



## Apexi PowerFC FAQ - *Frequently Asked Questions*

Updated: 11:40 PM 16/04/2008

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## What does the unit do?

The unit is a full replacement ECU for your factory computer. It is not a piggyback system and as such allows full control of the engine and computer controlled systems. It comes with a base map of your cars computer with base map tuned for basic mods such as exhaust, boost controller, air filter upgrade. "The Power FC is a complete, stand alone, total engine management system capable of handling virtually anything thrown in its path." - [www.apexi-usa.com](http://www.apexi-usa.com)

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## What cars is the PowerFC supported on?

### Standard Versions

- Honda Civic Type R 97/6-98/8
- Honda Integra Type R 95/9-01/6
- Mazda RX7 Series 1-3 91/12-95/11
- Mazda RX7 Series 4 95/12-98/12
- Mazda RX7 Series 5 99/1-00/9
- Mitsubishi Evo V 98/1 - 98/12
- Mitsubishi Evo VI 99/1-01/1
- Mitsubishi Evo VII 01/2 - 02/3
- Mitsubishi Evo VIII (EVO VII PFC + 4E73G013 EVO VIII Harness) - VIII MR might not be supported
- Nissan RPS13 (Black Head) 94/1 - 96/7
- Nissan RPS13 (Black Head) 96/8 - 99/1
- Nissan RPS13 (Red Head) 91/1 - 93/12
- Nissan S13 Red Top 91/1 - 93/9
- Nissan S14 93/10 - 96/5
- Nissan S14 96/6 - 98/12
- Nissan S15 99/1 - 02/7
- Nissan Skyline BNR32/BCNR33
- Nissan Skyline BNR34
- Subaru WRX Ver1,2 92/11-96/8
- Subaru WRX Ver3,4 96/9-98/8
- Subaru WRX Ver5,6 98/9-00/7
- Toyota Mark II, Chaser & Cresta JZX100 manuel 96/9-01/7 1JZ-GTE
- Toyota Altezza SXE10 01/5 3S-GE
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- Toyota Altezza SXE10 98/10-01/4 3S-GE
- Toyota Altezza SXE10 98/10-01/4 3S-GE
- Toyota Celica ZZZ231 99/9 - ZZZ-GE
- Toyota Mark II, Chaser & Cresta JZX100 Automatic 96/9-01/7 1JZ-GTE (Mark II only to 00/9)

### Djetro Version

- Mitsubishi EVO V CP9A 4G63 98/1-98/12
- Mitsubishi EVO VII CT9A 4G63 01/2- 02/3
- Nissan 180SX RPS13 91/1-93/12 SR20DET (Red Head)
- Nissan 180SX RPS13 94/1-96/7 SR20DET

- Nissan 180SX RPS13 96/8-99/1 SR20DET
- Nissan Silvia PS13 91/1-93/9 SR20DET(Red Head)
- Nissan S15 SR20DET 99/1-02/7
- Nissan Skyline BNR32/33 89/8 - 98/12
- Nissan Skyline BNR34 99/1-02/8 RB26DETT

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**What cars is the PowerFC not supported on?**

Vehicles such as the Nissan Stagea are not supported however the Stage features a Skyline engine (either rb25de, rb25det, rb26dett) engine and standard computer, so a suitable PowerFC for same engine year/model \*should\* work fine engine/computer.

The Apexi PowerFC is purely an injector and ignition driver but is it suited around specific car models to suit their sensors and control signals. It is possible to make it work on other unlisted models or cars but it would require extensive re-wiring and/or sensor matching to make it work.

Vehicles such as the Nissan Skyline R33 GTST that feature the Active-LSD or A-LSD and SLIP function (lights on the dash and vspec diff) will suffer A-LSD compatibility problems. The car will operate correctly and the diff should as well however you will experience "A-LSD" error/failure intermittently. To date there is no known solution for this problem. It appears to be only present on the R33 RB25DET. There was a limited run of R33 known as the GTS25TML spec which is the M Spec with Active LSD. The diff is a skyline GTR vspec diff, electronically controlled LSD instead of a normal R33 diff. It features the same finned cover and A-LSD function as the Skyline GTR. The A-LSD and SLIP functions in the Skyline GTR with the Skyline BNR33 PowerFC work fine, only the ECR33 with ECR33 PowerFC is affected. See [here](#) for some discussion on the topic.

There is now an unofficial Fix for the A-LSD problem found in the ECR33 Skyline. Please click here to view how to fix it; [Link](#)

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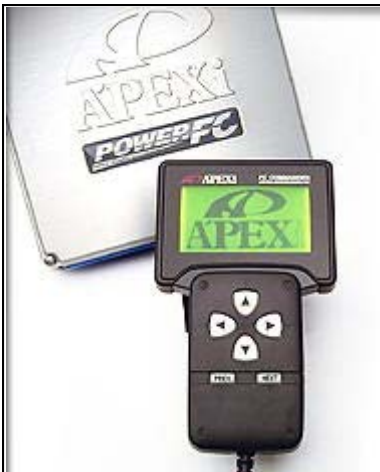
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## What does the unit look like?

The PowerFC looks and is usually in the same ECU case as the standard ECU for your car. This is because it needs to use the same car loom adapter, same brackets etc so its usually the same physical shell & bolt holes for the ECU bracket. The hand controller is a lightweight and ergonomic device with a backlit LCD screen. The screen is larger enough for most tuners and owners to use and operate. It includes enough functionality from the 4 main buttons and PREV and NEXT to control the car, make changes, update the tune etc. I would recommend all owners buy the PowerFC with the hand controller - It is very basic without the hand controller and you can't update/change anything.

This is the ECU and hand controller



This is what the settings screens look like



This is the unit's plug layout





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**What are all the menus and functions on the unit??**

Here is a function list of all available options from the Hand Controller.  
This is for every PowerFC version so you won't have some of these on your Hand Controller.

Note: Some items are not available on various units (ie: PimVolt only on DJetro and Map Sensor versions)

Note: Some factory items do not work - Airtemp on R33 GTST

MONITOR	<table><tr><td>AirTemp - Air Temperature</td></tr><tr><td>Airflow - Airflow Meter Voltage</td></tr><tr><td>BatVolt - Battery Voltage</td></tr><tr><td>Boost - Boost Pressure (Bar)</td></tr><tr><td>Eng Rev - Engine RPM</td></tr><tr><td>IgnT Ld - Ignition Leading (Rotary only)</td></tr><tr><td>IgnTmng - Ignition Timing</td></tr><tr><td>IngT Tr - Ignition Trailing (Rotary only)</td></tr><tr><td>InjDuty - Injector Duty</td></tr><tr><td>Knock - Knock Sensor</td></tr><tr><td>PimVolt - Map Sensor Voltage (DJetro only)</td></tr><tr><td>Speed - Speed KM/H</td></tr><tr><td>WtrTemp - Water Temperature</td></tr></table>	AirTemp - Air Temperature	Airflow - Airflow Meter Voltage	BatVolt - Battery Voltage	Boost - Boost Pressure (Bar)	Eng Rev - Engine RPM	IgnT Ld - Ignition Leading (Rotary only)	IgnTmng - Ignition Timing	IngT Tr - Ignition Trailing (Rotary only)	InjDuty - Injector Duty	Knock - Knock Sensor	PimVolt - Map Sensor Voltage (DJetro only)	Speed - Speed KM/H	WtrTemp - Water Temperature
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Knock - Knock Sensor														
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Speed - Speed KM/H														
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Injector - Injector Latency														
Pim Volt - Map Sensor Voltage Table (Djetrol														

ETC	Only)
	Rev/Idle - Rev and Idle Settings
	Wtr Temp - Water Temp Correction Table
	Prog. Version - Display PowerFC and Hand Controller version
	Sensor/SW check - Sensor check page
	Function Select - Function Select
	02 F/B Control - O2 Sensor Feedback Control - Open/Closed Loop
	Airflow Warn - Airflow Meter Warning - 5v Peak (Engine check light)
	Boost Cntl Kit - Apexi Boost Control Kit
	Idle-IG Cntrl - Map Sensor Idle Logic (Djetro only)
	Injector Warn - Injector Warning (Engine check light)
	Knock Warning - Knock Sensor Warning
	LCD/LED adjust - Backlit display contrast adjust
	All Data Init. - Reset to Factory Defaults

Apexi went to great lengths to ensure you could control everything that a tuner would need with minimal fuss.

The interface is very intuitive and easy to use. It appears as they didn't opt to include un-needed/un-necessary things such as monitoring oil pressure from the hand controller, oil temps, and other sorts of "nice to have features".

As these would add development cost, extra sensors etc. The unit is a very efficient plug and play unit for a very cheap and affordable price. Extra junk just adds development cost, which increases the price. So basically everything you need is via these menu's.

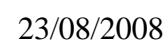
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## **Is there a menu roadmap?**

For a menu road map check out the following picture, courtesy of Autospeed:



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### **Does the unit work on my N/A car?**

It has been rumored the work with unconfirmed reports. The model however is still suited for the turbo version of the engine so timing, ignition, maps etc may be unsuitable. There are a few N/A PowerFC versions for the Honda etc so they do exist, its just more common for the turbocharged models.

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## **Does the unit work on manual and auto cars?**

The PowerFC only supports manual cars (excluding Toyota). It will work on an automatic car however it will not handle gear changes and simply keep the throttle nailed during a gear change. This will result in jerky gear changes and stress placed on the gearbox. The factory ECU during a gear change will communicate with the auto box and drop timing, ignition to ensure a smooth change. For those wishing to use PowerFC with auto you should consider a mechanical auto gearbox instead of an electronic. The PowerFC should work fine with a mechanical gearbox such as power glide, transbreak etc.

This is because the mainstream ECU's in Nissan etc rely on the main cars' ECU for gear logic change control and functions. Cars such as the Toyota have a separate ECU for the gearbox change logic and control so it's not affected. Apexi chose not to port the Automatic gearbox logic code (as its very long and complex) into the PowerFC because I suspect they found its simply not worth it & too complicated. You can buy an Automatic PowerFC for a Toyota Chaser for example and it has auto logic control under SETTING, you can set the shiftmap, ramp up speeds etc as it has the code to interact with the Toyota AUTO ECU that

is seperate to the main ecu. So in summary - Auto PowerFC's exist & work but only for Toyota. We have seen quiet a few Auto R33 Skylines with manual PowerFCs - some report they work fine etc and there is no difference - do so at your own risk.

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## How much does the unit cost?

The unit currently retails around \$900 AU delivered from Japan for a new unit. However as Apexi have altered their production plans this only applies to some select models. Other models must be sourced 2nd hand from forums, ebay,



other members etc. For AP Engineering models they are more expensive as they are a custom made model and retail is around \$1500 AU or even higher. Recent pricing indicates around the \$920 mark is more realistic. There are some workshops or resellers that list they have the "Australian" version of the Apexi PowerFC. This is simply the same PowerFC but sold with an Australian dealer or reseller warranty. Normally your PowerFC needs to be sent to Japan for a warranty claim and/or testing. With an "Australian" version it can be done locally supposedly.

There are also unconfirmed rumors of the local distributors being able to supply the latest firmware for the PowerFC. To date the latest firmware I have seen on ECR33 is 5.11 which was from Mid Oct 2006 build. The price of the "Australian" PowerFC is somewhere near \$1500 so its not even worth the cost, given the mean time between failure of the PowerFC's. Basically if it fails, you've done something wrong or have a dodgy wiring loom / hacked up loom.

Lately it seems everyone is cashing in on the "discontinued" situation that the PowerFC is in.

The main models are still in product, its just slower and takes longer to get one on order new from Apexi.

I would be careful in how much you pay for a PowerFC these days. I have seen upwards of \$1600 AU for a used unit these days on Ebay.

The places I would look for 2nd hand PFC's would be your local car club, Ebay and Yahoo Japan auctions (lots on here usually).

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## **When I buy the PowerFC what comes in the box?**

The current PowerFC comes with the following items

- Apexi PowerFC ECU
- Apexi PowerFC Hand controller
- Apexi PowerFC Japanese Manual
- Apexi PowerFC Japanese Warranty Card
- Velcro Sticky tabs for use with the Hand Controller

This applies to new units purchased. Previously the older style new units were the main ECU only.

Some time around 2004 ish Apexi decided to bundle the hand controller and ECU as one main price.

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## Is there an English manual? a PDF copy? English translation?

An outdated english manual (for the RX7) is available at [English Commander Manual](#).

The current Japanese manual can be found at [Japanese Command Manual \(updated\)](#)

For a complete Japanese Manual matrix on the Apexi site go here:

[http://www.apexi.co.jp/manual2/pdf/torisetu\\_p\\_fc.html](http://www.apexi.co.jp/manual2/pdf/torisetu_p_fc.html)

Japanese Manuals (high quality PDFs)

Name	Link
PowerFC Manual 3SGE	<a href="#">Right click, Save as</a>
PowerFC Manual RX7	<a href="#">Right click, Save as</a>
PowerFC Manual Nissan (180sx, 200sx, GTST, GTR)	<a href="#">Right click, Save as</a>
PowerFC Manual Evo Lancer	<a href="#">Right click, Save as</a>
PowerFC Manual Evo Lancer DJetro	<a href="#">Right click, Save as</a>
PowerFC Manual MR2	<a href="#">Right click, Save as</a>
PowerFC Manual 180SX	<a href="#">Right click, Save as</a>
PowerFC Manual SR20	<a href="#">Right click, Save as</a>
PowerFC Manual Honda Integra	<a href="#">Right click, Save as</a>
PowerFC Manual Skyline GTR Djetro	<a href="#">Right click, Save as</a>
PowerFC Manual Chaser JZX100	<a href="#">Right click, Save as</a>
PowerFC Manual Subaru WRX	<a href="#">Right click, Save as</a>

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### **I have the older PowerFC that did not come with a hand controller can I buy a new hand controller separate and use that?**

You may be able to depending on the version of the ECU and hand controller. If the version between the ECU and Hand Controller is different the Hand Controller will boot up the Apexi logo and freeze. Take this as a precaution as a few people have experienced this. If you experience the hand controller freeze problem click [here](#) to get some help on it.

[My Hand Controller freezes at the Apexi Logo. Why???](#)

Pay attention to the version matching and you can't go wrong. Your local supplier can order the correct hand controller for you. If you can't find a supplier <http://www.nengun.com/> can source the older styler and newer style hand controller (N001 and X001) for you new at a new price. If you are after a 2nd hand unit you can try Yahoo Auctions, Ebay or even Jap Parts at <http://www.japartsspecialist.com/>

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## **What model do I need? (Version Matrix)**

Version Matrix

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Version	Alternate names?	Input Type	Extras
Standard	LJetro or just normal PowerFC	Airflow meter	normal unit
Djetro	Map Sensor PowerFC	Map Sensor	normal unit with map sensor input instead of AFM
Pro	FC Pro - PowerFC Pro	AFM	Launch control (0km/h limiter) & Spark cut (instead of fuel cut) at limiter
AP Engineering	AP Eng	AFM usually	These are remapped PFC's to suit extra cars (ie R33 RB25 GTST PFC remapped to suit R32 RB20 PFC)

You cannot mix and match models - Some cars only have access to some models etc. ie: There is no Djetro version for R33 GTST - There is no Pro version of Evo 8 etc. Apexi release some models in all 3 flavours to suit the market (Skyline GTR gets all 3 options). Some models can be back ported to other cars ie: R33 GTR can work on R33 GTST so you can have R33 GTST Djetro (and Pro etc). Some AP engineering releases can be Pro versions too. There are some counterfeit FC Pro versions out there (buyer beware).

Click here to read up on the [PowerFC Djetro Version](#)

Click here to read up on the [PowerFC Pro Verion](#)

Click here to read up on the [PowerFC AP Engineering Version](#)

You should note that all models are now discontinued other than standard LJetro versions. Apexi no longer make Djetro, Pro or AP Engineering versions. You need to source these models 2nd hand from Ebay / forums etc.

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## **What is an "AP Engineering model" and do I need it?**

"A.P. Engineering Original Power FC units carry the same functions as the regular Power FC units but have been specially adopted for use on car models that the regular Power FCs do not cater for. As they are an item outsourced from Apexi, their pricing is higher than the regular models." - [www.greenline.jp](http://www.greenline.jp). An example of an "AP Engineering" model is the PowerFC for the r32 gts-t.

AP Engineering versions are no longer available brand new. You need to purchase one second hand if you want to buy one.

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### **What is the "D-Jetro" model and do I need it?**

The D-Jetro Power FC units carry the same functions as the regular Power FC units but do not require the use of the factory standard air flow meter and use a mass air pressure sensor. Apart from the unit itself, use of the D-Jetro units requires additional parts that vary depending on the model." - [www.greenline.jp](http://www.greenline.jp)  
The airflow meter (at least in the skyline range) does not pose a big restriction in terms of horsepower and one would doubt the use of the D-Jetro. If you really need massive airflow you can always change to 2 x Q45 Airflow meters and use those with the PowerFC. The skyline series are optimized for closed loop operation with an airflow meter.

The Djetro version has a few caveats you should know about before you consider using it

- Careful placement of the map sensors in multiple throttle body systems With multiple throttle bodies, such as the Skyline GTR RB26 or the Pulsar's GTI-R SR20 multiple throttle bodies can have bad side affects when using a map sensor system. Consideration needs to be taken into account when placing the map sensor (or map sensors) for the Djetro system to avoid idle problems on multiple throttle bodied engines.
- Tuning will take considerably longer It will take considerably longer to tune a Djetro PFC over a normal LJetro PFC. This is because all of the work has to be done from scratch instead of just doing the main bits in the AFM/LJetro version. You should discuss this with your tuner and find out the total cost for a Djetro tune.



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## What is the "Power FC Pro" and do I need it?

