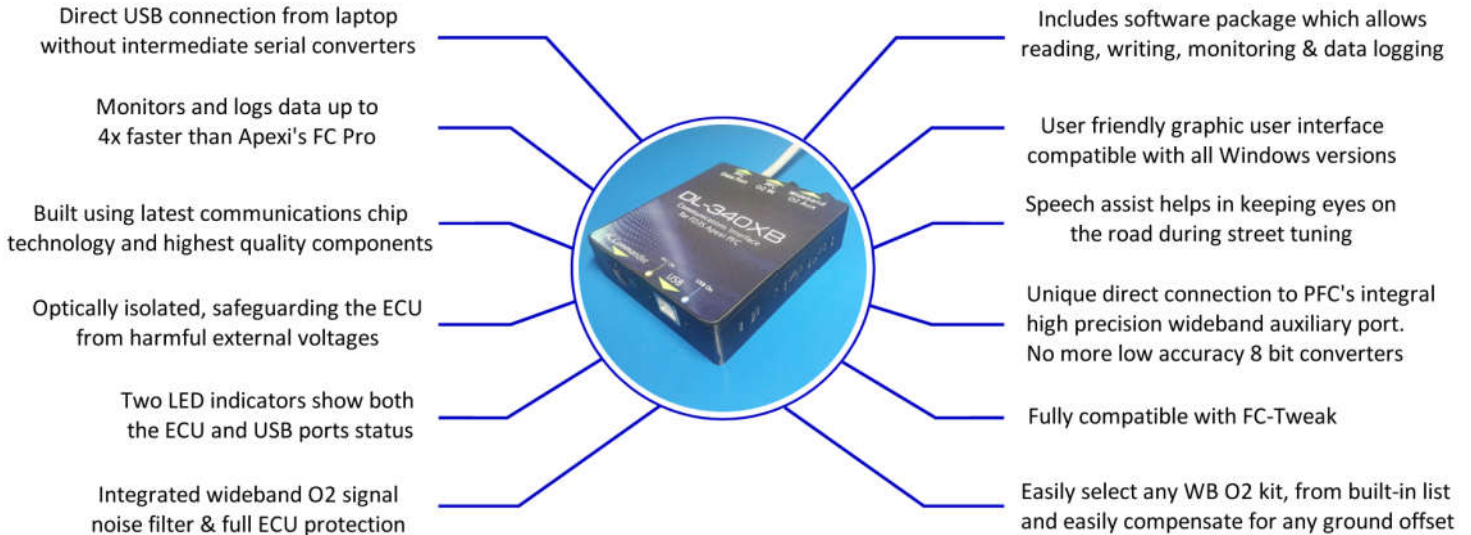


User Manual

DL-340XB Power FC interface

The fastest & most reliable interface for RX7 FD3S Apexi PFC



The DL-340XB data logging interface box will enable you to effortlessly perform data transfers, data monitoring and data logging using any Windows PC. You can finally get rid of your outdated interface, its slow performance, and countless other problems related to old software.

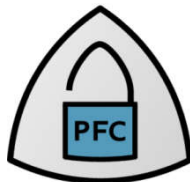
Free membership to DL-340XB support group

<https://groups.google.com/g/xb-pfc-tuning> (requires a Gmail account)

Link to most recent DL-340XB User Manual: <http://tinyurl.com/DL-340XB-manual>

Interface designed exclusively for use with
Apexi Power FC models S/N: PFC FD3S4 onwards

Includes PFC-Connect Software



Free online software updates

Can upload / download/unlock/ manually edit ECU maps and settings,
compare files, connect to any wideband O2 kit,
Monitor all data channels, log data in real time & playback log files.
Files can be used with FC-Tweak to fully tune any rotary setup.

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Email: ingxborg@gmail.com

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Introduction

The DL-340XB USB communications interface is designed for RX7 APEXI Power FC models from S4 onwards, and is supplied with 'PFC-Connect' software package for Windows PCs. Both software & hardware have been developed by a fully qualified automotive electronics & telecoms engineer and is the first of its kind. Unlike all other units on the market, it creates a direct link between the PFC's serial bus interface (NEC 78K SBI) port, available on its 5-pin mini DIN socket, and the laptop's USB without any intermediate RS232 serial conversions or additional PIC microcontrollers. It's also unique in that it utilizes the PFC's internal high precision A/D converter for wideband O2 data logging. These features make the new DL-340XB the fastest and most reliable Power FC interface. The PFC-Connect software package is included with each interface box so that the user/tuner is able to perform data logging, edit settings, and transfer data to and from the ECU. Together with FC-Tweak it can fully auto-tune any Mazda RX7.



DL-340XB interface



PFC-Connect software package

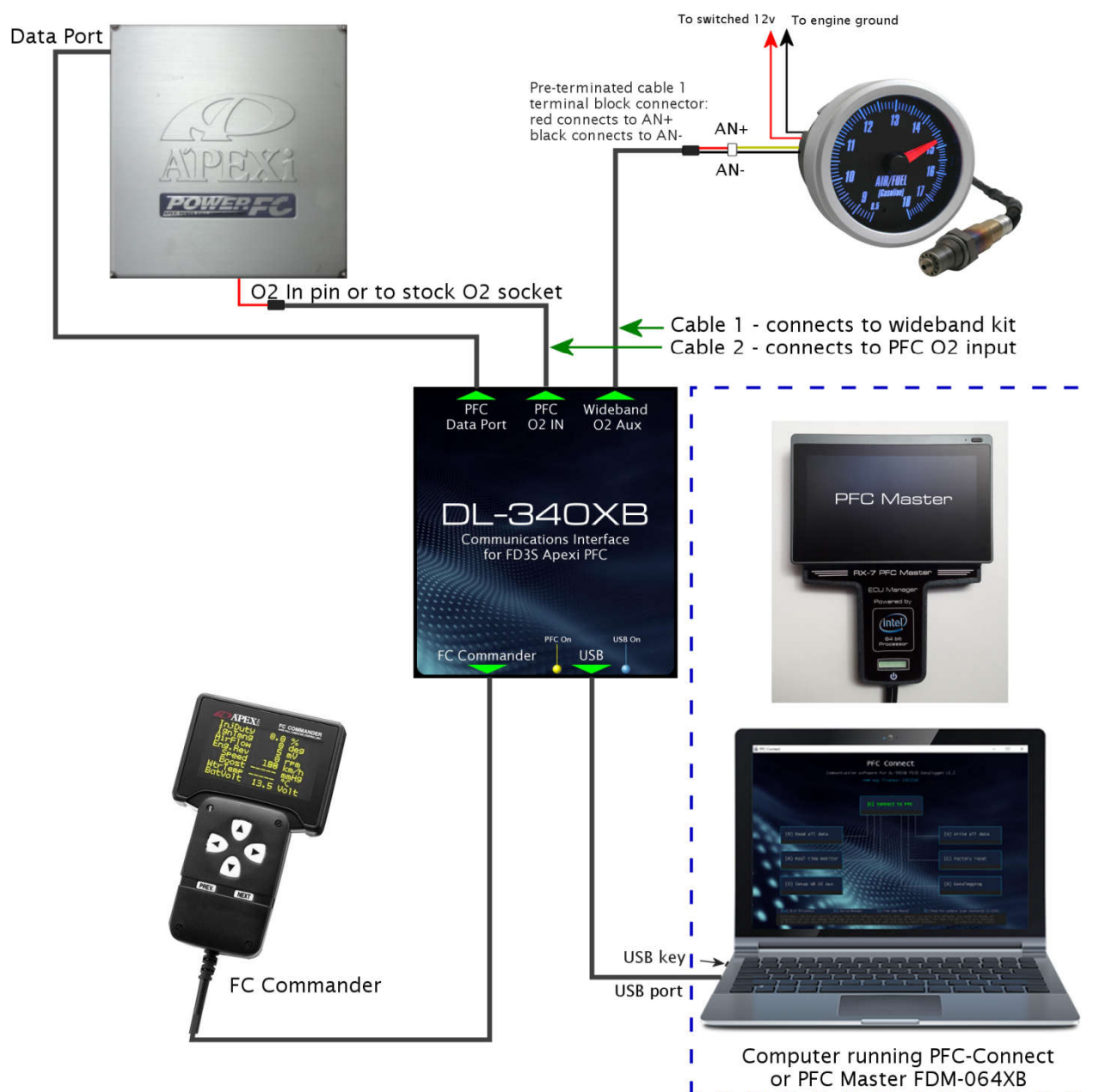
Features list compared to other PFC interface boxes:

Feature	DL-340XB	Most others
Sampling speed in 'Advanced+Aux' logging	40 data lines/sec	~20 data lines/sec (Datalogit) ~10 data lines/sec (FC Pro)
Sampling speed stability tested on Windows 10	High stability to ± 1 data line/sec Gives excellent data quality	Very low stability $\sim \pm 10$ data lines/sec Results in low data quality
Current consumption from PFC	<1mA for LED indicator (unit is USB powered)	50 – 200mA, extra current load on the PFC data port
Can be wired permanently in place	Yes	Other units may overheat the PFC after prolonged use.
Direct USB connection	Yes	Require additional serial to USB converters
Loop through for FC Commander	Yes	Not all
Completely isolates FC-Commander while in use	Yes	No, Commander will interfere with data
PFC / USB status indicators	2	0 – 1
Compatible with newest production of Apexi PFC	Yes	No
Voltage isolation between PC & PFC	Optical isolation	None. Laptop can inject noise into PFC supply lines.
Safe to connect/disconnect USB with PFC on	Yes	No
Can resume logging if car key is turned off	Yes	No – all other units shut down & loose all data
Auxiliary wideband input resolution	9 bit (twice the accuracy of 8 bit)	8 bit
Auxiliary WBO2 analogue noise filter	Yes	No
Auxiliary 0-5v ECU input protection	Yes	Not applicable
Comes with interface software	Yes + free USB key	Not all
Windows Compatibility	Win XP to Win 11	All others depend on FC-Edit (or unauthorized use of it) which was developed for Win98 & XP, and gives many problems on newer Windows versions
Software revision updates & support	Auto update from online server, Dedicated Google group & email support	Non existent
Data logging file size limit	Unlimited	32000 lines
Programming of UEGO Aux input	Easy selection from list of models	Cumbersome manual entry of parameters, prone to user entry errors.
Ability to trim for Aux ground offset	Yes	No – results in large errors in AFR
Interface to PFC cable – hardwired	Double shielded 24AWG Belden cable With silver plated connector pins.	Cheap AWG28 unbranded cable
Interface to PC cable	Included – gold plated high quality shielded USB to USB copper cable (1m)	Not included
Shielded cables for Aux input	Optional – high quality BNC terminated shielded cable (1m)	Not included
File formats backward compatible with FC-Edit	Yes – both data & log files	Not all
Graphic user interface software	Yes	No
Speech assist to warn while driving	Yes – helps in keeping eyes on the road	No

Disclaimer

We did our best to ensure that the interface hardware & PFC-Connect are totally safe. This interface will give full access and control over Apexi PFC's map data and will not stop you from uploading dangerous maps to your ECU. So, by using these tools, you agree to assume all responsibility for any damage or data loss that might result from direct or indirect use of this program. It is highly recommended to use this interface & software in conjunction with FC-Tweak tuning package.

DL-340XB wiring diagram



Connections on DL box

Front

FC-Commander : Mini-DIN socket for FC-Commander
 USB port : USB type B for connection to laptop or PFC Master
 LED Indicators : Yellow - PFC power, Blue - USB power

Rear

PFC Data Port : Hardwired & terminated in 5-pin mini-DIN plug
 PFC O2 IN : BNC socket, centre pin= O2 signal, exterior=shield
 Wideband O2 Aux: BNC socket, centre pin= AN+, exterior= AN-



Please refer to Appendix A for important notes on fitting Mini DIN and BNC connectors

Turn car key off. Connect the PFC port cable to the PFC, taking care of the mini-DIN plug notch orientation. The notch arrow mark should be facing the front cover of the Apexi PFC. Connect the FC-Commander plug into the mini-DIN connector on the interface box, again noting its orientation, and the supplied USB cable to its USB port, with its other end connected to any of your laptop's USB ports. Skip to page 8 if you're not equipped with a wideband O2 sensor kit, or if you would like to connect the O2 kit at a later date.

