only”.
- **Note: If you remove secondary O2 sensors you must fit bungs to block the holes left.**
- **Note: Cat protection is still active and fueling is still restricted under some circumstances to protect cats from damage.**

07: RACE CAR CONVERSION

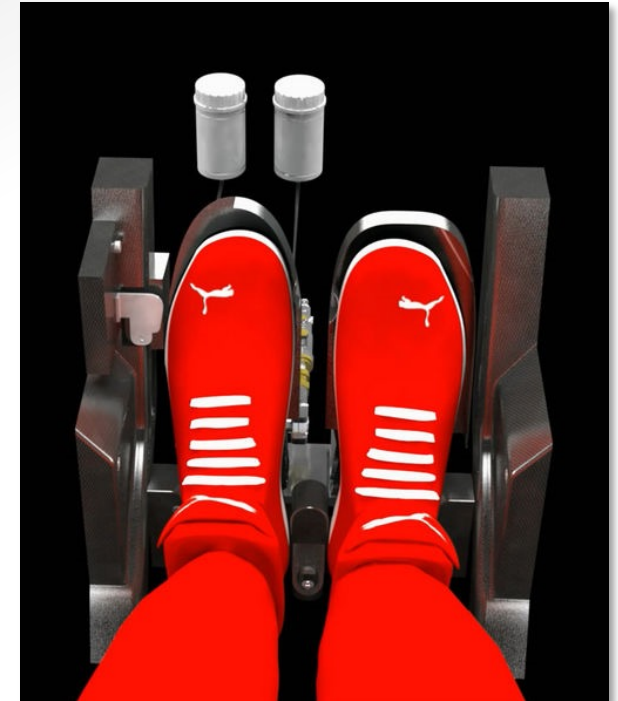
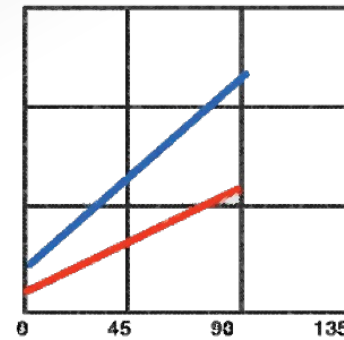
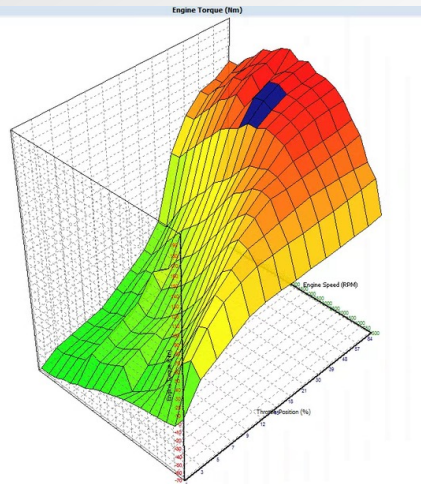


- Cat protection elimination can be useful if you do full catalytic deletion by fitment of 'test pipes' when preparing a car for track only use preparation.
 - This is exclusively for customers who intend to use their 360 for track days only – or for converted race cars that don't require to pass any emissions regulations.
 - In some regions this is permissible. For instance 360's destined for UAE did not come equipped with any catalyzers at all (they borrowed hollow cats from the 360 Challenge race cars).
 - It removes the ecu cat protection calibrations so requested fueling is never restricted.
 - This lifts performance further (as used in Challenge race cars) as normally fueling is restricted in some circumstances to protect catalyzers from being damaged by too much fuel.
 - This full catalyzer delete is intended for '**Off Road Use Only**'.
 - It cannot be used on the public roads in countries or regions which have emissions regulations.
 - Note: This option can also be used 'in reverse' so that a race car can be used effectively with "Sports Cats" without ruining them with overfueling.