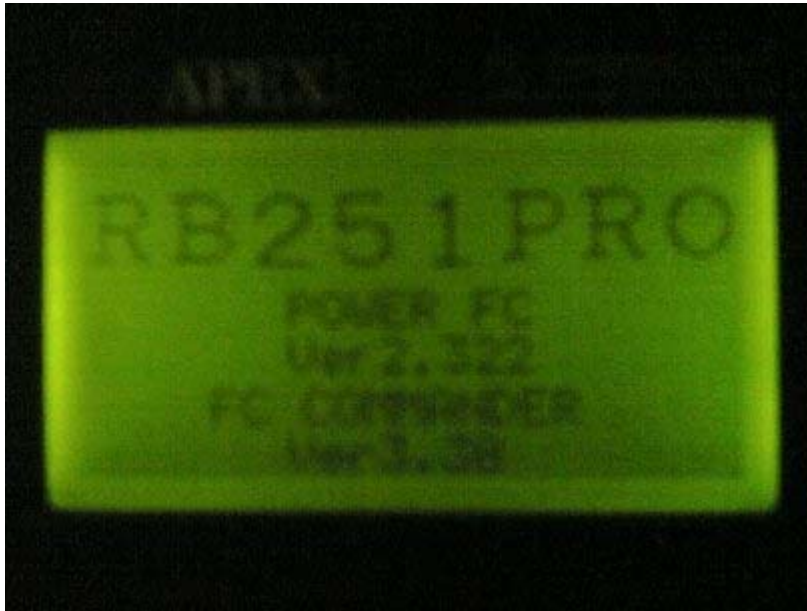
The Power FC Pro Spec.CPU has been designed for drag racing use. These units have two additional features. 1. Preset revolution limit is reached. At high rpm, there is the possibility of knocking when the fuel is cut potentially destroy the engine. 2. 0km/h rpm limiter setting - Allows for the setting for an initial rpm limiter for launches.

PowerFC Pro versions are no longer available brand new. You need to purchase one second hand if you want normal standard versions. The true PowerFC Pro versions have some unique features which give them

Have a look at [What does the PowerFC look like inside?](#) to identify what a PowerFC Pro version looks like (see Engineering). The other dead give away is the "FC Pro XZXZX" sticker on the side of the main ECU casing.

There should also be a sticker on the main ecu which would read something like "RB25PRO1" or "RB26" "RB26DETTPRO1" etc. It should definitely have PRO in the version string - There have been reports of j before you buy it to make sure its a legit PowerFC Pro version.

For some more discussion on the this topic check out [gtr.co.uk](http://gtr.co.uk);  
[Power FC Pro identification help](#)



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## **Does the PowerFC run the whole car or do I need controllers for... (Aircon, Lights, ABS etc...)**

The PowerFC emulates all the functions that your standard computer did. This includes things like Aircon, Lights, ABS etc.

What ever your car did with the standard ECU, it will do the same with the PowerFC.

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## What other optional parts are available for the PowerFC?

Here is an almost complete of optional parts for the PowerFC.

Note they do not work or plug into all models, some parts are Djetro only, some are Ap Engineering only etc.

### Hand Controllers

Name	Part No
Hand Controller ( <b>Old Style</b> (To suit ENGINE MODEL STYLE PFC - IE: <b>PFC RB25 or PFC RB26</b> ) & <b>AP Engineering old style</b> )	415-N001
Hand Controller ( <b>new Style</b> (To suit CAR MODEL STYLE PFC - IE: <b>PFC ECR33 or PFC GTR33L</b> ) & <b>Multiversion hand controller</b> )	415-X001
Hand Controller Toyota	415-T001
Hand Controller Toyota (JZZ30 only)	415-T003

### Hand Controller Extension Cord (**Make your own**)

Name	Part No
Hand Controller extension cord 60cm	415-XA01
Hand Controller extension cord 3m	415-XA02

### Boost Solenoid Kit (To read and display Boost on the hand controller)

Name	Part No
Apexi Boost Sensor (Boost Control Kit)	415-X001
Apexi Boost Sensor Harness (3 pin PFC)	49C-A002
Apexi Boost Sensor Harness (5 pin PFC)	49C-A003

**Apexi Official Software (not recommended)**

Name	Part No
Apexi FC Commander Pro software	415-X010

There are other optional parts available you just need to find the part numbers.  
In actual fact I recently brought the Boost Control Kit in parts and found it cheaper in parts, I guess this is because of the way its shipped in a medium box.

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## Why would I want to buy a PowerFC?

There are many reasons for changing to a PowerFC the most common being to extract more power from the current engine setup. Your cars factory computer has many limits and conservative settings to ensure engine reliability and to ensure factory components do not have excess load placed on them. As you upgrade these components the factory computer will not retune itself and therefore you will not obtain your maximum benefit. You can reset your cars ecu (works in most Skylines) and it will relearn your engine setup and adjust accordingly but that is only basic tune settings. There are much more advanced tune settings available with the PowerFC.

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## Does the PowerFC have limits?

The PowerFC does not have limits such as speed limiter or boost cut the factory ECU has to prevent engine stress / excess load. It has adjustable idle, rev limit and on-load idle. You can set your cars rev limit to whatever you like. 10,000rpm if you like.

There are no hardset limits in terms of power, killowatts, horsepower or turbo size etc its purely as good as your tuner. So if you have a good tuner then there is no logical/physical boundary etc. The Apexi 1200HP drag car uses a PowerFC for its main ECU (no surprise).

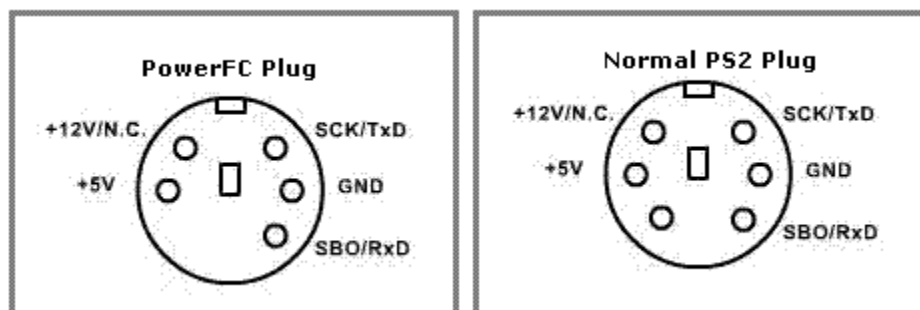
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## Are there any cool tricks with the PowerFC? Free mods etc?

A handy trick PowerFC owners use when they take car in for a service/work to be done they set the rev limit to 3000rpm and remove the hand controller. This prevents the workshop from taking your car out for a fang on the roads and driving it like they've stolen it as the PowerFC will cut the power at the 3000rpm rev limit interrupting the joy experienced by the joy rider of your precious car. This would be useful at panel beaters, car cleaners, stereo installers etc. This would not be suitable for a performance workshop cos if they are tuning your car or fixing a problem they may need to actually rev it out so use this wisely. Another unofficial mod is instead of buying the official PowerFC hand controller extension cord is to use a normal Ps2 extension cord used for a normal PC computer. Its the same cable you just need to break off one of the pins.



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## **How does the PowerFC compare with the Apexi SAFC, AVCR and other Apexi computers?**

The Apexi AVC-R and SAFC are piggyback systems. The SAFC controls airflow voltage and fakes airflow voltage to the ecu. This makes the ecu believe more airflow is present and cranks up the fuel/timing thus resulting in more power. The AVC-R is a boost controller and not really a piggyback as such.

Apexi SAFC - Piggyback Fuel Computer

Apexi AVCR - Boost Controller

Apexi VAFC - Vtech and Piggyback Fuel Computer

Apexi Imoni - Diagnostics display from consult port

Apexi Multichecker - Diagnostics display from consult port

Apexi PowerFC - Standalone Engine Management

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## How does the AVC-R compare to the PowerFC boost controller kit?

You can obtain the similar functionality from the AVC-R as you can from the PowerFC with the boost controller kit installed. The AVC-R and the PowerFC boost kit use the same solenoid and map sensor parts. It is confirmed that you can switch the AVCR solenoid and map sensor to the PowerFC boost kit but it should work. You can make the PowerFC display boost pressure without buying the Boost controller kit by buying the map sensor and using the Boost Kit Harness.

Parts list: [What other optional parts are available for the PowerFC?](#)

You will need:

- Map Sensor
- Map Sensor Harness
- Solenoid

The main difference between the AVC-R and the PowerFC Boost Kit is the AVC-R can do gear judge or predictive gear based boost control and it has the pretty blue screen. The code logic, solenoid parts, wiring etc is the same.

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## How do I install the PowerFC?

Disconnect your cars battery and discharge all power from the car. You can do this by unplugging the battery or pressing the brake pedal a few times. Locate your cars computer and unplug the factory car wiring harness. The factory wiring harness is usually screwed into the ECU so you need a Phillips head to undo the bolt in the middle. Once removed the factory-wiring loom you need to remove the ECU from its brackets. You can simply unscrew the ECU out. Once it has been removed put it in a safe place in case you need to go back to your factory car. Plug the PowerFC in its place and plug in the factory wiring loom the same way it came out of the stock computer. Note which way the ECU came out and match the pins/wiring notation correctly. Once it has been secured, holding down brackets/screws you are now almost ready to start your car. Before you start the car for the first time, you should give the ACC key turn power so the hand controller turns on. If you are not using the PowerFC kit make sure you disable this feature. Go to the "Etc" menu and choose "Function Select" and then choose "Control Kit" and set the option to a Japanese character that looks like a plus sign. This will disable the hand controller kit. The PowerFC manual states to start the car, ensure no errors are present and let the car idle for 30 minutes. During this idle period wait about 10 minutes, turn on the air con, wait another 10, turn off the air con, wait another 10 minutes or so and then your car is ready to drive. If you short cut the self learn idle procedure the car is turned off and back on again it will simply stall each time. If this occurs you must factory reset the car and do the procedure from the start.

- Disconnect Power
- Unplug stock ECU
- Plug in PowerFC ECU
- Reconnect Power
- Start Car, let it idle for approx 10 minutes before doing anything
- Turn on aircon, let it readjust its idle and wait about 10 minutes
- Turn on demister, let it readjust its idle and wait about 10 minutes

All done and you are ready to drive with your new ECU now. At this point you should familiarise yourself with the hand controller and just checking the initial sensors and make sure the basic options are turned on and read the basic information.

Below is a list of things you should check before heading off to your tuner. These are just precautions to ensure it's ready to be tuned and avoid any silly problems at the start.

Installation Checklist:

## Sensor Check

MAIN MENU, ETC, SENSOR SW / CHECK Look for any sensor names highlighted in BLACK background sensors. Any highlighted in black indicates a problem. The engine check light will also stay on if any of them aren't working (highlighted in black). This is not to be confused with the black DOT switch on / off sensor.

AFL: 1.00v	IGN: ●	WRN: ●
VTA: 1.00v	STR: ○	MRL: ●
VPA: 4.01v	STP: ●	FPC: ●
BOST: <b>5.10v</b>	PWS: ●	ACI: ●
WTRT: 2.56v	A/C: ○	A/C: ○
AIRT: 0.45v	ELD: ○	RPG: ●
AIMT: 0.00v	PRE: ○	O2H: ●
O2S: 0.00v	RL: ○	FAN: ○

Sensor names  
BLACK HIGHLIGHT means faulty or out of range value

Engine switches  
Black DOT means  
Empty DOT means

● : ON  
○ : OFF

## Stable Idle

The car should have a stable idle and shouldn't hunt. If it is hunting (revs bounce up and down a lot) & the engine "hunting" then you should consider a re-initialize and self idle learn again. If you don't have a car will be sucky and frustrating to drive.

## Engine vitals OK

MAIN MENU, MONITOR, 8 CHANNEL,

Select the following

- WtrTemp
- Knock
- BatVolt
- Airflow
- EngRev
- InjDuty
- Boost
- IgnTmng

**WtrTemp** when the engine is warm and stable should be around 70 to 80deg.

**Knock** at idle should be 0 or like 1 or 2 at the most. Give the engine a few revs, ensure it returns to 0.

**BatVolt** should be around 14 at idle. Too low is bad and Too high is bad. over 15 is bad and under 14 is bad.

**Airflow** should be stable at idle, around 1100mv (millivolts). Should increase when you give the engine a rev, should return to around 1100 after it returns to idle.

**EngRev** should be similar to what the stock tachometer says, it may be out a little bit. Ensure it follows stock tachometer you give the engine a rev.

**InjDuty** should be around 1 to 2% at idle and should increase considerably when you give the engine a rev.

**Boost** (if not using the boost kit it will be ---) should be around -500mmhg at idle and should go to near 0 at a free rev.

**IgnTmng** at idle should be around 15 or 20deg. Should increase considerably with free rev.

## No engine check light or exhaust temp light

The car's factory engine check light or exhaust temp light should NOT be on. If this is on or flashing it indicates a problem. See the "Sensor Check" section on what to look for to identify the faulty or wrong sensor.

## Restart the car a few times to ensure its stable

Restart the car a few times to ensure engine check light doesn't come on and idle is stable

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## **Help! My car doesn't start once I've installed the PowerFC**

Check that you've disabled the PowerFC boost controller kit in the step above. Check that you've chosen the right model PowerFC. Check that you've securely fastened the wiring loom and its not loose. Some cars only (for some strange reason) have half gauge wiring running from the battery to the ECU. This works fine for the factory computer but the PowerFC needs the full 12volts. You can simply run new 12volt wire from the battery to the ECU and this should correct this. This problem has been experienced by at least two members previously (both in R33 GTST) If the hand controller displays the Apexi logo and freezes then you have the wrong hand controller version or its damaged. If you find your car cranks, starts and stalls immediately you should check you have entered the correct injector and airflow meter settings (if they aren't standard items). If you still do not have a stable idle follow this procedure <

- Turn car off
- Turn car to ACC
- On Hand Controller, ETC, DATA INIT, YES
- Turn car off

- Turn car to ACC
- Change AIRFLOW and INJECTOR as needed (if different from stock)
- Turn off Boost Control Kit (if not being used)
- Start car and follow idle procedure

Failing that take the car to a mechanic/tuner who has worked on the PowerFC and see what they can sort out for you. It's pretty rare for a PowerFC to not start first shot - so double check the list, ensure you have done a DATA INIT on it and restarted the car etc before going further.

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## Does the PowerFC have any laptop hook up options or software?

The PowerFC has an official laptop software hookup but it is only for Power Excel workshops. These are workshops endorsed by Apexi and they will not give out the software. You can now purchase the official PowerFC Cable and Software for around \$550 AU. This includes the official cable and PowerFC software. The Software is in Japanese and so is the manual. There is an unofficial product called the FC-Datalogit. This is a 3rd party product that includes a dongle/serial cable and software. It's retail is around \$520 AU and supports full control of the system just like with the hand controller and supports logging to your laptop for replaying and viewing later. You can also make your own cable/dongle providing you know how (and have the PIC processor code). The diagram on my site needs PIC processor code to work and this code is NOT available, is it not released for public use, please do not ask for it. Should cost around \$50 in parts, then you can use the PowerFC Pro (if the cable works) software from my site. There is a new product on the way due for release in August which is the FC Tune. This appears to have the same functionality as the datalogit however it supports all of the cable types including a custom made one. Retail is rumored to be around \$299 USD for the cable. The software is free.

- Apex'i FC Pro Software and Cable (retail product)
- FC Tune and Cable
- Datalogit FC Edit and Datalogit Connector Box (retail product)
- Kashima's custom cable (needs PIC processor code)

You should read here if you are interested in [Datalogit](#)

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## **Are there any hidden/secret features? Stuff you can't access by the Hand Controller?**

If you have the PowerFC cable and software or the datalogit kit you can get to a few features that arent supported on the hand controller.

- You can download maps to your PC and save them.
- You can set the fan temperature turn-on value to below lower then 60deg.
- You can set the millisecond values for the engine flash light for AFM, INJ, KNK levels.
- You can access and control the air temp correction table.
- You can adjust load map points by extended the airflow measure levels.

The follow tables/settings are also changeable

- Inlet air temp fuel map
- Water temp fuel map
- RPM acceleration fuel map
- Cranking Injector dwell map
- Water temp versus boost fuel correction
- Inlet air temp versus boost fuel correction
- RPM Load Point table
- AFM load point table
- AFM voltage table
- Ignition versus water temp correction
- Ignition versus inlet air temp correction
- Ignition dwell versus RPM correction
- Ignition versus battery voltage correction
- Ignition versus boost correction
- Individual injector trim
- Injector lag versus battery voltage correction

The following functions can be supported by additional hardware with Datalogit

- Antilag via injection
- Antilag via ignition
- Intercooler spray
- A/C and non A/C overheat fan temp switch.

- Every standard sensor is logged
- Optional logging for (lambda, brake temperature, suspension travel etc)

The PowerFC has a map for inlet air temperature which is not accessible by the Hand Controller but the table is still used by the PowerFC if it picks up Air Temp from the factory sensor. The Skyline RB26 has this sensor and the stock GTST loom can be adapted to support this sensor and allow the GTST PowerFC to read the value.

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## **Once the PowerFC is installed can I expect any better performance or does it HAVE to be tuned?**

It is always recommended that you get your PowerFC tuned for your cars mods. This will take into factor things like a lazy fuel pump etc that will be missed with just the factory tune. A full tune will ensure your A/Fs are safe and the engine is not excessively knocking and you are getting maximum benefit from the new ECU. A standard map will have benefit over the stock computer as it wont have built in limits the factory computer has and it also controls things like Variable Valve Timing better (on r33 RB25det at least) and provides more torque in the rev range without a tune.

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## **Can I drive around without it being tuned for a few days? Months?**

You can drive the car around as you would normally but you should take care not to put stress on the engine. Basically don't fang around in it, as you could be running unsafe A/Fs etc and just causing more damaged. Best to get it tuned. Make sure you watch the knock levels if you do this to make sure there isn't excess detonation.

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## **What does the PowerFC support in terms of modifications?**

The PowerFC can support bigger injectors, larger turbos, aftermarket plenums, superchargers, nos kits, etc. The PowerFC is able to do this by allowing the tuner to adjust all the parameters of the engine on a load vs. rpm map for each of the core components. You can tune the computer to run xyz amount of fuel at 2300rpm on load xyz and to have xyz timing at the same load etc so the combinations are virtually endless. It will also support bigger airflow meters, different and custom meters, larger fuel pumps etc.

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## Where can I get my PowerFC tuned and how much will it cost me?

There are dozens of workshops that can tune the PowerFC you best reference would be a search in your local chapter (or car club).

For a PowerFC tune you are looking at a price of around \$300-\$500 varying on mods you have and car etc.

A list of known workshops who can tune PowerFC's;

Workshop	Address	Contact	Notes
Racepace	9/6 Holloway Drive, Bayswater, VIC, (03) 9762 9421	Ben	Track car specialists (incl. datalogit)
RE Customs	16 Yiannis Court, Springvale, VIC, (03) 9548 3414	Ray	Premium tuner with Datalogit
Dr Drift	Unit 4/9 Alick Rd, Brooklyn, VIC, 0425 818 755	Sam	Premium tuning and remapper of std ECU's
CREATD Motorsports	11a Merola Way, Campbellfield, VIC	Rob	These guys have done GTR PFC on RB20
Croydon Racing Developments	9 Blaxland st, Silverwater, NSW 2128, (02) 96484264	Jim	Premium tuner (incl datalogit). Built <a href="#">GTR700</a>
Unique Autosports	Unit 1/20 Tucks Rd, Seven Hills, 2147	John	Premium tuning (custom RB26 PFC on VG30DETT)

If you would like your workshop listed here please [email me](#) and provide some information about your workshop so I can list you.