Preparing the interface box for wideband O2 logging

If you intend to use the unit for data logging, then it is highly recommended to order the 2 optional BNC cables, one to connect the interface to your WB O2 kit and the other to connect the interface to the PFC O2 input. Both cables must be connected in order to log AFRs. These are high quality shielded cables which guarantee a perfect signal from your wideband module.



Cable 1 (UEGO to DL-340XB)



Cable 2 (DL-340XB to PFC O2 in)

Connecting a Wideband O2 Universal Exhaust Gas Oxygen sensor (UEGO) kit to the interface box

Use option cable 1 to connect your wideband O2 kit to the DL-340XB interface. Connect the end with the BNC plug to the DL-340XB 'Wideband O2 Aux' port. Connect the UEGO's 0-5v AN+ wire to the red wire on the terminal block connector of this cable, and the UEGO AN- to the black wire, as shown in the wiring diagram. If your UEGO has no AN- terminal (for example the AEM 30-4110), do not connect the black wire of option cable 1 to anything.

Cut any extra length of the UEGO's analogue output unshielded wires. Do NOT modify the pre-assembled shielded cable.

Connecting to the PFC high precision O2 input (required for AFR logging)

The Power FC wastes such valuable high precision input for use with the factory narrowband sensor, which most of PFC owners do not even use. The new interface box makes full use of this input to read your wideband kit's output. Use cable 2 to connect the interface box to this PFC O2 input. This cable is pre-terminated in a single bullet connector. Connect the end terminated with a BNC plug to the DL-340XB port labelled 'PFC O2 In'.

A female bullet connector is also provided which should be crimped either:

Method 1: directly on PFC O2 pin 3C wire (FD3S4 versions) close to the ECU connector, or
Method 2: to the stock O2 sensor plug in the engine compartment. See page 7 for more details.

Method 1: Directly to the PFC O2 input terminal wire (this method gives the cleanest signal)



- (1) Cut O2 input wire a few cm away from the PFC connector
- (2) Strip about 6mm of wire from each end
- (3) Terminate end A with the supplied female bullet crimp connector
- (4) Terminate end B with the supplied male bullet crimp connector
- (5) Connect bullet plug on option cable 2 to end A. (End B is not used)

Whenever/ if ever you want to revert to use the narrowband sensor simply disconnect the option cable and reconnect connect A to B.

Locating the PFC O2 input for method 1

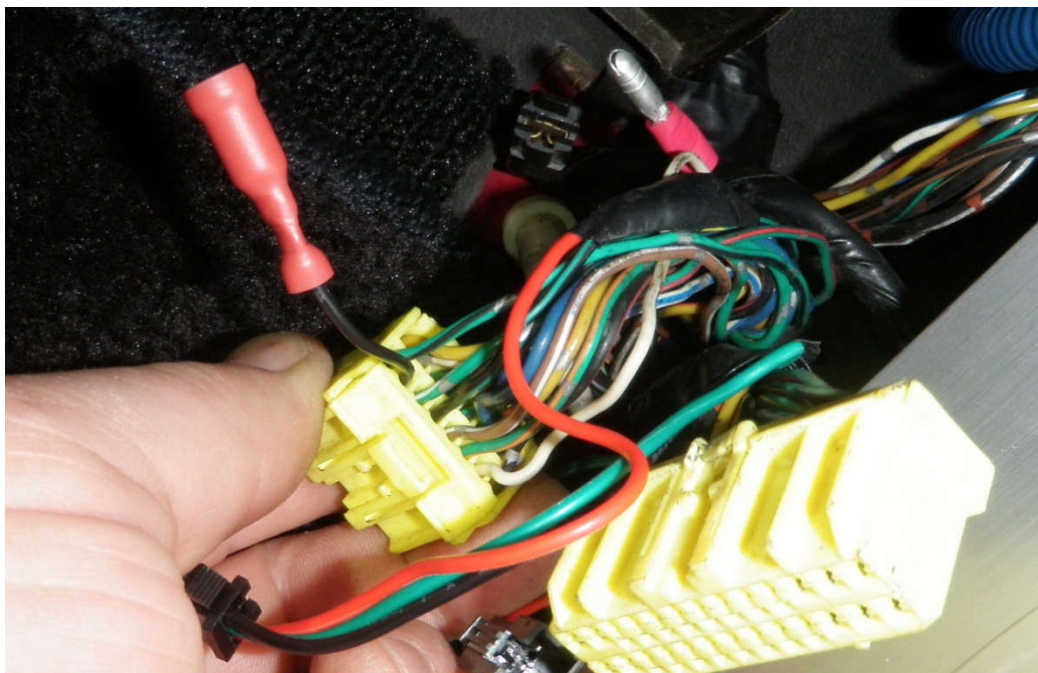
For FD3S models 1992-1995 (All US models)

View from harness side (looking at the ECU with connectors in place)

4Y	4W	4U	4S	4Q	4O	4M	4K	4I	4G	4E	4C	4A	3O	3M	3K	3I	3G	3E	3C	3A	2K	2I	2G	2E	2C	2A	U	S	O	M	K	I	G	E	C	A	
4Z	4X	4V	4T	4R	4P	4N	4L	4J	4H	4F	4D	4B	3P	3N	3L	3J	3H	3F	3D	3B	2L	2J	2H	2F	2D	2B	V	T	R	P	N	L	J	H	F	D	B



The PFC O2 input pin 3C, shown circled in red, has stock harness wire coloured black



Crimp the supplied female bullet socket on the cut wire end on the ECU side as shown above
Then fit cable 2 to this bullet socket (photo shows 92-95 model)

For FD3S models 1996-1998

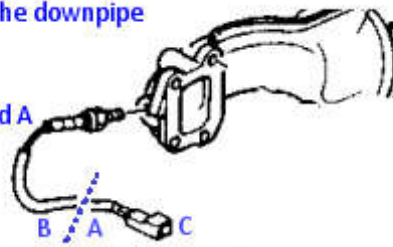
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The PFC O2 input pin for these models is pin 3D

For FD3S models 99-02, the PFC O2 pin is also pin 3D.

Method 2: Connecting to PFC O2 input using the narrowband O2 sensor connector in the engine compartment

- (1) Locate the factory narrow band sensor fitted on the downpipe
- (2) Unclip its plug C from the harness connector
- (3) Cut the sensor wire about 1" away from plug C
- (4) Crimp the supplied bullet female connector on end A
- (5) Crimp the supplied male connector on end B
- (6) Refit plug C to engine harness



During logging: Connect A to the preassembled O2 cable bullet connector. If you never use O2 feedback, you may leave this permanently as is.

Whenever/ if ever, you need to use the narrowband sensor, just reconnect bullet plugs A to B



This method is particularly useful if you plan to use the DL-340XB to tune customers' cars, on which tapping to the ECU harness is obviously not an option!

Note regarding the O2 feedback function

Whenever the DL-340XB interface is wired up to the PFC O2 input, the ECU reads the wideband O2 AFRs instead of its factory narrow band sensor. The O2 feedback function should therefore be disabled. This function is practically useless and most RX7 PFC users turn it off anyway. With O2 feedback disabled, your car will in fact drive smoother while cruising and once turned off, you can make the ECU run cooler by recalculating the fuel map. You can disable O2 feedback using either the FC-Commander or with FC-Tweak. Using FC-Tweak you can simply select the option 'Recalc fuel map and disable O2 feedback' from its sessions options and export the resulting tweaked file.

Setting up PFC-Connect

PFC-Connect software package is delivered on a 16Gb USB key provided with your interface box. Do not use any other software to connect with this interface or you may damage your ECU. The USB key unlocks the software on any computer as long as it is present on any one of its USB ports. You can either run the software directly from the USB key, or copy the whole folder into your main drive C:\ folder. Do not lose the USB key, this is your user license and nothing can work without it.

System requirements:

Supported Windows Operating Systems: Win XP, 7, 8, 10, 11 → 32 or 64 bit versions

CPU speed: Preferably over 1GHz, ideally 3GHz or faster

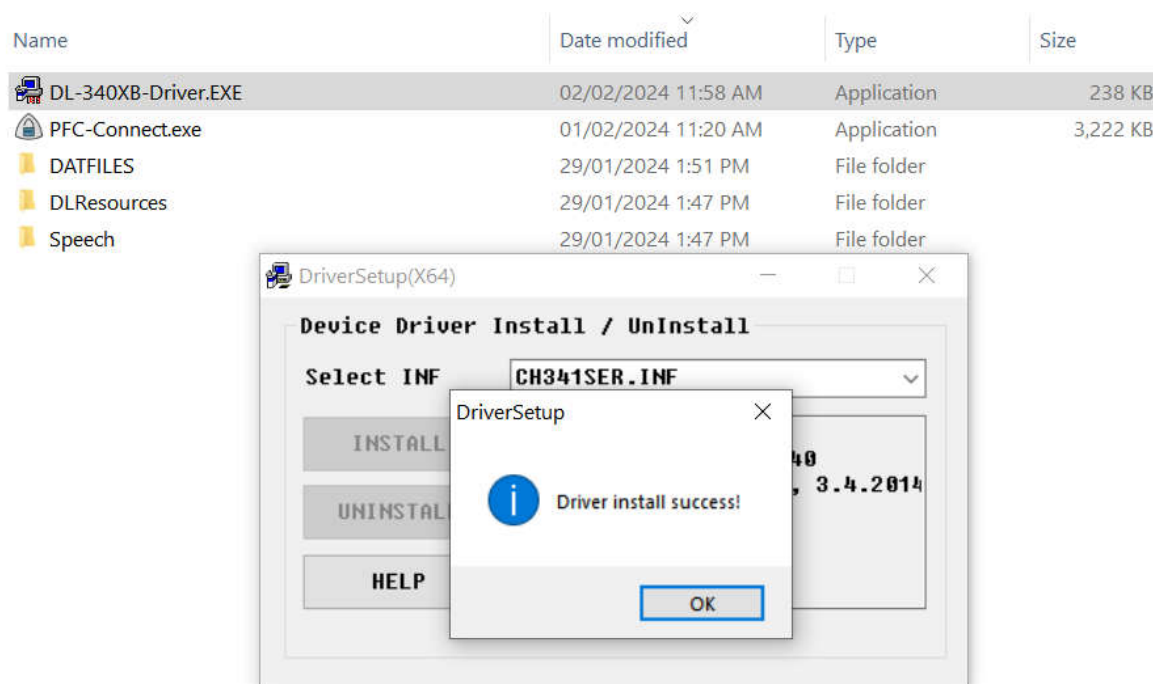
Screen resolution: > 1200 x 768 (Laptops with 1200x768 will run PFC-Connect in full screen mode)

USB ports: Minimum 2 (one for the USB key and another for the interface)

Installing the DL-340XB device driver

A device driver is required so that your PC will recognize the interface as a virtual COM port. This job can be done first thing upon unpacking the new interface, before wiring anything into your car. With your computer booted up and running Windows, and with the USB key present on any of the laptop's USB ports, simply connect the interface to any other USB port, no need to connect the PFC yet. The blue LED on the front panel will light up.

