PowerTune User Manual V1.0

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Installation in Vehicle

Connect the Power Supply to Ground and a Switched 12V source (ignition)



Data Cable

Depending on your ECU, connect your ECU Cable to your PowerTune Dash. For Apexi /,*OBD2*/,Nissan Consult / insert the ECU cable into one of the USB ports on the side of the Dash, for CAN ECU's insert the CAN cable into the CANBUS port of the Dash



Connecting the data cable to the ECU

The OBD port is located on the drivers side of the Vehicle in the Footwell area (consult your vehicle manual for exact location)



For Apexi the communication port is the circle port on the Side of the ECU



Nissan Consult Port is located in the footwell area near the drivers fuse box



For CAN based ECU's (Link/Vipec/Haltech and most other modern ECU's) consult the User Manual of your ECU to locate the CANBUS port (some examples Below)



Microtech ECU

HI

HI

HI

HI

<u>LT-9c</u>

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LT-10c

LT-15c

<u>LT-16c</u>

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ECU Configuration

LINK / VIPEC

ode	Streams	Test Calculator	CAN Devi	ices						
CAN	Configurat	tion								
	CAN Modu	le	Mode			Bit Rate		OBD OFF		
(● CAN 1 ○ CAN 2	User De	fined	1 Mbit/s 🔍 🗸		0 ISO 15764-4 on CAN		CAN 1		
Data	i.			Mode				CANID		
Data Cha	annel 1: Tra	nsmit Generic Da	ish	Mode Transmit Gener	ic Dash		~	CAN ID	F	ormat
Data Cha Cha Cha	annel 1: Tra annel 2: OF annel 3: OF	nsmit Generic Da F F	sh	Mode Transmit Gener	ic Dash		~	CAN ID	F	ormat) Normal
Data Cha Cha Cha Cha Cha Cha	annel 1: Tra annel 2: OF annel 3: OF annel 4: OF annel 5: OF annel 5: OF	nsmit Generic Da F F F F	ash	Mode Transmit Generi Transmit Rat	ic Dash e		~	CAN ID ID 1000	F	ormat) Normal) Extended
Data Cha Cha Cha Cha Cha Cha	annel 1: Tra annel 2: OF annel 3: OF annel 4: OF annel 5: OF annel 6: OF	nsmit Generic Da F F F F F	ssh	Mode Transmit Gener Transmit Rat 20 Hz	ic Dash e V		~	CAN ID ID 1000	Fe	ormat) Normal) Extended

Haltech

Haltech automatically outputs at 1mbit over CAN and does not require configuration in almost all cases. In some circumstances CAN output may need to be enabled at 1mbit in the Haltech windows software.

Adaptronic



Microtech



PowerTune ECU SETUP

ECU setup

- **OBD2**
 - 1. In the Settings screen ECU select choose "OBD2"
 - 2. Switch the Autoconnect button to the right into the on position



In the Startup settings TAB select OBD
 Click apply and the Dash will reboot



5. In the Settings menu click on the OBD settings Tab



- 6. Click Check
- 7. Select the values you want to poll from the ECU
- (the more you choose the slower the update rate)
- 8. Click Apply (The Dash will reboot and your ECU communication is finished)

Apexi Power FC

1. In the Settings screen ECU select choose "Power FC"

Main Dash Sele	ect Sensehat Wa	rn / G	ear Speed	OBD	RPM	Dash Config	Startup	
-	· · · ·		-					
ECU Serial Port:	USBO	\$	Connec	ct	Disco	onnect		
GPS Port:	COM11	\$	GPS Conr	nect	GPS Di	sconnect		
GPS Baud:	9600	\$	Trip Res	set	Q	uit		
Speed&Temp units:	Metric	\$	Shutdov	vn	Re	boot		
Pressure units:	kPa	\$	RPM Smoothing	g :	OFF	\$		
ECU Selection:	PowerFC	\$	Speed Smoothi	ing :	OFF	\$		
GoPro Variant :	Hero	\$	Auto	connect		ata Logger		
GoPro Password :	GoPro Password		GoPr	o rec		utoconne		
Logfile name:	DataLog		V 1.45		ov	5V	Name	
Odo:	2				9	16	AFR	AN1-2
Trip:	1.9				Value	Value	AFR	AN3-4
Weight kg								