If you can [install the PowerFC yourself](#) you will save yourself some easy \$ in the initial setup. Djetro PowerFC tunes will typically cost more so keep this in mind.

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## **Can I tune the car myself?**

You sure can if you know. You can also look up some DIY threads using a lambda sensor and the trial and error procedure. Be warned you are playing with an electronic controlling mechanism of your engine and any incorrect setting could cause bad things. See the below parts on the Map Tracer for some info on Self Tuning. You can self tune the ignition timing yourself with trial and test method but you should not do this for fuel injection as you can lean it out too far and burn the exhaust valves which is permanent engine damage. Self ignition timing tuning can be done quite easily and will certainly aid in more fuel economy. It's not recommend for more power as this should be done on a dyno so you can ramp up the load and max out to 200km/h without breaking any road laws / putting yourself at risk.

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## **What is Map Tracer? Is it useful?**

Map Tracer can be used to work out what map the powerfc is currently using. Each map contains settings for the engine. A map is a 20x20 grid each position has a value. There are maps for fuel injection and ignition. The map has 20 load points and 20 rpm points. Each rpm point is 400 rpm. This grid looks like:



0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																

A map for the ignition timing values looks like this (rb25det map)

Ignition Map	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	15	15	20	25	25	35	37	40	42	42	41	41	36	31	30	3
2	15	15	20	25	25	35	37	40	42	42	41	41	36	31	30	3
3	20	20	27	32	38	38	43	43	42	42	40	41	36	31	30	3
4	20	20	27	33	33	37	42	43	40	40	39	40	35	31	30	3
5	20	20	28	36	36	36	41	43	39	40	37	39	35	31	30	3
6	20	20	26	33	35	35	39	41	38	39	36	39	34	31	30	3
7	18	18	25	31	32	33	37	39	36	37	34	38	33	31	30	3
8	18	18	25	29	32	33	35	37	35	35	33	35	32	31	30	3
9	18	18	25	27	29	29	35	36	34	33	31	33	32	31	30	3
10	18	18	19	25	25	28	30	33	31	32	31	32	32	31	30	3
11	18	18	19	22	23	24	23	24	28	29	28	30	30	30	29	2
12	16	16	16	20	20	21	23	24	27	27	25	24	24	24	24	2
13	16	16	16	22	21	20	21	23	22	23	20	20	20	19	20	2
14	16	16	16	22	22	22	22	22	22	20	19	19	19	19	20	2
15	16	16	16	22	22	22	22	22	22	20	19	19	19	19	20	2
16	16	16	16	18	20	20	20	20	20	20	20	18	18	18	18	2
17	16	16	16	16	15	15	18	20	22	20	20	20	20	21	21	2
18	16	16	16	16	15	15	18	19	21	20	20	20	20	21	21	2
19	16	16	16	16	15	15	18	19	21	20	20	20	20	21	21	2
20	16	16	16	16	15	15	15	15	15	15	20	20	20	21	21	2

A completed map trace in 2nd gear going from idle to redline looks like this. Please note this is done w pedal is to the floor:

Map Tracer	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																

Load is based on how much airflow the airflow meter is measuring. Going up a hill in 3rd gear at 50km load value 13 if the airflow meter is seeing 4.1volts of "air" and an rpm point of 11 if you were at say (vertical left side) 13 out of 20 represents the amount of engine load being placed on it, which is taken measurements. The ECU also knows how hard you've pushed the pedal based on the "THRO" sensor. So "values" that it's given in real time to work out what cell values to use for ignition timing and fuel injection for tuning the engine as you can adjust any load point you like how you see fit. It's a little clear when diagram: If you were noticing an issue when under a certain load or rpm you could run a map tracer screen read and then adjust the corresponding map value under ignition or fuel. To have the map tracer save the map tracer screen press next when in map tracer and as it goes through the maps it will leave the if turned on mouse trails in windows, you see the previous trail it has left. This makes it easier to debug and what values need to be adjusted to alter how the car runs based on the map values being read in

Below is a map trace of light and medium throttle. This was done from my car based on a 15 minute drive on streets on what I would consider normal throttle. The majority of the time you aren't on full wide open done based on the car being on a dyno with the throttle wide open to check for safe A/F and tune for rpm however you will lack fuel economy as the a/f's for low and medium throttle are nowhere near the full



As you can see from this most of my time or "operation" is spent on the top left of the Map. Now remember, load is up and down and rpm is left and right. So based off this trace we can see I'm not hitting much load, the most rpm I'm hitting is point 8. So the max for that trace is load point 10 which is about 2/3 of the r33 gtst (The stock powerfc and afm can only show upto 15 points for 'load' reference). The rpm is 8 \* didn't go over 3200rpm and didn't give it lots of throttle but enough to access the lower end region. So economy is fairly good but I am sure I can get better so we need to drill down to the fuel cell values for as I am sure they weren't tuned on the dyno as this wasn't a priority for the initial tune. More to come, I will look into my tune and try and get some better fuel economy. Consider how much time you spend on full throttle and you'll realise where your fuel economy has gone. Out the window as the majority of the fuel cells are highlighted above and they are default apexi map values so they need to be tweaked.

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## **What do the strange sensor names mean?**

If you goto ETC and then choose SENSOR CHECK/SW you will see a list of sensors and corresponding values. These report values that the current sensors are returning. This can be useful for checking faulty sensors and to check if a certain sensor is working expectedly. Below is a translated list of the ECR33 PowerFC

商品コード	適合車種(通称名)	車両型式	エンジン型式	年式
414-N012	スカイライン	ECR33	RB25DET	'93/8~'98/4

### ● センサ類

[AF-1] ... **Airflow Sensor**

[THRO] ... **Throttle**

[BOST] ... **Boost Sensor**

[WTRT] ... **Water Temp Sensor**

[O2-1] ... **Oxygen Sensor**

[EXTM] ... **Exhaust Gas Sensor**

[\*\*\*] ... 予備

[\*\*\*] ... 予備

### ● スイッチ類

[IGN] ... **Ignition**

[STR] ... **Starter Motor**

[A/C] ... **Air Conditioning Switch**

[PWS] ... **Power Steering Pump**

[NTR] ... **Neutral Gear**

[\*\*\*] ... 予備

[\*\*\*] ... 予備

[\*\*\*] ... 予備

[ECC] ... **ECCS**

[WRN] ... **Engine Warning**

[EXT] ... **Exhaust Gas Warning**

[F/P] ... **Fuel Pump**

[FP1] ... **Fuel Pump Control**

[VTC] ... **Valve Timing Control**

[O2H] ... **Oxygen Sensor Setter**

[ACR] ... **Air Conditioner**

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## **What are the basic mods I should have when I get my PowerFC?**

You can fit the PowerFC whenever you like however a basic list of mods is a great start as you'll get the most gain out of it from the standard computer

- Full Exhaust 3" from turbo back
- Boost Controller (Bleed Valve or Electronic Boost Controller - Or you can use the PowerFC boost controller kit)
- Air filter upgrade / Pod filter or CAI setup kit
- Upgraded Intercooler

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## **Why does my engine light flash when I drive with the PowerFC?**

The PowerFC uses the factory engine warning light to alert the user of "upper limit" or ceiling values in the engine systems. Things such as airflow meter max value, injector max duty, excessive knock will cause the engine warning to flash. Usually the engine flash is in a sequence of 3 flashes each 0.5 seconds apart. Should you experience this you should review the hand controller max values (press down when in monitor mode and displaying values to see the max values for each) and consult your tuner immediately. Excessively high knock can cause engine damage. Running on max injector duty can also be fatal so speak to your tuner. Aggressive tunes that are tuned around winter temps/airflow and being run hard in summer may cause these symptoms if the tune is very aggressive and on border line of maxing out the stock components. This is only hearsay but I have seen this from at least one or two members.

See [Basic Hand Controller functions and use](#) for information on how to isolate which warning is triggering the engine flash light

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## **My idle is really crappy and it hunts around a lot when on idle. What can I do?**

The first step when installing the PowerFC is to let it idle for upto 30 minutes on your car so it adjusts to your engine setup. This includes turning on the Aircon, Demister and Heater throughout the idle stages so the ECU has time to learn the engine setup and idle levels. This can be done by doing an "initialize" on the PowerFC. This will reset all settings back to default (including your tune) and set the PowerFC back to learn mode (for idle only). You should not do this if you have a tune as there is no way to save the tune before it is erased. If you have datalogit or the FC Pro cable/software you can copy the maps. Perform the initialize and then reupload the maps. A few people have seen really screwy idle from the Hand Controller itself being plugged in. The workaround is to unplug the Hand Controller and it idles normally. This is a very strange problem and certainly not common. Initial suggestions would lead to an electrical problem somewhere? If you are still stuck with an unstable idle, try the factory ECU and does the idle bug go away? If it is still present it could indicate a mechanical issue with the factory idle control (usually the AAC valve). You can reset the PowerFC to factory defaults to "re-learn" the idle control from scratch and this seems to fix most idle related issues, such as hunting at idle and also high RPM surge when coming off a gearchange or throttle acceleration.

Last but not least if you still have screwy idle speak to an auto elec or mechanic. There could be something else wrong that requires further attention.



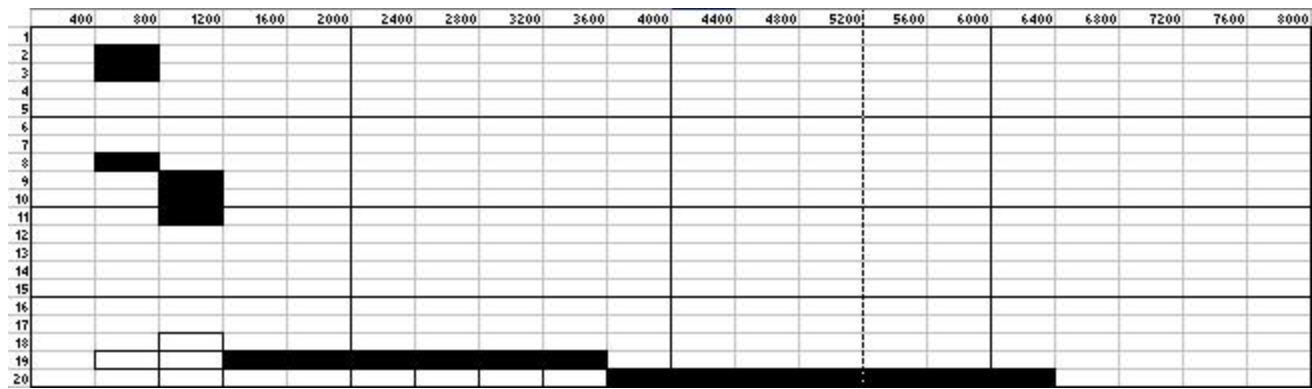
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**I am seeing on my Map Tracer that I am reaching load point 19-20 on full throttle. I am maxing out the PowerFC! What can I do?**

Load or what is considered "load axis" on the powerfc maps is based on values fed from the airflow meter. If the airflow measure "lots" or air the powerfc moves down the axis on the left and reads the corresponding values. What happens when your AFM is showing the ceiling or "highest" values the powerfc has calibration for then you are stuck with a "flatline" load map which would look something like:



From here you can see it drops the max load points fairly quickly. This would most likely result in being unable to accurately tune from 4000rpm onwards as it just keeps reading the same load values each time (aka end of the map). This issue has only been found to occur with the AP Engineering RB20 PowerFC and using a "high load" setup such as an RB30 bottom end conversion. The issue is correctable by "extending" or "stretching" out the airflow meter reference points. This corrects it by when the airflow meter measures 3.2volts the powerfc matches that to load point 11 as an example. By default the AP Engineer PowerFC looks to reference the max load points a little early with an upgrade intake system and maxes out a little to early. This is not to be confused with the actual airflow meter maxing out at 5 volts. The correction in this case is to obtain the RB25 airflow map refence points and use them instead of the RB20 ones. This then "extends" the airflow meter range and allows it to run around the load point 15 mark on full throttle instead of the bottom of the map. This should allow for more accurate tuning as there is room for "increased" load because there are 5 or 6 "points" to advance in load before its at max again. This cannot be done with the Hand Controller as it requires the FC Pro software, Datalogit or Fc Tune to access the airflow ramp tables.

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## What do I need to do when changing my Airflow Meter?

When you choose another airflow meter to allow a large opening diameter or a higher resolution meter you need to select the unit from the [SETTING], [Airflow] menu and select it from the list. You should do this before you start your engine to prevent really unsafe mixtures and also to prevent stalling/bad idle. Once you have highlighted the correct model you have fitted to the car you can simply press [PREV] on the hand controller and return to normal [MONITOR] and start the car. It should idle OK (well hopefully) however this does not mean it is safe and ready to go. Selecting the correct airflow model simply loads the voltage ramp table into the PowerFC. This tells the PowerFC at what airflow levels the meter is reporting in its voltage range. You should have your AFR's checked with your tuner and a wideband after an airflow meter change to ensure its not too lean or too rich. If you need to drive a fair distance to your tuner or would like to run around for a few days on the new airflow meter without it being retuned/checked then theres a simple procedure you can follow

1. Let engine warm up and idle
2. Give the engine a bit of a rev in neutral and check to see if smoke comes out the exhaust.
  - 3a. If you see *\*some\** black smoke
    - > Then its running rich (preferred) and it should be OK to drive around on light/low load, although your fuel economy will probably be terrible.
  - 3b. If you see *\*lots\** of black smoke
    - > Then its running very very rich and you'll need to lean it out a bit. You can do this by going into [SETTING], [IGN/INJ] and then on the right hand side you will see INJ correction. You can then slowly change the ADJ value to a negative value in small increments. After a few adjustments give the engine a rev and there should not be as much black smoke. Repeat until there is a little bit but its not *\*lots\** of black smoke.
  - 3c. If you don't see any black smoke

-> Then its running lean or possibly too lean. Do the same procedure (as above) but add more fuel by adding or upping the ADJ value and after a few increments try a free rev. If you get some black smoke then you are starting to richen it up.

4. You should remember this value or write down the correction number used because if you turn the car's power off you must come back to here each time to put the value back in. This is because its only a temporary test mode and it should not be used all the time. You could also give this value to your tuner to give him an idea of how rich its running.

#### **Source: Apexi Documentation**

80m RB25 airflow meter can measure up to approx. 300ps (221kW)  
80mm VG30 airflow meter can measure up to approx. 500ps (368kW)  
90mm VH41 airflow meter can measure up to approx. 400ps (294kW)

\*Output is calculated off of measurable air volume

Airflow Meter Adjustment Range

Using 100% as a base, the airflow can be adjusted from +50% (-50%) - 200%

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## **My fuel economy is terrible and I just had a complete tune, Whats wrong?**

A "complete tune" is not always a complete tune. It is most likely just a high power run, that is run the car on the dyno and suck out the most power you can and make sure it doesn't knock. Usually advance the timing, lean it out and make sure its a safe tune. This is done on full throttle usually in fourth gear (as stock diff ratio is 4:11) which is the closest to 1:1. Now think to your driving habits, how often are you on full throttle for the entire duration of your tank of petrol? 5% of the time seems reasonable but your entire tune is based on full throttle and max load, certainly not your ideal tune as far as economy. You should read up on how to use the Map Tracer here before continuing any further as you need to use this as part of the tuning process.

Speak to the tuner if you still have terrible economy. Ask to have the light cruise AFR's check on the dyno with a wideband sensor or even better as them to come for a drive with you wide a wideband sensor up the exhaust. Show the tuner your typical driving habits and make sure the AFR's are nice and lean on light cruise. My car is setup to be around 16 AFR's on light cruise which is safe & reasonable providing it is done correctly. Below is a simple checklist for poor fuel economy;

- Check the tune (light cruise AFRs etc)
- Make sure closed loop O2 feedback is on (ETC, FUNCTION SELECT, O2 FEEDBACK)
- Make sure you have a working O2 sensor (ETC, SENSOR SW CHECK, O2-1 (for gtst) should however between 0 and 1v)
- Don't constantly load the car up to get it on boost over and over
- Keep a steady throttle (O2 feedback doesn't work if you keep moving the accel pedal, keep it constant in light cruise)

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## Self Tuning - Ignition Timing

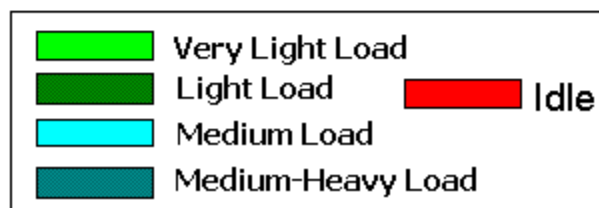
Things you will need:

- 1 x Friend
- 1 x PowerFC Hand Controller
- 1 x Road

This should be done on quiet road with someone else driving your car. This should not be done by you road is probably the most suitable, and we all have these of course. Ok drive around normal load, cruise excessively, be sure to press UP so you get a "digital" value as well as the bar chart on the hand control can pick up other things that are not "engine knock" but merely things that sound the same. Knock over Map Tracer and see what values are being read. It should be somewhere around say rpm point 7 (220 accelerator pedal pressure). This is because as soon as the driver varies the throttle the engine loads it turn adjusts what cell the PowerFC is using. Ok now goto Setting, IGN/IJN and on the left side you will see KNOCK and see if the knock goes up a little bit. A little increase in KNOCK is OK and acceptable, value "digital" knock value by pressing right when it is displayed along with the bar chart. If the knock appears the accelerator pedal in 5th gear at say 50km/h. This should throw the map trace down the left axis : flooring it as we aren't interested in that. In fact this is not recommended as running advanced timing slow takeoffs and very small amounts of load. Keep checking the knock values and make sure it is OK

At this point you shifted the entire ignition timing map up 2 degrees everywhere. The car should be a hardly you should proceed to save this adjustment and monitor your fuel economy. It is recommended instantly. +2deg timing increase should give a good increase in fuel economy. See if you can set IGN (new tune. Again make sure its safe and not knocking before you do this. If you do this incorrectly you warned). Set the IGN CORR back to 0 deg and then let your driver have a rest or turn the car off but it will hurt if you suffer motion sickness as watching map trace and knock while someone drives around the whole map up as we've already had a max power tune which is fine we just want more economy. At the time. These are the cells we want to "tune", aka thrown in our +2 deg correction permanently.