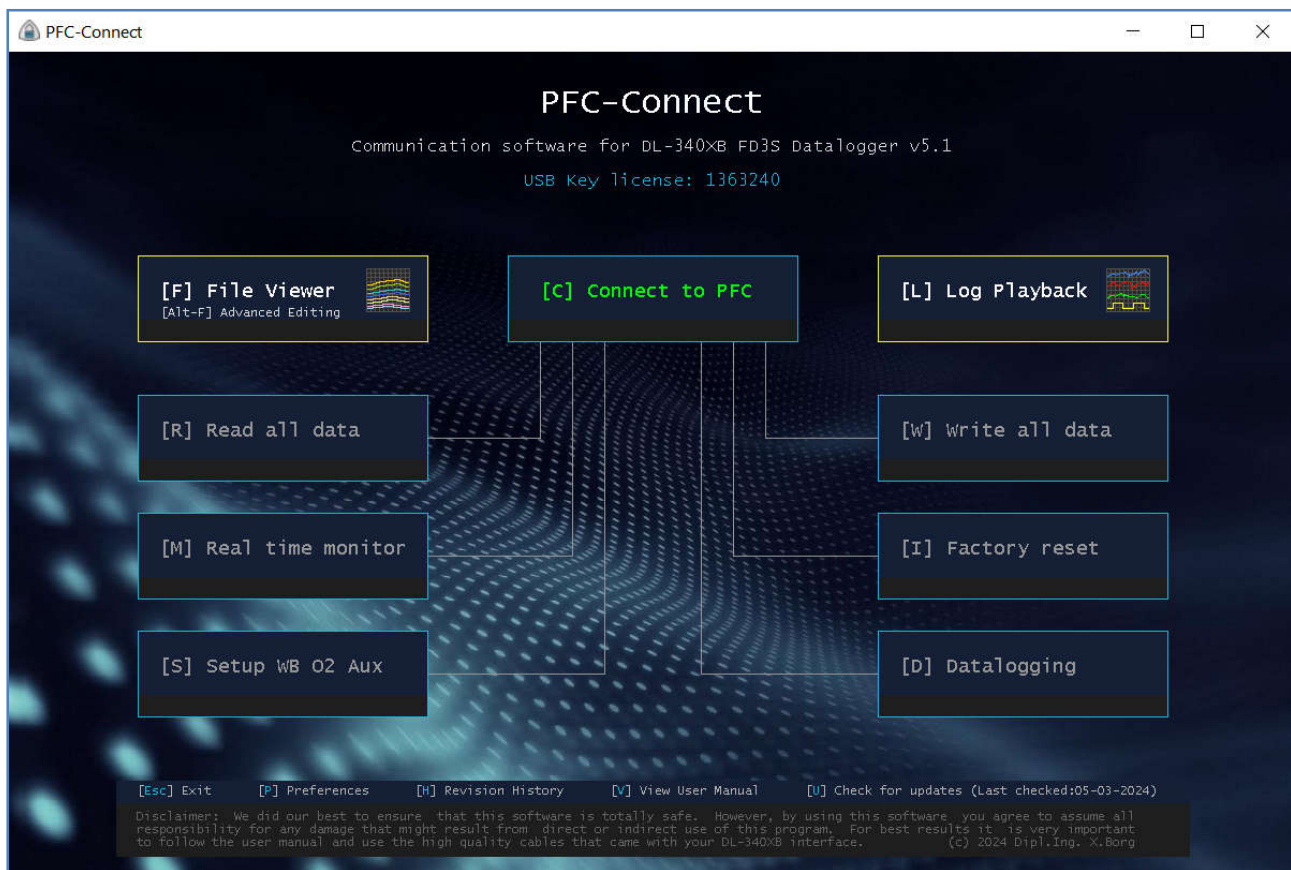
The device driver is included on the USB key. Locate the file DL-340XB-Driver, double click on it and click on 'INSTALL'.



Wait a moment until the message 'Driver install success!' is displayed. Click OK and close the application.

You are now ready to launch PFC-Connect.

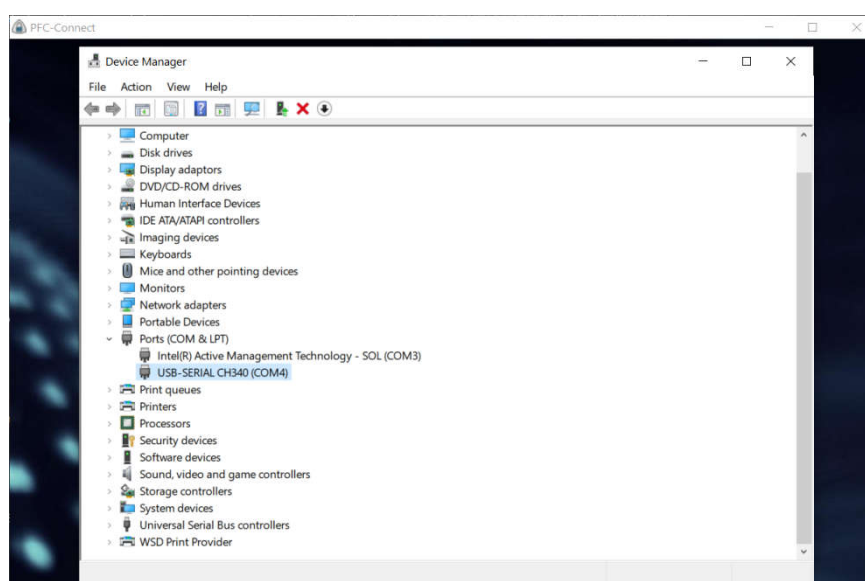
Setting up the virtual com port



With both USB Key & interface connected to USB ports on your laptop, run PFC-Connect. This is the software's main screen from which one can launch any of its functions.

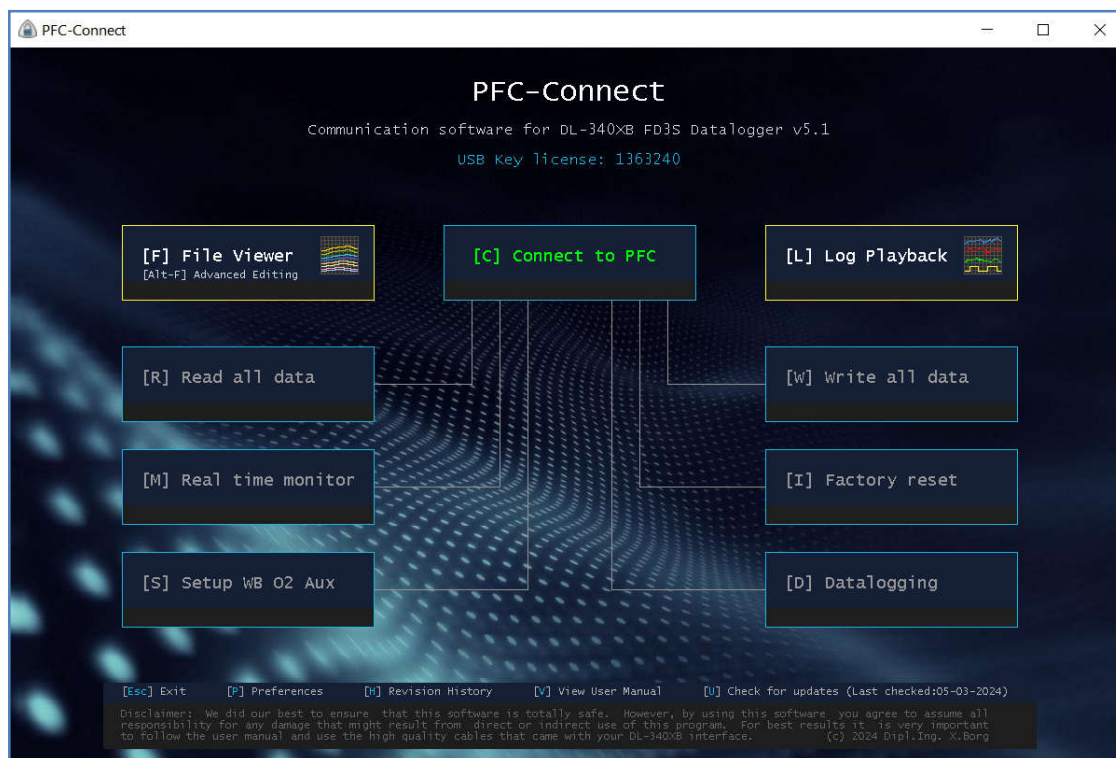
Before connecting to the PFC, you need to make sure that the interface has been installed on a virtual COM port in the range 1 to 9. Over time, Windows may leave these ports reserved for hardware that is no longer in use, and keeps incrementing the 'used' COM port numbers up to 255, without ever freeing up unused ones!

Launch Windows Device Manager.



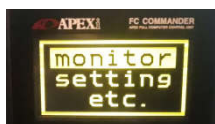
Expand the Ports (COM & LPT) entry and confirm that the interface COM port number is in the range 1 to 9. In the above example it is set on COM4, meaning that the PFC serial bus interface can now be directly accessed through this port, and FC-Connect is ready to connect. If the assigned port is not in the range 1 to 9, refer to Appendix B to re assign a different port number.

Using PFC-Connect

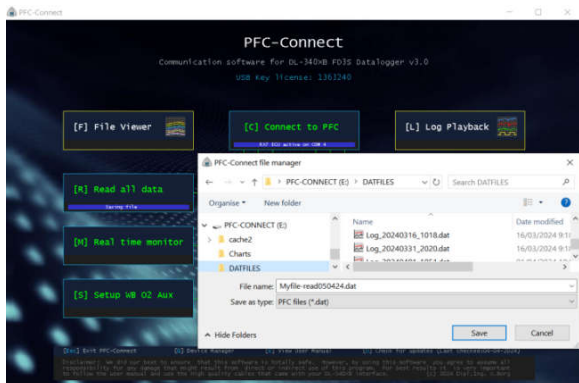


The main screen gives you direct access to any of the program functions. The File viewer, Log Playback, User Manual, Program preferences, and Software Update functions can be accessed offline (do not require an interface connection, but still require the USB key), while the rest of the functions work online once an ECU connection is established. Here is a brief description of each function before going into more detail.

[C] Connect to the PFC : Connects to the PFC and enables all other online functions.



Turn car key on, set the FC-Commander to its main menu (not monitoring any channel), connect the USB cable and press [C] to connect. If you connect the USB cable BEFORE turning key on, the newer OLED Commanders will display 'Communications Error' and the older LCD type will be showing the Apexi Logo, this is perfectly normal since the Commander is totally isolated and you can use the software this way if you prefer. The software will automatically locate the interface on the virtual COM port and communicate with the PFC. If an FD3S model is detected, all the other online menu options will be enabled and highlighted green.



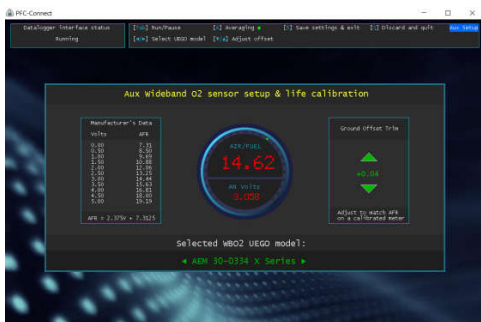
[R] Reads all data in the PFC and saves it to a *.dat file in the DATFILES folder. Windows file dialog box will pop up. Dat files can then be viewed using either the internal File viewer (see [F]) or FC-Tweak. The file format is also backward compatible with any older datalogging software able to read dat files.

[W] Write all data from a Dat file to the PFC. This function sends any valid RX7 PFC file from the laptop to your ECU. Windows file dialog box will pop up for file selection.

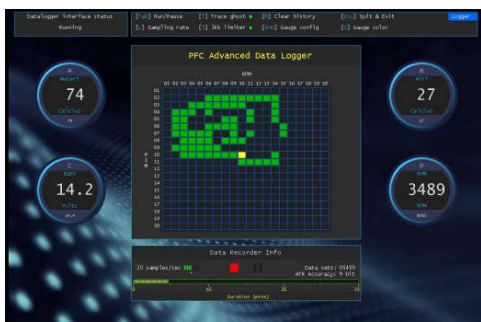
[I] Performs an ECU factory reset. Asks for a confirmation before proceeding. FC-Connect will automatically save a backup of the existing map, just in case you ever need it. This function is useful when one requires the PFC to enter the idle self learning mode before sending a new map.



[M] Real time monitor. This function continuously reads in real time all ECU channels, and displays them in both digital & bargraph modes.



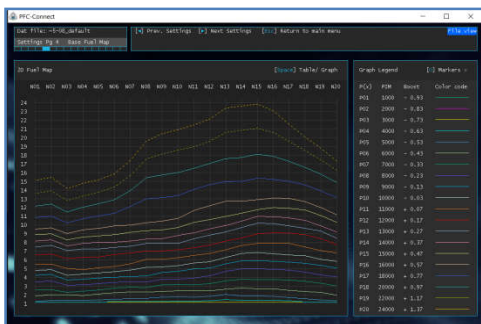
[S] Setup WB O2 Aux. This function lets you select the model of your UEGO kit, so that the correct AFRs are displayed and logged using the correct voltage-to-AFR equation.