- Switch the "Autoconnect" button to the right into the on position
 Select the ECU COM Port from the dropdown "/dev/ttyUSB0"
- 4. Click Connect

Nissan Consult

- 1. In the Settings screen ECU select choose "Consult"
- 2. Switch the "Autoconnect" button to the right into the on position
- 3. In the Startup settings TAB select Consult
- 4. Click apply and the Dash will reboot
- 5. In the Settings menu click on the Consult settings Tab
- 6. Click Check
- 7. Select the values you want to poll from the ECU
- (Choose only the ones you need)
- 8. Click Apply (The Dash will reboot and your ECU communication is finished)



Main	Dash Select	Sensehat	Warn / Gear	Speed	Consult	RPM	Dash Config	Startup	
Check									



....

CAN based ECU's (all other supported ECU's such as Link, Haltech)

- 1. In the Settings screen ECU select choose "UDP"
- 2. Switch the Autoconnect button to the right into the on position
- 3. In the Startup settings TAB select your ECU Protocol (Haltech or Link)
- 4. Click apply (The Dash will reboot and your ECU communication is finished)

Main Dash Se	elect Sensehat	Warn / Gea	ar Speed	OBD	RPM	Dash Config	Startup	
ECU Serial Port:	COM3	^	Conne	ct	Discor	anect		
GPS Port:	COM11	0	GPS Con	nect	GPS Disc	connect		
GPS Baud:	9600	\$	Trip Re	set	Qu	iit		
Speed&Temp units	Metric	\$	Shutdo	wn	Reb	oot		
Pressure units:	kPa	\$ R	PM Smoothin	g :	OFF	0		
ECU Selection:	UDP	\$	peed Smooth	ing :	OFF	\$		
GoPro Variant :	Hero	\$	Auto	connect	Da	ita Logger		
GoPro Password :	GoPro Passw	ord	GoP	ro rec	Au	toconne		
Logfile name:	DataLog	V	1.45					
Odo:	2							
Trip:	1.9							
Weight kg								
Main Dach S	last Canaabat	Warn / Con	r Croad	OPD	DDM	Dach Capfie	Chartup	
Main Dash 36	sect Sensenat	Walli / Gea	i Speeu	OBD	RPM	Dash Coning	Stattup	
					Apply S	ettings :	apply	
					Apply Se	ettings :	apply	\$
					Apply S <mark>Start up</mark> Main Sp	ettings : Daemon : Deed Source	apply Consult None	\$
					Apply S <mark>Start up</mark> Main Sp	ettings : Daemon : weed Source	apply Consult None HaltechV2	\$
					Apply S <mark>S</mark> tart up Main Sp	ettings :) Daemon : weed Source	apply Consult None HaltechV2 Link Generic	\$ Dash
					Apply S Start up Main Sp	ettings :) Daemon : weed Source	apply Consult None HaltechV2 Link Generic	\$ Dash
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					Apply S <mark>Start up</mark> Main Sp	ettings :) Daemon : weed Source	apply Consult None HaltechV2 Link Generic Microtech Consult Apexi OBD2	Dash

Unit selection

There are 2 unit selection drop down menus in the Settings Menu (to access settings, scroll across to the right)

Speed and Temperature

-Imperial (Speed will be shown in MPH and Temperatures in Fahrenheit)

-Metric (Speed will be shown in KMH and Temperatures in Celsius)

Pressure Units

-kpa (Displays all pressure units in kpa)

-PSI (Displays all pressure units in PSI)

Main Dash Sel	ect Sensehat	Warn / G	ear Speed		RPM	Dash Config	Startup	
ECU Serial Port:	COM3	\$	Conne	ct	Disco	onnect		
GPS Port:	COM11	\$	GPS Con	nect	GPS Dis	connect		
GPS Baud:	9600	0	Trip Re:	set	Q	uit		
Speed&Temp units:	Metric	\$	Shutdov	wn	Rel	poot		
Pressure units:	kPa	\$	RPM Smoothin	g :	OFF	\$		
ECU Selection:	UDP	\$	Speed Smooth	ing :	OFF	\$		
GoPro Variant :	Hero	\$	Auto	connect		ata Logger		
GoPro Password :	GoPro Passwo	ord	GoP	ro rec		utoconnect GPS	5	
Logfile name:	DataLog		V 1.45					
Odo:	2							
Trip:	1.9							
Weight kg								

Master Warning settings

In The Settings screen click the Warn/Gear Tab

Enter the Values that you want the Warning to trigger.