			400	800	1200	1600	2000	2400	2800	3200	3600
			1	2	3	4	5	6	7	8	
<b>Airflow Meter Axis</b>	250	1									
	500	2									
	750	3									
	1000	4									
	1250	5									
	1500	6									
	1750	7									
	2000	8									
	2250	9									
	2500	10									
	2750	11									
	3000	12									
	3250	13									
	3500	14									
	3750	15									
	4000	16									
	4250	17									
	4500	18									
	4750	19									
	5000	20									



For each of those cells highlighted, or even ones you wish (only recommended to do the first 8x8 as an

1. Setting
2. IGN Map
3. Navigate to cell you wish to alter, you can see the rpm points across the top, and load points down
4. Press NEXT to enter the adjust cell screen which will show what RPM point and LD (load) point you are at
5. Press NEXT to edit the value and then you can press UP to increase the value, in this case do it 2
6. Press NEXT to save the value change

As you can see by the above procedure it takes a bit of time to edit all the cells, the quick method is to use the map trace and repeat for each load point up to around 8 or 9.

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## **How do I hook up the optional Boost Controller kit?**

The optional boost controller kit for the Power FC consists of the pressor sensor, pressure sensor harness and solenoid. The solenoid should be plumbed between your manifold and the wastegate actuator (internal wastegate setup). For external wastegate setup it should be plumbed between the manifold and your external wastegate pressure line. The pressure sensor should be plumbed in parrallel with the factory MAP sensor which is used by your standar boost guage.

The solenoid has two labels on it, you should match them accordingly



**COM** line should goto wastegate actuator  
**NO** line should goto intercooler piping

It can be T'ed into the plumbing with its included T piece fitting.

#### Boost Controller Kit Type #1

3 wire plug, Solenoid runs to stock boost control loom on stock ECU wiring loom.  
 3 wires in Apexi loom are for Map sensor - Signal, Ground and Power

#### Boost Controller Kit Type #2

5 wire plug, Solenoid runs to map sensor harness which runs to Boost Controller port on PowerFC  
 3 wires are for Map sensor - Signal, Ground and Power. 2 Wires are for Solenoid Power and Ground

Skyline RB25DET PowerFC and GTR RB26 Uses Type #1

The pressure sensor has the main wiring harness directly attached to itself, one end plugs into the 5 pin port on the PowerFC. The solenoid piggybacks off the Pressure Sensor wiring harness which leads to the PowerFC connector port. The wiring is shown below.

#### MAP Sensor

Red = Positive

Black = Negative (earth)

Green = Signal

#### Solenoid

Pink = Positive



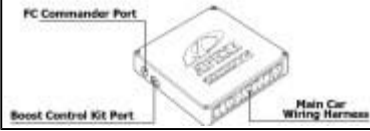
Black = Negative

When the solenoid wiring meets with the Map Sensor harness the colours for the Soneoid change as follows;

Pink = Red

Black = Brown

<b>Boost Control Kit - Parts Inventory</b>	
<b>Boost Control Kit - Complete Kit</b>	
<b>Boost Control Kit - MAP Sensor</b>	

	
<b>Boost Control Kit - Solenoid</b>	
<b>Apexi PowerFC - Plug Layout</b>	

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## How do I configure the Optional Boost Controller Kit?

Once the harness and sensors have been connected you need to turn the Boost Controller Kit on under this. All that is left is to set the desired boost pressure, SETTING and then BOOST. On this screen you

Each option is a preset boost pressure and duty item, the currently selected one is the active "boost profile"

The first value is Boost Profile Number.

The second value is the maximum amount of boost you wish to run.

The third value is duty cycle

The fourth value is unused (always 255).

### Boost Pressure

1. 1.00 kg/cm<sup>2</sup> 40 255
2. 1.10 kg/cm<sup>2</sup> 46 255
3. 1.20 kg/cm<sup>2</sup> 52 255
4. 1.30 kg/cm<sup>2</sup> 60 255

- Choose boost profile #1
- Set target boost pressure
- Do a test 3rd gear drive and see what boost it reaches
- Adjust duty cycle as needed
- Lower number if boost is too high over target boost or if safety cut is reached.
- Increase number if boost is too low or it doesn't reach desired level.

If the map sensors detect that boost pressure is 0.25kg/cm<sup>2</sup> over the set boost pressure then it will cut easily or it's having trouble maintaining a stable pressure or keeps hitting the cut limit then turn the duty boost on the fly. The current selected profile (option 1,2,3 or 4) is active when you see it's highlighted and

### Source: Apexi Documentation

#### Basic Duty Setting

Our boost control uses duty-cycle of the solenoid valve to control boost pressure. The setting of the duty cycle should be increased when the boost level does not reach the above-mentioned

A rule of thumb is that it changes by the boost value by 0.1 (about 9.8kPa) when duty cycle changes

For example, when current duty is 56% and boost setting is 1.1[] (approx. 107.9[kPa]) but the boost

Some mechanical conditions may prohibit boost from reaching the target boost.

Please set it to the correct duty value that corresponds to the boost setting value.

Please note that it causes the overshoot or hunting of boost pressure and self learning control if the

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## **How do I hook up the D-Jetro Map Sensor Harness Kit?**

There are various installation methods for the D-Jetro Map Sensor depending on the Car Model.

This will depend on your car - it's recommended to view the documentation for your specific D-Jetro model.

The manual will be in Japanese but the wiring should be in clear english with pinouts etc.

- Evo Lancer CT9A do not have to do anything as the car runs a factory Map

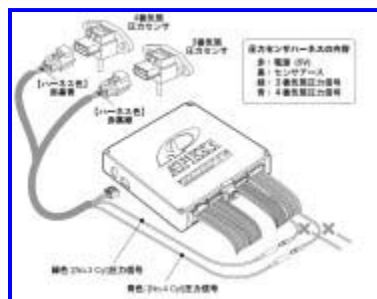
#### Sensor

- Skyline RB26 customers must splice twin Map sensor into the Airflow meter signal wires on the std ECU loom
- Nissan S15 customers must also manually splice a single Map Sensor into the harness (via AFM signal wire)

Below are instructions on how Skyline RB26 customers should connect up the Djetro kit.

It appears that D-jetro customers must splice the twin map sensors into the Boost Control Kit harness (or at least use the same port) to extract positive and negative power.

The signal for each MAP sensor is then connected to each of the AFM input signals on the main ECU loom.



So Map sensor #1 which is located near Cylinder #3 on the intake plenum runs to AFM input #1 on the ECU loom.  
and Map sensor #2 which is located near Cylinder #4 on the intake plenum runs to AFM input #2 on the ECU loom.

For a more in depth diagram and guide please view the correct manual for your car's Djetro version as it will have correct Map Sensor wiring.

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## Basic Hand Controller functions and use - Monitoring

Basic hand controller use is very simple and you can check and ensure your engine and system is running happily. Monitoring Values

Highlight "Monitor" on the menu and press NEXT and then select how much values you wish to view and then press NEXT.

You can now select which items you wish to monitor from the menu below

- InjDuty - Injector Duty / How busy the injectors are
- IgnTmng - Ignition Timing - Camshaft timing
- AirFlow - Airflow meter voltage
- PimVolt - Map Sensor voltage
- Eng Rev - Engine revs
- Speed - Road speed
- Boost - Boost Pressure (requires optional boost kit fitted)
- Knock - Knock sensor reading
- WtrTemp - Water temperature or engine temperature
- AirTemp - Air inlet temperature (sensor is not fitted on ECR33 skyline, DO NOT attempt to make this work)
- BatVolt - Battery voltage

(Standard ECR33 Skyline menu options shown)

If you want to monitor your injectors and airflow meter select both of them after you choose 2 channel and then press next. You will then see them in their digital output mode on the hand controller. You can press UP to show their maximum values at any one time. You can press right to clear their maximum values. Any max values you see are cleared when you turn the cars power off.

The knock sensor when you view it by itself (1 channel) will give a bar graph like

display showing knock. The Knock value is not number of knocks per second or knocks per engine turn, its just a number. The factory knock sensor is a microphone in the engine that listens for a certain frequency. When it detects this frequency it registers this as a knock, the higher the value the worse it most likely is.

Airtemp will always display --- on the ECR33 skyline as there is no air temperature sensor on the RB25. GTR / RB20 uses will have a value displayed which should show the air intake temperature. On the RB26 this sensor is located next to the throttle body inlet.

when viewing values via MONITOR you can also press NEXT and it will alternate between digital display and graph mode. When in graph mode you can use the "replay" function by pressing up and then PREV / NEXT

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## Basic Hand Controller functions and use - Checking Functions

### Checking Functions

Highlight "ETC" and then choose "FUNCTION SELECT".

BOOST CNTL KIT - Enable/Disable optional boost controller kit

AIRFLOW WARN - Enable/Disable airflow warning

INJECTOR WARN - Enable/Disable injector warning

KNOCK WARNING - Enable/Disable Knock warning

O2 F/B CONTROL - Enable/Disable O2 feedback

If the boost control kit is turned ON and you are not using it (not plugged in) the car will not start.

If the AIRFLOW WARN is set to ON the engine light will flash when the airflow value gets near its ceiling limit of 5 volts.

If the INJECTOR WARN is set to ON the engine light will flash when the injector duty values gets to 98%

If the KNOCK WARNING is set to ON the engine light will flash when the knock level exceeds 60

If the O2 F/B is set to ON the engine will utilise the factory oxygen sensors to save fuel

Function Select		
1. Boost Cntl kit		ナシ
2. Injector Warn.		ナシ
3. Knock Warning		アリ
4. O2 F/B Control		アリ
5. Idle-IG Cntrl		アリ

ON => アリ	OFF => ナシ
----------	-----------

If you see your engine light flash whilst driving then goto MONITOR, 4 channel and then select

AIRFLOW  
INJDUTY  
KNOCK  
IGNTMNG



Then repeat the same process and then press UP on the hand controller once you see the engine flash to check the max levels of each sensor you are monitoring. You can then work out which is causing the engine light to flash. On a stock ECR33 with the basic mods fitted you'll find that you are maxing out all the factory sensors so in that case I turned my AIRFLOW and INJECTOR warnings to OFF and leave the knock sensor warning to ON. So if you see the engine light flash its a kNOCK warning and should be taken as a true "warning". You should speak to your tuner if you see high knock levels and the engine light flashing. A knock level of 60 is considered quite high. If you have O/2 Feedback turned off the PowerFC will not enter its closed loop feedback mode and will waste fuel and be very un-economical. Expect bad fuel economy

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## Basic Hand Controller functions and use - Checking Sensors

### Checking Sensors

Highlight "ETC" and then choose "SENSOR/SW CHECK"

If you goto ETC and then choose SENSOR CHECK/SW you will see a list of sensors and corresponding values. These report values that the current sensors are returning. This can be useful for checking faulty sensors and to check if a certain sensor is working expectedly. Below is a translated list of the ECR33 PowerFC

商品コード	適合車種(通称名)	車両型式	エンジン型式	年式
414-N012	スカイライン	ECR33	RB25DET	'93/8~'98/4

<b>●センサ類</b>	
[AF-1] ... <b>Airflow Sensor</b>	[O2-1] ... <b>Oxygen Sensor</b>
[THRO] ... <b>Throttle</b>	[EXTM] ... <b>Exhaust Gas Sensor</b>
[BOST] ... <b>Boost Sensor</b>	[***] ... 予備
[WTRT] ... <b>Water Temp Sensor</b>	[***] ... 予備

<b>●スイッチ類</b>	
[IGN] ... <b>Ignition</b>	[ECC] ... <b>ECCS</b>
[STR] ... <b>Starter Motor</b>	[WRN] ... <b>Engine Warning</b>
[A/C] ... <b>Air Conditioning Switch</b>	[EXT] ... <b>Exhaust Gas Warning</b>
[PWS] ... <b>Power Steering Pump</b>	[F/P] ... <b>Fuel Pump</b>
[NTR] ... <b>Neutral Gear</b>	[FP1] ... <b>Fuel Pump Control</b>
[***] ... 予備	[VTC] ... <b>Valve Timing Control</b>
[***] ... 予備	[O2H] ... <b>Oxygen Sensor Setter</b>
[***] ... 予備	[ACR] ... <b>Air Conditioner</b>

BOST will show voltage if you are using the optional powerfc boost control kit

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## **Airtemp sensor on unsupported car?**

Some PowerFC's have support for the AirTemp sensor under MONITOR but the car itself does not utilize a factory air temp inlet sensor. I attempted to hook up an airtemp sensor on my ECR33 PowerFC and fried the powerfc and damaged a sensor on my car. The concept was to look at which pin on the BNR33 PowerFC the air temp sensor was connected on and then try and replicate this on the ECR33 PowerFC. I tried this and it did not work, I tried an adjacent wire and it fried the PowerFC. It has since been fixed and all is working but I do not recommend you try to get this working. It may work out costly like it could have been in my case.

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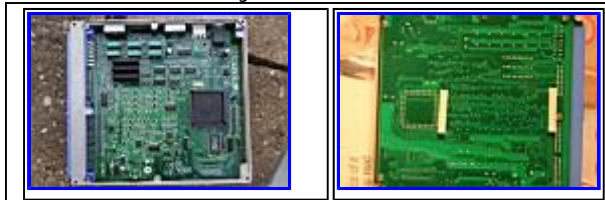
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## What does the PowerFC look like inside?

Here are some pics of what the Apexi PowerFC looks like inside. These photos are just for curiosity sake

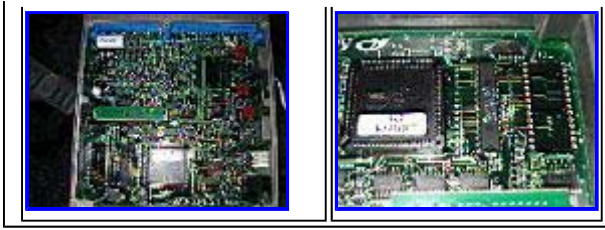
This is inside a Skyline GTST RB25 PowerFC



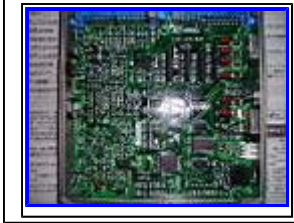
This is inside a Skyline GTST RB20 AP Engineering PowerFC

Note: the expansion slot used by an adapter



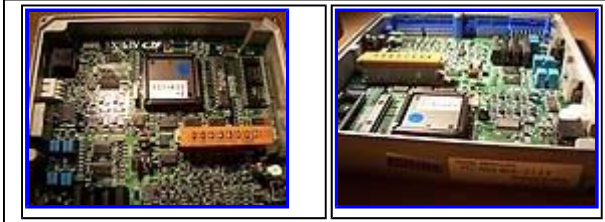


This is inside an Skyline GTR RB26 PowerFC



This is inside a Skyline GTR RB26 PowerFC Pro

Note: The expansion chip (like the rb20 ap eng) and the alternate main ecu



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## Can you reflash the PowerFC with new code and/or different versions of the Apexi code?

The newer model Apexi PowerFC's have a different model NEC processor and also feature an onboard connector, possibly for reflashing internally by Apexi staff and / or authorised dealers etc.

If you open up your PowerFC unit and you see a processor which has;

NEC Processor: 78P3 CPU

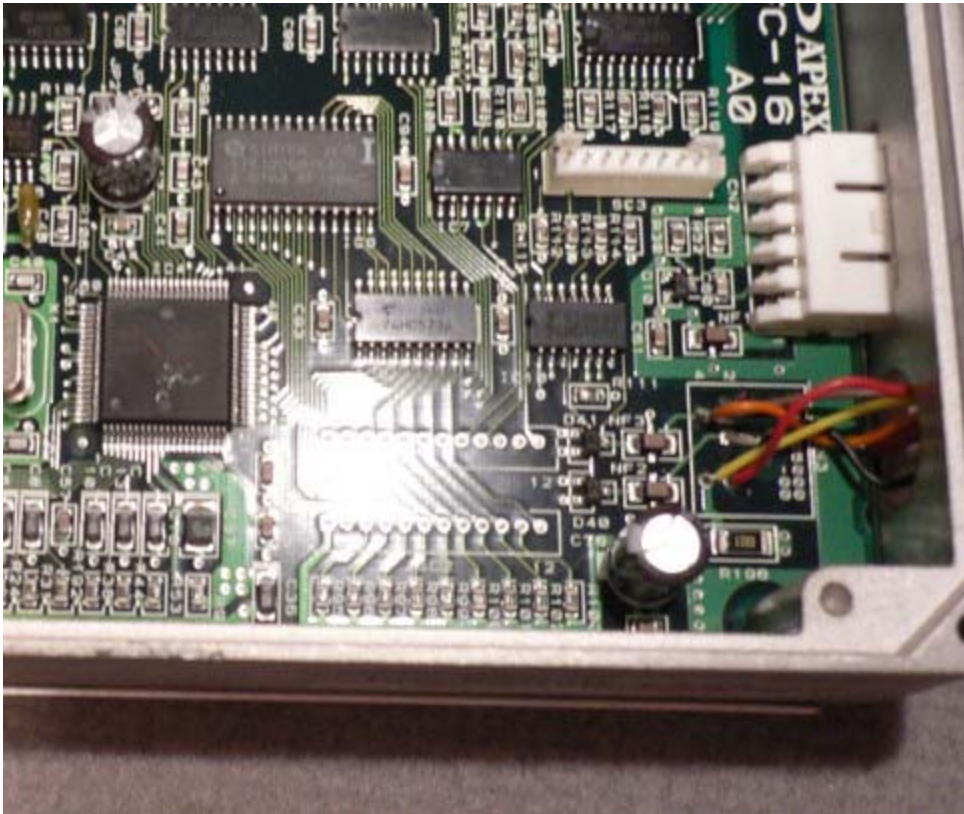
Not reflashable



NEC Processor: 78F4 CPU

Reflashable





For more information on this check out the thread on the [RX7 forum by FastHatch](#). He has done some extensive research on this and found that they are reflashable and can be altered providing you know. Some good news possibly :)

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## Are there any cool custom hacks, hand controller holders, DIY rewiring you can do?

There are a few custom mods you can do some clever, some not so clever. The pictures contained below are mostly taken from the Rx7 forum and other forums found in google. Some show some clever hand controller holders you can get, generic mobile phone holders should work fine. See below pics for some cool ideas:







[pfc3.jpg](#)

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## What is Datalogit?