[D] Datalogging starts a datalogging session which stores all advanced parameters together with the wideband O2 AFR readings in a text file. This text file can then be used by FC-Tweak to perform autotuning. The saved format is also compatible with FC-Edit.



[L] Launches logfile player (works offline as well). This provides you with a very powerful diagnostic tool by replaying the driving session while viewing all the recorded parameter values, and plot graphs against time for selected parameters.



[F] File viewer (works offline as well). This shows the maps and settings within the PFC data file. It has the same settings page views as FC-Tweak. For details on each settings page, refer to FC-Tweak user manual.

[Alt-F] Advanced mode File Editor (works offline as well). This mode lets you modify any parameter stored in the PFC. It's a powerful manual editor that should only be used by advanced users. A single wrong value can damage your engine. This mode is particularly useful to program aftermarket injector lag tables and aftermarket boost sensor parameters.

[P] Set your program preferences (speed units, temperature units, boost units, WBO2 units, logger settings...)

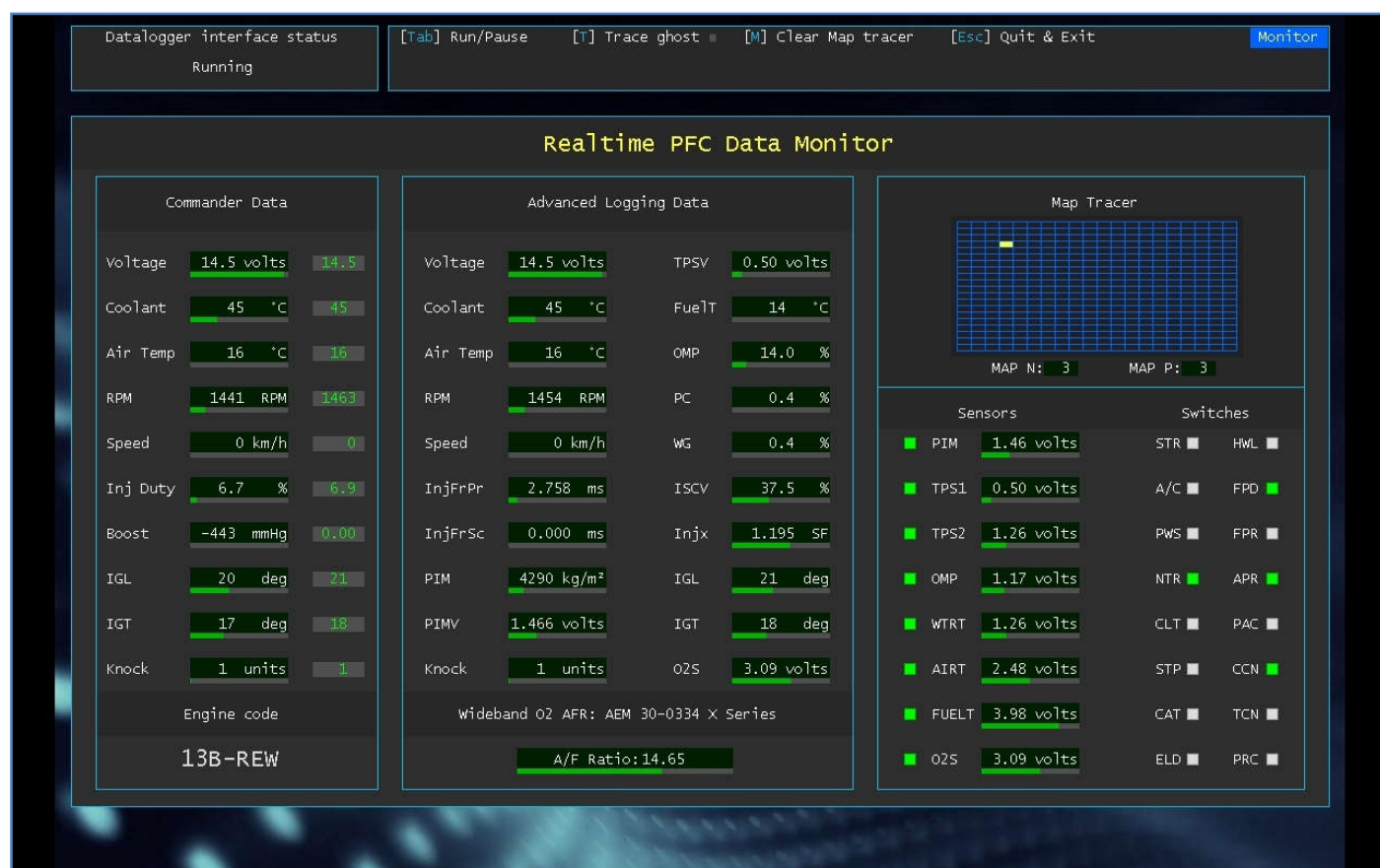
[H] Shows software revision history

[V] Opens this user manual

[U] Checks our online server for software updates on demand. These are downloaded for free.

[Esc] Exits PFC-Connect and saves your preferences. Always use this key to exit (not by clicking on the top right X)

Real time data monitoring [M]



This mode shows all data scanned by Power FC's internal logger. All data is shown in both numeric and bargraph modes. Units for temperature, speed and boost can be changed to either show values in US or SI values from the program preference settings accessible from the main screen.

This screen is subdivided into 5 groups, serving different functions:

- **Commander data**
- **Advanced logging data**
- **Map Tracer**
- **Sensors**
- **Switches**

Commander monitor data: The Power FC collects this data, mainly to be displayed on its FC-Commander. It is a small group of low resolution readings which are very useful to have during normal driving. The maximum readings are displayed to the right of each realtime value, in a similar fashion shown on the FC-Commander. [M] clears the peak hold values history.

Parameter	Description	Parameter	Description
Voltage	Battery or alternator voltage	Inj Duty	Fuel Injectors duty
Coolant	Coolant Temperature	Boost	Relative boost pressure
Air Temp	Intake air temperature	IGL	Leading ignition timing
RPM	Engine speed	IGT	Trailing ignition timing
Speed	Vehicle speed	Knock	Knock signal amplitude

Advanced data: The ECU has also a built-in advanced datalogger mainly aimed for professional tuning. It is a comprehensive list of parameters which gives a full picture of what's going on within the ECU. Most important parameters like Injector pulse widths, PIM, TPS voltage and auxiliary Wideband O2 sensor inputs use internal high precision 9 bit A/D converters. PFC-Connect uses the parameters of the UEGO model which you select on the WB O2 Auxilliary setup page (see next page) to calculate the exact realtime AFR. This whole packet is the one we need to log in order to fully tune any RX7 setup.

Parameter	Description	Parameter	Description
Voltage	Battery or alternator voltage	TPSV	TPS 1 sensor voltage
Coolant	Coolant Temperature	FuelT	Fuel temperature
Air Temp	Intake air temperature	OMP	Oil metering pump rate
RPM	Engine speed	PC	Turbo Pre-Control solenoid duty
Speed	Vehicle speed	WG	Turbo Waste Gate solenoid duty
InjFrPr	Fuel injection front Primary injectors	ISCV	Idle speed control valve duty
InjFrSC	Fuel injection front Secondary injectors	Injx	Instantaneous fuel injection factor
PIM	Absolute intake manifold pressure	IGL	Leading ignition timing
PIMV	Voltage at intake manifold pressure sensor	IGT	Trailing ignition timing
Knock	Knock sensor signal amplitude	O2S	Voltage at PFC O2 sensor input

Map tracer: This is meant to offer simple diagnostic. It shows the cell location the ECU is on. Both N & P range from 1 to 20. [M] clears the map tracer and peak hold history, while [T] toggles the trace ghost function on/off. This setting preference is saved on exit.

Parameter	Description	Parameter	Description
MAPN	Tracer RPM grid column number (1-20)	MAPP	Tracer PIM grid row number (1-20)

Sensors: Also shown on the FC Commander display. The green indicators light up red whenever any of the sensors goes faulty or is disconnected. The readings are all in Volts.

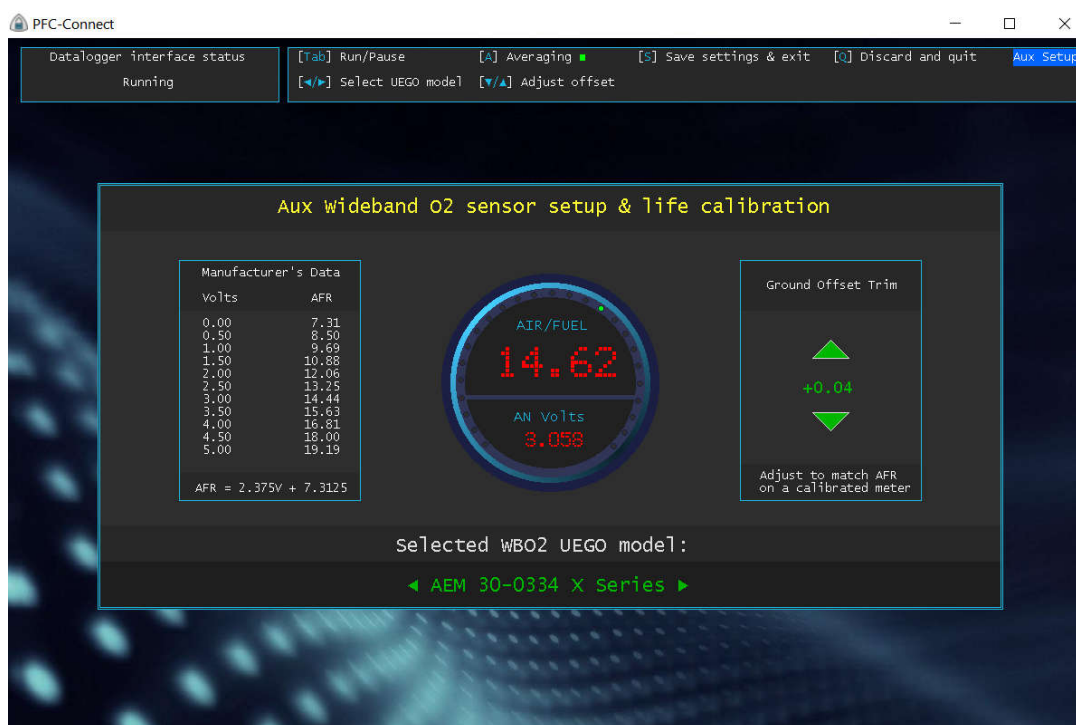
Parameter	Description	Parameter	Description
PIM	Manifold absolute pressure sensor voltage	WTRT	Engine coolant sensor voltage
TPS1	Full range TPS sensor voltage	AIRT	Intake air temperature sensor voltage
TPS2	Narrow range TPS sensor voltage	FUELT	Fuel temperature sensor voltage
OMP	Oil metering pump sensor voltage	O2S	PFC O2 input voltage

Switches: This group shows the status of 16 switches and are also visible on the FC-Commander. Status is shown as grey for 'off', and green for 'on'.

Parameter	Description	Parameter	Description
STR	Starter Relay	HWL	Exhaust warning indicator / sensor fault
A/C	Air conditioning compressor relay	FPD	Fuel Pump Drive
PWS	Power Steering oil pressure switch	FPR	Fuel Pump Relay (Speed)
NTR	Neutral gear switch	APR	Air Pump Relay
CLT	Clutch Switch	PAC	Port Air Control
STP	Brake (Stop) lights switch	CCN	Charge Control
CAT	Catalyzer thermo sensor (JDM models)	TCN	Turbo Control
ELD	Electrical loads on	PRC	Pressure Regulator Control

Wideband O2 AFR: Shows your AFR controller brand & model (as configured from Setup WBO2 Aux page) and its Air/ fuel ratio reading.

Wideband O2 Auxiliary port setup [S]



On this page you can configure any wideband O2 sensor kit to be used with the DL-340XB interface box. Once set, you will be able to view and log in real time the exact AFR values. Before proceeding, make sure that both Option cables 1 & 2 are connected and wired as shown on page 4.

Selecting your UEGO module

There is no need to enter any equation or voltage to AFR conversion tables, since PFC-Connect has a built in library of most commonly used wideband modules. If you do not see your model listed, contact us and we'll include your model in the list. Select your model using the left / right arrow keys.