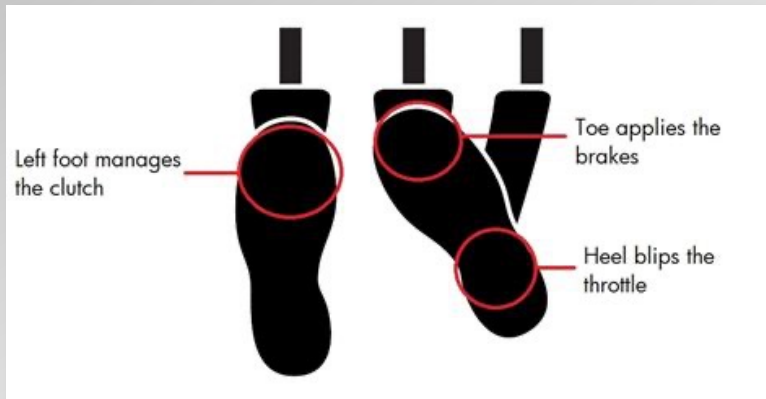
08: E-THROTTLE

- Improvements to the calibration associated with electronic throttle including the sensitivity.
 - The sensitivity is re-calibrated for improved torque feeling, particularly at the lower to mid-range level where you need it most
 - This gives a more satisfying take off the line and is useful for F1 to reduce clutch slip and improve clutch life for F1-AMT equipped vehicles
 - *Selectable maps will be available later in the year from your smartphone app

Throttle Position (%)																
0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
2000	0.62	31.32	41.85	52.39	62.92	66.92	67.12	67.42	67.62	68.22	68.82	69.42	70.12	71.92		
1750	16.19	47.62	69.69	85.19	94.32	100.42	100.73	101.02	101.32	102.32	103.23	104.23	105.12	107.92		
1500	49.28	35.52	64.98	87.15	102.23	112.23	115.13	118.02	120.92	123.79	125.23	127.73	129.03	130.03		
1250	21.08	14.74	46.99	67.26	92.52	116.32	127.63	136.82	137.42	138.42	139.42	140.52	141.53	144.03		
1000	23.38	2.28	23.62	49.52	75.42	106.73	127.02	139.92	144.63	158.63	151.42	152.23	153.13	155.63		
750	25.38	16.98	6.92	38.82	54.72	90.12	117.52	137.42	147.23	161.43	165.82	170.13	171.03	172.73		
500	27.59	26.49	4.95	16.59	38.12	72.52	104.42	128.13	142.92	166.79	172.02	177.73	178.92			
250	30.38	34.38	14.73	4.95	24.62	56.12	88.42	120.82	140.23	169.43	175.73	181.43	183.43	184.43		
0	34.09	41.09	22.69	5.38	12.92	41.52	73.82	106.62	130.42	164.63	175.92	181.43	183.43	185.92		
5000	38.49	17.49	10.73	3.82	3.12	29.42	59.02	91.32	117.92	164.43	179.73	185.43	187.43	189.43		
6000	42.28	23.88	17.73	11.62	5.48	20.02	46.22	77.32	107.82	155.63	174.73	185.43	187.43	189.43		
7000	47.49	30.28	24.59	18.88	13.19	11.01	36.52	64.72	100.32	150.83	163.18	171.84	179.08	185.92		
8000	53.18	34.69	28.49	22.38	16.09	7.72	26.02	59.42	85.62	144.23	172.02	184.43	186.33	188.92		
9000	56.09	31.09	22.72	14.35	5.08	19.12	10.81	45.72	75.82	132.32	162.53	173.13	181.43	186.73		
10000	60.09	40.69	30.22	24.73	20.28	12.88	7.52	33.22	62.12	122.42	156.92	171.82	174.82	184.13		
12000	65.18	38.99	46.13	41.38	36.39	22.38	7.88	19.12	49.22	119.42	142.53	158.32	164.43	172.43		
14000	66.19	54.38	48.46	44.52	39.59	24.78	9.98	4.92	31.82	99.52	133.52	150.42	159.03	163.63		
16000	71.59	58.89	54.68	50.49	46.28	33.69	21.09	8.48	15.22	87.12	120.73	139.03	143.42	154.53		
18000	71.59	59.38	55.35	50.82	46.59	33.88	21.19	8.48	15.22	87.12	120.73	139.03	143.42	154.53		



09: HEEL & TOE ENHANCEMENT



An upgrade to permit 'Heel & Toe' yields instant 'fun'....