Datalogit is a 3rd party system for the Apexi PowerFC. The system/kit includes of a dongle box and software. The dongle box plugs into the Hand Controller port on the PowerFC and the software runs on a laptop connected to the dongle box via a serial cable. The dongle box has a Hand Controller port so you can keep the normal Hand Controller connected whilst using Datalogit. The Datalogit dongle box translates the PowerFC signals from the Hand Controller to signals to the COM port on the dongle box which are used by the software running on the laptop.

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## What does Datalogit do, is there a feature list?

The software has many features as to does the Dongle box. The dongle box has the following "external" features: Scramble and Wideband O2 Input. The software has the following items which are not accessible via the dongle box:

- You can download maps to your PC and save them.
- You can set the fan temperature turn-on value to below lower than 60deg.
- You can set the millisecond values for the engine flash light for AFM, INJ, KNK levels.
- You can access and control the air temp correction table.
- You can adjust load map points by extended the airflow measure levels.

The follow tables/settings are also changeable

- Inlet air temp fuel map
- Water temp fuel map
- RPM acceleration fuel map
- Cranking Injector dwell map
- Water temp versus boost fuel correction
- Inlet air temp versus boost fuel correction
- RPM Load Point table
- AFM load point table
- AFM voltage table
- Ignition versus water temp correction
- Ignition versus inlet air temp correction
- Ignition dwell versus RPM correction
- Ignition versus battery voltage correction
- Ignition versus boost correction
- Individual injector trim
- Injector lag versus battery voltage correction

You can choose to log values from the sensor list that you see in "SENSOR/SW CHECK" and also the ones not visible in MONITOR but are visible in "SENSOR/SW CHECK".

One of the most useful features I have found is the "Advanced Logging" system which logs a selected KNOCK against a map tracer view and it will plot min/max/avg KNOCK for each map tracer cell in real time so you can adjust the timing for that particular cell. Below is an "Advanced Knock" watch that was done to see which cells are knocking more than others, so I would easily know which cells I could afford more knock as an example. This method of logging and map trace is available for any of the loggable items.

Map Watch											
File Log View Window Options											
Advanced Knock		Avg		0		Hold off (mSec)		9999		Max Val	
	400	800	1200	1600	2000	2400	2800	3200	3600	4000	
0						1	1	2	2		
1446		1	1	1	1	1	1	1	2		
1928		1		1	1	1		3	1	4	
2411		1		1	1	1	1				
2893					1	1		1			
3375			1		1	1	2	1		3	
3857			1			1	1		1		
4339			1	1		1		1			
4821			1	1	2	2			2		
5785		1	1	1	2	6	1	2			
6750				3	4	4	4	2			
7714					6	4	4	5			
8678					5	4	8				
9642						4	5	5	5	6	
11571										1	
13499											
15427											
17356											
19284											
21213											

If you wish to see a log run or an example of the data logged then please click [here to download](#) an Ex

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## What does the box look like and what's inside it?

The dongle box has a very simple circuit diagram to translate the communication between the PowerFC and the software. The PowerFC protocol has checksumming and error correction in the protocol so I assume this is what the PIC processor is used for. The Dongle box also analog and switchable inputs which can be used for 3rd party tools (as listed above). Below are some pics of the Dongle box. Note: do not promote disassembling or reverse engineering the box but merely took some pics for "curiosity sake."



[IMG1137.JPG](#)



[IMG1138.JPG](#)



[IMG1141.JPG](#)



[IMG1142.JPG](#)



[unit.JPG](#)

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## **Do you really need to have it or is the Hand Controller OK?**

Datalogit is not required for normal use and even tuning. Things are easier with datalogit and you can much easier (as addressed above) when correcting knocking and other tune based issues as you can quickly find what cell has the min/max/avg of any value. It also allows you to save your tune to a .dat file in case you reset your unit or it gets damaged somehow. I found it very handy to plug datalogit into a laptop and use the laptops video out to my built in TV screen to preform Advanced Knock log whilst driving around, very helpful but certainly not required. The Datalogit kit is required when you move to a Q45 airflow meter or other unsupport airflow meters as you need to alter the airflow voltage ramp table. Selecting VH41 from the menu does allow it to run but it usually needs to be fine tweaked via the voltage ramp table.

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## **Where did you get it from and can I buy one? What is support like?**

Datalogit can be purchased from <http://www.fc-datalogit.co.nz> (Brand new its about \$500 AU) or from a 2nd hand user on the forums or even a group buy. There is a small delay from the time of purchase, to receiving the Datalogit box and software. Support is formed as an open community user group as opposed to a phone number or online web page. Latest versions of the software are also available in the user groups for download.

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## **Boost display without the Boost Control Kit?**

By default as the PowerFC will not show boost pressure as it has no method of reading it in via the stock ECU loom. If you purchase a suitable map sensor and connect it to the PowerFC boost control kit port then the hand controller will display boost pressure. The boost control kit uses a Denso map sensor which is part #DPS 310 2000a - Denso 949940 6270 5V and the wiring loom cable/plug can be brought from Apexi which is around \$40 AU. The cable is listed as the



3pin boost control harness. Nengun has this listed under Electronics -> Apexi -> D Jetro Option Parts

Alternatively below is the pin out diagram for the Boost Control Kit port. This is for the 3 pin version only. I am unsure of the pinouts for the 5 pin version.



1 = Voltage+  
2 = Signal  
3 = Ground

I have done this on my car and it works correctly. I used the boost control kit harness (\$30 new) and the Boost Control kit Map sensor. Connect them up using the supplied plugs & loom and plug it into the PowerFC Boost Control kit port. You don't need to enable the Boost Control Kit (under ETC, FUNCTION SELECT) for it to display boost and for BOST to work in ETC, SENSOR SW/CHECK

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## Is the PowerFC Pro Discontinued?

Apexi have discontinued the PowerFC Pro model which was the special version of the PowerFC that had IGN cut instead of Fuel cut and also had a REV LAUNCH function holding the rpm at a set value at 0km/h. For some cars the PowerFC Pro model exists (RB26, RB20, WRX) but for most models it has been discontinued. Apexi have not released any information as to why the model's have been discontinued or if there will be a new model coming out. Those customers who must have the Pro models should look for a 2nd hand unit instead.

For alternate solutions for "Pro" style functionality check out [Apexi PowerFC Djetro PRO - Does it exist???](#)

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## **Help! My car doesn't idle once I've installed the PowerFC**

Your car should idle straight off the bat when it is installed on your car and you start it for the first time. Make sure you complete the idle procedure correctly and let it idle for 10 minutes in each stage. If you rush the idle self learn procedure you may end up with a car that doesn't idle. If this happens simply reset it. You should also check to make sure your AIRFLOW meter is selected correctly under SETTING, AIRFLOW (you can do this before you start the car).

Have a read of [My idle is really crappy and it hunts around a lot when on idle. What can I do?](#) for some more help on unstable idle etc.

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## Self Tuning - Fuel Economy

Things you will need:

- 1 x Friend
- 1 x Wideband Sensor
- 1 x Wideband AF Guage or Digital Guage
- 1 x PowerFC Hand Controller
- 1 x Road
- 1 x Workshop with Datalogit or a Pen + Paper (Get your tune saved before you fiddle - Either have a c map as you will be adjusting those values and if yo do it wrong, you should at least have the option to

!!!! Before you Begin !!!!

Turn off O2 Feedback under ETC, FUNCTION SELECT

14.7 AFR means an Air/Fuel Ratio of 14.7 parts to 1. 14.7 is 1.0 Lambda which is ideal AFR for fuel ec the mixture and it will make less power, however it will have less exhaust heat. The leaner the AFR th 14.7 at max/full load as there will be too much heat. Generally full throttle or max load AFR's are arou its richen'ed up to make sure its safe. Freeway cruising at 100km/h you should have an ideal AFR of 1 100km/h is not safe as you will generate too much heat

Lean - More Power, More Heat, Less Fuel Usage

Rich - Less Power, Less Heat, More Fuel Usage

Light Load - Leaner (use less fuel and make resonable power)

Full Load - Richer (use much more fuel to keep exhaust gas temperatures safe and make good power)

You may find a factory ECU when you go on the dyno and do a full load run that it may drop into AFR's

things are cool and hunky dory. The factory ECU's main priority is not to make max power at 5700rpm altered airflow meter signals make's the ECU run leaner in areas so you can make power usually.

This should be done on quiet road with someone else driving your car. This should not be done by you road is probably the most suitable, and we all have these of course. Ok drive around normal load, cruise quick it reacts to throttle and load changes. The sensor should react almost instantly to throttle changes.

Whilst on low load, light cruise goto Map Tracer and see what values are being read. It should be some driver varies the load (varying accelerator pedal pressure). This is because as soon as the driver varies the measured "voltage", which in turn adjusts what cell the PowerFC is using.

Ok now pick a cell area and get your driver to keep the throttle pedal the same so that you sit on the load cell 3. Watch the Wideband AFR (lets pretend its 13.2 AFR). We now know that the AFR is 13.2 wideband ideal).

Now goto Setting, INJ Map and navigate to the cell that map tracer was showing you, 6x3 is the area indicated so we simply take some fuel out of the cell, so press NEXT and then press down say 5 times. This should be saved. Now check the wideband sensor and the AFR should have dropped a little. Hopefully it has moved.

If it hasn't moved check

- 1) O2 Feedback is OFF
- 2) The car is still using map cell 6x3, check Map tracer again, 6 should be REV point and 3 load point (

Keep watching the wideband sensor output and take out a few more cells, keep repeating this until you driver to say drop 10km/h off the speed and this should move the REV cell down to say 5x3. Then manually adjust it's value until desired AFR is reached. You should repeat this step for all cells in the 7x7 area and this

			400	800	1200	1600	2000	2400	2800	3200	36
			1	2	3	4	5	6	7	8	
<b>Airflow Meter Axis</b>	250	1									
	500	2									
	750	3									
	1000	4									
	1250	5									
	1500	6									
	1750	7									
	2000	8									
	2250	9									
	2500	10									
	2750	11									
	3000	12									
	3250	13									
	3500	14									
	3750	15									
	4000	16									
	4250	17									
	4500	18									
	4750	19									
	5000	20									

	Very Light Load	
	Light Load	Idle
	Medium Load	
	Medium-Heavy Load	

For each of those cells highlighted, or even ones you wish (only recommended to do the first 7x7 as a

1. Setting
2. IGN Map
3. Navigate to cell you wish to alter, you can see the rpm points across the top, and load points do
4. Press NEXT to enter the adjust cell screen which will show what RPM point and LD (load) point y
5. Press NEXT to edit the value and then you can press UP to increase the value, in this case do it 2
6. Press NEXT to save the value change

As you can see by the above procedure it takes a bit of time to edit all the cells, the quick method is s and repeat for each load point upto around 7.

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## Hybrid Apexi PowerFC models and mix n match models, can

*Whilst this type of work is possible and it can work there are some known gotchas and things to be aware of. Please read it in full and understand everything before you go ahead and do it. Lastly there are some things for you, this is common for example using the RB26 GTR PFC on the R33 GTST, there are some things you need to tune it for you. Some of the known gotchas are the O2 sensors, loss of VCT and AFM ramp trim work.*

It is in fact possible to interchange Apexi PowerFC models to suit other engines. That is to, rewire an engine and loom. Below is a list of the combinations possible and how to achieve the goal of making it work. It is taken from the Forums are various peoples opinions and ideas, it is not %100 guaranteed nor have you've been warned.

### *Apexi RB25 PowerFC on RB20*

To run the RB25 PowerFC you need to swap injector triggers for cylinders 4 and 6. This is wires 112 and 113. There is a diagram which can be found [here](#). You also need to run larger than rb20 injectors. You should be able to run without much fuss and this should work, providing you dial in the correct injector latency and correct timing.

### *Apexi RB26 PowerFC on RB20*

The traditional Ap Engineering RB20 model is in fact an RB26 model remapped to suit the RB20 loom. The difference between the two is Airflow meter and O2 sensors. The RB26 having two, and the RB20 having one of each.

*Two AFM:*

If you are using two airflow meters you will need to run wiring for the second airflow meter manually as if you only have one for one airflow meter.

*One AFM:*

If you are using one airflow meter you can simply parallel up the airflow meter signal into the second average out both signals despite it coming from the same airflow meter to work out engine load (or air flow).

*O2 Sensor:*

The RB26 uses two O2 narrowband sensors to run in closed loop correctly. Simply parallel up the oxygen sensor input on the RB26 ECU.

*Hybrid RB30DET*

You can use any variant of the Apexi PowerFC on the RB30DET. It would be easier using one that suits the engine. The likely recommendations for the RB30DET would be the RB20 or RB26 version. You don't need to worry about choices.

*Notes:*

If you use the RB26 PowerFC on your hybrid or standard engine you have the best pick of the bunch. 'Cause you can use it on both.

Able to use two airflow meters when a single becomes a restriction Have access to the Apexi PowerFC Apexi PowerFC Djetro version

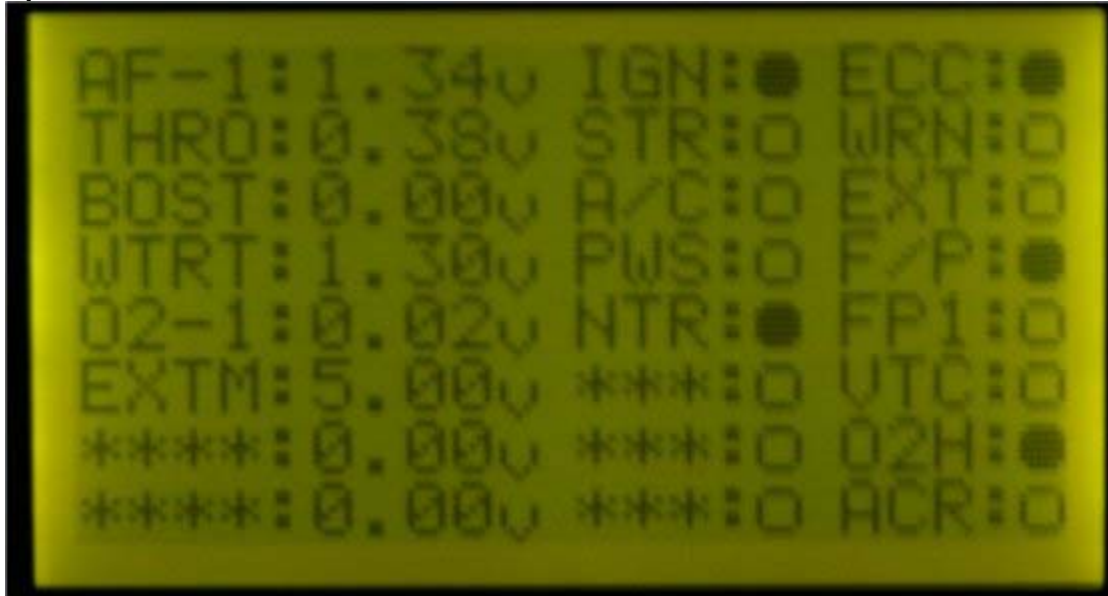
*Apexi PowerFC RB20 vs Apexi PowerFC RB25 wiring*

Here are the main differences in the wiring loom for the RB20 vs RB25

**Apexi PowerFC RB20 SENSOR SW CHECK**



## Apexi PowerFC RB25 SENSOR SW CHECK



## Differences between RB20 and RB25 looms

101	102	103	104	105	106	107	108	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	26	27	28	29	30	
109	110	111	112	113	114	115	116	11	12	13	14	15	16	17	18	19	20		31	32	33	34	35	36	37	38	39	40	
101	Injector No. 1							1	Ignition timing (power transistor) Cyl No. 1										21	Receive (control unit data reception) RX									
102								2	Ignition timing (power transistor) Cyl No. 5										22	Transmit (data sent from control unit) TX									
103	Injector No. 3							3	Ignition timing (power transistor) Cyl No. 3										23	Detonation sensor 1 (cyl 1 - 3)									
104	Fuel pump volt control (FPCM)							4	AAC Valve										24	Detonation sensor 2 (cyl 4 - 6)									
105	Injector No. 2							5	Engine A/T control input signal (BT1)										25										
106								6											26	Airflow meter ground									
107	Injector ground							7	Tachometer speed signal										27	Airflow meter intake air signal									
108	Injector ground							8											28	Engine temperature sensor									
109	Injector power supply							9	Airconditioner relay (A/C cut signal)										29	Exhaust gas sensor (O2)									
110	Injector No. 5							10	Ground (ignition signal system)										30	Sensor ground (throttle sens. ENG temp)									
111								11	Ignition timing (power transistor) Cyl. No. 6										31	Clock (synchronization signal) CLK									
112	Injector No. 4							12	Ignition timing (power transistor) Cyl. No. 2										32	Monitor and check lamp (red)									
113								13	Ignition timing (power transistor) Cyl. No. 4										33										
114	Injector No. 6							14	Engine A/T control input signal (BT2)										34										
115	Exhaust gas sensor heater earth							15	Engine A/T control input signal (BT3)										35										
116	Injector earth							16	ECCS relay										36										
								17											37										
								18	Fuel pump relay										38	Throttle opening output									
								19	Power steering switch										39										
								20	Ground (ignition signal system)										40										

R32 RB20DET

R32 RB20DET

Here is a version matrix for all the Skyline PowerFC's and their feature set

	A	B	C	D	E	
1	<b>Engine Model</b>	<b>Standard Version</b>	<b>AP Engineering Version</b>	<b>Djetro Available</b>	<b>Pro Version Available</b>	<b>V</b>
2	RB20	No	Yes	No	Yes - 2nd hand only	N
3	RB25	Yes	No	Yes	Yes - 2nd hand only	Y
4	RB26	Yes	No	No	Yes - 2nd hand only	N

From here you can see the RB26 version is the pick of the bunch if you are going to run a different Pox combination. Choosing the RB26 version allows you to select

- Djetro or Ljetro
- Pro Version
- Single or Twin AFM (if single parallel up the single AFM onto both AFM inputs)

As an experimental branch I am trying to wire up and sell 26 PFCs to suit Rb20 and Rb25. This will neq Apexi/NEC and give Rb20/Rb25 owners a chance to still buy and use the PowerFC. For more details on <http://www.skylinesaustralia.com/forums/index.php?showtopic=161511>

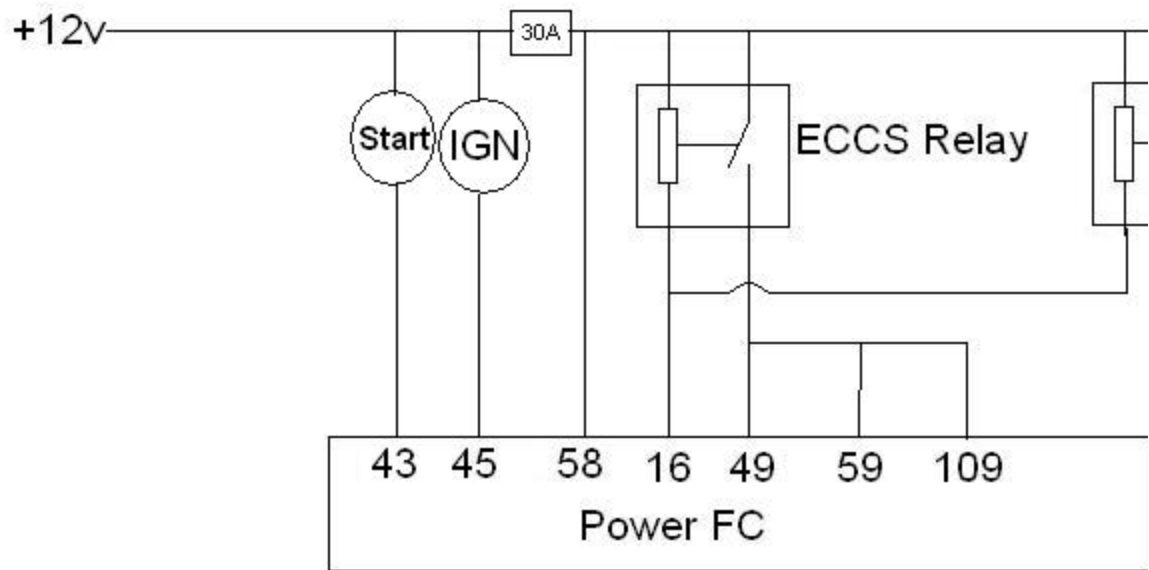
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## **When I turn my car off I loose any changes on the PowerFC!**

Any changes made to settings on the Apexi PowerFC are written in memory and then committed to NVI power loss to IGN it saves its state into NVRAM. This usually takes around 1 second. Once this is complete (automatically). If your car has had an engine swap it is possible and likely that the standard ECCS wiring mean that when the IGN is turned off the PowerFC doesn't have time to save its changes. This results in a diagram on how it should be wired in with the ECCS relay. The diagram is suited for the RB26 ECU's diagram for the matching wires.