Trimming the ground offset



The central dot matrix font display shows both the analogue voltage and the calculated AFR for the selected model number. Any small discrepancy due to ground offset can be corrected using the up / down arrow keys.

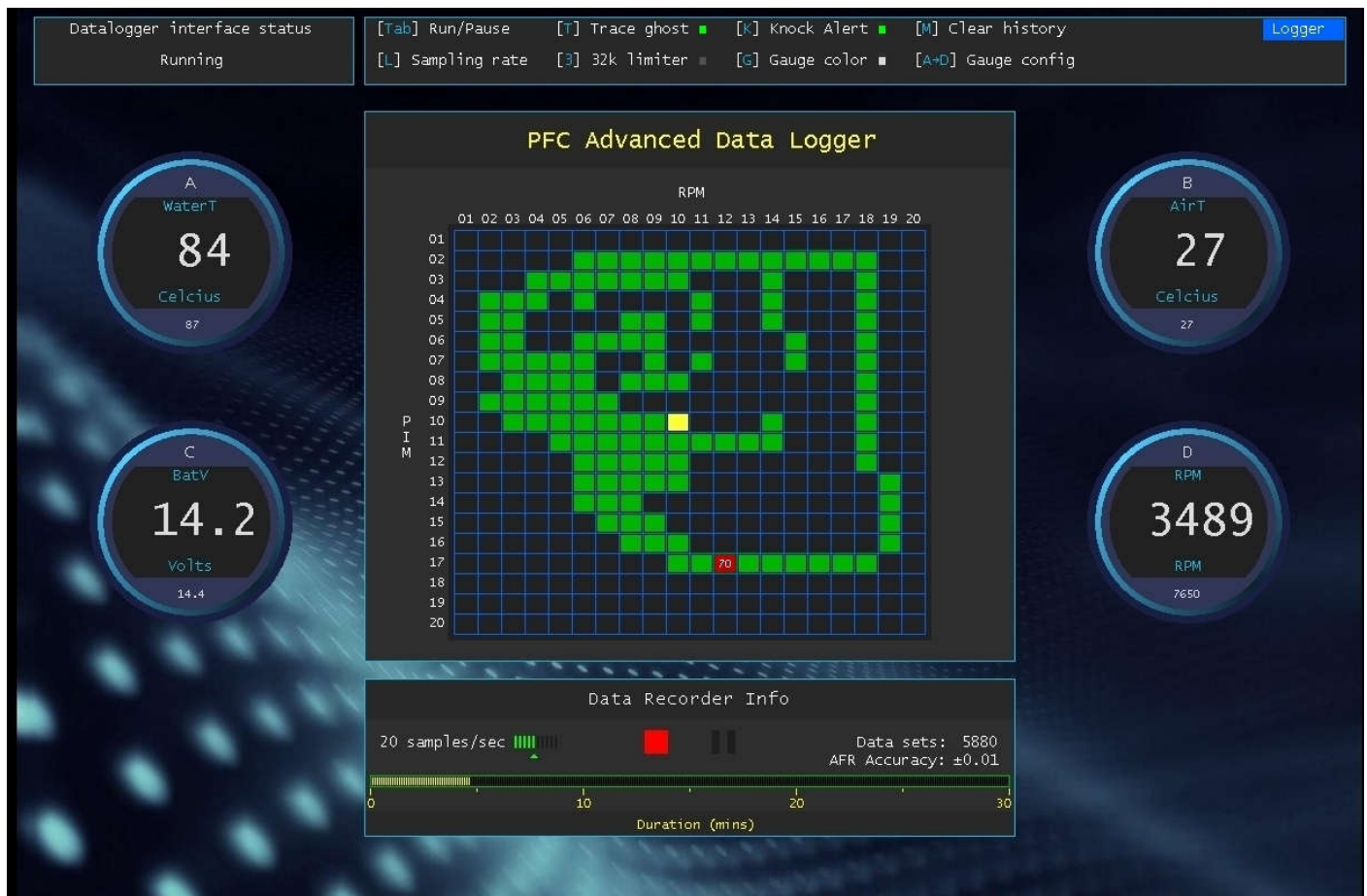
To trim the voltage offset, start the engine and leave it idling. Compare the displayed value with that shown on your UEGO digital meter. Press arrow up/down until the readings match exactly. Do not perform this calibration with engine off. **If the required ground trim offset exceeds ± 0.40 it is highly recommended to choose a better grounding point for the main grounding terminal of your WBO2 unit.** The rear engine hanger bolt usually gives good results.

Once both readings match, re-confirm that the model name is correct, and press [S] to save settings.

From thereon, the saved model & ground offset will be your default whenever you start the program.

User defined conversion table option: If you own a fully programmable UEGO module and would like to define a customized AFR range which differs from its factory default, you can do this by selecting model : *User Defined*. Then enter its AFR limits in the preferences menu.

Real time data logging [D]



This mode is a fast & reliable data recorder which stores all the advanced datalogging parameters including the Wideband O2 auxiliary channel to a file on your laptop. This can be used by a tuning software such as FC-Tweak.

The graphic interface is intentionally made simple with not much visual information other than the map tracer, four user defined gauges & data related to the data recording function itself. This drastically reduces the chance of road accidents during a street driving logging session. Any warnings are communicated to the driver through the software's unique voice assist, which will inform you if anything goes wrong with the logging session. You may also want to connect the laptop's audio to your car stereo auxiliary.

Configuring the live gauges

As soon as you enter this screen, PFC-Connect reads the whole map from the PFC so that it gets the proper RPM & PIM scale factors, and displays 'Ready to go!' At this time, ideally before commencing data logging, you should setup the live gauges and data recorder preferences. These need only be set once since they are all saved upon exit.

To configure the gauges, press letter A,B,C, or D to scroll forward through the parameter list on each respective gauge. [Alt-A/B/C/D] scrolls in the reverse order. It is highly recommended that you set one of the gauges to read water temperature, so that you can verify that the engine has warmed up (to 80C/ 176F) before starting a logfile. You can also change the color of the gauges by pressing [G]. On its central digital display, each gauge shows the real-time measurement while it's peak hold value is shown on the lower half. The peak hold values are useful to instantly find out the highest recorded value for a particular parameter. For example, it can be used to find out the highest knock level recorded during a log session. You may set SI or standard American units as the default displayed units for temperatures, speed and boost, from the program preferences on the main screen.

Note that the choice of parameters selected for live viewing on the gauges does not have any effect on which data is recorded. The log file will always contain the whole set of advanced and auxiliary parameters scanned by the PFC.

Any of the following 22 parameters can be displayed: Engine Rev, PIM, PIM V, TPS V, Prim Fr Inj, Inj Factor, IGL, IGT, Fuel Temp, OMP, Pre-control, Waste gate, Water Temp, Air Temp, Filtered Knock, Battery, Speed, ISCV, WB O2V, Boost, Sec Fr Inj, and Wideband O2.

Setting the data recorder preferences

[T] Trace Ghost toggles between the two map tracer modes. Normal mode will only highlight the map cell in use, while ghost mode will keep any cell which has been used highlighted. With Ghost mode enabled, you will have a visual record of the map zone you've covered during the driving session.

[K] Knock Alert function will highlight red any cells in which a high knock value is recorded. It will also display the actual recorded knock value on the map tracer. Logger high knock threshold value is set in the program preferences. Suitable threshold values are usually in the range of 60 to 80, depending on the car setup. PFC-Connect will clean up virtually all false knocks in real time.

[M] Clears the map tracer history accumulated in trace ghost mode and all highlighted knock cells. Logging will continue uninterrupted.

[L] Selects the sampling speed (20 or 40s/sec). The faster speed will of course generate a larger file for the same session duration. The lowest speed selection is the same as the old Datalogit box but at twice the accuracy, while the fastest speed selection is twice as fast as the Datalogit with same accuracy. Since the data quality & accuracy on the new interface is much better than that of the older units, sampling at the low sampling rate of 20s/sec gives optimal results and is the default sampling speed. The software also shows the actual measured sampling rate in the Data Recorder Information bar.

[3] is the 32k log lines limit. This is only required if you (or your tuner) needs to be able to view the logfile using older software like FC-Edit, which would simply freeze if this limit is exceeded. On the other hand, both PFC-Connect logfile viewer & FC-Tweak can handle large logfiles without any problem, so if you wish to utilize the full potential of FC-Tweak and are not interested in viewing the log file with older software, it's best to turn off this limit so that the software can log the full 30 minutes.

Starting and pausing a logging session

Once you press [Tab] the data recorder starts recording all advanced & auxiliary WB O2 parameters. The red recording indicator flashes while recording. Once logging is started, the [Tab] key is used to toggle between pause and resume recording. You can thus pause logging if for example you get stuck in traffic, and resume logging when the road is clear again. As long as the laptop remains powered on, the engine can also be turned off during a logging pause, and resume after restarting the engine.

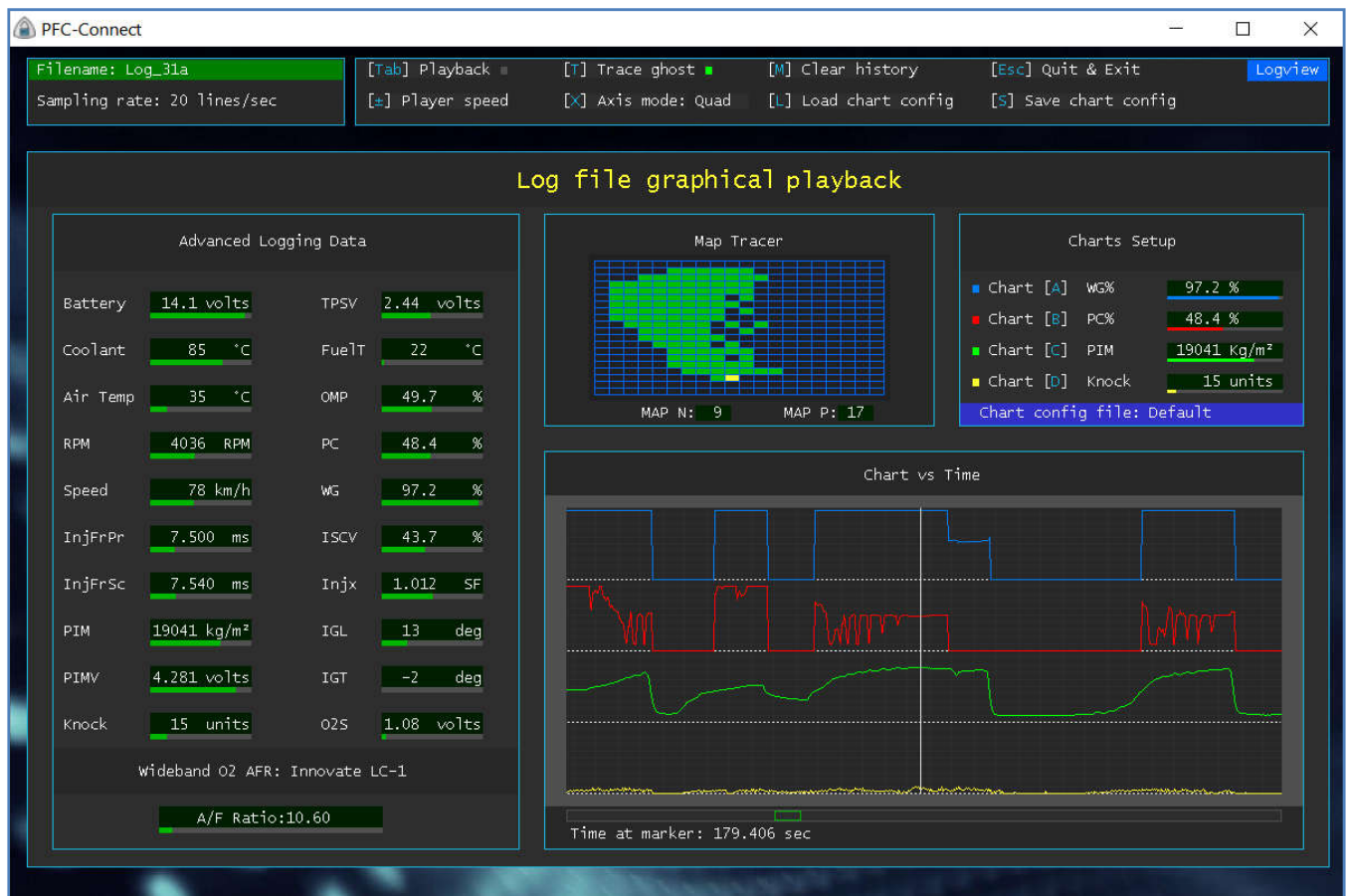
Saving a logging session

At any time you can manually stop the recording by [Tab] and hit [S] to save all data to disk. A copy of your map file is also stored together with the log file, with the same name. Filenames are automatically named in the format Log_YYYYMMDD_HHMM, with extensions '.txt' for the logged data and '.dat' for the map file. These files can be directly loaded by FC-Tweak to perform auto tuning and generate a fully tuned map.