If you don't wish to have warnings, just set the values to a higher value than possible Easter Egg :

The Revs warning Triggers a Danger To Manifold Warning like the one in a certain movie ©



Warning Example



Setting up the Gear Calculation Feature :

If your ECU does not send the current gear you can switch on the gear calculation feature. (Leave the switch off if your ECU sends this information)

In the Settings screen click on the "Warn/Gear" Tab

To make the Gear calculator work you need to set up the values per gear .

RPM divided by Speed gives a fixed number for each gear

Drive your car and record the speed at a specific rpm for each gear (you can choose different rpms per gear, just record the speed you are driving, the current rpm and note which gear you are in). You can round the result to the next full number

gear 1 st 2 nd 3 rd 4 th 5 th	rpm 3000 3000 3000 3000 3000	speed { { {	1 @ rp r 25 40 55 32 08	n 300(300(300(300(300(forn / Drpm / Drpm / Drpm / Drpm / Drpm	nula 25 K 40 K 55 K 82 K 108 K	mh mh mh mh mh	gear v	alue to	been 120 75 55 37 28	tered in
Main	Dash Select	Sensehat	Warn / Gear	Speed	OBD	RPM	Dash Config	Startup			
WaterTemp 100	0.9	Revs 8000	Knock 80								
Gear Calula	tion ON	Gear1 120	Gear2 75	Gear3 55	Gear4 37	Gear5 28	Gear6				
			7	8	9	$\overline{\mathbf{X}}$					
			4	5	6	ц					
			1	2	3) I					
				0	,						

Example :

Useful non PowerTune related fact :

Now that you know the value for each gear you can now also calculate each gears top speed, or speed in a specific gear at a specific RPM

Lets say your car is a Mazda RX7 and your redline is 8100 RPM Just take the rpm and divide it by the calculated gear value

 1^{st} Gear = 8100rpm / 120 = 67 Kmh 2^{nd} Gear = 8100rpm / 75 = 108 Kmh 3^{rd} Gear = 8100rpm / 55 = 147 Kmh 4^{th} Gear = 8100rpm / 37 = 219 Kmh 5^{th} Gear = 8100rpm / 28 = 289 Kmh

Speed correction

In some vehicles, both the original analogue cluster and PowerTune will show incorrect speed readings for a variety of reasons beyond just an old car, such as in situations where different size wheels and tyres have been put onto a vehicle. Firstly, have a friend measure your highway speed using a third party device (smartphone GPS app) and compare this with your speedo reading.

In the Speed Correction TAB enter your correction factor in percent, 100 is default and will display the value as sent by the ECU to the display.

Example:

Your friend tells you the smartphone says you are driving at 100 KM/H per hour but your speedo shows 90 KM/h, which is 10% too little. You then enter 110 in the speed correction and this will show 10% more speed than what is read from the ECU

Main	Dash Select	Sensehat	Warn / Gear	Speed	RPM	Startup	
Speed Con	rection %						
110							
1							

RPM and Shiftlight Settings

Click on the RPM Settings TAB

- 1. Enter the max Value Your RPM Gauges should display (this does not affect ECU settings, nor does any other PowerTune feature)
- 2. The shift Lights on the Dashboards have 4 Stages Enter the RPM value that triggers each Stage

Main	Dash Select	Sensehat	Warn / Gear	Speed		RPM	Startup	
MAX RPM	S	hift Light 1	(g) Shif	't Light 2 (g)	Shift	Light 3 (y)	Shift Lig	ght 4 (r)
8000		3000	55	500	550	00	7500	



Dashboard display configuration

You can select 4 Different active dashboard screens from the dropdown boxes in the "dash select" tab of settings.