If the power to ECCS and COILS are taken from the Ignition the PowerFC will not have time to save it  
fix is to wire it correctly into the matching ECCS and COILS wires as per the diagram.

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## How do I configure larger injectors?

Configuring larger injectors into the PowerFC is quiet simple and takes only a few moments. You need

- Current injector size
- Current injector latency
- New injector Size
- New injector Lag time

Injector Size and Latency (standard units)

Unit	Size	Latency
RB20	260cc/min	0.890msec
RB25	370cc/min	0.528msec
RB26	444cc/min	0.772msec
SR20 (Jap Spec Manual)	448cc/min	0.584msec
Nismo 480cc	480cc/min	1.100msec
Rx7 550cc	550cc/min	0.730msec
Aftermarket New Units	600cc/min	0.810msec

To work out new INJECTOR correction and latency;

Old SIZE / New Size = Correction

New Latency - Old Latency = Latency Correction

John plans to install 600cc injectors into his RB26 VL Turbo. The following figure's are used;

$$444 / 600 = 0.74 * 100 = 74.0\%$$

$$0.81 - 0.77 = +0.04 \text{ msec}$$

So he would enter 74% for correction and 0.04 as new latency

Once you have switched to larger injectors you should still check your AFR's with a wideband to ensure

For a list of common OEM injectors and their settings try here;

[Injector Chart - Side Feed OEM](#)

[Injector Chart - Top Feed OEM](#)

### Source: Apexi Documentation

If changing 440[cc/min] to aftermarket 600[cc/min]

$$440 / 600 = 0.73$$

Enter the value "0.73" for each cylinder.

Bolt-on turbo spec. POWER FC applications assume that the injectors have been upgraded. This is

Injector Lag Time Setting

The POWER FC includes factory vehicle injector data. If you switch to any other type of injector, k

Changing the factory 440[cc/min] with 0.78[msec] injector lag time to an aftermarket 600[cc/min]

"Injectors to be used" - "Factory Injectors" = "Correction Value After Changing"

$$0.85[\text{msec}] - 0.78[\text{msec}] = 0.07[\text{msec}]$$

Enter "0.07" into the [msec] parameter for each cylinder.

\*If the aftermarket injectors have a shorter lag time, add a "-" (minus) before the value.

<div>monitor</div> <div>setting</div> <div>etc.</div>	<div>Ign Map</div> <div>Inj Map</div> <div>PIM Volt</div> <div>Injector</div> <div>Boost</div> <div>Acceler.</div> <div>Ign/Inj</div> <div>Cranking</div> <div>Wtr Temp</div> <div>Rev/Idle</div>	<div>Injector</div> <div>No. 1 100.0%</div> <div>No. 2 100.0%</div> <div>No. 3 100.0%</div> <div>No. 4 100.0%</div> <div>No. 5 100.0%</div> <div>No. 6 100.0%</div>
-------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

On this screen you need to enter your new Correction% and Latency. Be sure to double check these numbers. If you enter the wrong values, this could be fatal to your engine so be careful.

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## Apexi SAFC vs Apexi PowerFC, whats the difference?

My cousin Peter just brought an Apexi SAFC for his R33 skyline and he had it tuned and made 204rwkw. It cost him \$300 and \$250 for a tune. Most people simply assume you can make power and expect 220rwkw.

They will both make very close to the same amount of power if both have been tuned correctly. But clearly the PowerFC winds hands down if it has been tuned correctly and has a bulk of its load points tuned. If you have the IGN and INJ tuned in the low load / light load areas the car will feel much better to drive, response will be better and fuel economy better than the SAFC + stock ecu. The main difference is the PowerFC will support more mods and if tuned correctly will feel like a new car to drive.

Both are only as good as the tuner.

Car 1 - rb25det with SAFC

Car 2 - rb25det with PowerFC

The truth is that car #2 isn't likely to make twice the power as the ecu costs twice as much. It all comes down to tuning and how the car drives, average power is the key here. The engine should feel nice on throttle response (IGN timing), come on boost nice (IGN timing) and curse will with good economy (INJ tuning). I would expect the power difference to be 5 to 10rwkw at the most in the midrange and top end.

Distinct Advantages:

- Adjustable IDLE
- Configurable knock warning
- Configurable injector warning
- Configurable airflow meter warning
- Airflow meter change support
- Injector change support
- Complete ignition map control
- Complete fuel injection map control
- No speed cut
- no excess airflow cut (aka boost cut)

The main problem with an SAFC and increase power levels is that its still a piggyback and when you tune more and more, it's still a compromise. As you try and lean it out more, it (the stock ecu) advances the timing as a result, which results in more detonation. The end result is it has to be richer than is needed, to avoid detonation. With the PowerFC you can simply dial in whatever AFR's



you like and IGN timing to suit, anywhere on the map. This would certainly give a good power advantage in the midrange and top end.

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## **What are the percentages for my airflow voltages for?**

The airflow meter percentage or "correction" per AFM voltage bracket is simply that, a correction for each voltage range. This allows the tuner or operator to

show more or less Airflow to the Load map, which in turns moves it final load bearing on the load map.

At 80% for the say 3.20v bracket means that any airflow between 3.20v and 3.84v (standard GTST scaling) will only show 80% to the laod map. So if by default it was to land on load points 10 through to 13 then it would end up landing on load points 8 to 9 instead, 80% of the airflow load. You won't have less or more power as the same amount of airflow comes into the system, it just affects how it is represented on the load maps.

This allows the tuner to move the load bearing around on the map quickly and easily to effectively shift the map up and down. The benefit of doing this is you can quickly shift the load bearing around without adjusting 60 odd load points on the load map, for IGN and INJ settings for a given AFM voltage bracket. This is one of the more common methods for quick tuning of the PowerFC but certainly not the only one. This is more common with standard to mild setups, which can include Cams, Turbo's, AFM's etc. There does come a point and time where it is quicker to just leave the voltage correction all at 100% and move on the maps directly and begin altering the INJ and IGN values directly.

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## **Is there a way or guesstimation to calculate AFR's based on the INJ values?**

You can use the following calculation as a guesstimation for target AFR's

Target AFR = 14.7 / INJ value

This is by no means a true relationship to the AFR's that come out in the end. It is exactly that, a guesstimation or rule of thumb. You should always use a fast and wide lambda or O2 sensor to determine the true AFR's. The most recent version of datalogit lets you view the INJ table in Lambda, INJ values and AFR ratio using this method.

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## Apexi LJetro Vs Apexi Djetro - Whats the deal??

For some time this debate has gone on with various opinions and ideas with no real concrete evidence

There are two distinct differences between the LJetro and Djetro PowerFC (and presumably other LJe is a hot topic.

Having since worked out the mathematics behind the Load axis calculations for both the LJetro and Djetro they are both calculated.

First we should look at each base model and how it works;

- Apexi PowerFC LJetro Version
- Uses standard airflow meter
- 20x20 Load Map
- Other additional supported airflow meters (selectable on menu)
- Apexi PowerFC Djetro Version
- Uses optional supplied Apexi Map sensor
- 20x20 Load Map
- Other additional supported map sensors (selectable on menu with correct voltage and offset)

Both units are scalable upto 1100bhp with supported modifications, sensors, injectors etc.  
i suspect the Ljetro version was created first, and then Apexi following demand added the Djetro version  
were migrating to other ECU's to map sensor support.

Ljetro Vs Djetro Load Axis:

Ljetro			Djetro		
Map Reference			Map Reference		
	AirFlow	RPM		PIM (cPa)	RPM
01	0	400	01	0	800
02	1446	800	02	1485	1200
03	1928	1200	03	2227	1600
04	2411	1600	04	2969	2000
05	2893	2000	05	3711	2400
06	3375	2400	06	4454	2800
07	3857	2800	07	5196	3200
08	4339	3200	08	5938	3600
09	4821	3600	09	6681	4000
10	5785	4000	10	7423	4400
11	6750	4400	11	8908	4800
12	7714	4800	12	10392	5200
13	8678	5200	13	11877	5600
14	9642	5600	14	14846	6400
15	11571	6000	15	17815	6800
16	13499	6400	16	20784	7200
17	15427	6800	17	23754	8000
18	17356	7200	18	26723	8400
19	19284	7600	19	29692	8800
20	21213	8000	20	35630	9200

Both have arbitrary values for Load indication, Djetro has higher RPM as its from RB26 Djetro

Airflow Meter Ramp:

Air Flow Curves											
	21	22	23	24	25	26	27	28	29	30	31
Voltage	3.360	3.520	3.680	3.840	4.000	4.160	4.320	4.480	4.640	4.800	4.960
Airflow 1	1167	1345	1539	1763	2002	2280	2568	2885	3228	3598	3996
Airflow 2	1193	1413	1582	1816	2067	2360	2666	3002	3367	3762	4188
Airflow 3	1937	2246	2586	2961	3376	3835	4335	4883	5475	6114	6804
Airflow 4	1716	1976	2277	2600	2992	3421	3854	4337	4847	5396	6015
Airflow 5	2787	3233	3722	4261	4859	5519	6239	7027	7879	8799	9792

Voltage Ramp for Airflow meter load signal. Infinitely scalable, as we can rescale any given airflow me

The most common airflow meters are supported out of the box, Z32, Q45 and Apexi Power Intake. Seemingly all the Apexi Power Intake does it alter the ramp values, which should yield slightly higher : the map 1.3rows if that, ever so slightly.

Map Sensor Ramp:

	Scale	Offset
<input checked="" type="radio"/> 1 1. APEX	43860	3289
<input type="radio"/> 2 2. Option1	43860	3289
<input type="radio"/> 3 3. Option2	43860	3289
<input type="radio"/> 4 4. Option3	43860	3289
<input type="radio"/> 5 5. Option4	43860	3289

Voltage Ramp for Map Sensor. Each sensor has a single Offset and nothing more. Fixed offset value  
Optional Map Sensors include GM5bar map sensor and Denso unit's also. The Apexi one is in fact a De  
the box is the optional Apexi one (denso rebadged).

GM 5 bar and other sensors need their scale and offset placed into the PowerFC to work.

Apexi Ljetro Load Calculation:

$$\text{LOAD} = \text{CORRECTION} * (16384 * \text{Airflow lookup(MAFSV)} / \text{RPM})$$

Airflow is proportional to RPM so this is why we are divisible by RPM.

We obtain MAFSV from our running environment.

We lookup the Airflow value from the Airflow ramp table (viewable by datalogit) and use this value.

We lookup the CORRECTION value from the Airflow correction table, for 4.48v and higher my correctior

ACR	MAPN	MAPP	Rpm	Load	MAFS1 V	MAFS2 V	Inj ms	Inj +/-	IGN	Dwel
0	11	14	4694	10725	4.705	0	15.568	256	21	51
0	10	14	4591	10918	4.73	0	15.88	256	21	51
0	11	14	4725	10915	4.745	0	15.952	256	21	53
0	11	14	4950	10956	4.835	0	16.08	256	21	54
0	12	14	5175	11121	4.9	0	16.528	256	21	58
0	12	14	5202	11153	4.93	0	16.632	256	21	58
0	13	14	5561	10997	4.99	0	16.464	256	21	62

$$\text{LOAD} = 0.84 * (16384 * 3598 / 4950)$$

The answer gives us 10003.57 and we can see for load point 14 we have an Load value of 9642.

The load value for point 15 is 11571 so we place our load axis on 14 with a value of 10003

As we can see here the load will always increase as the engine speed increases.

More and more air comes into the system and thus airflow load will always keep increasing until redlin

There have been doubts over this as many people see bog stockish R33 GTST's drop to load points 15

This is due to the fact they are maxing our the airflow meter at 5.10 or very close to.

The reason it drops to load point 15 is because the majority of them have airflow % correction somew

Appexi Djetro Load Calculation:

$$\text{LOAD} = \text{Map Sensor Offset} * \text{Map Sensor(PIMV)}$$

We lookup the Map sensor offset and use this value (viewable by datalogit).

We obtain PIMV from our running environment

BatVolt	MAPN	MAPP	Rpm	PIM	PIM V	TPS V	Inj ms	Inj +/-	IGN
14.3	2	8	1515	6565	1.996	0.501	2.111	152	14

14.3	2	8	1499	6414	1.95	0.501	2.007	152	14
14.3	2	9	1536	6782	2.062	0.501	2.176	152	14
14.3	2	9	1529	6696	2.036	0.501	2.184	152	14

LOAD = 3289 \* 1.95

The answer gives us 6413 and we can see for load point 8 we have an Load value of 5938.  
The load value for point 9 is 11571 so we place our load axis on 14 with a value of 6681.

As we can see once pressure is fixed or doesn't increase any more, the load value doesn't.  
This will result in a horizontal shoot across method once target boost pressure is reached.  
This is because the Djetro version uses air pressure and runs a guesstimation method to calculate airfl  
As the engine speed increases more and more air comes into the system, pressure remains the same .

The Djetro has two additional features which are;

IGN vs TPS correction

INJ vs TPS correction

These are there presumably to assist in correction for the throttle position sensor.  
These will have an affect on the output figures but don't appear to adjust the load bearing.  
These are much like Airtemp correction or water temp correction, they affect values but don't adjust l

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## Ljetro

Pro's

- -> Out of the box, works great, plug and play nothing more to add/change

PR: This is suitable for the majority of customers

- -> Supports factory airflow meters and larger models

PR: This is suitable for the majority of customers and tuners (less fiddling the better)

Cons'

- -> Some tuners/owners believe the airflow meter is a restriction

PR: Turbocharged cars have a restriction after the compressor outlet, not before.

- -> Once you max out the airflow meter it can't show any more useful load to the ECU

PR: Once you max out a given airflow meter, move to a larger unit with higher resolution.

If you stay with an airflow meter maxing out (stockish GTST customers) then you basically have the s:  
load bearing as Djetro customers. Once you peak or reach max airflow (the most the AFM can show) t  
This is dead obvious for stockish GTST customers who do a map trace.

## Djetro

Pro's

- -> No air intake restriction

PR: Turbocharged cars have a restriction after the compressor outlet, not before.

- -> No airflow meters in pipework

PR: This can be helpful for large twin applications. It may also help avoid chuffing or compressor shuff  
With correct pipework and bends you should be able to run twin MAF's or even a big single MAF reloca  
• -> Can't max out airflow meters

PR: This is a valid Pro. But once you max out any airflow meter simply change to a larger unit or more

Con's

- -> You loose load point resolution once you reach target boost (horizonatal shoot across, as pressur

PR: This would be my main caveat of moving to map sensor system, the lack of tuning points, as the r

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**When I turn my car on I get a clicking relay noise and the hand controller dies**



This is related to an ECCS / Power source wiring problem. Either the PowerFC does not have the right voltage, a chip/circuit is damaged in the PowerFC or the unit is possibly faulty. When I fried my PFC due to a misconfigured wiring loom I had this problem. I opened up the PFC and found a burnt track. I resoldered the burnt track and all was well. I encounter loud clicking noises from the PFC, and garbled text and characters on the hand controller when the IGN had power. You can view a similar topic here [When I turn my car off I loose any changes on the PowerFC! Help!!](#)

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## My Skyline R32 GTR has a wierd misfire problem, what's wrong?

This topic is currently under discussion and there is possibly a pattern among R32 GTR owners. The PowerFC used is the same version as the R33 GTR PowerFC but this bug/problem only appears on R32 Skyline's. An intermittent misfire problem when coming on full load seems to be the common factor.

8.04a and 8.0 are known versions to be affected by this bug.