Auto-save function

If the time limit of 30 minutes pass, or if the 32k file size limiter is enabled and is reached, the logger will automatically pause and save your log file, so the logging function does not require any attention at all, and you can keep your eyes on the road at all times.

Log file Playback [L]



This mode is a powerful diagnostic tool which enables you to replay a log file, and read the value of all parameters at any instant in time and to plot graphs against time for selected parameters.

The screen has 4 windows:

Advanced logging data

This table displays the value of each recorded parameter at the graph marker position in both numerical and bargraph modes. Unlike other software, ALL parameters are correctly decoded to show the real values with their correct units.

Map Tracer

This grid table indicates the map cell which the ECU is reading from at that particular point in time.

[T] toggles trace ghost. This enables the trace to leave a trail behind it, thus making visible the map zone covered by the ECU during the elapsed time.

[M] clears the past trail history.

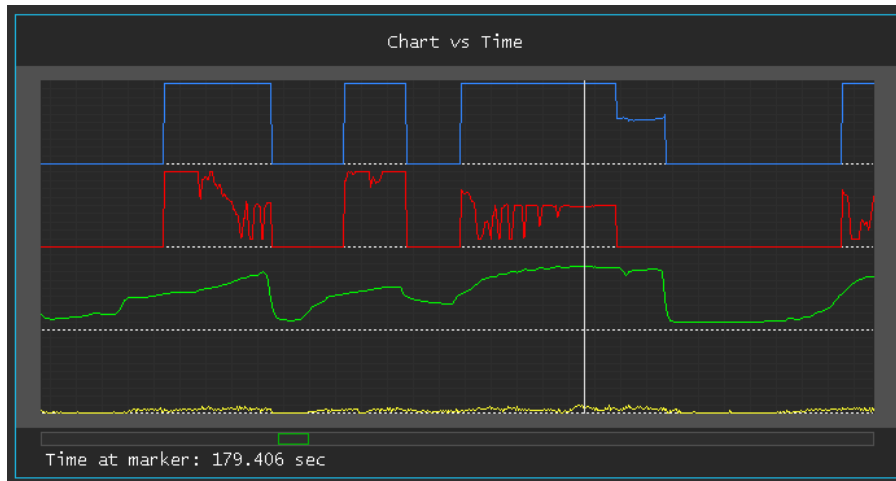
Charts setup

From here you can define the parameters to view in graphic mode. To select the parameter shown on chart A, press[A]. This will scroll forward within the logged parameter list. Pressing [Alt-A] will scroll backwards. Same method applies for charts B, C and D.

You can also change the chart colors to your preferences. Move the mouse pointer over any of the 4 colored boxes in the charts setup window, and left click once. Windows color dialog box will come up from which you can select a new color for the selected chart. The selected graph colors will be saved as your default on exit.

[L] & [S] let you Load and Save chart setups respectively. In practice the parameters you select will depend on the problem you're diagnosing. So, you can generate your own library of chart setups for different diagnostics.

Charts vs Time



This window shows up to 4 selected parameters on the same time axis. This is very useful when trying to diagnose a particular fault.

The parameters to graph are selected from the chart setup window as described above.

The parameters shown are those recorded at the time displayed at the white marker location on the chart.

[X] selects the axis mode. You can view the selected graphs in 3 modes.

- (a) Single axis: plots all graphs on the same graph, on a common Y-axis
- (b) Dual axis: Plots graphs A&B and C&D grouped on two common Y-axis
- (c) Quad axis: Plots all 4 graphs on an individual Y-axis

PFC-Connect will autoscale each graph making the chart setup process incredibly easy.

Analyzing the graphs

Automated Playback

Pressing [Tab] key starts or stops automated playback of the log session. Playback is shown in real time, with 1 second of playback time exactly equivalent to 1 second of logging. Pressing [+] or [-] keys will vary the playback speed factor. Unlike other log playback software, the fast forward playback does NOT skip time frames, so it cannot miss any logged data, and results in perfectly smooth graph motion. Note that some older computers will not be able to reach the highest playback speeds.

Manual graph scrolling

Manual graph scrolling can be done in 2 ways.

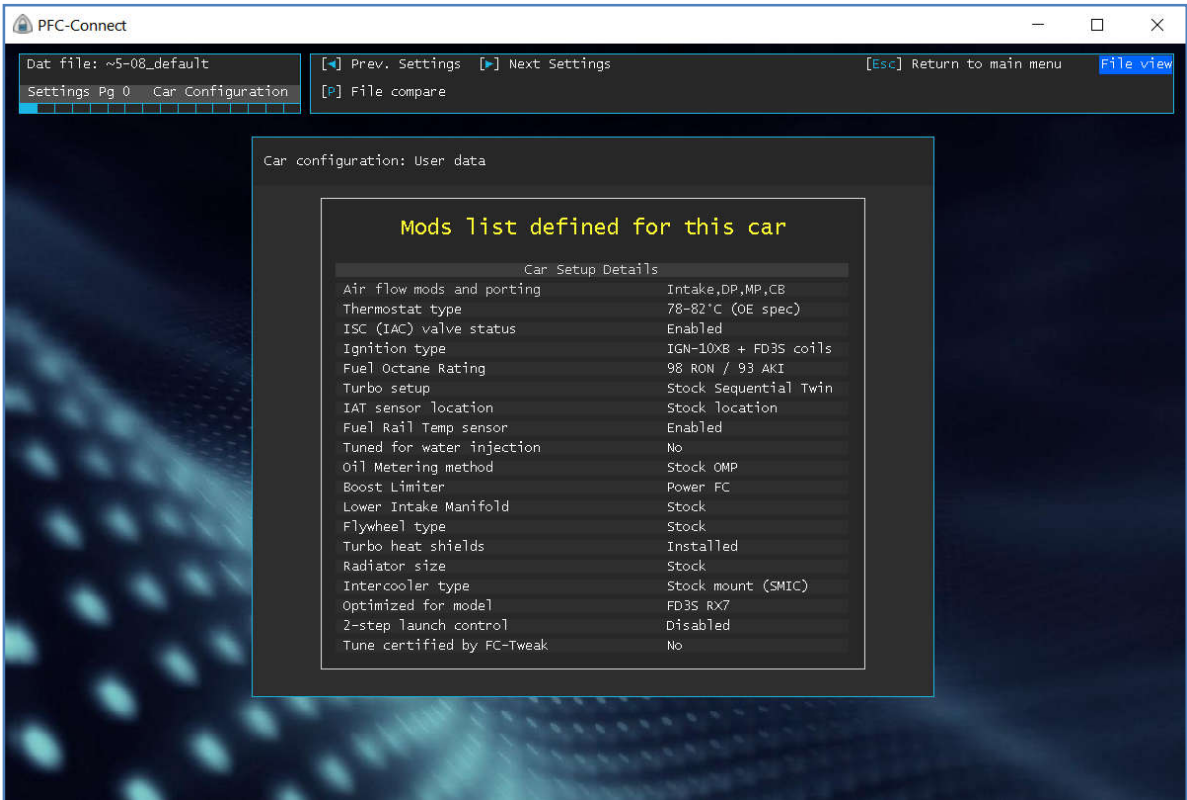
Moving the line marker: You may either left click on any location within the graph area and the marker will instantly move to that position. You can also locate the mouse pointer on the marker line, hold left button and drag. Dragging the marker close to the graph window extremities will scroll the charts forward or backward at variable speeds. The more you approach the window extremity, the faster it scrolls.

Fine frame by frame motion: Fine movements to analyse frame by frame changes in parameters are easily done using the left & right cursor keys.

Moving the timeline box: The green timeline box below the chart, indicates the viewed window with respect to the whole time line. You can either left click the mouse button on any place on the timeline to instantly move to that point, or hold left mouse button on the green box and move it along the timeline.

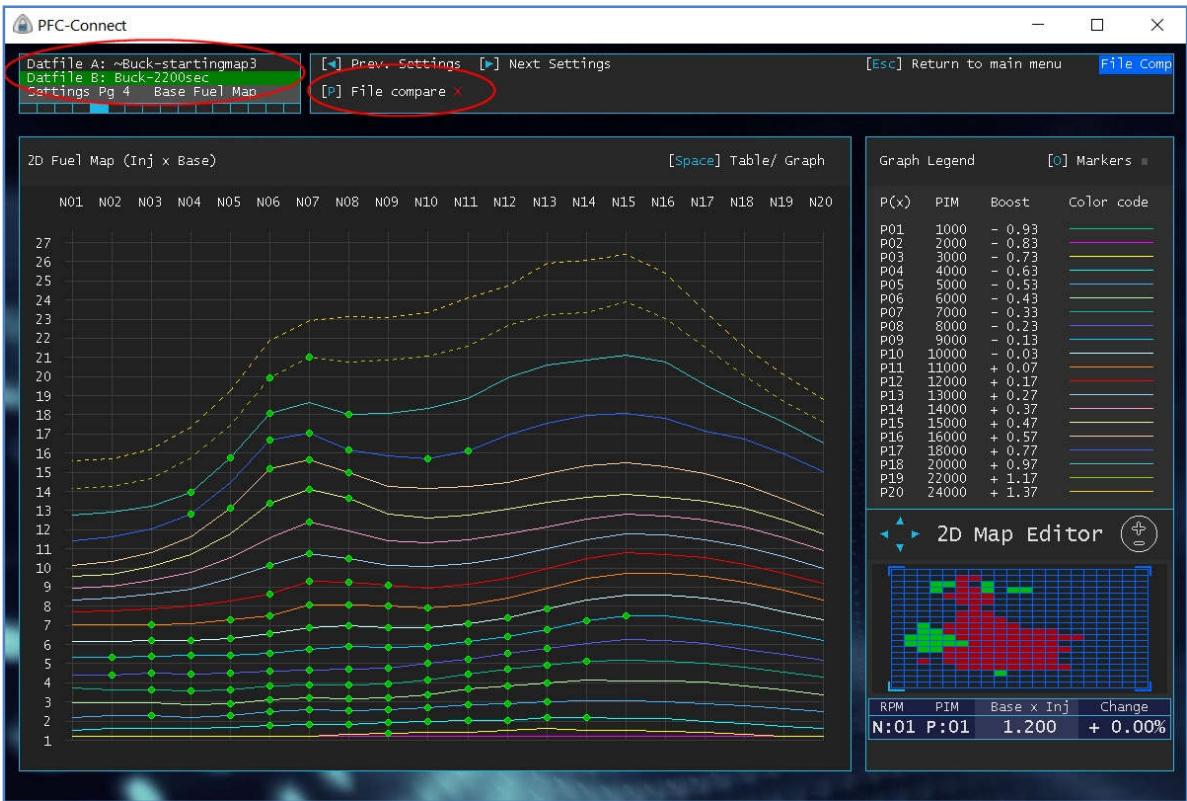
File viewer [F]

This mode shows all settings stored within the PFC, organised by function on 15 pages, exactly in the same way they are on FC-Tweak tuning software.



If the file has been created by FC-Tweak, it will also show the car mods list stored on the PFC file.

You can use the viewer to immediately view all settings, including timing and fuel maps in both numeric and graphical formats. [P] performs a file to file comparison, and checks whether the two files are an exact match or not. If not, it will pin point all differences found between the two.