- This allows you to override the standard 'Bosch' pre-programmed algorithm so that you can heel and toe on a gated car!
 - The standard gated 360 Modena has throttle pedal lockout configured when you press brake and pedal together.
 - This eliminates **fuel cut** and throttle pedal **lockout** algorithm, as also engine management normally turns off fueling during clutch de-activations to save fuel.
 - This allows you to blip on downshifts on manual gated cars!
 - More satisfaction from doing it yourself
 - *Alternatively we will add an 'auto downshift' blip feature that's selectable from your phone app in future

10: AUTO-BLIP ENHANCEMENT

- This allows you to override the standard 'Bosch' pre-programmed algorithm so that the car auto-blip's the throttle on downshifts on a gated vehicle.
 - Eliminates fuel cut algorithm and automatically rev matches between gear changes.
 - Sound like a pro driver!
 - Improves performance so car doesn't bog down between gears.
 - ***Alternatively do it yourself with 'heel and toe' manual blip feature that's selectable from your phone app in future**



11: IMMOBILIZER RE-ARM



- Annoyingly the factory default timeout after de-activating the immobilizer on the 360 is woefully too short.
 - This increases the time limit so you have enough time to start up from **25 seconds** to **1 minute** to allow more time to start the vehicle after unlocking the car with the fobs before it kicks back in.
 - Useful to eliminate frustration of having to lock/unlock every time you try to start your own vehicle!
 - This feature can even be configured and requested to NOT re-arm at all, which means it acts like a semi permanent immobilizer delete
 - That is until you battery cycle the power then the first time after a cold power off you need to use the fob only once.
 - At any time you can re-arm with the fob.



12: IMMOBILIZER DELETION



- With so many common starting faults directly attributed to the aging Bosch immobilizer units, its sometimes preferable to consider complete elimination (*if you begin to have immobilizer non-start issues.)
 - This allows you to remove the problematic factory immobilizer system entirely from the vehicle including the 360 Challenge Race cars with start button only.
 - Once completed no fobs are required to start vehicle just your physical key.
 - Note this means your remote central locking function is lost (*) so its not for everyone.
 - The alarm siren needs also to be removed too.
 - This can improve the vehicles 'off battery tender' abilities too.
 - Without parasitic loads on the battery the car can be started over a month later without issues once full immobilizer is deleted.
 - This can also prevent the issue of engine starting on one bank.



Please Note: Immobilizer deletion is not for everyone and is only recommended if your having problems with random start or immobilizer related non-start issues.

- You will loose **CENTRAL LOCKING** functions if the unit is completely removed. This is because the fob reception is combined with the immobilizer unit.
- Further note: Its strongly recommended to fit an aftermarket insurance approved immobilizer and anti-theft alarm system if this option is chosen.
- Its also required to prove ownership of the vehicle and sign a disclaimer that you understand this could make the car easier to steal and if you don't inform your insurance company they could invalidate your cover.

13: CUSTOM EXHAUST VALVE MAPS



- No longer do you need to choose between having exhaust valves or not. This is the best of both world.
 - Fully selectable exhaust valve maps with custom calibration maps
 - The exhaust valves can be reconfigured to open earlier and under less throttle application in both sport and race modes.
 - More details can be provided and recommended maps shown.
- Some owners prefer to have the valves almost always closed in Sport mode and then almost always open in Race mode (just after idle and > 2% throttle (just like Ferrari did with the 599 GTO). This means at idle its closed but as soon as you give it some throttle it opens up. It makes the race mode button act like a built in exhaust valve controller. Press it again and the car quietens down.