I installed a new engine cover (the bit in the middle that covers the coil packs) - this allowed me to move the ignitor pack back up on top of the engine cover. I took that opportunity to make sure I had a good earth when I moved it (which I assume the guys from Mercury have not) Prior to having the engine cover on - the coils and the ignitor pack shared the same earth - and I was just using one of the screw holes that holds the coil pack (plug) leads in place I plan to make a dedicated earth strap over to the -ve battery terminal over the weekend

The user reports that "New earth for the ignitor pack fixes it"

Thanks Scott

For an ongoing discussion you view it [here](#) ***This is a confirmed unofficial bug in the RB26 R32/R33 GTR LJetro PowerFC. This has been seen by quiet a few users with reproducible results. You should read the Skylines Australia thread above for known workarounds and fixes etc.***

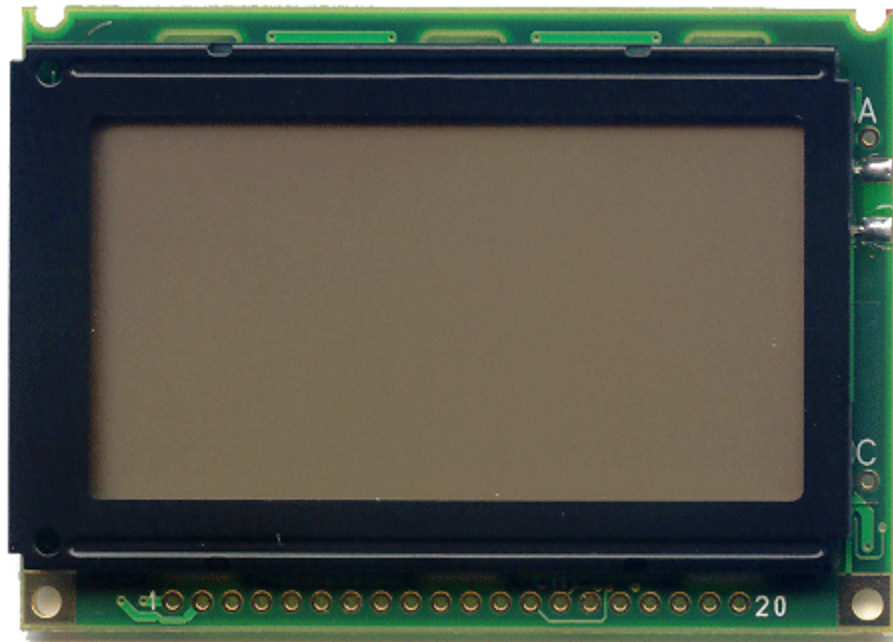
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## Is there a replacement hand controller screen?

As an unofficial replacement hand controller screen you can check out [here](#) for a suitable 128x128 backlit LCD. It even comes in different colours to be cool. I am unsure if this model works OK with the apexi hand controller.



I have tried using the Sieko screen on my personal hand controller work bench and it did not work.

The screen simply refuses to power up and light up. Try it yourself if you wish - you might get lucky.

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## **I have fried my PowerFC. Is it fixable?**

We have seen on a few occasions that an Apexi PowerFC is in fact fixable and can be repaired. The usual suspects are burnt tracks, fried chips or damaged circuits on the board itself. One member was able to send their PowerFC to a local electronics shop with a wiring diagram for their PowerFC. The shop ran a multimeter debug and replaced a few capacitors and resistors. The unit now works and remains to operate correctly. Previously the unit would not power up at all (blank screen and no fuel pump). The original fault was caused by a mismatched wiring configuration which shorted out a few fuses and the PowerFC failed at this stage. Your last resort would be to try a local electronics shop to try and debug what is failed or damaged. I would expect a \$150 repair bill to be about normal for this sort of work. The other option is simply to buy a new or used PowerFC.

Everything is fixable its just a matter of how much will it cost :D - ask your local

mechanic/auto elec shop for a quote if you have toasted your PowerFC

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## **I always have knocking, is it true, is it lies or is something wrong?**

The factory knock sensors are exactly that, small microphones attached to the outer casing of the block and they listen for certain frequencies. The frequencies they detect are those heard when detonation occurs. Hence the name, knock sensors. To sense engine knocking/detonation. Is it possible for

knock sensors to detect other noises and vibrations from the engine (and road/environment) but they usually do indicate a problem.

The knocking level found in the Apexi PowerFC refers to the level of knock detected not the frequency. Higher voltage indicates a bigger knock has been heard or detected and it is displayed on the hand controller.

You cannot alter the sensitivity of the knock sensors. You can alter the flash sequence or how often it should flash when a certain knock level is reached (using Datalogit).

A knock of 50 when the engine is on small amount of load at 3300rpm is much different to a knock of 50 when the engine is on full load at 5800rpm. The higher the load and RPM the harder the engine is working, the more likely detonation is going to occur, and the severity of it also increases. Knocking in low rpm can often be overlooked or just accept the fact and move on with things, but knocking under full load near mid to high RPM is a concern and always should be.

***Do **NOT** ignore detonation - it can be an engine killer if ignored and the driver acts like a stupidhead - always check and find the cause or speak to your tuner. If the engine light is flashing its for a reason - get it sorted or be prepaid for heavy rebuild costs etc. It is better to be over-reactive when dealing with knocking than to ignore it and play the dumb driver "i didn't know"***

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## How do I debug knocking, how can I make it go away?

There are 5 methods that come to mind immediately when dealing with knocking and their approaches are listed below. Before you go ahead and try to be a cowboy fixing knocking if you aren't comfortable etc or don't know what you are doing go and see your tuner. Tell them all the information you have and get it sorted - Don't ignore it or just hope for the best. Either fix it yourself or speak to your tuner.

### 1. Use temporary IGN adjust

Drive around and replicate the concerning knock levels, be sure to note roughly where it happens (rpm or load etc).

SETTING -> INJ/IGN Adjust -> Press DOWN 3 times and you will see -3 for IGN ADJUST. This drops the IGN map 3 degrees timing temporary (will reset when car is powered off).

Drive around and try to replicate the knocking levels again, be sure to try and reproduce the engine load and rpm you did previously. If the knocking has dropped considerably or has gone away completely (very likely) then it is simply a few cells on the IGN map have too much advanced timing.

You should give this information to your tuner;

Max Knock of: 50

At RPM: 4700

At Engine Load: Max Load (throttle was nailed)

Using Fuel: Standard BP Premium

Adjustments: -3 deg IGN timing fixed the problem

The tuner then has enough information to drop onto the IGN map and take out 3 deg timing where 4700 and max load lands on the IGN map. Should take no more than 5 minutes to correct and all be happy. The blanket and braindead approach is to drop the whole map 3 deg either using Datalogit or dialing the crank angle sensor backwards a notch, this is NOT recommended as its braindead. You have stand alone engine management, it should be used like one.

## 2. Use higher octane fuel

Drive around and replicate the concerning knock levels, be sure to note roughly where it happens (rpm or load etc).

Find a local service station with really high octain rated fuel, Shell V Power Racing is a good one. Plonk in a full tank of V Power Racing in and drive around for about 5 minutes to get the fuel flowing.

Drive around and try to replicate the knocking levels again, be sure to try and reproduce the engine load and rpm you did previously. If the knocking has dropped considerably or has gone away completely (very likely) then it is simply a few cells are possibly too lean on the INJ map (could also be IGN timing). Running a much higher octane rated fuel is almost guaranteed to take away some detonation. I am using Shell V Power Racing (100ron) and its fantastic as a detonation killer (highly recommended).

## 3. Adjust IGN map

Drive around and replicate the concerning knock levels, be sure to note roughly where it happens (rpm or load etc).

You should give this information to your tuner;

Max Knock of: (highest level you saw)  
At RPM: (what RPM you noticed the engine check light come on)  
At Engine Load: (driving conditions)  
Using Fuel: (what fuel you used)  
Adjustments: -3 deg IGN timing fixed the problem

The tuner then has enough information to drop onto the IGN map and take out 2 degrees timing where your driving conditions land you on the IGN load map. Should take no more than 5 minutes to correct and all be happy. The blanket and braindead approach is to drop the whole map 3 deg either using Datalogit or dialing the crank angle sensor backwards a notch, this is NOT recommended as its braindead. You have stand alone engine management, it should be used like one.

## 4. Blanket approach

The blanket and braindead approach is to drop the whole map 3 deg either using Datalogit or dialing the crank angle sensor backwards a notch, this is NOT recommended as its braindead. You have stand alone engine management, it should be used like one. Lowering IGN timing is likely to take away any detonation but will certainly give the engine a flat and empty feeling (not recommended).

## 5. Ground Zero approach

Set the IGN timing from 4500rpm to 6000rpm at zero degrees.  
Set the INJ map from the same load areas to 10.5 to 1 (mega rich).

That should complete eliminate any knocking, that is it is not humanly possible



for it to knock now. Do a max load dyno run (damn it will be boggy and make jack all power) and see what knock levels you get now. If you still see knocking then its likely the sensors are picking up other mechanical noises in the engine bay. Using a chassis ear tool would assist in debugging where the noise is coming from.

One owner reports;

***"Then I went for a little walk around the engine bay on the dyno with the chassis ear. It turned out to be the remote oil filter sandwich plate tapping on the oil pressure gauge adaptor. They were located right under the rear knock sensor. There was obviously was a slight engine vibration at that RPM, which I later traced to an unbalanced pressure plate."***

So it certainly is possible for other external factors to cause "knocking" and thats the Ground Zero, rule out everything else approach.

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## **My car won't start when I plug in the PowerFC, but the stock ecu works fine**

First when dealing with a new PowerFC install and the car does not start there are a few basics to check;

- Check the PowerFC to car loom connector
- Check the warning lights on the dash, do they come up?
- On the hand controller, goto ETC, SENSOR SW CHECK, are any sensors highlighted in black? (Shouldn't be)
- Make sure you disable the Boost Control Kit if you aren't using it
- Make sure you have the right airflow meter selected (if you have a non standard one)
- Make sure you have correct injector settings (if you have non standard ones)
- Check all fuses
- Listen for clicking relays
- Check for burning smells near the ECU and or inside the ECU
- Inspect the ECU itself for physical damage or burn marks (open it up)

Finally we have seen on a few skylines that the car works fine with the stock ecu but not the with PowerFC. It has been traced back to a missing fuse. The missing fuse is on the left side in the R33 GTST and its at position #7. According to the diagram it is Engine Control. Somehow the stock ecu works if this fuse is missing but the PowerFC doesn't

See the [diagram here](#) for "Engine Control" which is a 10AMP fuse.

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## Can I use 95ron octane fuel (non premium)?

The PowerFC itself does not know the octane count of the fuel you use, that is it will not know if you put in 95,96, or 98ron (and so on...) What is likely to happen if you put in lower octane fuel is that it will detonate lots more, commonly known as knocking. This is completely unsupported and excessive detonation can make your engine go bang, using 95 ron or low octane fuel is NOT a good idea

**!!! Temporary IGN/IJN Adjust values are reset at car power off. You MUST re-enter this each time you restart the car (if you use say low octane for say 2 days and need to turn the car on/off) !!!**

There are two steps you should take when using lower octane fuel.

### **Retard the ignition Timing to prevent detonation**

You can do this by going into [SETTING], [IGN/INJ] and then on the left hand side you will see IGN correction. You can then slowly decrease the ADJ value to a negative value in small increments. It would take out around 7 degrees (so -7) then drive around and see if it knocks. If knocking levels are normal (around 20 odd) then its fine and keep it that.

### **Richen the fuel up to prevent detonation**

You can do this by going into [SETTING], [IGN/INJ] and then on the right hand side you will see INJ correction. You can then slowly increase the ADJ value to a positive value in small increments. If

you see black smoke then you have richend it up too much, take some out. If it doesn't idle properly (ie coughing or spluttering) you have richend it up too much, take some out.

If you do both of those when you put in lower octane fuel then the car should run fine and should have minimal knocking. You should only use this sparingly as its still much more likely to knock with lower octane fuel. Whilst you are doing this unsupported function you MUST watch the knocking levels on the hand controller at all times. MONITOR, 1 CHANNEL, KNOCK and watch the bar graph. Press UP to get a digital readout figure (highest value). Anything above 60 is bad and can be causing damage.

IE: Don't use this every day. If you are out of fuel, then put in say 20 lites of 95ron (or crap fuel) and find the nearest premium outlet. You should not use lower octane fuel and octane booster as a comprimise for premium 98 ron fuel, instead it is much safer to use the above procedure.

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## **My Hand Controller freezes at the Apexi Logo. Why???**

When you use an incorrect model hand controller on a PowerFC unit the hand controller will freeze at the Apexi Logo. I believe this occurs as during boot up the hand controller sends a "hello,ping" to the PowerFC using a specific CRC function (or possibly a shared key based on the model). The PowerFC replies with a preset "shared key" to suit that unit, such as an rb26 skyline shared key. If you are using a different hand controller then the packet is scrambled or fails CRC and boot up fails, the result the Hand Controller stays on the Apexi logo. The PowerFC will still work, it just means that you can't use the hand controller. The most common "in the wild" occurrence of this we have seen is the first generation PowerFC's 2.x 3.x 4.x and using newer model hand controllers. There are quite a few version "variants" in the wild and below is a list of them. This is taken from my own "in the wild" experience and what's on the Apexi site. It is by no means a perfect model list and it could be wrong or have errors/mistakes.

Internal Apexi Model Name for Hand Controller

FCC NT First generation to suit Nissan  
FCC FN Second generation to suit Nissan  
FCC AD First generation to suit Nissan Djetto  
FCC TS MR2 model  
FCC TZ MR2 model  
FCC SX Toyota Altezza/Lexus I think  
FCC ZF RX7  
FCC ZG RX7 Second Generation  
FCC IH Honda Integra  
FCC2 SX Version 2 for Toyota Altezza/Lexus  
FCC2 JX Version 2 for Toyota Chaser  
FCC2 DK Version 2 for Evo Lancer  
FCC2 Version 2 general  
FCC3 Version 3 general  
FCC3 1JAT Version 3 Chaser Auto

The main product codes seem to be

FCC First Batch  
FCC2 Version 2  
FCC3 Version 3

Units that are sold as Version 3 seem to be the newer PowerFC and Hand

Controller bundle in one price/package. Most people that have brought a new PowerFC in the last 2-3 years should have this bundle/package. The Hand Controller versions for these units should 5.x 8.x and so on. Units that are sold as Version 2 seem to be expansions of the Version 1 run but with more cars supported. This is likely to be version 3.x and 4.x under ETC, VERSION Version 1 or FCC is likely to be the first generation PowerFCs and may even say 2.x under ETC,VERSION.

The PowerFC also has an internal model or board number. My Skyline has FC-14B for its main board version. The main thing to note here is the sticker or product code on the PowerFC Shell. My skyline has ECR33. Other likely models would be GTR33 or SR20 and so on (basically the car or engine code).

The hand controller logo freeze seems to crop up when using an FCC3 on an FCC based PowerFC. Such as using as first generation R33 PowerFC and using a newer generation R33 hand controller. The common "in the wild" example is using FCC3 (sticker on back of hand controller) on a RB25 PowerFC (sticker on side of unit). This will not work, as RB25 PowerFC labelled units expect FCC NT instead of FCC3 so it will freeze and fail boot up.

Looking at the [Apexi product chart](#) for models we can see that the original run of Skyline R33 PowerFCS were known as RB25 on the unit itself. Its a little white sticker on the outside of the case. Newer generation R33 were known as ECR33 and this is present on the sticker also (in the same spot). So going from apexi's chart we can see that the original style RB25 PFC needs FCC NT. We can also see from this chart that FCC NT works on all of the first generation Nissan models. So if you can find an older style to suit any of the Nissan PowerFCs then this should work on RB25 PowerFC. Most suppliers dont stock the older versions cos they don't carry them anymore. Our main supplier Nengun.com has the following older style hand controllers

415-N001 Nissan Main Old Style  
415-T001 Toyota Main Old Style  
415-T003 Toyota Type B Old Style (not sure what this is for)  
415-X001 Newer Style Hand Controller

So if you have 3.x 4.x then you should aim for the older style to suit your Car. if you have the newer 5.x then you should go for the newer X001 unit.

So for RB25 you should choose 415-N001 as 415-N001 is the first generation Nissan Hand Controller. If you have ECR33 you should choose 415-X001 as its the newer Nissan Hand Controller.

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## Poor mans antilag??

Whilst there is no official Apexi plug in Anti Lag and Datalogit Antilag is broken you can do a "poor mans antilag". This is at zero cost and is merely amusing and a bit of fun, I don't think it does any good (and might not be safe).

1. SETTING
2. IGN MAP
3. Change the top row (row P01) to be all zero's (the number 0) for IGN timing.
4. Drive around and listen to the car pop and backfire on gearchange

This is because on gear change the AFM momentarily drops its air when the throttle body closes so AFM drops into load point P01 (most times, not %100). So the result is, the engine drops to 0deg IGN timing for a split second and it pops and backfires on gearchange, race car style. This may not be safe and suitable for ceramic exhaust wheel'd turbo cars as it could cause exhaust wheel failure from heat. Logic says it should bring on boost a bit quicker but it doesn't appear to do squat. Traditional anitlag backs off timing on gearchange and dumps fuel, but keeps the throttle nailed so keep exhaust gas flowing.

Anyway try it and impress your friends. I have this applied to my car still after about a year and everything is still fine - standard turbo is still in tact etc

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## **Boot up diagnostic??**

There appears to be some sort of internal debug, check sum or something at boot up.

1. Press and hold UP on the hand controller
2. Turn the car ON
3. See what comes up on the hand controller



Email me (paulr33@hotmail.com) what results you get, I'd be interested to see what comes up.

Email me what version PowerFC you have from ETC, VERSION and what is displayed.

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## **Can I have a lumpy 'cammed' idle?**

For some bizzare reason you may want a lumpy 'cammed' idle. To impress your

friends, for kicks or to sound tough on the streets at the traffic lights against that Clubsport R8. When the PowerFC runs it's idle loop it plonks itself onto cell 2x2 and stays there. You may notice if you dial in more or less IGN timing on that cell, that it is ignored for idle loop. That is, it will always run 15deg IGN timing no matter what you dial into that cell. An alterate "hack" is the following

1. Turn car ON
2. SETTING, IGN/INJ
3. Press DOWN 1 time

If you observe lumpy idle then note the number ie: -1 If you don't observe lumpy idle, press DOWN again. Keep repeating until you get lumpy idle, don't go past -3 or -4 it's too much. Now with that number in mind do the following

1. Turn car OFF
2. Dial back the Crank Angle Sensor whatever number you had in IGN/INJ Adjust, so if you had -2 dial it back 2 deg
3. Turn car to ACC
4. Edit the IGN map and shift every cell UP whatever number you used in #2. So if it was -2 then add 2deg timing to every IGN cell on the map
3. Turn car ON
4. Observe lumpy idle

This is by no means a supported feature and it might not even be a good idea. It's just something I observed and thought of with my car. By all means try it but do so at your own risk, if you blow stuff up or cause problems then its your own fault, you were warned.

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## **Ford Falcon XF Throttle body with the PowerFC**

Some owners upgrade the standard Skyline GTST single throttle body to a larger unit. A common donor for this part is the Ford Falcon XF Throttle body. The problem with this swap is the throttle body opens backwards on the XF unit so the TPS signal wont match. You need to use the Nissan RB30 TPS sensor which is the same as the standard skyline one and works with the XF unit.