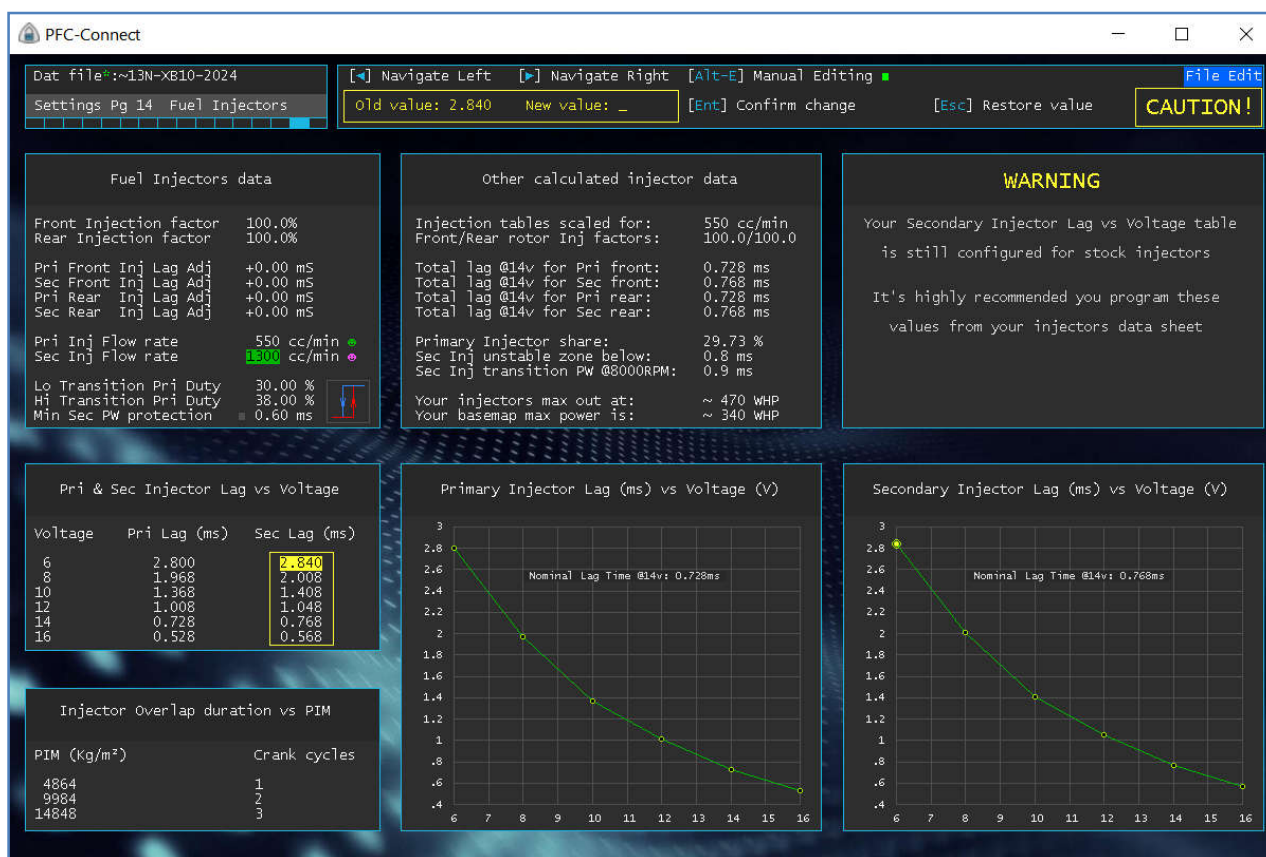
Advanced manual File editor [Alt-F]

This is a powerful manual editor which lets you modify all PFC internal parameters, including hidden and locked settings. It is meant to be used by advanced users only, since a single mistake can result in engine damage. This editor is extremely useful to generate new starting maps, define injector lag parameters and program aftermarket boost sensors. This mode will also give you the option to [U] unify the fuel map (aka basemap recal) if not yet done.

Left and right keys will let you scroll among the 15 settings pages.
[Alt-E] enters or exits manual editing mode for each selected page.

On the car configuration page 0, you can create or re-configure the car setup information. Use up/down/left/right keys to select and modify any of the selections. Press [Alt-E] again when ready. The file will need to be re-optimized using FC-Tweak if you change any selection on this page.

To change any PFC entry on any of the other settings page, press [Alt-E] to enter editing mode on the selected page. Navigate within the settings to the one you wish to change and press [Enter]. Type the new value in the yellow menu bar dialog. Press [Enter] to confirm the change, or [Esc] to revert back to the original value. PFC-Connect will clip the entered value to the PFC internal limits if the edited value is out of range. Repeat the procedure for any other parameter on the same page. Entries which have been edited will remain highlighted green so that you can easily keep track of all the changes done during the editing session.



Finally, press [Alt-E] to exit editing mode on the particular page, and either move on to edit another page, or press [X] to export the edited file.

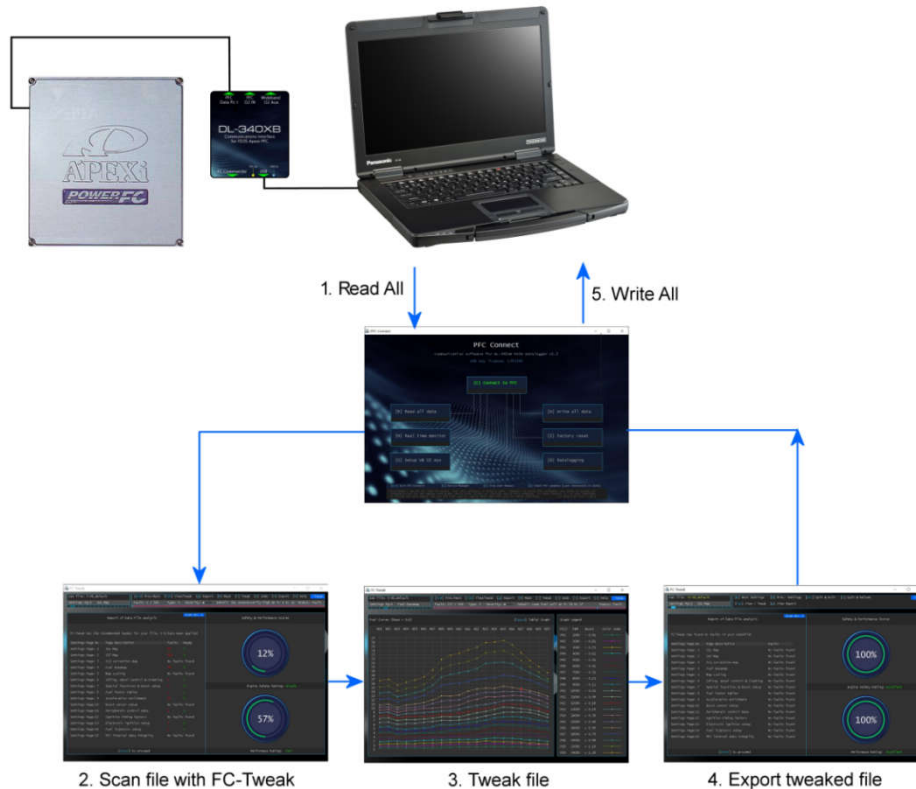
Fuel and timing maps on settings pages 1 to 4, can be directly edited in graphic mode. In this mode you can change the value of any cell by hovering onto the point to be changed, and press [+] or [-] to increase or decrease its value. [Alt +] and [Alt -] make bigger changes for faster/coarse editing. Escape key will restore its original value.

Please refer to FC-Tweak User Manual for more detail on each setting

Optimizing your PFC map file with FC-Tweak (sold separately)

PFC file optimization should ideally be performed before starting logging and auto-tuning.

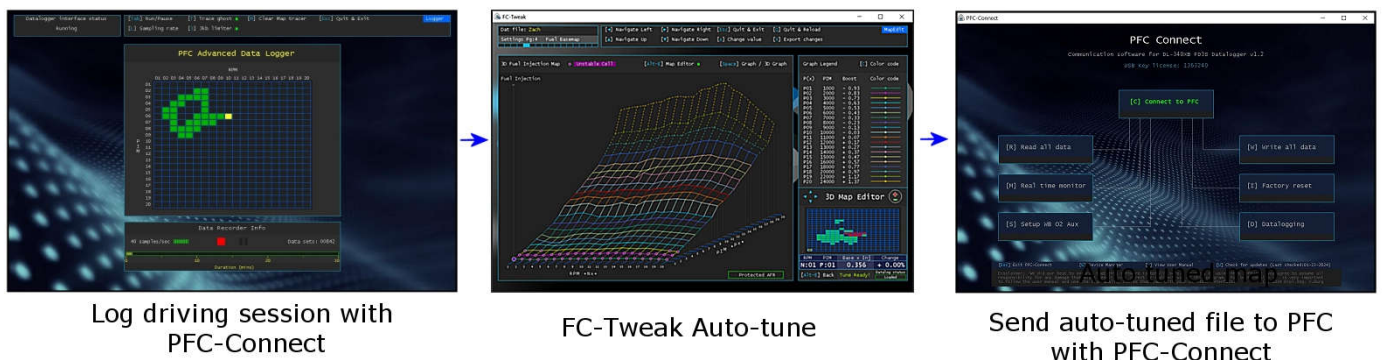
- Connect the DL340XB interface box to the PFC
- Turn car key on, and connect interface USB cable to laptop and run PFC-Connect
- Follow steps 1 to 5 as shown below



Please refer to FC-Tweak User Manual for more detail

Autotuning your fuel map with FC-Tweak Pro (sold separately)

- Connect the DL-340XB interface to the PFC and the two shielded cables as shown in the wiring diagram
- Make sure that the PFC O2 feedback control function is disabled
- Turn engine on and wait until engine warms up to 80C
- Connect interface USB cable to laptop and start logging with PFC-Connect
- Follow the below steps to auto-tune your map



Please refer to FC-Tweak User Manual for more detail

Appendix A

Notes on fitting plugs



It is very important to make sure the plugs are fitted in the right orientation otherwise you may break the pins or damage the equipment.

The interface comes with a pre-terminated Mini DIN connector. The plug orientation notch is also marked with an arrow. This should be aligned with the PFC's socket notch. Correct orientation is with arrow facing up towards the Apexi Logo cover.

A similar plug is found on the FC Commander, which should now be connected to the interface box, with its notch/arrow facing up towards the interface front label.



Fitting BNC connectors

BNC connectors are special shielded connectors which lock securely in place by turning them quarter of a turn. To insert the plug, first align the pin on the interface socket with the slot on the plug, then hold the front ring and push forward towards the socket while turning clockwise a quarter turn. Release and it will lock in place.



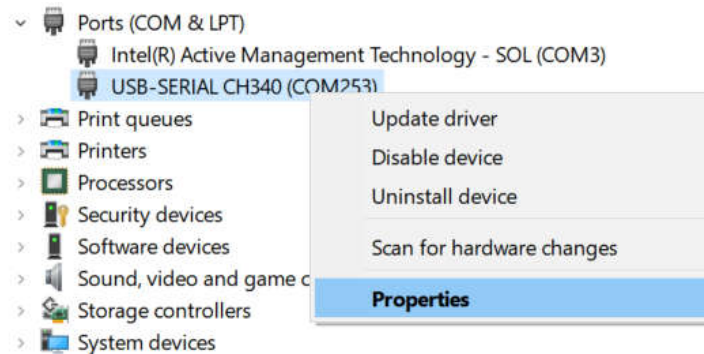
To unplug, push the plug's ring towards the module, and turn anticlockwise a quarter turn until the socket's lock pin is inline with the plug's slot. Then pull the plug out gently. Do not pull from the cable.