		Rpm										
Throttle %	No.	PHY	0 800.00	1 1520.00	2 2520.00	3 3000.00	4 3600.00	5 3800.00	6 4120.00	7 5000.00	8 6000.00	9 9000.00
	0.0	PHY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	54.0	PHY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	63.8	PHY	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
	69.0	PHY	0.0	0.0	0.0	0.0	0.0	1.0	1.0	2.0	2.0	2.0
	81.0	PHY	0.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	2.0
	90.0	PHY	0.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	2.0

14: FUEL CAP LOOSE CEL



- If you get annoyed that not tightening the fuel cap can cause an engine CEL you can deactivate it.
 - This feature is quite simple, it simply removes it.
 - The loose cap CEL is only to inform you that you have forgotten to completely tighten the refueling cap.
 - It should also be used if you intend to do an EVAP delete
 - If you intend to remove the entire fuel vapor system with and fit a simple vent to air solution (to save weight). (See EVAP deletion).

15: F1/GATED SWAPS



- This features allow you to convert between F1 and Gated transmission setup's by re-configuring the engine management firmware accordingly.
 - To reduce complexity and weight, the F1 system can be removed.
 - Full options include swapping from F1 to 6-Speed gated.
 - Or from 6-Speed gated to F1 shift paddles.
 - This configures all of the correct software calibrations so that shifting is smooth and exactly like the factory does it.
 - We can also help you to configure you dashboard panel too.

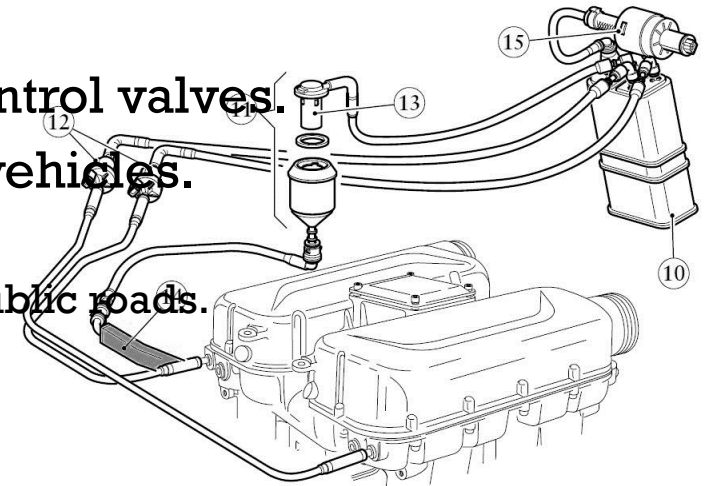
16: COLD START 'MISFIRE' CEL FIX



- After years of blighting the Ferrari 360's (All Model years) we finally have a calibration solution.
 - No more "Phantom" cold-start random multiple misfires!
 - If you genuinely have a real misfire this will not stop the misfire CEL's, it will just prevent cold start triggering phantom CEL's.
 - This configures calibrations so that you never get a phantom cold start CEL again.

17: FUEL EVAP SYSTEM

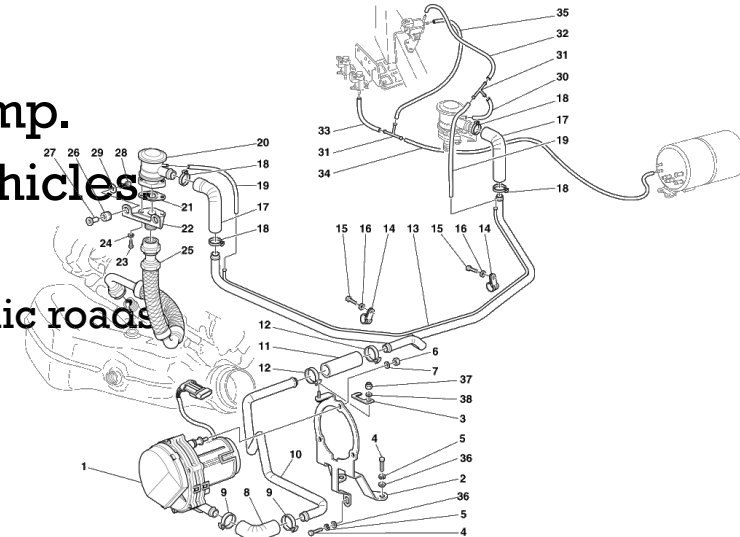
- Fuel evaporation system removal is typically part of conversion of a road car to racing or track only duties.
 - To reduce complexity and weight, the charcoal canister, vapour separator, solenoid actuation valves and associated pipework can be completely deleted.
 - Installing a mini charcoal canister with vent to atmosphere valve is recommended.
 - This feature deletes the CELs and ecu control solenoid control valves.
 - Typically recommended for “off-road use only” for track vehicles.
 - Not road legal in many countries.
 - Please check applicable laws in your region if you intend to use on public roads.