A discussion thread on this topic can be found at:

<http://www.skylinesaustralia.com/forums/index.php?showtopic=151259>

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## **Piggybacking the PowerFC with another ECU**

There are some cases of people piggybacking the Apexi PowerFC onto other ECU's and running both. Presumably this would be in the case of an auto car that needs auto shift logic control. We recall that Keir Wilson's drag car at one stage had a Motec ECU piggybacked with a PowerFC. I believe this was for knock sensor display/support. There was an article in Autospeed about it. I don't see why anyone would want to piggyback it with another ECU, but it could certainly work.

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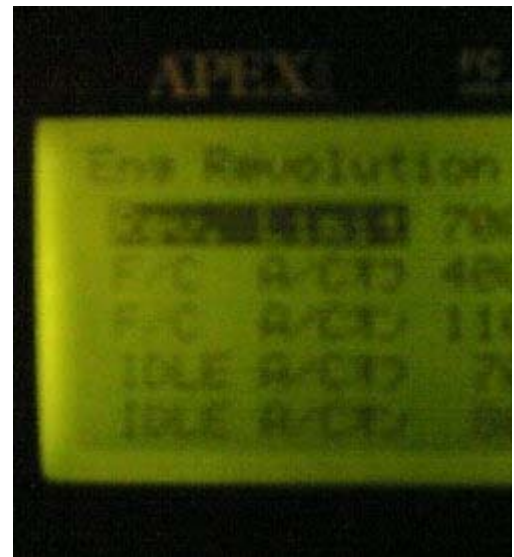
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## PowerFC Pro - Launch Control

The Launch Control in the Apexi PowerFC Pro version is very simple. It allows you to set an alternate RF this is your "launch" rpm.

Under the SETTING, REV LIMIT screen simply enter your desired launch rpm as the second option. This launch control rpm limit. When the vehicles speed is 0km/h this will be the new rev limit.



Basically if you set the 0km/h launch RPM to say 3600rpm and your car is stationary (speed must be 0). If you floor it the revs will fly to 3600rpm and stay there (it should also spark cut - aka flames and bar as the car isn't moving your RPM will halt at 3600rpm (or whatever you set) and stay there. Once you clutch the 0km/h limiter will deactivate and it will move to your normal RPM cut. So as you take off the clutch etc and your RPM limiter will be say 8000rpm or whatever you set for the other RPM limit.

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## **I want to go EPROM/Firmware hacking, Tell me how**

Whilst I cannot help you directly someone (Kashima) on the Internet has done some extensive work on the EPROM and Firmware on the PowerFC. He covers changing the EPROM chip on the hand controller, the binary dumps for the maps, the pinouts for the various sockets and even board/chipsets used.

PowerFC Firmware: <http://www.kaele.com/~kashima/car/powerfc/>  
PowerFC Adapter, Apps: <http://www.kaele.com/~kashima/car/pfcadp/>

Kashima is very clever in this area - you should read some of his pages if you are intersted in his work etc. There is another guy who is pretty darn clever in terms of the PowerFC and how to play with it - he is Goblin on the Rx7 forums. He originally wrote the "Hacking the PowerFC" documentation and it goes into detail about the datalogit system etc. A bit controversial sure - but worth a read and some interesting things to note in there too.

[Hacking the PowerFC/DataLogIt](#)

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## Apexi PowerFC Djetro PRO - Does it exist???

From time to time there are various rumours or confusion over specific ECU models. The Apexi PowerFC Djetro PRO does not exist for retail sale / standard production use. The Apexi drag car is believed to run a Djetro PRO version which gives it spark cut, 0kmh launch control and djetro. I believe Apexi have simply modified the mainboard firmware to include both chipsets, being Apexi they can do whatever they like.

There are two ways that I can think of to achieve this goal;

### **Apexi PowerFC Pro & HKS VPC (Vein Pressure Converter)**

The VPC is an old legacy HKS device which lets you run map sensors and emulate standard AFMS.

I don't think it is supported on the mainstream skyline branch but I have seen it for z32 300zx.

I have also seen someone run an rb26 Djetro PFC on a 300zx as they are compatible (with changes).

### **Apexi PowerFC Djetro & Gizmo Launch Interface**

The Gizmo launch interface is a spark cut / anti lag box which runs in parallel of the 6 ignition drivers.

This provides on demand spark cut for anti lag launches and flat shifting.

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## **Replacement or upgradable Map Sensors for the Boost Control Kit / Djetro Kit?**

The Djetro and Boost Control Kits use standard mainstream map sensors to provide manifold pressure in digital output. You can use most OEM map sensors to give you a larger scale and accurately show more pressure to the ECU. Here is a short list of known working replacement map sensors;

- AEM 3.5bar sensor
- GM 3bar sensor
- APEX 3bar sensor
- APEX 4bar sensor

To install the new map sensor you need to rescale it correctly. You can do so [here](#).

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## Replacement Air Temp sensor?

Some members have been looking for a replacement air temp sensor to avoid heat soak or show faster changes in temperature. Some of the guys from the Rx7 club have found a suitable sensor and are trying it out.

They believe it should be a direct swap and work really well with the PowerFC standard AIRT sensor control.

<http://www.compsystems.com.au/Downloads/Catalogues/MMR/CSA5ATS.pdf>

The company is in Victoria which is handy. More news when they test it out and get it working correctly.

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## **Why buy a PowerFC? Aren't they discontinued????**

As everyone knows the PowerFC's future is in doubt. Apexi have had some financial issues and now there are delays with ordering models. Some units have been scrapped and wont be made anymore. But nevertheless the are still thousands of second hand units on the market.

There are still plenty of tuners around and still plenty of workshops who support it. I am even trying to resurrect the RB20/RB25 powerfc by using an RB26 PFC and a custom loom.

So needless to say its not like all the PowerFCs in the market will magically vanish or disappear tomorrow so keep on 'trucking'.

There are however some alternatives to the PowerFC on the market and we should not be biased here, as that is not fair.

I'm a proven Apexi PowerFC fan but like any ECU it has downfalls and bad sides, most things do.

So let's look at some of the alternatives and how they compare;

- Greddy Emanage
- HKS FCON
- Apexi SAFC & SITC
- Motec M800
- Autronic
- Haltech
- Wolf 3d
- Remapped ECU

- [Link](#)

Below is some brief notes on each of the units and my thoughts / knowledge on them.

This is by far no means of a technical comparison or tuners views on each of them.

You should **ALWAYS** discuss any ECU choices with your tuner before you even start.

### **Greddy Emanage**

The Greddy Emanage is a piggyback system onto the stock ECU.

That is, its a generic remapper for stock ECUs. So if you have a GTR, GTST, Evo, Subaru etc the emange can sort it out.

Its a stage 1 interceptor which intercepts IGN, INJ, and all the main sensors to control the car and let you "tune" the main system.

The stock ecu is still present so complex things like 4wd, traction control, abs systems etc work just as normal.

The unit needs a main harness to suit your car but the unit is generic so you can sell (or buy it from) it to anyone.

Once installed you can make relevant changes as needed such as airflow meter changes, AFR tuning, IGN timing etc.

There are some limits into the size of the injectors you can run and other changes as its an interceptor but all in all a good unit.

I have never been a fan on a remapper/interceptor but if I was going to choose one, the emange would be the one.

### **HKS FCON**

The HKS FCON is by far one of the more advanced and superior ECUS for the Japanese domestic market.

This bad boy supports EVERYTHING known to man and more than you can poke a stick at.

AFMS, Map sensors, twin kits, everything is virtually supported and it includes a 32bit ecu with 32x32 map area.

The HKS FCON has its drawbacks however, in Australia only one place can tune the FCON which is BD4's in Sydney.

SO if you live in Melbourne, forget it you can't touch jack shit on the ECU. There is a graphical FCON unit but I don't think its the equiv of the PFC hand controller.

The HKS FCON is locked to the HKS pro writer software so you can touch it with laptop software of your own hacking. Tuners need to be official HKS pro tuners to get the software. So if there are local HKS FCON tuners in your area go nuts, get it and enjoy, but for most there are no local HKS FCON tuners so its useless. Much like a mines ecu, no local tuners. I would love to try out this ECU and see how far and how much you could tune it, but sadly I cannot as I am not a certified HKS tuner (haha).

### **Apexi SAFC & SITC**

These two little brothers are like peas in a pod. You can't link them together directly but they give a good compromise for standard ecu owners.

These two mates are favourable among the Auto market which the PFC does not support Auto cars (well nissan anyway).

Running both of these lets you bend IGN timing to your hearts content and

make the ecu think your AFM is drunk to get some more power in and out.  
All in all not a bad compromise if you dont have a choice or cant go for a good supported stand alone (ie: auto ecu etc).  
Cheap, cost effective and works well. You will be limited by this setup so be careful.

### **Motec M800**

Enter SATAN. The bad boy of the ECU market that dominates all.  
The Motec is a complete stand alone ECU for any car, any setup, any scenario.  
You can choose inputs, outputs, engine control, batch or sequential fire, anti lag, fuel or spark cut, complete map control and 3rd dimension selection.  
There is nothing the Motec cannot do. It is mainly used for rally and race cars but can be used on a street car. This ECU costs a fortune and is the ultimate stand alone ecu.  
I would not recommend it for a mild skyline but you certainly can use it, it will just cost a lot. There are lots of local tuners so that shouldnt be an issue and everything is supported.

### **Autronic**

I do not have much to say about the Autronic as I know very little about it. As far as I know its a stand alone mutli-purpose ECU to suit most cars.  
It has good local technical support and a range of tuners as well. I believe you have options of AFM or Map sensor and it also enters the 3rd dimension letting you tune in 3d via Throttle Position Sensor (maybe others too?).  
The Autronic has things like antilag, launch control and a few other cool features so its not a plain vanilla ECU. This is aimed at race/competition cars.

### **Haltech**

I know jack shit about Haltech

### **Wold 3d**

The Wold 3d has been one of the older generation ECUs for generic cars.  
It has been locally supported and developed in australia for some time now. I think you get the choice for AFM or MAP so thats a bonus.  
The newer Wold 3d v500 has extensive support for most of the comon features and extra stuff most users need, they say it even rivals motec/autronic.  
I dont see any issues with running a wold 3d, but like most ECU's you need to find a range of good local tuners to sort it out for you.

### **Remapped ECU**

Running a remapped ECU is cool and cost effective. It lets you tune the stock ecu (providing its supported and doesnt cost a bomb) and gives you good bang per buck.  
You can support almost anything within reason, such as larger AFMS, bigger injectors etc and still retain factory control.  
The main issue with remaps is you cant adjust jack shit once its remapped and most tunes are expensive each time as they do a complete burn of the chip.  
Ie; its not like they can just change timing via a hand controller each time. The user also has no control or real time interaction with the tune.

### **LINK**

I know jack shit about Link

So there you have it, a quick glance over some of the more common ECU's and what they have to offer.  
If you disagree with any of these comments, please send me a pm on SAU or

email me (paulr33@hotmail.com) and let me know.

I am happy to correct any incorrect info, mistakes or bad opinions. If you have an ECU you think should be on this list let me know also.

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## **How do I setup a larger scale map sensor?**

If you are maxing out the factory map sensor supplied in the Boost Control kit for your car you'll need to install a larger unit. These units are commonly used in the "wild" but feel free to find your own if you wish;

- AEM 3.5bar sensor
- GM 3bar sensor
- APEX 3bar sensor
- APEX 4bar sensor

Here is a list of what you need to upgrade your Map Sensor. This spreadsheet should help you determine the settings for Scale and Offset for any typical linear 5V MAP sensor.

The idea is that you measure your new MAP using:

1. a 12 Volt or 5 Volt source (for powering the MAP - I think most use 12V?)
2. a pressure/vacuum tester (like a MityVac or similar)
3. a multimeter (for reading output).
4. [This spreadsheet](#)

You put the info you gather into this sheet and then play with Scale and Offset until it matches your experimental data. Don't bother downloading this unless you have all the items listed above in 1, 2, and 3.

This was taken from the Rx7 forums as they often have to upgrade their map sensor. Wargasm is the author of this content so be sure to check out his thread if you have questions or issues regarding this.

[Main Thread](#) on rx7club.com

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## What's the Apexi D1 Limited Edition Hand Controller?

There was a limited build run of approx 100 units of the D1 Limited Edition D1 style hand controller. This was a gold stylish hand controller and worked just the same as the normal hand controller units. I suspect it was a plain run of X001 hand controller to suit most models as there was only 100 made. From all that I can see its simply a gold case - I have no working photos of the unit in action etc.





Special Thanks to Skylineowners.com for the picture.

If you have any working pictures or a copy of "ETC, VERSION" from this hand controller please send it through to my email address [Email me](#)

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 **Car Forums - New Celica - Advanced  
Datalogit Tuning**

Courtesy of the New Celica forum they have provided some fantastic in-depth documentation on PowerFC tuning. This is coupled with screen shots for datalogit, diagrams and lots of technical information. If you are interested in engine mangement tuning this is an absolute must. It also goes into detail to list all of the features in datalogit along with explanations etc.

[How To: Power FC and FC Datalogit Tuning](#)

Special thanks to Jesse IL on the Celica forums for this information - it's a great help!.

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## Car Forums - RX7Club.com

The RX7 guys seem to be the pioneers of PowerFC information. These were the original crew who worked with people like Goblin on hacking the PowerFC. Also other special guests such as FastHatch who are working on FC Tune and other custom modders and specialists out there. They also have their own version of the PFC FAQ to suit the RX7.

[Rx7club.com](http://Rx7club.com) - PowerFC Forum

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## Car Forums - Evolutionm.net

The guys who insist on running 35psi+ with the PowerFc's. These guys are good source of wierd install issues and antilag solutions. They have a dedicated area on the evolutionm.net forums for PowerFC discussions. In fact they have a whole area for ECU specific tuning.

[Evolutionm.net - PowerFC Forum](#)

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## Apexi PowerFC Wikipedia

Thanks to a datalogit user we now have an Apexi PowerFC Wikipedia document. This includes some very technical information on the PowerFC, methodology, calculations and other technical briefs. This is a recommended read if you are interested in low level engine management.

[Apexi PowerFC Wikipedia](#)

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## Datalogit Yahoogroups!

I hate the Yahoogroups! with a passion (tm) but if you use Datalogit and you need help then this is the place for it. Its usually pretty popular and regular topics appear each day so its an active list. **You need to be a member and datalogit product owner to view this**

[Datalogit Yahoogroups!](#)

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## Autospeed review of the Apexi PowerFC

You can view the [Autospeed review of the Apexi PowerFC](#) here.

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## Change Log

Is there a Change Log I can view to see what has changed?

Yes you can view my online Change Log at [Skylines Australia Forum - PowerFC FAQ Change Log](#)

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## **A note from the author**

*This document originally started out by myself one night as I had just purchased an Apexi PowerFC for my skyline and I had a few obvious questions. I had known that they had been asked before but I couldn't recall the answers. I began looking for the answers and after finding them in several different places, decided to compile them into one guide. I had never planned for the PowerFC FAQ to become this large, and complete. I almost think it is at the stage of completion now, covering most of the common topics, ideas, concerns and questions asked by users. There have been many people who have helped to*



*offer ideas, concepts, fixes and other various parts of information to myself and this and they are the reason this guide exists. I have simply compiled it all into one big document. I have certainly learnt a lot in my time of writing of this guide and would like to thank everyone who has helped make this possible.*

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## **Apexi Officially Bankrupt**

Apexi have officially closed and announced their Bankruptcy.

A quote from an unknown source

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There will be no problems ordering of Apexi products, as the car parts division will keep running as normal. We, Apexera are applying for Minjisaiseiho (I don't know what this is called in English but if translated it means something like Civil Reformation). It's a type of government support as part of bankruptcy law in Japan. It doesn't mean the business is finished as yet. The trouble came out of our other divisions of the business (home security systems, telecommunications etc). We do not foresee problem in the near future and your orders will not be affected.

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For more information on this please check out [Bankruptcy Notice](#) I have ordered a brand new Rb26 PFC on March 20th and I am yet to receive it still (April 25th). So there are \*some\* delays on PowerFCs from Japan.

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## Apexi PowerFC - Model Discontinue Notice

This was originally listed as an "End of Sale" notice but it appears Apexi are dropping some of the least popular models. There also appears to be some supply issues with some of the processor used in some of the models (NEC chip for the Skyline units)

After about 1 to 2 years of rumors that the PowerFC would be discontinued this time more rumours have surfaced.

There are more rumours found [here on the rx7club](#).

Some more discussion on the topic [here on the gtrcanada club](#).

Our club discussion on the topic can be found [here on skylinesaustralia.com](#)

PowerFC AP Engineering versions - All models discontinued

PowerFC Pro versions - All models discontinued

- AE86 discontinued model
- BG5 discontinued model
- ECR33 discontinued model
- EG6 discontinued model
- EG9 discontinued model
- EK9 discontinued model
- EP82 discontinued model
- EP91 discontinued model
- ER34 discontinued model
- FC3S discontinued model
- GC8 discontinued model
- HCR32 discontinued model
- JZA70 discontinued model
- JZA80 discontinued model
- JZX90 discontinued model
- JZZ30 discontinued model
- RNN14 discontinued model
- ST205 discontinued model
- SW20 discontinued model

Some models have been discontinued as they weren't popular, some removed as the FCON dominated that model (toyota supra) and some were removed as they have run out of NEC processors (Skyline R33/R34). We are unsure at this stage if any more models will be cancelled or removed, or if its just a reshuffle of the crap models, and clear out some old unpopular models. AP Engineering no longer exists as a company, so the AP Eng versions have gone. There are of course many many units in the public market so there should be plenty for sale second hand it just means these models aren't sold as new anymore.

We have no news of a replacement unit (if in fact one is coming??), specs, features, name etc so if you have any information on unit, or details please send

them to me (paulr33@hotmail.com) and I will add them up here.

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## **A note about the PowerFC FAQ**

This FAQ has been written based on various opinions, resources and information found on the web, Skylines Australia forum, SAU members and other unmentioned car forums. This document is supplied as a "FAQ" or Reference guide only and should only be used as an informative guide. It is by no means a "spec" sheet or product manual. You should always consult your tuner before

making changes. No warranty is implied or provided with the information given here, use it at your own risk.

*This document was written by Paul Rivoli (paulr33) for the Skylines Australia car club (<http://www.skylinesaustralia.com>).*