Appendix B

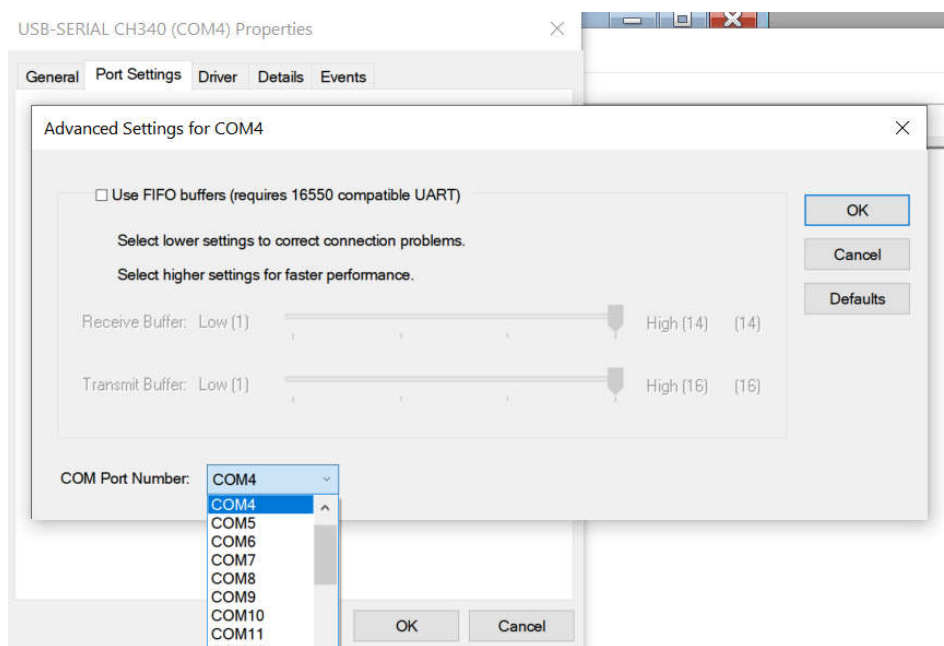
Re-assigning a different virtual port number

In most cases Windows will assign a COM port in the range 1 to 9, and you're good to go.

If Windows assigns a COM port number greater than 9, you can manually change the assigned port from the device manager. Right click on the interface port, in this example Windows has assigned the interface, port number 253.



Click on Properties, Port settings, Advanced.



Click on the arrow next to the COM port number and scroll up to any port number less than 9 which is not in use and click to select. Click OK and OK again and the device manager should now refresh & show the interface on the chosen port number.

In some cases no COM ports in the range 1-9 are shown. This happens when Windows does not free old unused devices from its COM port list. In such cases, select 'View' -> 'Show hidden devices' in Device Manager, and right click on any greyed out COM port in the range 1-9. Select 'uninstall' to free up the unused port, so that you can reassign it to the interface box as explained above.

Appendix C

USB key usage

- (1) You can either copy the whole content from the USB key to your hard disk FC-Tweak folder so that PFC-Connect will reside in FC-Tweak folder and share the same DATFILES folder. In this case, the key will only be used to unlock PFC-Connect, and all files will reside on your computer.
- (2) Or you can run PFC-Connect directly from the USB key, as a stand-alone tool. In such a case, all log files will be saved on the key itself. This will leave no trace of the software on the host computer, and one may run PFC-Connect from the USB key on the customer's own computer without installing anything.

Creating a desktop icon:

Having a desktop icon gives fast access to start up PFC-Connect



For usage (1), click on the Windows search button, type 'file explorer' and click on File explorer App. Double click on 'Local disk C:' folder and click on FC-Tweak folder. Then right click on the application file 'PFC-Connect' and select 'Send to->Desktop (create shortcut)'.

For usage (2), you first need to make sure that your computer always assigns the same drive letter whenever the USB key is inserted. So first, right click on the Windows start button, select 'Disk management', right click on PFC-Connect pen drive, select 'Change drive letter & paths', press 'Change' and assign letter 'T'. Avoid choosing letters A-F, as these are commonly auto-assigned by Windows. Finally, open file explorer and go into T: main folder. Right click on the application file 'PFC-Connect' and select 'Send to->Desktop (create shortcut)'.

Setting for best graphic appearance

On computers with a customized screen scaling factor, the graphics may appear out of focus. If you see that PFC-Connect's graphics are not perfect, proceed with the following.

For both (1) or (2), right click on the desktop icon, select 'Properties' and 'Compatibility', select Change high dpi settings, then select 'Override high DPI scaling behaviour. Scaling performed by -> Application' and hit OK, apply, OK.

Warning: In order to avoid data losses or any hardware damage, always select 'Safely remove hardware and eject media' from Windows taskbar before pulling out the USB key.

Important: All our files are tested clean from any virus or malware. However, Windows Defender treats all executables as zero reputation files and tends to block or delete them during remote updates. In order to avoid this from ever happening it is recommended to set the following:

For Windows Defender

Click on Windows Start > Settings> Update and Security> Windows Security> App & Browser control > Reputation based protection settings > Turn off Potentially unwanted app blocking

Click on Windows Start > Settings > Update & Security > Windows Security > Virus & threat protection settings > Manage settings > Exclusions, select Add or remove exclusions > Add an exclusion> select FC-Tweak folder

For AVAST Avast will not usually block or delete our software, but sometimes it delays it a few seconds from starting if running it directly from the USB key. The following steps will tell Avast to exclude the USB key from all its scans.

Click on Avast icon> Menu > Settings > Exceptions > Add exception > Browse & tick USB key > Add exception > Next > Confirm 'I understand risks'

Appendix D

Setting PFC-Connect as your default *.dat file viewer/editor

To set PFC-Connect file editor as your main *.dat file viewer, follow these simple steps:

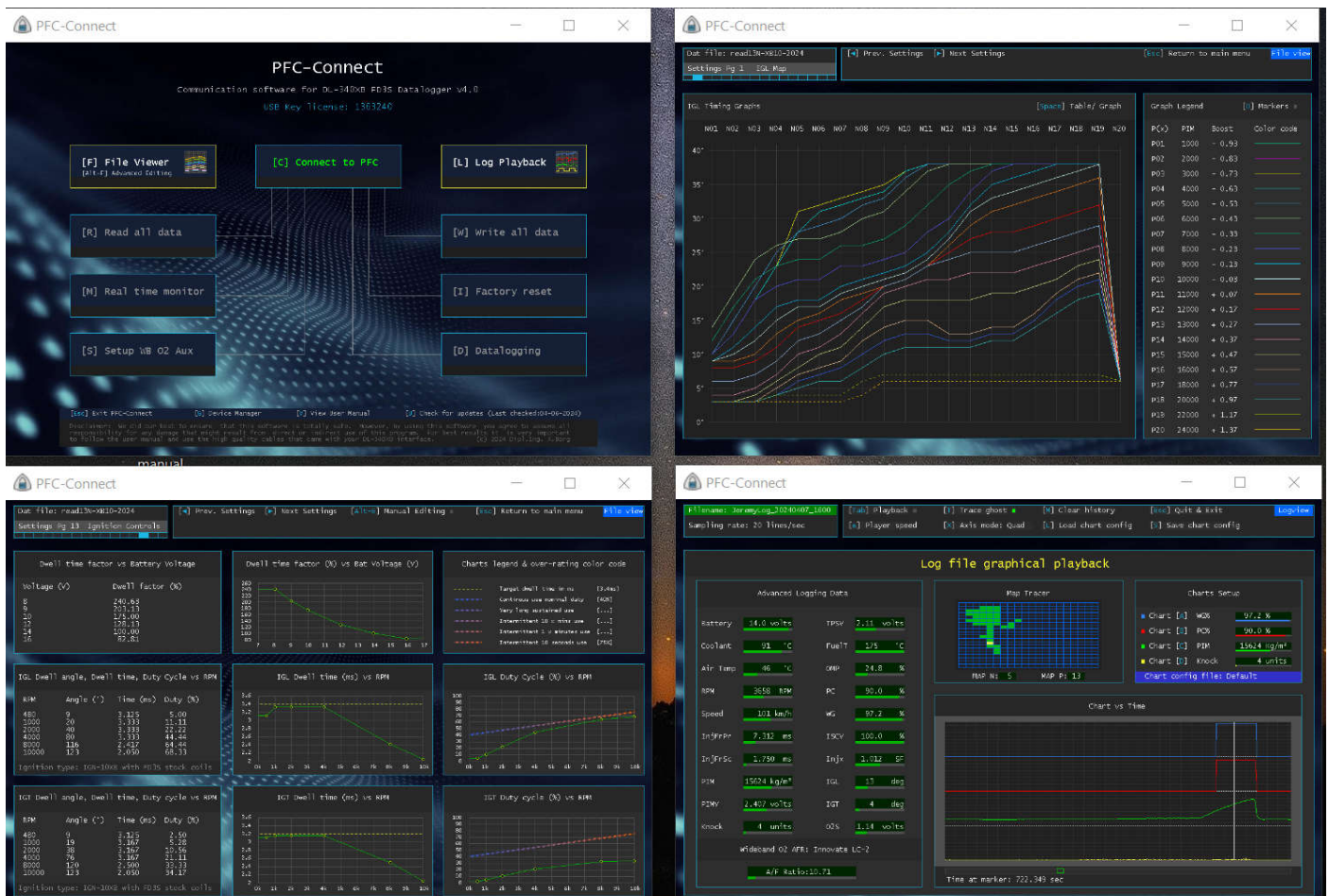
- Run Windows File Explorer and locate the DATFILES folder within FC-Tweak folder
- Right click on any of the dat files
- Select Open with -> Choose another App -> More Apps -> scroll down to the bottom of the list
- Select Look for another App on this PC and tick on 'Always use this App to open dat files'
- Locate PFC-Connect application file in FC-Tweak folder and click 'Open'

From there on, all *.dat files will show PFC-Connect icon on File Explorer, and whenever you double click on such file, PFC-Connect will automatically open and view the selected file in advanced edit mode.

Resizing PFC-Connect Window

You may select one of five screen modes by consecutively pressing [Alt Enter].

PFC-Connect windows can also be dynamically resized by clicking and holding the left mouse key, while resizing the program window. This makes it possible to run several instances of the program on the same screen, or share the screen with other applications. Note that only one window can be connected to the interface. This feature will obviously not work while the program is in full screen mode.



Appendix E

DL-340XB Interface kit items description

The interface kit comes with everything required to wire up the interface to your PC and to the Power FC, and perform all functions required for use with FC-Tweak. This is the best value for money Power FC interface kit you can possibly buy.

Contents:

- (1) DL-340XB PFC interface box
- (2) USB cable with gold plated connectors
- (3) 16Gb USB 2.0 license key including PFC-Connect communications software
- (4) User Manual in PDF format is supplied on the same USB key

With the basic kit you can:

- (1) Read all map data and settings from the ECU and save it to file
- (2) Backup existing ECU map and reset to factory conditions
- (3) Write the tweaked map file to the ECU
- (4) Monitor all data channels, including Commander data, sensors, switches, Aux and advanced logging data.
- (5) Configure Aux port and perform logging (ready made optional cables are highly recommended, see below)



DL-340XB interface box



USB cable with gold plated plugs



PFC-Connect software on USB key

Recommended options for wideband O2 installation

These options are highly recommended if you plan to perform AFR tuning using FC-Tweak Pro (auto-tune). These pre-assembled, 1 m long, shielded cables are required to be able to log AFR from any aftermarket UEGO kit.



BNC to bullet connector
From DL-340XB to PFC O2in



BNC to terminal block connector
From DL-340XB to UEGO analogue AN+ & AN-

Appendix F

Price list

DL-340XB interface for Apexi PFC versions FD3S4 and above. USD 270
Includes a compact 16Gb USB license key with PFC-Connect software
and a 1 metre long USB cable



Option pre-terminated shielded cables 1&2, required for wideband O2 logging USD 38
(a) BNC to terminal block connector shielded cable (1m)
(b) BNC to bullet connector shielded cable (1m)
(c) Bullet crimp connectors required to complete installation



Optional interface holder USD 20



You can permanently fix this holder, while still being able to easily unplug and slide out the interface box. Interior is lined up with soft Velcro fabric to eliminate any vibration.



FC-Tweak Pro - dongle option for FC-Tweak Pro owners USD 60
This option enables the supplied PFC-Connect USB key to also
unlock FC-Tweak Pro on any laptop (must already own a Pro license)
With this option, you will be able to run both FC-Tweak Pro & PFC-Connect on any PC.



All shipments are sent via Fedex Express courier worldwide USD 50
All items are normally in stock, ready to ship.

To order contact ingxborg@gmail.com