10 Active charcoal filter
11 Multifunction valve
12 Canister-purge solenoid valves
13 Roll-over shut off valve
14 Fuel vapour separator
15 Soupape d'arrêt

18: SECONDARY AIR SYSTEM

- Where fitted the Secondary Air System – this is an emissions control system used to get catalysts up to speed quickly.
 - Note: This system is not fitted on EU spec 360's
 - To reduce complexity and weight, the air injection system can be completely deactivated.
 - It deletes very rich startup condition maps as normally extra air and fuel pumped in.
 - This deletes the monitoring, CEL's and control of the air-pump.
 - Typically recommended for “off-road use only” for track vehicles.
 - Not road legal in USA and other countries.
 - Please check applicable laws in your region if you intend to use on public roads



19: STEP #1+ PERFORMANCE



- **Step #1 Performance upgrade takes factory calibration further.**
 - We improve performance with tweak to various engine management calibrations to tailor the car to “Fast Road” use.
 - This map is for fast road enjoyment, not to make outright peak power at the expense of enjoyment.
 - We setup the Air to Fuel ratio’s for “**Optimal Torque**” in all conditions vs “Optimal Fuel Efficiency” of the stock maps.
 - These maps will still pass emissions testing as we leave the areas of the map which are tuned for emissions alone so your yearly/bi-yearly test will still be fine.
 - We remove dead and ‘flat spots’ in the rev range by tuning the performance specifically for a free flowing sports exhaust.
 - The recommended system is the factory Challenge Style optional exhaust, or any other system which still uses valves and does a bypass of the back box (highest flow) on valve opening.
 - Performance is specifically tuned for low back pressure systems.
 - This map is recommended for use with “180/200 Cell Sports Cats” and a “Free flowing Sports Exhaust”.

20: STEP #2+ PERFORMANCE



- **Step #2+ Performance upgrades for “Track Performance”.**
 - We improve performance with tweak to various engine management calibrations to tailor the car to “Track Usage”.
 - This map is intended for Track usage.
 - We setup the Air to Fuel ratio's for “**Optimal Torque**” in all conditions vs “Optimal Fuel Efficiency” of the stock maps.
 - Stage 2 also calibrates the Ignition curves to be optimized for higher octane fuel so at this point its recommended to use 98+ RON octane rated petroleum.
 - We remove dead and ‘flat spots’ in the rev range by tuning the performance specifically for a free flowing sports exhaust and “test pipes”.
 - The recommended system is the factory Challenge Style optional exhaust, or any other system which still uses valves and does a bypass of the back box (highest flow) on valve opening.
 - This calibration is recommended for use with “Test Pipes” or free flowing “100 cell Sports cats” and a free flowing “Race Exhaust”.
 - Performance is specifically tuned for low back pressure systems however we can also accommodate “low dB” back boxes and other dB reducing equipment (please enquire).
 - The rev limiter is raised to 9,000 rpm. (**note: this requires verification of cam timing**)

21: STEP #3/4/5 PERFORMANCE

STEP
3+

- **Step #3/4/5 Fully Personal Calibration & Data Logging.**
 - We work directly with you to improve performance.
 - These calibrations are fully tailored to your needs
 - A full data logging suite is installed and we can monitor telemetry in real-time.
 - Examples include;
 - Fully Built Blue-printed engines
 - Polished High Flow Performance Heads
 - Cubic Capacity increases
 - Larger Fuel Injectors
 - Larger Throttle Bodies
 - Re-profiled Cam shafts
 - Recommended settings for Exhaust cam timing
 - Please enquire for more details, this stage goes right up to 550hp!