Main	Dash Select	Sensehat	Warn / Gear	Speed		RPM	Startup	
	Dash1		Dash2		Dash3		Dash4	
	Main Dash	\$	User Dash 1	0	User Dash 2	\$	Laptimer	\$

Select which RPM bar style you would like for each userdash (you can also choose none)

Some dashboards in PowerTune are configurable, such as UserDash. In order to begin building a dash, in the dash select screen, add UserDash1 one of the four active displays. Scroll across to this display, which will be an empty black page. Start building your dash by double tapping the black page



From the dropdown box in the top right corner, select the desired sensor and then start by clicking 'add square' to add a square style gauge. Once the gauge has been added, you can double-tap on the gauge to modify the look, style, warnings and limits as well as the labels.

Double-tap on the gauge, this will allow you to move the gauge by dragging it across the screen and will also bring up the settings menu for the gauge, allowing you to change a variety of values. For example, if we wanted the gauge to flash red if the Oil Pressure drops below a certain level, we would select "set min warning" and enter the lowest acceptable number before the gauge starts flashing red to warn you. To remove the gauge, scroll down in the options list and select "remove gauge"



From the same menu where you added the square gauge, note the other buttons available. The "save" button will save your changes for the next reboot. The "background" button will allow you to add your RPM/speed bar style, background pictures and colours. To add background images, put the files (PNG FILES ONLY) in the folder /home/pi/Logo If you want the background image to perfectly cover the entire display, the resolution for the image must be 800x480 pixels

Accel Ped Pos.	\$
Add Square	Add Bar
Add Round	Add Text
Add Image	SAVE
Colors	Clear
Import	Export
Background	Close

Set the RPM style in the top right corner to your preferred taste. Power-FC users have the option to add sensor states using the "extra" menu.



Example dash:

R	о ()	o () () n/h 11	2
ECT		OIL T.		TPS	
63	°C	69	°C	41	%
OIL P.		FUEL P.		BOOST	
13	PSI	0	PSI	19.90	

GPS/Lap timer setup

The GPS and Laptimer dashes can be enabled from the dash select tab in the settings menu. PowerTune automatically calculates lap times based on the start/finish line of the particular track you are using via the GPS module coordinates. It does not require any manual input from the user, other than resetting the fastest lap time when required and selecting the current track from the dropdown boxes along the top right corner of the laptimer dash. Our testing has shown lap times are accurate to within 1/10th of a second. The GPS dash screen (shown as Dash3 below) will only display map data if the display is connected to a WiFi network - typically this dash screen is not required to be active.

Dash1	Dash2	Dash3	Dash4	
User Dash 1	\$ Main Dash	\$ GPS	\$ Laptimer	\$

Datalogging

To start datalogging, enable the datalog switch in the settings menu. PowerTune will export the data to a CSV spreadsheet stored on the SD card of the unit. <u>Each time you</u> toggle the datalog switch, the current datalog will be overwritten. If you want to datalog multiple runs, ensure you change the logfile name each time, example run1, run2 ect

The datalog files can be found in the directory /opt/PowerTune when connecting to your display from a computer (more details below, refer to WINSCP). (opt is a root folder, is it not within the home folder) Note: Datalogs will be deleted when PowerTune is updated.

Main Dash	Select	Sensehat	Warn /	Gear	Speed			RPM	Startup
ECU Serial Port:	CO	M4	\$		Connect			Disconne	ect
GPS Port:	CO	M1	٥		GPS Conne	ect		GPS Discon	inect
Speed units:	Me	tric	٥		Trip Rese	et		Quit	
Temp units:	Me	tric	\$		Shutdow	n		Reboot	:
Pressure units:	kPa	L.	\$	RPM	Smoothing		OF	F	\$
ECU Selection:	Cor	nsult	0	Speed	d Smoothin	g :	OF	F	\$
GoPro Variant :	Her	0	\$		🕖 Data I	Logger	C	GoPro	o rec
GoPro Password :	GoP	ro Passwor	d	V 1.8	5	_			
Logfile name:	Dat	aLog							
Odo:	49								
Trip:	48.2	2							
Weight kg	2								

GOPRO setup

PowerTune can integrate with GoPro cameras so you can trigger the GoPro recording from your PowerTune dash; and with datalogging enabled it will also log the moment the recording is started so you can overlay your ECU data onto video footage, just like a real racing car driver! First, quit PowerTune from the settings menu, and connect the display to your GoPro's WiFi network (see WiFi setup in this manual for detailed steps). Once you have connected the WiFi, restart the display back into PowerTune by typing sudo reboot now (and then press enter)

Re-enter the GoPro password into the password box and when you are ready toggle the "GoPro rec" button. This will tell your GoPro to start recording, and if datalogging is enabled, this exact moment in time will be captured in the datalogs.

Main Dash S	elect Sensehat V	Varn /	Gear Speed	RPM	Startup
ECU Serial Port:	COM4	\$	Connect	Disconne	ect
GPS Port:	COM1	٢	GPS Connect	GPS Discor	nnect
Speed units:	Metric	٢	Trip Reset	Quit	
Temp units:	Metric	٥	Shutdown	Reboot	:
Pressure units:	kPa	٢	RPM Smoothing :	OFF	\$
ECU Selection:	Consult	0	Speed Smoothing :	OFF	\$
GoPro Variant :	Hero	\$	Data Logger	GoPr	o rec
GoPro Password	GoPro Password		/ 1.85		_
Logfile name:	DataLog				
Odo:	75		1		
Trip:	74.2				
Weight kg	2				

WIFI Setup

Quit PowerTune from the settings menu and connect a keyboard to the display. At the login prompt login as

user: pi

password: raspberry

Open the advanced settings by typing: sudo raspi-config (then press enter) Select "network options" and enter your WiFi credentials to connect (you will not be notified if connection is successful)

Once you have completed the setup, select finish in the bottom right corner (using the arrow keys + enter) and then type sudo reboot now

Software update

Quit PowerTune from the settings menu and connect a keyboard to the display. At the login prompt login as user: pi password: raspberry type: ./updatePowerTune.sh

Accessing PowerTune from Laptop via WIFI

Install 'WINSCP' for Windows from: https://winscp.net/eng/download.php

Connect your display to your WiFi network (or via LAN cable) and obtain the IP address for the display. You can obtain the IP address two ways, either by quitting powertune, logging

in with 'pi' and 'raspberry' for the username and password and then typing 'ifconfig' . Alternatively you can login to your home router/modem and check the DHCP list for the IP address of the display. It will be something similar to 192.168.0.2 / 192.168.X.XXX

Enter your IP address into the host name field, username as 'pi' and password as 'raspberry' and select Login. Leave the port as whatever is selected by default.

winSCP	te effet d'attent d'attentio de la		- 🗆 ×
Local Mark Files Commands Sess	on Options Remote Help		
I 🕀 📰 🗊 Synchronize 📗 🧬 🛛	🖹 🍘 🖗 Queue 🔹 🛛 Transfer Settings De	efault - 🥵 -	
New Session			
My documents • 🚝 🔽		・ 信回 トー・・ 回知会会	🔯 Find Files
I c B Unload - D Edit - Y - 4			
	🖓 Login		· 101 C1 C0
C. (oseis (Mike (Documents)	New Site	Session	P. 14
Name 512 Custom Office Templ EVE FeedbackHub FfeedbackHub FfeedbackHub Heroes of the Storm I-Novea Launcher I-Novea Studios iRacing My Games OpenTD Rockstar Games Sound recordings Sound recordings Sound recordings Ubiodf IAB AcKIND.scn 578 KE AUS FIXED - Copy.scn 559 KE AUS FIXED - Copy.scn 559 KE	pr@192.168.1.111 [Jol6 ▼ Manage ▼ Manage ▼ Manage ▼ Manage ▼	Bie protocol: SFTP Host name: Pot number: 192.163.1111 22 (c) Liser name: Password: pi Save Advanced V	rignts Uwner
U AUSCR.scn 557 KE	SCN File 10/15/2015 9:42:23 AM		
MD AUS CO - Copy.scn 599 KE	SCN File 10/15/2015 6:51:40 PM		
MD AUS CO SHARK .s 769 KE	SAV File 10/16/2015 4:50:20 PM SAV File 10/16/2015 2:20:10 DM		
0 B of 5.50 MB in 0 of 26 Not connected.	10/10/2013 3/2010 FM	5 hidden	

